

*Medi***TERRA**



**INTERNATIONAL CENTRE FOR ADVANCED MEDITERRANEAN AGRONOMIC STUDIES
BLUE PLAN
PRESSES DE SCIENCES PO**

Électre bibliographical database (in conjunction with the Sciences Po Library)

Mediterra 2009. Rethinking rural development in the Mediterranean/ International Centre for Advanced Mediterranean Agronomic Studies and Blue Plan; Bertrand Hervieu and Henri-Luc Thibault (eds.). – Presses de Sciences Po, Paris, 2009.

ISBN 978-2-7246-1110-6

ISSN 1960-8527

RAMEAU:

- ⇒ Développement rural: Méditerranée (région)
- ⇒ Développement durable: Méditerranée (région)
- ⇒ Agriculture: Méditerranée (région)
- ⇒ Alimentation: Méditerranée (région)

DEWEY:

- ⇒ 38.1: Économie de la production agricole (produits agricoles)
- ⇒ 630: Agriculture – Généralités
- ⇒ 363.3: Protection de l'environnement – Problèmes sanitaires
- ⇒ 333.3: Économie des ressources naturelles

The 1957 Intellectual Property Act explicitly prohibits photocopying for collective use without the authorisation of the rightful owner(s). (Only photocopying for the private use of the copier is authorised.)

We therefore emphasise that any form of reproduction of the present work, whether in part or in full, is prohibited without the authorisation of the editor or of the Centre français d'exploitation du droit de copie (CFC, 3, rue Hautefeuille, 75006 Paris).

*Medi***TERRA**

RETHINKING RURAL DEVELOPMENT
IN THE MEDITERRANEAN



**INTERNATIONAL CENTRE FOR ADVANCED MEDITERRANEAN AGRONOMIC STUDIES
BLUE PLAN
PRESSES DE SCIENCES PO**



The Blue Plan acts as a think tank and Mediterranean Observatory for the Environment and Sustainable Development and is a United Nations Environment Programme/Mediterranean Action Plan (UNEP/MAP) Regional Activity Centre, set up, financed and run by the riparian States and the European Community.

Its mandate, as defined by the inter-governmental conference held in Split in 1977, is to develop regional cooperation in order to build up and make available a fund of knowledge intended to facilitate the implementation of sustained and environmentally friendly development.

The Blue Plan produces prospective analyses on the environment and development, acts as a Mediterranean sustainable development observatory and is one of the support centres for the Mediterranean Commission on Sustainable Development (MCSDD).

President: Lucien Chabason

Director: Henri-Luc Thibault

www.planbleu.org



Founded in 1962 on the joint initiative of the OECD and the Council of Europe, the International Centre for Advanced Mediterranean Agronomic Studies (Ciheam) is an intergovernmental organisation comprising thirteen member countries from the Mediterranean Basin (Albania, Algeria, Egypt, Spain, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Tunisia and Turkey).

Ciheam is made up of a General Secretariat based in Paris and four Mediterranean Agronomic Institutes (MAI) located in Bari (Italy), Chania (Greece), Montpellier (France) and Zaragoza (Spain).

In pursuing its three central missions (education, research and cooperation) Ciheam has come to be recognised as an authority in its fields of activity: Mediterranean agriculture, food and sustainable rural development.

President: Abdelaziz Mougou

Secretary General: Bertrand Hervieu

www.ciheam.org

General Secretariat	11 rue Newton, 75116 Paris, France Tél: +33 (01) 53 23 91 00 Fax: +33 (01) 53 23 91 01 secretariat@ciheam.org
MAI Bari (ITALY)	Director: Cosimo Lacirignola Via Ceglie 9, 70010 Valenzano, Bari, Italy Tel.: +39 (080) 4606 111 Fax: +39 (080) 4606 206 iamdir@iamb.it www.iamb.it
MAI Chania (GREECE)	Director: Alkinoos Nikolaidis P.O. Box 85, 73100 Chania, Crete, Greece Tel.: +30 (2821) 03 50 00 Fax: +30 (2821) 03 50 01 alkinoos@maich.gr www.maich.gr
MAI Montpellier (FRANCE)	Director: Vincent Dollé 3191, route de Mende, 34093 Montpellier, France Tel.: +33 (04) 67 04 60 00 Fax: +33 (04) 67 54 25 27 sciuto@iamm.fr www.iamm.fr
MAI Zaragoza (SPAIN)	Director: Luis Esteruelas Apartado 202, 50080 Zaragoza, Spain Tel.: +34 (976) 71 60 00 Fax: +34 (976) 71 60 01 iamz@iamz.ciheam.org www.iamz.ciheam.org

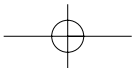
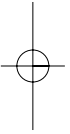


Table OF CONTENTS

PREFACE	11
CONTRIBUTORS	13
ABBREVIATIONS AND ACRONYMS	17
INTRODUCTION	21
<ul style="list-style-type: none"> • Hunger for land and thirst for water: farming systems under pressure 21 • Agricultural <i>and</i> rural development: a political priority 22 • For sustainable development of farming systems and rural worlds 24 • A report constructed collectively 25 	
> CHAPTER 1	
Preserving natural resources	27
<ul style="list-style-type: none"> • Mediterranean know-how - the fruit of thousands of years 27 • Water resources: a rapidly changing balance 28 • Slow and progressive desertification 32 • Polluted environments, degraded life 39 • Managing wooded areas 43 • Haro for bio! 49 • Development models need adapting 57 	
> CHAPTER 2	
Revising water strategies	63
<ul style="list-style-type: none"> • Trend in agricultural water demand incompatible with the trend in available resources 63 • Better management of agricultural water demand 70 • Virtual water: a concept for guiding agricultural policies? 86 • For a comprehensive global vision of water 93 	
> CHAPTER 3	
Adapting agricultural systems to climate change	97
<ul style="list-style-type: none"> • Panorama of the agricultural sector and water resources 98 	

• Recent climate trends and future projections	103
• The many different impacts of climate change	106
• Strategies for adapting to climate change	113
• Measures for adapting to climate change	118
• Recommendations for agriculture faced with climate change	122
• Regional cooperation: an imperative	128
> CHAPTER 4	
Fighting desertification	131
• Definition and physical processes of desertification	132
• Monitoring desertification and the environment	135
• Techniques for fighting desertification	147
• Institutional response: monitoring and evaluating UNCCD implementation	150
• Public strategies and measures taken since the 1970s	156
• Social solutions	163
• New strategy frameworks for fighting desertification	167
> CHAPTER 5	
Developing local areas and their people	177
• The status quo: rural development policies and local approaches in the Mediterranean countries	178
• Local policies and approaches: an overview	183
• Some reflections on common problems	188
• The concept of local development	194
• Rural and regional development	198
> CHAPTER 6	
Rural life	203
• The rural world: plural realities	203
• Insufficient geographical rebalancing	206
• Where does agriculture fit into the rural environment?	211
• No end to poverty	216
• Predominance of small farms and family work	219
• Progress in services, but shadow zones persist	222
• Stimulating development in the hinterland and opening up the landlocked areas of the North	225
• The new challenges for rural areas	228

> CHAPTER 7		
	Managing collective land and rangelands	233
	• Collective rangelands in agrarian history	234
	• The historical heritage	239
	• Pastoral management in the dock	241
	• Major changes in production systems	246
	• Pastoral policies	256
	• What is to become of collective lands?	260
> CHAPTER 8		
	Improving rural governance	267
	• A flurry of reforms faced with the challenges of globalisation	267
	• The emergence of new forms of rurality in the North of the Mediterranean	268
	• Agriculture, smallholdings and the importance of the rural population in the South and East	271
	• European policies tested by rural realities	274
	• Rural development strategies in the countries of the South: the central place of agriculture and poverty reduction	280
	• From “constructed” areas in the North to “lived areas” in the South	283
	• The future of Mediterranean rurality	292
> CHAPTER 9		
	Diversifying rural activity	297
	• Rural areas in the Northern Mediterranean: multifunctionality and diversification	297
	• Rural areas in the Southern and Eastern Mediterranean: boom and new adaptations	311
	• Agriculture first and foremost	328
> CHAPTER 10		
	Measuring agricultural and rural development	333
	• Definitions	335
	• Some results	343
	• Reservations regarding calculation and interpretation	347
> CHAPTER 11		
	Evaluating the effect of the MSSD	353
	• Reminder of the MSSD	353

- Preliminary feedback of experience in agriculture and rural development **355**
- The way to convergent development policies **360**

CONCLUSION **363**

- Natural resources and endogenous knowledge **364**
- Rural activities and societies **365**
- Regions, policies and governance **367**

TABLE OF DOCUMENTS **369**

PREFACE



Mediterra 2009, the eleventh Ciheam annual report, has been drawn up in the context of an innovative regional approach and has the special feature of uniting the efforts of the Ciheam – the only intergovernmental organisation in the Mediterranean Basin – and the Blue Plan, the Regional Activity Centre of the Mediterranean Action Plan (MAP), which is the only cooperation forum bringing together all of the countries bordering on the Mediterranean under the auspices of the United Nations Environment Programme (UNEP).

This partnership is founded on a deep-rooted, and now established, relationship between the two institutions, which forms the core of the converging missions of reflection and action in the service of development in the Mediterranean. The Ciheam and the Blue Plan have been working in close collaboration since 2005, aiming in particular to give substance to the Mediterranean Strategy for Sustainable Development, which was adopted by the riparian countries and the European Community in 2005, and to concur in constructing this edition of *Mediterra* focusing on the monitoring and evaluation of sustainable development policies in rural areas.

Convinced that climate change, responsible management of natural resources and new regional dynamics are several of the most decisive variables for Mediterranean farming systems and rural worlds, they first examined the contrasting statuses of sustainable rural development in the Mediterranean region and gradually built up this work around a series of topics where socio-economic issues are examined in terms of sustainability imperatives.

With food insecurity back in the world headlines, agriculture has once again become the crucial concern in international strategies. So it is not surprising that *Mediterra 2009* has followed this trend, underlining that the depletion of water and land resources and the vulnerability of farming systems will most certainly be the baseline trends of an otherwise unpredictable 21st century. One of the key messages of this report lies in the following simple, yet essential, statement of fact: there will be no rural development in the Mediterranean region without dynamic agricultural policies, and there can be no agricultural development without rural vitality.

Thanks to a pluridisciplinary approach uniting committed research and scientific stringency, many experts from all shores of the Mediterranean have brought innovative insights into these broader issues. We extend our thanks to them for this work; the results presented in the present report are no doubt but one of many stages in the complex but necessary exercise of reflecting on the future of rural worlds and on how farming systems can be adapted to environmental constraints. And lastly, *Mediterra 2009* launches work on defining new models of agricultural and rural development for the Mediterranean; it will take time to explore this challenge scientifically.

Bertrand Hervieu
Ciheam Secretary General

Henri-Luc Thibault
Blue Plan Director

CONTRIBUTORS



Steering Committee

Scientific editors:

Bertrand Hervieu, Ciheam Secretary-General

Henri-Luc Thibault, Blue Plan Director

Drafting Committee:

Annarita Antonelli (Ciheam-MAI Bari)

Omar Bessaoud (Ciheam-MAI Montpellier)

Pierre Blanc (Ciheam General Secretariat)

Jean-Paul Chassany (INRA, UMR Lameta, France)

Pierre Icard (Blue Plan)

Jean de Montgolfier (Engref, France)

Florence Pintus (Blue Plan)

Patrizia Pugliese (Ciheam-MAI Bari)

Technical coordination:

Sébastien Abis (Ciheam General Secretariat)

Authors

Annarita Antonelli (Ciheam-MAI Bari)
 Omar Bessaoud (Ciheam-MAI Montpellier)
 Nabil Ben Khatra (Sahara and Sahel Observatory, OSS)
 Abdallah Ben Saad (IRA, Tunisia)
 Mohammed Blinda (Blue Plan)
 Alain Bourbouze (Ciheam-MAI Montpellier)
 Jeanne Chiche (IAV Hassan-II, Morocco)
 Jean-Pierre Giraud (Blue Plan)
 Ronald Jaubert (IHEID, Switzerland)
 Sandrine Jauffret (Sahara and Sahel Observatory, OSS)
 Grigori Lazarev (consultant)
 Florence Pintus (Blue Plan)
 Patrizia Pugliese (Ciheam-MAI Bari)
 Mélanie Réquier-Desjardins (Sahara and Sahel Observatory, OSS)
 Gaëlle Thivet (Blue Plan)
 Mahi Tabet-Aoul (ARCE, Algeria)

Authors of the country monographs

Tahani Abdelhakim (Ciheam-MAI Montpellier, France)
 Lahcen Ahouate (Ministry of Agriculture, Morocco)
 Felisa Ceña Delgado (University of Cordoba, Spain)
 Adrian Civici (Tirana Agricultural University and Centre for Rural Studies, Albania),
 Suzana Djordjevic-Milosevic (Ministry of Agriculture, Serbia)
 Ayhan Elçi (Turkish Seed Industry Association, Turkey)
 Ali Eryılmaz (Turkey)
 Rosa Gallardo-Cobos (University of Cordoba, Spain)
 Dimitris Goussios (University of Thessaly, Greece)
 Khalil Harrane (PhD student, Ciheam-MAI Montpellier)
 Jemaïel Hassainya (INAT, Tunisia)
 Alain Le Goff (Ministry of Agriculture and Fisheries, France)
 Francesco Mantino (INEA, Italy),
 Adel Moulai (PhD student, Ciheam-MAI Montpellier)
 Andreas Seiler (Ministry of agriculture and Fisheries, France)
 Mahi Tabet-Aoul (ARCE, Algeria)
 Zeineb Tamehmachet (consultant, Morocco)

Experts consulted for specific contributions

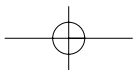
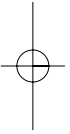
Jean Bonnal (FAO, Italy), Géraldine Camara (IFAP), Elena Cebrián Calvo (EEA, Denmark), Christina Chirico (CIA, Italy), Olga Christopoulou (University of Thessaly-Volos, Greece), Vito Cistulli (FAO, Italy), Eugene Clancy (Friends of the Earth Europe, MedNet, Belgium), Marie Helen Collion (World Bank, United States), Luc Dassonville (Blue Plan), Iannis Faraslis (University of Thessaly-Volos, Greece), Dimitra Gaki (University of Thessaly-Volos, Greece), Barbaros Gönençgil (University of Istanbul, Turkey), Fatmir Guri (PhD student, University of Montpellier (1)), Mona Haidar (UNDP Thematic Centre, Lebanon), Abdallah Herzenni (consultant, Morocco), Manuel Jost (Faculty of Political Science, University of Lyon, France), Prodromos Mardakis (University of Thessaly-Volos, Greece), Giovanni Matteotti (Agende 21 Locali Italiane, Italy), Mohammed Nawar (Faculty of Agriculture, University of Cairo, Egypt), Jean-Yves Ollivier (DIACT, France), François Richard (AFD, France), Bernard Roux (INRA France), Zoubir Sahli (University of Blida, Algeria), Daniela Sciarra (Legambiente, Italy), Patrizia Tartarino (International Association for Mediterranean Forests, Italy), François Vallerand (University of Thessaly-Volos, Greece), Mathilde Woillez (University of Thessaly-Volos, Greece).

Translation from the French

Carolyn G. Loane, Peter Gosling, Rebekka Yates

Cartography

Patrice Mitrano (geographer-cartographer) and Aurore Colombani (cartography technician), Atelier de cartographie de Sciences Po, Paris.



ABBREVIATIONS AND acronyms

AB	organic farming (<i>agriculture biologique</i>)
ADS	Social development network (<i>Agence de développement social - Morocco</i>)
AFD	French development agency (<i>Agence Française de Développement</i>)
Agence BIO	French agency for the development and promotion of organic farming (<i>Agence française pour le développement et la promotion de l'agriculture biologique</i>)
AIACC	Assessments of Impacts and Adaptations to Climate Change
AMAP	Association of smallholders (<i>Association pour le maintien de l'agriculture paysanne</i>)
ANCC	National agency on climate change (<i>Agence nationale du changement climatique - Algeria</i>)
ANKA	Greek development agency
APIA	Agency for the promotion of agricultural investment (<i>Agence de promotion des investissements agricoles - Tunisia</i>)
ARCE	Association for environment and climate research (<i>Association de recherche sur l'environnement et le climat</i>)
AUEA	Association of agricultural water users (Egypt)
Capmas	Central Agency for Public Mobilization And Statistics, Egypt
CECOS	Centre for the study and conservation of sperm (<i>centre d'étude et de conservation du sperme</i>)
CGEM	Confederation of Moroccan Enterprises (<i>Confédération générale des entreprises marocaines - Morocco</i>)
CNCC	National committee on climate change (<i>Comité national du changement climatique - Morocco</i>)/National council on climate change - <i>Conseil national changement climatique - Tunisia</i>)
CNSTCC	National scientific and technical committee on climate change (<i>Comité national scientifique et technique sur les changements climatiques - Morocco</i>)
CNTS	National centre of spatial technologies (<i>Centre national des techniques spatiales - Algeria</i>)
CRDA	Regional centre for agricultural development (<i>Centre régional de développement agricole - Tunisia</i>)
EAFRD	European Agricultural Fund for Rural Development

ENGRF	National college of rural engineering, water resources and forestry (<i>École nationale du génie rural, des eaux et des forêts</i>)
ESDS	European Sustainable Development Strategy
FDRMVT	Fund for rural development and the development of land through leasehold (<i>Fonds de développement rural et de la mise en valeur des terres par la concession - Algeria</i>)
FEMISE	Euro-Mediterranean Forum of Economic Institutes
FLDPPS	Fund for combating desertification and developing pastoral farming and the steppes (<i>Fonds de la lutte contre la désertification, de développement du pastoralisme et de la steppe - Algeria</i>)
FNIH	National federation of hotel entrepreneurs (<i>Fédération nationale de l'industrie hôtelière - Morocco</i>)
FNRDA	National fund for agricultural regulation and development (<i>Fonds national de régulation et de développement agricole - Algeria</i>)
Fonal	National housing fund (<i>Fonds national d'aide au logement</i>)
GIP	public interest group(ing)
GIS	Geographical Information System
GIS Sol	Scientific interest group on soils (<i>Groupement d'intérêt scientifique Sol</i>)
GTZ	German cooperation agency (<i>Gesellschaft für Technische Zusammenarbeit</i>)
HCELCD	High commission for water, forestry and desertification control (<i>Haut Commissariat aux eaux et forêts et à la lutte contre la désertification - Morocco</i>)
Icona	National institute for nature conservation (<i>Instituto nacional para la conservacion de la naturaleza</i>)
IFAD	International Fund for Agricultural Development
INAO	National institute of designations of origin (<i>Institut national des appellations d'origine</i>)
INAT	Tunisian national institute of agronomy (<i>Institut National Agronomique de Tunisie</i>)
INEA	National institute of agrarian economics (<i>Istituto Nazionale di Economia Agraria</i>)
INDH	National human development initiative (<i>Initiative nationale de développement humain - Morocco</i>)
INE	National statistics institute (<i>Instituto Nacional de Estadística - Spain</i>)
INRA	National institute for agronomy research (<i>Institut national de la recherche agronomique</i>)
IPCC	Intergovernmental Panel on Climate Change
IRESA	Institution for research and higher education in agriculture (<i>Institution de la recherche et de l'enseignement supérieur agricoles - Tunisia</i>)

Abbreviations and acronyms

ISIS	International Standard Industrial Classification of All Economic Activities
LAG	Local Action Group
LSPPC	Local Solidarity Partnerships between Producers and Consumers
MAAPC	Ministry of Agriculture, Food and Consumer Protection (Albania)
MADA	Albanian agency for the development of mountain regions
MADR	Ministry of Agriculture and Rural Development (Algeria)
MAPA	Ministry of Agriculture, Fisheries and Food (Spain)
MARH	Ministry of Agriculture and Water Resources (Tunisia)
MARM	Ministry of the Environment, Rural Areas and the Sea (Spain)
MDCI	Ministry of Development and International Cooperation (Tunisia)
MEDD	Ministry of the Environment and Sustainable Development (Tunisia)
MOAN	Mediterranean Organic Agriculture Network
MSSD	Mediterranean Strategy for Sustainable Development
Odesypano	Office for the sylvo-pastoral development of the North-West (<i>Office du développement sylvo-pastoral du Nord-Ouest - Tunisia</i>)
OECD	Organisation for Economic Cooperation and Development
Onagri	National agricultural observatory (<i>Observatoire national de l'agriculture - Tunisia</i>)
ONH	National office of oil (<i>Office national de l'huile - Tunisia</i>)
ONS	National statistical office (<i>Office national des statistiques - Algeria</i>)
OSS	Sahara and Sahel Observatory
OTEDD	Tunisian environment and sustainable development observatory (<i>Observatoire tunisien de l'environnement et du développement durable</i>)
PACFS	small-scale family or social farming (<i>petite agriculture à caractère familial et social - Tunisie</i>)
PAT	Tourist host country (Pays d'accueil touristique - Morocco)
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
PNDA	National programme for agricultural development (<i>Programme national de développement agricole - Algeria</i>)
PNDAR	National agricultural and rural development programme (<i>Plan national de développement agricole et rural - Algeria</i>)
PPDR	local rural development project (<i>projet de proximité de développement rural - Algeria</i>)
PPDRI	integrated local rural development project (<i>projet de proximité de développement rural intégré - Algeria</i>)
RDO	Registered Designation of Origin
ROSELT	Network of local long-term ecological monitoring observatories (<i>Réseau d'observatoires locaux de surveillance écologique à long terme</i>)

SAGE	Masterplan for water development and management (<i>Schéma directeur d'aménagement et de gestions des eaux</i>)
SASS	North-Western Sahara Aquifer System (<i>Système aquifère du Sahara septentrional</i>)
SEMCs	Southern and eastern Mediterranean countries
SME	Small and medium-sized entreprises
SPI	Standard Precipitation Index
TGS	Traditional Specialty Guaranteed
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UTAP	Tunisian union of agriculture and fisheries (<i>Union tunisienne de l'agriculture et de la pêche</i>)
UTICA	Tunisian union of industry, trade and craft industries (<i>Union tunisienne de l'industrie, du commerce et de l'artisanat</i>)
WEF	World Environment Fund



INTRODUCTION

AN IMPERATIVE REVISION



In 2007 and 2008, the world rediscovered the strategic importance of agriculture in connection with two matters of major concern – the ability to feed a steadily growing global population and the difficulty in guaranteeing sustainable outputs in a context of accelerating climate change and depletion of natural resources. The Mediterranean region is no exception to this universal agricultural concern. Indeed it is a precipitate of all of the tensions surrounding agriculture and, more specifically, its role in rural areas, which are still densely populated but also poorly developed in most Mediterranean countries.

The Ciheam and the Blue Plan have analysed the contemporary dynamics of Mediterranean rural worlds in order to examine the status of implementation of sustainable development strategies but also to take a new look at the policies that are being developed in rural areas. The aim is to raise awareness of the problems and major challenges connected with sustainable development in the Mediterranean and to present convincing arguments for the need for profound revision of approaches in order to adapt Mediterranean farming systems and rural areas to the new challenges of this century. Although the Mediterranean is no longer the geo-economic core of the world, it is nevertheless still the epicentre of international relations, where all of the world's demographic contradictions, social gulfs, economic divergencies and geostrategic controversies are combined and intermingled.

Environmental tensions, marginalisation of rural zones, and food turmoil, although less visible, are indicators of a lack of development that is affecting the Mediterranean Basin, and their repercussions leave their mark on people's daily lives.

Hunger for land and thirst for water: farming systems under pressure

In the southern and eastern Mediterranean, regions already under the iron rule of aridity, increasing water shortages are the signal that water tapping has reached its limits. And the climate trends that are anticipated – and worrying to say the least – could put strain on already very limited resource endowments. Even in the countries on the northern shores that are better endowed water resources are an issue in terms of quality.

Under the pressure of certain cropping practices and urbanisation, land is gradually being eaten up, a phenomenon which is a cause of concern particularly in the south and east of the basin, where arable land is scarce, whereas rural and agricultural population growth is tending to reduce average arable acreage per farm. A myriad of

small farms are just surviving, serving as a “social mattress” for a large proportion of rural populations, while highly capital-intensive large-scale farming units employ more or less downgraded labour. In the north of the region, the duality of agriculture, although less shocking, is nevertheless a reality and one that has been virtually sanctioned by public policies, since the volume of aid allocated to farms was for many years strictly connected with farm size.

What is more, agricultural populations, which are in general poorly paid compared to other sectors of society, live in rural regions where development is often lagging behind. These peripheral zones, which are sometimes very poorly equipped and have poor links with the rest of the region, reflect inequitable development, which cannot be sustainable. But can one really speak of long-term development in these circumstances? Mediterranean agricultural and rural worlds are going through social, economic and environmental crises, which public policies have been unable to resolve entirely. Yet these worlds are far from negligible, if only in demographic terms. But quite apart from these population society as a whole is concerned by the lack of agricultural and rural development. Indeed the last food crisis, which shook several regions of the world and did not spare the Mediterranean, demonstrated just how crucial the question of agriculture and food is for the future of the world.

Agricultural and rural development: a political priority

Some time before the gravity of that crisis became manifest, major international sponsors had in fact made these issues the top priorities on the agenda, having ignored them for two decades. This was the case with the World Bank, which devoted its 2008 annual report¹ to these issues. The eminently evocative title of that report, *Agriculture for Development*, highlighted the imperative of supporting the agricultural sector as an essential lever for reducing poverty.

In a Mediterranean political area in the making, further progress is inconceivable unless attention is devoted to these issues and to the possible avenues for improvement. Agriculture, food and environment issues are so closely connected with the daily lives of the populations that the convergence of the Mediterranean shores could be jeopardised unless they are adequately taken into account in public policies at the national and regional level. Action to promote balanced development on those various shores is more necessary than ever; once the cobwebs of its former attributes have been removed, the new *mare nostrum* will be feasible if, and only if, *terra nostrum* also becomes a common horizon!

The Ciheam and the Blue Plan are strongly committed to these issues. It was thus considered legitimate, and indeed essential, at a time when these problems are becoming more and more acute, for these two actors of sustainable development in the Mediterranean region to combine their complementary expertise to propose an assessment of agricultural and rural development in the region. This work is in fact the continuation

¹ - World Bank, *Agriculture for Development*, World Bank, Washington (D. C.), November 2007.

of cooperation that began in 2003 on the Blue Plan's environment and development outlook, which led to the publication of a major report in 2005.² The Ciheam was completing a report at the time on sustainable rural development in the Mediterranean.³

This concurrence was not a pure coincidence. Rural development was emerging in the countries in the North as the second pillar of the CAP (application of Agenda 2000). The southern and eastern Mediterranean countries were defining ambitious policies for the rural world (Strategy 2020 in Morocco, Strategy for Sustainable Rural Development in Algeria, Integrated Rural Development Programmes within the framework of the 9th and 10th Plan in Tunisia, Land Reclamation in Egypt, the South-East Anatolia Project in Turkey, and so on). Rural development thus featured as an essential issue on either shore of the Mediterranean, but for very different reasons.

Although the intensive-production agricultural system established in the countries of the European Union had achieved its economic objective (ensuring food security), the human consequences (desertification of rural areas) as well as the consequences for the regions, human health and the environment (reversion of land to nature, closing landscapes, soil and water pollution) had become apparent from the mid 1970s. And as for the southern and eastern Mediterranean countries, the liberalisation process that had been accelerated by the structural adjustment programmes of the 1980s had sanctioned a "two-tier" agricultural system with competitive and highly profitable farm undertakings on the one hand and, on the other, a system of small, low-return family farms that were faced with the natural hazard of recurrent droughts, insecurity due to rising input prices, underequipment, and funding needs and were suffering from the withdrawal of the support services provided by the agricultural administration. The survival strategies adopted to safeguard that population from poverty and food insecurity (the practice of engaging in several different activities, crop diversification and migration to towns and cities or emigration to other countries) were all attempts – sometimes tragic attempts – to counter this lack of development in rural areas in the South.

The assessments of these two reports on the status of rural societies and economies in Mediterranean countries converged. They underlined the main population trends in the countries of the North and South, which were often divergent (a decline in the North followed by a "rural renaissance", as opposed to growing populations in the South). They described social conditions (recomposition in the North in connection with residential strategies, poverty and inequalities in the South), economic changes (a boom in non-agricultural activities in the North as opposed to the major role played by agriculture in the South) and the constraints impeding growth in rural economies. They emphasised the diversity of Mediterranean rural areas as well as their fragility. And, lastly, they made an initial assessment of rural policies based on the new paradigm of sustainable development, which most southern and eastern Mediterranean countries were incorporating into their strategies. Institutional and organisational innovations concerning new modes of governance in rural areas were integrated into the general policy matrix, which called for the participation of local actors, measures to establish

2 - G. Benoît & A. Comeau (eds.), *Méditerranée: les perspectives du Plan Bleu sur l'environnement et le développement*, Éditions de l'Aube, La Tour-d'Aigues, 2005.

3 - B. Hervieu (ed.), *AgriMed 2005. Agriculture, Fisheries, Food and Rural Development in the Mediterranean region*, Ciheam Annual Report 2005, Ciheam-MAI, Montpellier, 2005.

public-private partnerships and bottom-up approaches. Public policies were also assigned the duty of developing rural areas. More specifically, the objectives aiming to meet the challenges of those areas were structured around three main lines of action: action to improve the living conditions of rural populations, action to conserve natural resources and action to strengthen rural economies by diversifying and promoting non-agricultural activities. Since several years had passed since these reports were published, it was all the more important for the Ciheam and the Blue Plan to conduct a new assessment of action plans.

For sustainable development of farming systems and rural worlds

A further major fact that must be underlined is that the UN, or more specifically the Mediterranean Action Plan, adopted a “Mediterranean Strategy for Sustainable Development” in November 2005. This strategy, which was adopted by the Contracting Parties to the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean at their 14th session in Portoroz (Slovenia) in 2005, underlines “the need [...] to protect and manage natural resources sustainably for economic and social development [...] and to “integrate the objective of sustainable development more effectively into the process of globalization”. The contracting parties noted that social issues (poverty, unemployment, access to basic facilities, illiteracy and gender equality) are a “major concern” and underlined that entire sections of rural society were marginalised in the southern and eastern Mediterranean region. The Strategy thus aims to ensure “an equilibrium between satisfying the people’s needs, the requirements of economic development and environmental protection”. Taking these facts as a basis, four main objectives are then set with a view to promoting progress towards sustainability in the economic, social and environmental areas and in the field of governance.

Objective 1 consists of contributing to economic development by enhancing Mediterranean assets. The Strategy calls for “cumulative flows of added value to be drawn from the region’s unique cultural and natural assets, while also exploring new avenues for the promotion of innovation, skills and culture.” It advocates action to develop new activities in the service sector and to distribute activities more evenly over the various countries so as to provide local job and income opportunities.

Objective 2 aims to reduce social disparities by implementing the Millennium Development Goals and to strengthen cultural identities. Action to develop human resources and to foster the capacities of all of the various actors is regarded as being “of crucial importance” in this context. The Strategy considers that “The protection of the environment, economic development and sustainable progress cannot be achieved while such a large proportion of the population is illiterate and lacks access to essential services” and adopts the Millennium Development Goals aiming to improve people’s living conditions and promote gender equality.

Objective 3 is to change unsustainable production and consumption patterns and ensure the sustainable management of natural resources. Precedence is given to protecting natural resources (water and soil) and biodiversity, promoting traditional know-how as

well as the cultural and landscape heritage, and reducing exposure to natural hazards (such as floods, fires, droughts and climate change).

And lastly, Objective 4 assigns governments the task of improving governance at the local, regional and national level. Sustainable development on a large scale requires governance in a spirit of “openness, participation, accountability, effectiveness and coherence.” The objectives that have been set can be achieved through more effective governance that is backed with education on sustainable development issues and appropriate training programmes as well as the dynamic participation of the various actors involved.

What is more, since promoting sustainable agricultural and rural development is now one of the seven fields of priority action determined by the contracting parties, priority indicators have been defined for monitoring and assessing public policies, and measures and guidelines have been identified.

A report constructed collectively

Such was the analytical framework which served as a basis for reflection for the steering committee composed of officers and experts from the two institutions (Ciheam and Blue Plan). Complementary indicators for monitoring and assessing policies were first examined in the light of this framework, the aim being to ensure general monitoring of the progress made towards sustainable development in the Mediterranean. It must be underlined that the research potential accumulated by the Ciheam and Blue Plan research networks was used to a very large extent in this work on sustainable rural development indicators. On the strength of this reflection on how rural development in the Mediterranean can be assessed, the partners in this study analysed the progress made in this field in terms of the main pillars of sustainable development (natural resources, economy, social development and rural governance). Experts were called in to conduct national studies taking all of these aspects into account, and no less than ten countries were thus explored: Algeria, Albania, Italy, Spain, Egypt, France, Morocco, Turkey, Greece and Tunisia.

This illustrates the extent of the work carried out in order to fully comprehend the status of rural development in the Mediterranean. In order to avoid juxtaposing monographs, however pertinent, and to facilitate the comparative analysis of these studies, the results have been set out in comparative form in the chapters devoted to the various pillars of rural development: all of this material collected in each of the countries studied was used as a basis for constructing the chapters on natural resources, the inclusion of the regions in rural development policies, people’s needs, local governance and economic diversification.

It was also considered appropriate to develop regional studies on the emerging challenges the Mediterranean countries are now facing: the authors have thus elucidated climate change, which is obviously affecting the sustainability of farming and rural systems. There is furthermore a specific chapter on the desertification process, which is connected with climate change, but only in part. Likewise, it was considered relevant to analyse how the rural territorialisation process is conceived in the individual countries. And even if rangeland management does not concern the entire Mediterranean region, it was nevertheless important to devote attention to the issue in the Maghreb and Mashraq countries with their vast expanses of rangelands.

And lastly, it was considered imperative to fine-tune development indicators as a matter of urgency for those who want to monitor the implementation of the decisions taken by the Mediterranean Commission for Sustainable Development with any pertinency. We have devoted the last part of the present study to that criticism of the means of gauging the sustainability of development.

This report has set itself the objective of drawing up a survey of rural and agricultural development in the Mediterranean region that is as exhaustive and analytical as possible. And the intention is to go further. Having understood the urgency of a strategic issue in a region that is equally strategic, the Ciheam and the Blue Plan hope that their work will serve as a basis for reflection and action on the part of policymakers and actors in the countries in the region, who have come to realise that agricultural and rural policies must form the core of the economic and social policies of Mediterranean countries.



CHAPTER 1

PRESERVING NATURAL RESOURCES

Florence Pintus (Blue Plan)

If it is to be viable, Mediterranean agriculture, like world agriculture, will have to overcome the threefold challenges of demographic growth and food security, protection of the environment and natural resources, and the growing scarcity of fossil fuels.

The agricultural trade balance of the Mediterranean countries has been clearly out of step since 1970 and the production capacity of the States of the Middle East and North Africa needs support. The risk, however, would be to focus efforts and resources on the most prosperous regions and overlook reconstruction for the longer term. The time for choosing a type of agriculture is past. It is now about identifying and taking advantage of all the local dynamics of production systems which can be found everywhere and, on imperative environmental grounds, reaffirm the place of agriculture in areas where it is subject to severe constraints and justify it as deserving of a public policy. For there can be no agricultural development without rural dynamism, just as there can no rural development without a vibrant agriculture.

However, the need to continue to increase both yields and areas under cultivation in an uncertain climatic context and against the background of the energy crisis raises issues of the availability and renewal of resources – the water or carbon cycle, soil fertility, maintenance of forests, natural balances (environmental pollution, loss of biodiversity, preservation of rural communities), land use and, ultimately, public health.

The solutions lie in modernising forms of government intervention, strengthening agricultural policies and legislation to conserve natural resources, adapting to climate change and allowing rural populations the freedom to manage their own resources (crops, land, etc.). It also involves supporting research into the development of agriculture with a high ecological value through a successful blend of scientific knowledge and local know-how and educating the community.

Mediterranean know-how – the fruit of thousands of years

The Mediterranean suffers from considerable handicaps, essentially related to relief, climate and limited land and water resources and their uneven distribution over the region. Taming these resources and conquering the land is an age-old task which has

mobilised the regions' many civilisations. The fruit of thousands of years of endeavour, a wealth of scientific knowledge has been accumulated in response to the huge challenges to agriculture, raising water management into an art form. It has founded a material and spiritual culture of exceptional splendour spreading from Arab Andalusia to the entire Mediterranean.

In the confines of the desert, the ingenuity and tenacity of oasis-dwellers has enabled them to manage the scarcity of water by perfecting ingenious water distribution and management systems on which true "hydraulic societies" are founded (Wittfogel, 1964). In their many and varied ways, these efforts by populations to adapt to aridity have allowed them, thanks to this traditional irrigation based on small-scale rural water systems, to live in harmony with the environment and to preserve a certain food balance.

Agriculture in the Mediterranean remains, nevertheless, essentially pluvial and much of the rural area (highlands, arid plateaux) is given over to forestry and livestock. The hazardous environments of these arid and semi-arid regions have been exploited by populations for centuries. They are complex regions where nomadic and sedentary populations have been living side by side in areas defined since the Ottoman era by boundaries, such as rainfall, which are not hermetic. Their degrading is just as ancient, evidence of resistance to the increase in anthropic pressures much higher than the assumptions on which some development programmes rely. The state of these environments is the result of permanent mechanisms by which communities adapt as well as their resilience in clinging to agricultural and livestock activities.

The steppe regions no longer have the same functions, as technological innovation has led to a huge increase in agricultural production in modern times and a new relationship with urban markets. They are still of great value for biodiversity, especially that arising from livestock farming, which serves to underpin the resilience of the natural environment and, more generally, not forgetting the importance of its wider effects. Reconciling on the capacity of the environment and of the people living there is the real challenge in preserving natural resources and maintaining humanised environments.

Water resources: a rapidly changing balance

The need for more intensive agriculture

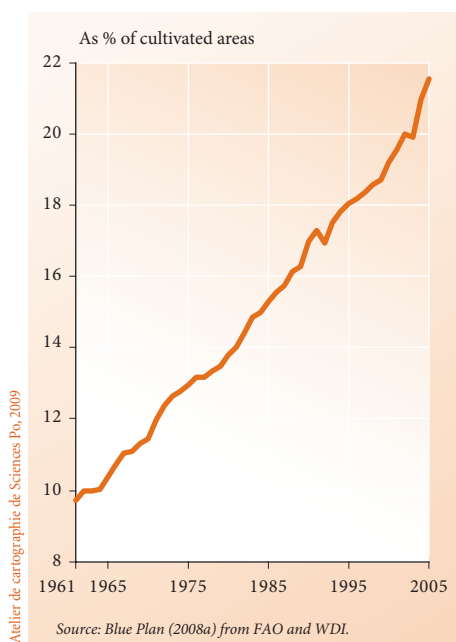
During the 20th century, traditional irrigation methods reached their limits. The demographic explosion following from advances in medicine and improvements in living conditions was accompanied by new patterns of consumption. New forms of irrigation were developed based on technological and organizational innovation. They led to the mobilisation of large volumes of water through large scale hydraulic works and the conquest of ever more extensive areas hitherto left to pluvial or desert agriculture.

The irrigated areas of the Mediterranean countries thus doubled in forty years to over 26 million hectares in 2005 or 21% of cultivated land (Plan Bleu, 2008a). While areas of arable and permanent crops tended to stabilise overall or even decline in the period 1961-2005, the average annual growth rate of irrigated land never faltered.

In Egypt, the spectacular increase in agricultural production and productivity was reflected both in its intensification and an increase in cultivated areas under a policy of developing

desert land. The chief hydraulic development project, the Aswan Dam, by controlling and storing Nile flood waters, allowed a regular and permanent supply of irrigation water, extending the irrigated area (horizontal intensification) and, apart from permanent plantations, shifting from one to two or three crops per year (vertical intensification).

Chart 1 - Total irrigated areas in the Mediterranean countries, 1961-2005



The cultivated and harvested area was therefore effectively double the area of agricultural land: 14.55 million feddans (6.1 million hectares) for 8.47 million (3.55 million hectares) respectively.¹ It shows the high level of intensification of Egyptian agriculture estimated at between 1.71 and 2.00 in 2004-2006. As for the total agricultural area, that rose from 2.5 million hectares in 1990 to 3.5 million hectares in 2004, of which one third² was reclaimed from the desert.

In Algeria, the growth in irrigated areas, initially more modest, accelerated from 2000, rising from 620,687 hectares (or 7.4% of the useful agricultural area, UAA) in 2004 to 803,880 hectares (or 9.5% of UAA) in 2006.³ The irrigated area in 2004 was divided as follows: 56,000 hectares of large-scale irrigation (LSI) and 554,000 hectares of small and medium-scale irrigation (SMI). Irrigation in the North of the country (Tell) is divided into two categories, distinguished by size and method of management: large areas are managed by regional irrigation offices and the rest are classified as SMI managed directly by the operators (Zella, 2007).

These gains in irrigated areas barely offset the productivity deficits of the land, and Algerian agriculture remains highly vulnerable due to the aridity of the climate and the extreme irregularity of precipitation. The agricultural year 2001-2002 was thus marked by a period of drought which had a serious impact on cereal yields with a fall of -27% compared with 2000-2001, -4%, for tomatoes, -14% for olive oil between 2001 and 2002 (Bedrani, 2003). Conversely, land productivity in Italy rose from 1.68 for the period 1981-1983 to 2.24 over the period 2000-2002.

1 - Agricultural Statistics, 2004.

2 - The estimated area of new agricultural land varies depending on the source. Some data include all land worked outside the delta and the valley since the 1950s, while others do not include areas worked prior to the 1970s. The latter are called the "former new lands". Moreover, several organisations are involved in their development which results in different data from different organisations. For example, the data from the national statistical report differ from the Ministry of Agriculture statistics.

3 - I.e. an annual increase in the irrigated area of 36,639 hectares per year (General census of agriculture (RGA) 2001; Ministry of Agriculture and Rural Development (MADR), 2006).

With some 1,000 m³ per inhabitant per year, considerable irregularity of the place and timing of precipitation, including from one year to the next, and over 70% of mobilisable surface resources divided between three basins, Morocco is also highly vulnerable. To mobilise these resources, the State has built over 100 dams with a total storage capacity of some 16 billion m³ which are dependent on climatic conditions.

Technology leaps to the rescue of the environment

Irrigation, considered as a factor of intensification to be encouraged, has been the beneficiary of subsidies from the Algerian State. To increase agricultural production, the Algerian National Agricultural Development Programme (NADP) envisages, among other things, the development of naturally unproductive land and the extension of irrigated areas, with the obligation to improve the efficiency of irrigation, in accordance with the Mediterranean Strategy for Sustainable Development (MSSD). It relies on a triple combination of new technology, irrigation methods and tarification. The price of water per m³ at 0.018 dollars is still derisory (Zella, 2007). But the area of an irrigated plot must exceed 50 hectares for mechanisation and other investments to be viable.

Such plots today cover only 22.7% of UAA and gravity remains the chief method used (5 hectares out of 7 irrigated). And even if the method is modern, irrigation is generally carried out in a traditional manner, without calculating the need of crops for water, scale of installations or management of irrigation.

In Turkey, resort to irrigation under pressure has become an absolute priority, yet only 8% of irrigated areas currently involve this type of irrigation, the remainder being irrigated by gravity systems.

As a result of the State's voluntary policy, however, and bearing in mind the environmental constraints, the development of irrigation in Tunisia only concerns some 4% of existing useful agricultural areas, and this ratio is unlikely to exceed 5% according to consensual estimates. Rationalising water use in these irrigated areas thus becomes an imperative need, even if they already generate 30% of the total value of agricultural production, animal and plant, a share which should reach 50% by 2010.

In the North Mediterranean, the problem is identical. Spain is now suffering from a major water deficit, especially in the East, an inevitable consequence of adverse climatic conditions. These latter are increasingly structural, which implies less water available for agricultural use. During the period 2000-2005, water reserves ranged from 45.3% to 67% of reservoir capacity, albeit without any problems of replenishment. Spain, however, has considerable potential for saving water by modernising its irrigation systems, supported by the Spanish National Irrigation Plan, up to 2008, and co-financed by the EAGGF. During the period 2000-2006, the plan supported actions involving 1.6 million hectares, with investments of 2.5 billion euros and water savings of 2.9 km³ per year (over 5% of the reserve capacity of the entire country). These savings were achieved essentially by converting 55.5% of the irrigated area to pressure irrigation and reduction of losses in the weather supply and distribution system. The pursuit of optimal water efficiency ensures that it is closely consistent with the European Framework Directive on Water.

With the increase in land under irrigation (especially in the North of Italy) and the emergence of problems of shortages chiefly in the regions of the South and Centre, saving water is also the goal of the Italian National Irrigation Plan which relies mainly on enhanced efficiency of irrigated systems, progress in supply and overall improvement in the quality of water resources. The inefficiency of the irrigation is the principal constraint, either due to various technical aspects (irrigation systems, pipe systems, sources of supply, etc.), management (methods and programming, inadequate planning in low water periods, etc.) or choice of crops which are not suitable where water is scarce.

Irrigation, balancing profit and sense

The increasingly frequent recourse to irrigation to maximise the profitability of crops with a high economic return may have perverse long-term effects which damage natural resources in the long run. An increase of 52% compared with 1995 in future demand for water has been announced in the OECD countries. The volume of water consumed to Agricultural Gross Domestic Product (AGDP) (indicator AGR_C13)⁴ may be considered in this regard as an indicator of the economic return on water consumed. It is nevertheless difficult to interpret as it may just as easily reflect the level of equipment and modernisation of agricultural production in the country (irrigated crops/total crops and/or technical efficiency of water use), as the change in strategies under the influence of market-related factors or government measures (reduction in subsidies, tariffication of water, etc.) or changes in the availability of the resource.

Furthermore, rather than relate the volume of water consumed to irrigated AGDP alone, it relates it to total AGDP. Thus in Tunisia where irrigated production represents some 30% by value of agricultural production, or 799 million Tunisian dinars (DT), the indicator rose from 0.89 m³/DT of AGDP to 2.96 m³/DT of AGDP of irrigated production in 2004.⁵ By also relating the volumes used to AGDP, Algeria stands at 0.21 m³/\$ (Directorate of Agricultural Statistics and Information Systems (DSASI), 2004) and Egypt at 2.5 m³/\$ in 2004⁶ according to the Central Agency for Public Mobilisation and Statistics (Capmas). France stood at 0.1794 m³/\$ in the same year. The following table shows the results achieved by the Spanish National Irrigation Programme (NIP).

Table 1 - Volume of water as a ratio of AGDP in Spain, in m³/\$

Year	1999	2000	2001	2002	2003	2004	2005
m ³ /\$	1.1	0.97	0.91	0.85	0.82	0.81	0.76

Source: National Institute of Statistics (INE).

In France, the use of irrigation water seems now to be stabilising. Incentives were offered to farmers under the Hexagonal Rural Development Programme 2007-2013 such as agro-environmental measures to convert irrigated areas into dry crops or the Vegetal Plan for the Environment which seeks to improve individual irrigation systems in order to reduce waste (drip irrigation).

⁴ - For the definition and time series of indicators, see Chapter 10.

⁵ - 2,369 million m³ for 2,664 million DT.

⁶ - 29.7 billion m³ for 11.7 billion dollars.

Various European or national policies contribute to better quantitative management of the water resources. The adoption of prefectural framework decrees, defining restrictions on envisaged irrigation and trigger thresholds allows farmers to anticipate periods of drought by modifying their crop rotation or sowing dates. The Water and Aquatic Environments Act of 30 December 2006 contains several provisions aimed at promoting collective management of irrigation water in zones characterised by chronic water deficits and encouraging more economical use by means of an “irrigation” tax which can be modulated according to the state of the resource.

Despite everything, water resources are limited

With a recent estimate of useable resources of 1,500m³ per inhabitant per year, Turkey is not a water deficit country. In 2004, 43 million hectares, or over half the total area, were dedicated to agriculture, of which 4.9 million hectares were irrigated. It is estimated that 8.5 million hectares could potentially be irrigated. At present, the agricultural sector already uses 74% of the total water resources. According to demographic projections of the National Institute of Statistics, Turkstat, the total annual available volume will be close to 1000 m³ ⁽⁷⁾ per inhabitant in 2030, which will undoubtedly add to the pressure for allocation of resources between sectors, at least in certain regions of the country.

In Morocco, agriculture absorbs over 80% of water consumption, but the trend for this share is slightly downwards. While the balance between mobilisable water resources and needs gives room to hope that it can be satisfied up to 2020, these projections should not mask the huge disparities between regions, some of which already show structural deficits which can sometimes require transfers of water on a grand scale. Moreover, 40% of the rural population still does not have access to drinking water and only 14% is adequately connected while the rest of the population obtains its supplies from resources which do not comply with the national standard.

In many Mediterranean countries, reserves of land, like water, are limited. The proportion of agricultural land often ranges from 15% to 25% of the total area (Algeria, Cyprus, Israel...), and it is over 50% in Syria, Tunisia and Turkey with the inclusion of grazing tracts. While cultivated areas in Mediterranean countries have been fairly stable in recent years, the proportion of arable land per inhabitant, conversely, has halved since the early 1960s. In Egypt, it is strikingly low and continues to fall despite efforts to increase it: 0.25 feddan (1,050 m²) per inhabitant in 1960, 0.13 (546 m²) in 2000 and 0.118 (495 m²) in 2004. It is expected to fall to 0.09 feddan (378 m²) per inhabitant by 2017.⁸ The question of land productivity, impoverishment of the soil and desertification then becomes critical.

Slow and progressive desertification

Mismanaged and lost land

The loss of arable land (indicator AGR_P02) is an indicator which measures changes in the area of arable land subject to different types of pressure or soil use: erosion,

7 - Water scarcity is defined as 500 m³ per inhabitant per year.

8 - World Bank, *Egypt Human Development Report*, 2005, p. 159.

Chart 2 - Total cultivated areas in the Mediterranean countries, 1961-2005

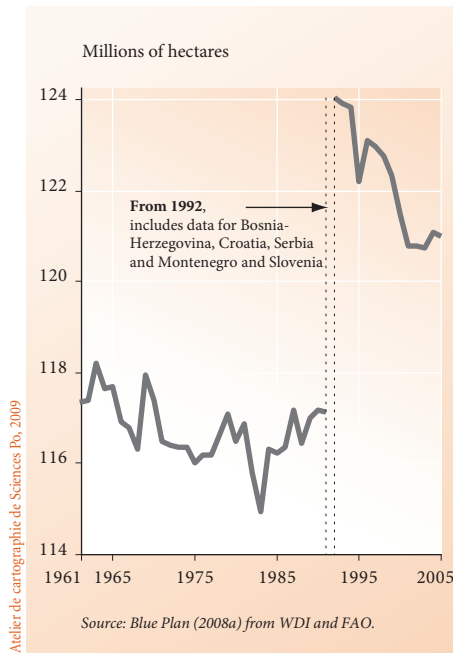
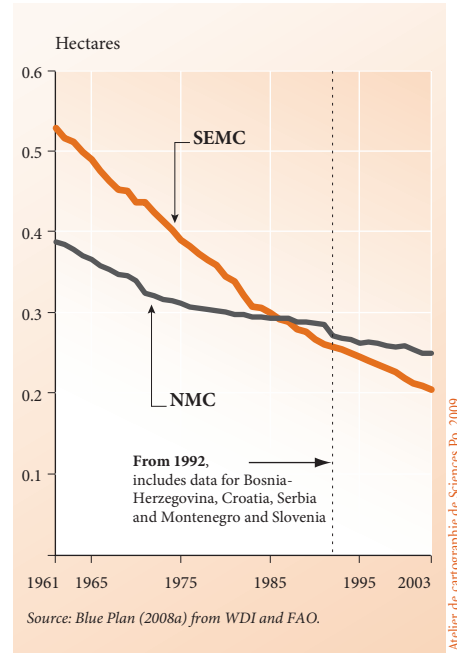


Chart 3 - Arable land per inhabitant in the Mediterranean countries, 1961-2003



salinisation, artificialisation, deforestation, abandonment of agriculture, etc. This indicator, however, gives a net result which can mask opposing dynamics which offset each other. Egypt thus shows an overall gain in arable land (cf. chapter 10) while estimated losses range from 0.3% to 0.6% per year.⁹

This indicator has averaged 59,000 hectares per year during the last decade in Algeria,¹⁰ and between 15,000 and 20,000 hectares per year in Tunisia. In Morocco, annual losses due simply to erosion are estimated at some 100 million tonnes, leading to a loss of storage capacity of dams through silting of 50 million m³ per year and affecting some 60% of UAA (or 5.5 million hectares).

The loss of arable land is a fairly ancient phenomenon in Egypt but one which has accelerated during the last four decades under the combined effect of the action of man and/or nature. Urbanisation is the chief problem, compounded by the method of irrigation and the parcelling up of the ancient lands of the valley and delta, where it is estimated that 20% of the area is occupied by irrigation channels and divisions between plots. Thanks to demographic growth, towns and villages have continued to expand to the detriment of hundreds of hectares of agricultural land.

9 - Depending on whether one takes the Ministry of the Environment Report or the World Bank *Egypt Human Development Report* (World Bank, Egypt Human Development Report, 2004).
 10 - National Report of Algeria on the implementation of the Convention to Combat Desertification, 2004.

The same can be seen in Tunisia. The proportion of losses attributed to urbanisation on the fringes of Greater Tunis and the major coastal towns could be as much as 4,000 hectares per year. The nibbling away of agricultural land by the uncontrolled expansion of the towns, on the one hand, and the building of individual houses, on the other, continues to spread. Furthermore, the Tunisian soils “offer a remarkable pedological diversity”, their cultivation over thousands of years using production methods which often pay no heed to environmental conditions has progressively stripped them of much of their richness and intrinsic productivity. Despite the lack of precision and scarcity of the figures, land losses in Tunisia were estimated in 1998 at 13,000 hectares from water erosion and 7,000 hectares from wind erosion (especially sand encroachment).

Desertification is considered to be the result of the fragility of the ecosystem and intensive cultivation of agricultural land beyond the capacity of the ecosystem to cope. It is not a case of the desert encroaching but a progressive loss of productivity of the soil and thinning of the vegetation cover attributable chiefly to human activity in dry zones. In this sense, the phenomenon affects the whole Mediterranean. In Spain, cultivated land declined from 18,753.2 to 17,844.2 thousand hectares between 1995 and 2005, which represents a loss of some 5% of the current agricultural area, while it declined by 214,500 hectares in Greece over the same period (cf. table 2). In France, it is considered that 31,000 hectares were affected between 2000 and 2006.

Table 2 - Loss of arable land in Greece 1995-2005 in hundreds of hectares

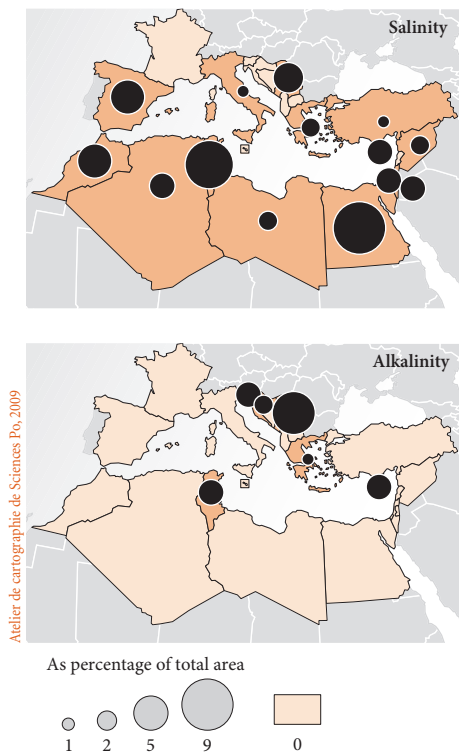
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total agricultural area	39 704	39 544	39 365	39 257	39 153	39 139	38 934	38 718	38 452	38 578	38 017
Arable land	28 851	28 654	28 409	28 226	27 970	27 866	27 697	27 439	27 128	27 228	26 697
Losses of arable land		- 197	- 245	- 183	- 256	- 104	- 169	- 258	- 311	100	- 531

Source: National Statistical Service of Greece (NSSG).

Up to the 1990s, an expansion of cultivated land was observable in Greece to the detriment of vast areas of grazing tracts and scrubland especially in hill areas. Between 1995 and 2006, the loss of arable land was still limited (of the order of 4%). For arable land, it was more marked (7%) and probably under-estimated, as the statistics on abandoned land are often delayed since very often the owners of such land do not declare that they no longer cultivate it.

In the latter case, the cessation of cultivation of the land or changes in technical and economic methods underlies their degradation, since at the same time an expansion of tree cultivation has been observed. Moreover, the arable lands, concentrated in the plains and hill areas of Greece, have seen a decline in their quality and yield capacity in recent years, linked to over-exploitation in the plains (pollution, erosion) and ploughing on the slopes in the hill areas (leaching of soils).

Map 1 - Salinated or alkalisated areas in several Mediterranean countries



Salinisation of land, on the other hand, is a process essentially linked to irrigation in arid and semi-arid zones. It concerns large irrigated areas as well as small farms. It may arise as the result of inappropriate irrigation. Sometimes it is the entire production system (choice of crops, technical itineraries...) which is ill-conceived in its natural environment. In Egypt, its increase is a consequence of intensive cultivation of the land and the poor state of drainage networks. Certain forms of salinity lead to a breakdown and irreversible loss of soil fertility and thus desertification. In Morocco, over 30,000 hectares have already been seriously affected by this process, and a study undertaken under the International Programme for Technology and Research in Irrigation and Drainage shows that some 500,000 hectares are threatened with excess salinity.

Knowledge of soils and protection methods

Soil erosion, essentially caused by climatic conditions and human activity is one of the chief environmental problems in Spain. The national summary of maps of erosive states¹¹ shows that the intensity of the process has

exceeded acceptable limits in almost half the country (23 million hectares, or 12 tonnes of material per hectare per year. 12% of the country (6 million hectares) is subject to very severe erosion, greater than 50 tonnes per hectare per year. These erosion zones are mostly situated in the hydrographic basins with a continental Mediterranean climate.

The seriousness of the problem led to the development of various programmes and measures designed to protect the soil, among them the Horizontal Rural Development Programme of Support Measures 2000-2006 which provides for compensation measures involving bans on working the soil along the line of the steepest slope and degraded areas zones, and agro-environmental measures such as extensification of agricultural production, forestation of agricultural land, support for use of advice services which develop environmental behaviour on farms.

In Spain, as a consequence of the application of conditionality, there is a larger percentage of constantly dry crops (olives, vines, almonds, etc.) than in other EU countries.

¹¹ - Maps prepared between 1985 and 2002 by the Instituto Nacional para la Conservación de la Naturaleza (ICONA) then by the Ministry of the Environment.

Situated in hilly terrain, they help to prevent erosion, when there are suitable measures to tackle it, and to conserve the landscape and biodiversity. In 2003, the Spanish Ministry of the Environment presented the National Programme of Action Against Desertification, the objective of which is to determine the factors involved and practical measures to combat and minimise the effects of drought.

In Tunisia, a study is currently under way in the Ministry of the Environment and Sustainable Development (MESD) on the “evolution of factors of desertification”. It can already be inferred from the reduction in the solid outflow of watercourses from 49 to 27 g/l that soil loss is declining thanks to the water and soil conservation works (1.3 million hectares of catchment basins treated) and improved livestock farming, also reflecting better adaptation of crop systems to the soil. Major dune stabilisation works have been carried out, notably at Kebili and Souk Lahad, to protect oases and transport infrastructure especially, in the South of Tunisia.

In Egypt, many laws have been passed to regulate and limit the devastating effects of exploitation of the topsoil of agricultural land to manufacture building bricks. Following the ban on building on agricultural land, except under certain highly restrictive conditions, and relative failure of a sanctions-based policy, the public authorities have for some twenty years pursued a land development policy the objectives of which are the construction of new “satellite” towns to meet the strong demand for housing and to prepare a land development plan for each village which defines constructible zones for the future.

Soils play a key role in the control of landslips, protection of biodiversity, shaping the landscape and absorption of carbon. Their quality and environmental problems are closely linked to their pattern of use. The progressive decline of UAA in Italy in recent years (-6.5% from 1982 to 2003) mainly involved permanent grasslands and pasture (-26%). In the vicinity of urban centres (especially plains, coastal areas or valleys), on the other hand, agriculture is subject to very strong land pressures which have led to the constant replacement of the most fertile lands for non-agricultural use, the effects of which on the soil are often adverse and irreversible.

In many agricultural zones, especially plains and coastal areas with their specialised agriculture, the risks of pollution and contamination of the soils are higher. The excess phosphorus released by organic and mineral fertilisers, for example, is behind the alteration of the structural and organic balance of the soil. The highest concentrations (over 30 kg per hectare) are found in the northern regions of Italy, and these are also the regions which have seen the greatest reductions in volume over the last six years.

Water erosion and the decline in organic matter in the soils are the highest risks in mountain regions apart from forested regions. In Italy, the average soil loss is estimated at 3.11 tonnes per hectare per year, even more in some regions of the South, where the situation is considered critical. Lastly, the abandonment of pastoral activities and forestry, combined with unsustainable management of the forests, has led to an increase in the risk of water erosion and fire.

Like biological agriculture, eco-compatible agriculture generally requires reducing pollutant wastes in the soil. It also requires practices which are both less intensive and less

devastating in terms of erosion and loss of organic matter, such as the use of green fertilisers. Reversing the trend of recent years, in 2005, Italy devoted 7% of UAA, or 1.067 million hectares to biological agriculture, over half of which consisted of meadows, pasture and fodder crops also partly intended for biological livestock farming. One also finds progressive development of simplified farming methods which can limit the risk of soil crusting and mud slides.

This is also the case of France where, in 2001, non-tillage concerned some 1.5 million hectares. However, while these methods limit costs in time and energy, the technical itineraries are trickier to manage and may require an increase in phytosanitary treatments. In France, knowledge and monitoring of soil quality is essentially the outcome of national programmes relating to a soil mapping of the whole country, a measurement grid of soil quality and its evolution and a database of soil analyses. The Sol Scientific Interest Group (GIS-Sol) which manages these programmes is responsible for designing, guiding and coordinating the work of creating a geographical inventory of soils and operational monitoring of their quality. It establishes, develops and manages an information system which meets the requirements of national and European public authorities and society as a whole. In particular, it provides and validates the data and results obtained and coordinates with similar European programmes.

Culpable or commendable: the phoney livestock debate

Climate change, excessive summer temperatures and recurrent drought will affect the functioning of plants and, unless practices change, exacerbate the impact on agriculture. Warming of 1° C is equivalent to a shift of crops of some 180 kilometres to the North or 150 metres in altitude. Livestock would also be affected, since pastures and fodder crop systems are very sensitive to water shortages. The fodder deficit would be more and more frequent in summer and grazing periods would start earlier in Spring and last longer in Autumn.

While over-grazing influences erosion and weakens the capacity of soils to absorb water, maintaining herds is at the same time a necessary means of preventing reversion to scrub and controlling vegetation around villages. Their presence can also limit the severity and scale of Mediterranean fires. With changes in livestock farming practices, the loading of grazing tracts (indicator AGR_C03) does not suggest real pressures on the environment or its capacity to recover.

This indicator has not been calculated in Algeria since 1996. The livestock present on the steppes was then estimated at 19,170,103 sheep equivalent and the actual load on the 15 million hectares studied was 0.78 hectares per sheep equivalent while the potential grazing load was probably around 8 hectares per sheep equivalent, thus 10 times higher than the actual load on the grazing tracts.

In Tunisia, according to the Office of Livestock and Grazing, animal needs stood at some 5.5 million forage units (FU), the available resources in a wet year being some 5 million FU and available resources in a "dry" year some 4 million FU, which reflects a deficit of 0.5 to 1.5 million FU. Forest grazing resources, according to a national inventory, were estimated at 5.7 million hectares broken down as follows: 970,000

hectares of natural or regenerated forest, 470,000 hectares of alfalfa steppe and 4,620,000 hectares of natural grazing.

The Spanish dehesas, semi-natural pastures remarkable for their ecological importance are a good example of an ecological balance between livestock herding (chiefly Iberian pigs and sheep) and Mediterranean forest characterised by species of the genus *quercus* (holm oak, cork oak, sissile oak, etc.). The livestock density in Spain rose from 0.43 gross livestock unit (GLU) per hectare in 1995 to 0.58 GLU per hectare in 2005.

In Greece, with 9 and 5 million head respectively, sheep and goats represent 70% of ruminant GLU in the country. 77% of farms with sheep and 77% of the animals are in difficult or mountain zones, rising to 81% for goats. The great majority of these farms are characterised by an extensive system based on pastoral use of the tracts on public or common land. The last twenty years have seen a reorganisation with a sharp reduction in farms (some 40%) but the number of animals has not declined. In Greece, the quality of grazing has fallen perceptibly since it now only provides three to five months of the herds' needs (March-April to June-July), which forces farmers to resort mainly to forage and purchased foodstuffs. More precisely, the grazing only provides 40% of the annual requirements for sheep and 80% for goats with variations between the North (65%), the Centre (45%) and the islands (30%). For a decade, sheep rearing has tended to grow in the most favoured regions, in place of crops which are less subsidised following the reform of the Common Agricultural Policy, in the form of semi-intensive and fairly large scale free range farming (200-1500 sheep) which grow part of their forage. The emergence of innovative practices to protect land or manage common grazing areas is still limited, however, to a few scientific experiments, notably in the Natura 2000 zones.

In Turkey, over-grazing is considered to be the cause of degradation of pastures and grazing which account for up to 15.9% of the total area of the country. The Law of 1998 fixed precise limits on pastures and launched a series of projects to improve and manage grazing. Studies identified the distribution of forage along grazing routes and made it possible to relieve the pressure on natural resources by increasing the quantity and quality of forage production and controlling soil erosion.

Table 3 - Projects for rehabilitation of pastures and grazing in Turkey 2000-2007

Year	Number of projects	Area concerned (ha)
2000	6	680
2001	7	881
2002	33	6811
2003	24	9771
2004	198	70379
2005	158	90011
2006	98	53181
2007	139	55029
Total	663	286 743

Source: Ministry of Agriculture and Rural Affairs.

The impact of pastoral livestock farming in relation to water pollution (nitrates, pesticides, pathogens, etc.) is considered to be minor. However, the development of forage crops is sometimes implicated in the process of water pollution in the plains, and small-scale cheese producers are often the source of discharges into watercourses.

Polluted environments, degraded life

The responsibilities of agriculture

Since 1980, the trend has been to maximise yields per hectare through specialisation and intensification of crops. Chart 4 shows that intensification of agriculture has led to an increase in quantities of fertilisers used in the last decades in most Mediterranean countries, with a general slackening in recent times. The use of inputs in agriculture may increase the risk of an adverse impact on human health and the environment, especially when the quantity of nutrients exceeds the capacity of the crops and soils to absorb them.

Among the Southern and Eastern Mediterranean Countries (SEMCs), Turkey and Egypt are the two largest consumers of fertilisers, with levels which have now overtaken those of Spain and Italy, but behind France. In Egypt, the quantity of fertiliser used rose from 131.2 kilos per hectare in 1970-1971 to 404.3 kilos per hectare in 1989-1990. Globally, the increase in quantities has not slowed for the three types of fertiliser used in Egyptian agriculture:¹² from 1988 to 2004, nitrogen fertilisers increased by 45.8% (from 657,000 tonnes to 958,000 tonnes), potassium fertilisers by 108% (from 34,000 tonnes to 71,000 tonnes) and phosphate fertilisers by 92.6% (de 286,000 tonnes to 551,000 tonnes).

Algeria stands out for its relatively modest use of fertiliser compared with its Maghreb neighbours. Algerian agriculture consumed 155,000 tonnes of fertilisers in 2003, while fertiliser needs for the country's 2.5 million hectares of cereal crops alone are estimated at 410,500 tonnes per year.¹³ The marked decline in consumption of agricultural inputs began with the 1987 reform, due to the massive rise in fertiliser prices (in five years, the price of nitrogen, phosphorus and potassium rose 17-fold [Mesli, 2007]), frequent breaks in the supply of certain inputs and the lack of promotional campaigns. A hesitant revival of the use of fertilisers since 1999 can now be observed, probably due to subsidies for fertilisers.¹⁴

In Turkey, fertiliser use seems to have stabilised in recent years, with 5.3 million tonnes in 2000 and 5.2 million tonnes in 2005. In France, doses of fertiliser applied per hectare have been stable since 1990. Agriculture in Europe is now more environmentally aware, in particular due to the grant of assistance being made conditional on compliance with the nineteen European directives, and good agricultural and environmental conditions, as well as financial support for environmental protection measures. The major challenge now is combating diffused pollution which is more complex because it involves both individual and collective choices.

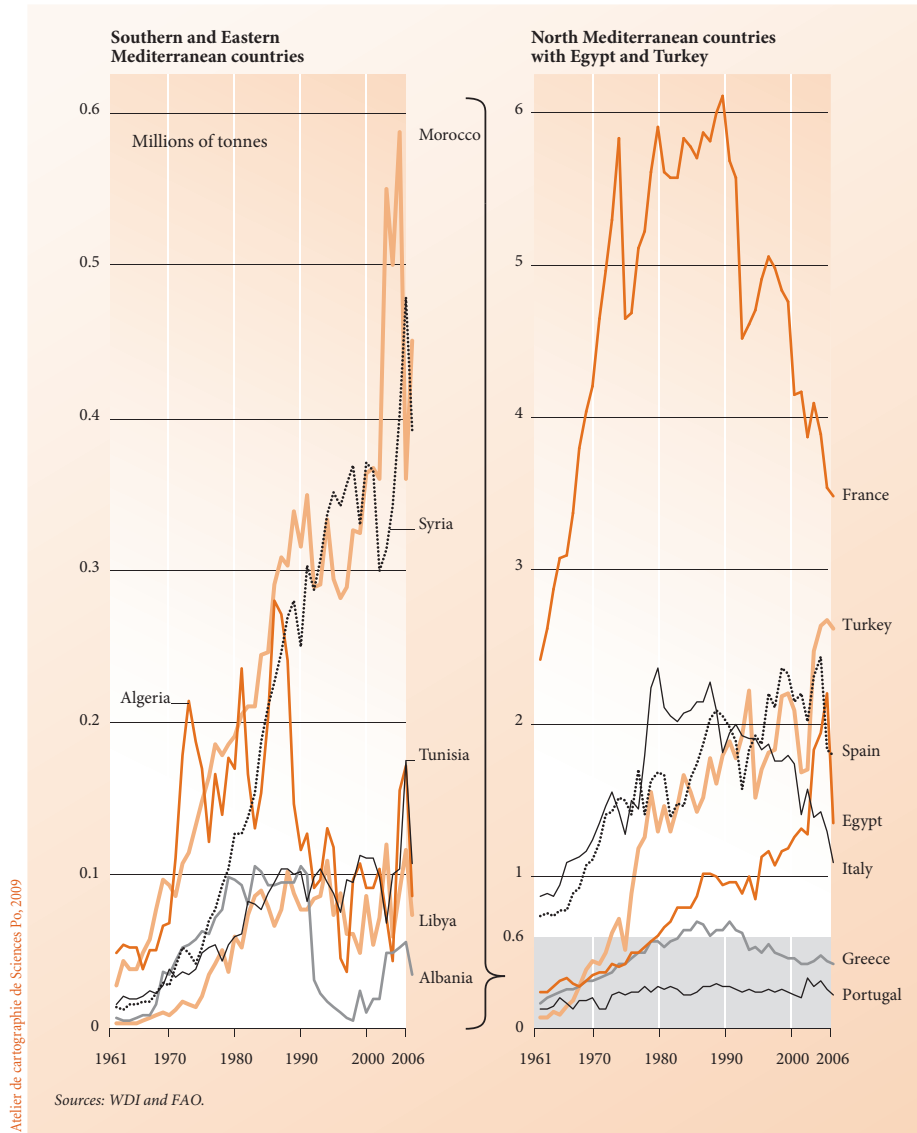
Nitrate pollution is one of the chief causes of the deterioration of water quality in rural areas, a problem found in all the member countries of the European Union. In Spain,

¹² - *Egyptian Journal of Agricultural Economics*, June 2006.

¹³ - Based on 72 kilos of N, 27 kilos of P₂O₅ and 65 kilos of K₂O (FAO, 2005).

¹⁴ - VAT on agricultural inputs is reduced to 7%.

Chart 4 - Consumption of fertiliser, 1961-2005



the proportion of “nitrate sensitive areas” is 12.6%, which is much lower than the 44.1% (on average) of the European Union of twenty-seven. The regions of the North of Italy, where fertiliser use is highly intensive, are the most affected by problems of water quality, with average nitrogen concentrations of 40.06 kilos per hectare in 2000 (22.04 kilos in the South of the country).

The quantity of fertilisers consumed as a ratio of AGDP (indicator AGR_C10) more reflects the efficiency of agricultural production across the national territory rather

than its intensiveness. It is similar to an indicator of economic yield from fertiliser use. Caution should be exercised in its interpretation to the extent that the value it gives may be the result of a rational choice of practices, changes in market prices or low purchasing power of the population. Moreover, it does not take account of organic manure which may account for almost all inputs in small highly labour-intensive farms. This indicator has improved to a greater extent in the North Mediterranean countries (Spain, Italy, France, Greece) since the mid-1980s.

In Tunisia, it was estimated in 2002 at 50 tonnes per million Tunisian dinars (t/million DT), for a total of 102,000 tonnes sold in the year. According to FAO data, these 50 tonnes were broken down as follows: 27 of nitrogen fertilisers, 20.5 tonnes of phosphate fertilisers and 2.5 tonnes of potassium fertilisers. In Algeria, it is estimated on average at 18.6 t/million \$ (for 155,000 tonnes per year sold), a figure which has been falling since the early 1980s. Based on 2004 in Egypt,¹⁵ it stood at 137 t/million \$ (for a total of 1.6 million tonnes sold). In France, it reached almost 226 t/million \$ (National Union of Fertiliser Manufacturers – Unifa, 2005), while in Spain it fell from 107.39 to 78.34 t/million \$ between 1995 and 2006.

Table 4 - Quantity of fertilisers sold by AGDP in Spain, in t/million \$

Year	Nitrogen	P ₂ O ₅	K ₂ O	Total in t/million \$
1995	1.79	29.79	24.26	107.39
1996	2.06	27.46	22.12	106.15
1997	1.86	26.21	22.47	97.5
1998	1.75	29.2	23.19	103.38
1999	1.9	29.3	22.94	108.05
2000	2.24	24.77	20.62	100.94
2001	1.85	25.19	19.31	91.15
2002	1.7	24.7	20.04	86.64
2003	1.96	23.8	19.19	89.71
2004	1.83	23.35	20.53	86.71
2005	1.81	21.53	17.34	77.76
2006	2.14	19.55	16.87	78.34

Source: Ministry of Agriculture, Fisheries and Food (MAPA) and INE.

With regard to pesticides, the North Mediterranean countries (France, Italy, Spain, Portugal, Greece) also consume the largest quantities. Although trends have been declining overall since 1990 in the Mediterranean countries as a whole, Italy standing out with a reduction of over 150%, the gap remains. Yet this trend does not necessarily translate into a significant improvement in the economic return on their use, measured by the quantity of pesticides consumed to AGDP (indicator AGR_C11).

In Tunisia, this indicator was estimated at 173 t/million DT (average annual consumption of 420,000 tonnes over the 10th plan 2002-2006). In Algeria, the average was 1.63 t/million \$ (for 557,000 tonnes per year). There, unlike in the North Mediterranean countries, insecticides are the most used (7,260 tonnes in 2004); herbicides (799 tonnes) come in

¹⁵ - *Egyptian Journal of Agricultural Economics*, June 2006.

fourth place behind fungicides (3,749 tonnes) and acaricides (780 tonnes), which is to be expected given the aridity of the climate (Alphy, 2004). Based on 2004 data in Egypt,¹⁶ it reached 0.34 t/million \$ (for a total of 4,000 tonnes sold, declining markedly for twenty years).¹⁷ In France, it reached almost 1.8 t/million \$ (French Crop Protection Association – UIPP, 2004), while in Spain it rose from 0.13 to 0.22 t/million \$ between 1995 and 2003. Between 2000 and 2005, the use of pesticides increased slightly in Tunisia from 33,543 to 44,337 tonnes.

Table 5 - Quantity of pesticides sold by AGDP in Turkey, in tonnes of active substance

	2004	2005	2006
Insecticides	4 861	4 539	6 668
Fungicides	2 875	3 060	5 228
Herbicides	3 328	3 193	4 023
Other	468	493	551
Total	11 532	11 285	16 470

Source: Global BKÜ Pazarı ve Ar-Ge. Dr Murat Kantarci-Dr. S.Kefi-Tubitak website

Threats to health

The persistence of pesticide residues in the human food chain and the environment can range from a few weeks to some thirty years. The risks vary considerably from one product to another, depending on their specific characteristics (toxicity, persistence, etc.) of their active substances and exposure (which depends on how they are used). The indicators for pesticides are useful tools which can help decision-makers to monitor and evaluate policies and to inform about the risks associated with the use of pesticides.

In the framework of Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, Spain, through the Autonomous Communities, identified sensitive areas for which codes of good practice, action programmes and control programmes were designed and put in place. In France, the encouraging results are partly due to the many actions undertaken on prevention and management of health and phytosanitary risks inherent in vegetal production. Systems of cultivation which are sparing in phytosanitary products and apply integrated protection principles (involving crop rotation, the technical itinerary of each crop and rationalisation of treatments, etc.) are being developed. Financial incentives are offered subject to outcome-oriented specifications in terms of reduction in the use of phytosanitary products.

A number of studies and reports (World Bank, 2007; Ramadan, 2006) emphasise the link between a polluted environment, water quality, poverty and public health. In Egypt,

¹⁶ - World Bank, *Human Development Report*, 2005, report of the Centre d'information et d'aide à la décision du Conseil des ministres, 2007.

¹⁷ - UNDP, *Human Development Report*, 2005. Over the period 1988-2004, official data show that quantities of pesticides used fell by an average of 950 tonnes per year, a fall of 16.74% in the average quantities used from 17,000 tonnes to 1,900 tonnes in 2004 (*Egyptian Journal of Agricultural Economics*, June 2006). Although over-estimated, this decline is confirmed by international sources.

access of the population to good quality water is a critical problem, as confirmed by recent demonstrations by Delta villagers. The water is contaminated at source (the Nile), water treatment is inadequate and the distribution grids have deteriorated. Since the industrialisation of the Delta in the 1950s (chiefly the textiles and chemical industries) some 4,000 factories discharge their waste into the Nile (12% treat it, 14% treat it partially and 74% do not treat it at all). Added to this is the pollution caused by agriculture and discharges of solid waste into irrigation channels. Thus, in the month of January, which is the period of maximum pollution of the Rachid branch (one of the two branches which form the Nile Delta), the water pollution rate is 20 times higher than the permitted level and causes the death of thousands of fish. Tests on samples of drinking water, moreover, showed levels of heavy metals in the water 5 to 10 times higher than permitted levels. The poor water quality is aggravated by the lack of a drainage system and the age of the supply grids.

Treatment of solid waste in Egypt

For some ten years, Egypt has been experiencing a form of recurrent pollution linked to the lack of means of treatment of solid waste, especially production waste. With the constant expansion of rice cultivation in the Delta each year, large quantities of straw are burned by the producers. This practice produces a pall of smoke (commonly called by the population and the national press, the "Black Cloud") which covers a large part of the Delta and the city of Cairo for several days. Despite the adverse effects on the well-being of the population and in the longer term on health, the public authorities have not introduced concrete measures to stop or limit this practice, nor have they carried out any research to find an alternative solution, process the straw or recycle it.

The average quantity of agricultural waste produced by a small agricultural village of 3,000 inhabitants in the Delta can be estimated at 740 tonnes per production cycle and household waste at 1.5 tonnes per day. The lack of collection and treatment of this solid waste has an adverse impact on the quality and volume of irrigation water and the health of the population. The pollution is harmful to the villages situated downstream from the channel.

Managing wooded areas

In the Mediterranean region, it is preferable to consider wooded areas rather than forest alone. In Spain, Greece and Turkey, other woodlands (scrubland known as *matorral*, *garrigue*, *maquis*, wooded steppe) account for about half of the total wooded area, and in North Africa, about one third.

Planting

Today, the situation on the two shores of the Mediterranean Basin is very different. In all the countries of the North, the forest is expanding apace, both in area and volume of standing timber. This is due to the retrenchment of agriculture which, during the 20th century, was reflected in the progressive abandonment of agriculture and livestock farming in most marginal land, which became unprofitable in a context of extended agricultural markets. The growth in wooded areas due to the recolonisation by natural vegetation was further amplified by reforestation by forestry departments.

Map 2 - Proportion of forest, woodland and agricultural land in the Mediterranean, 2005

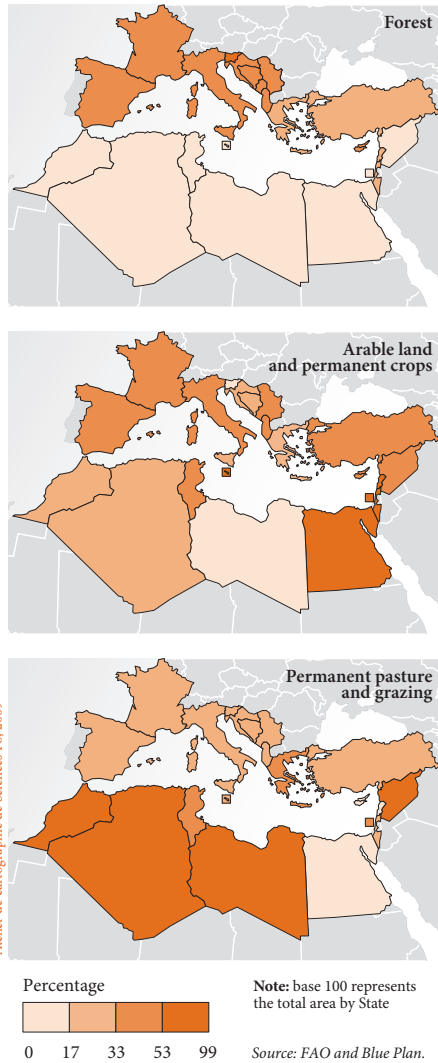
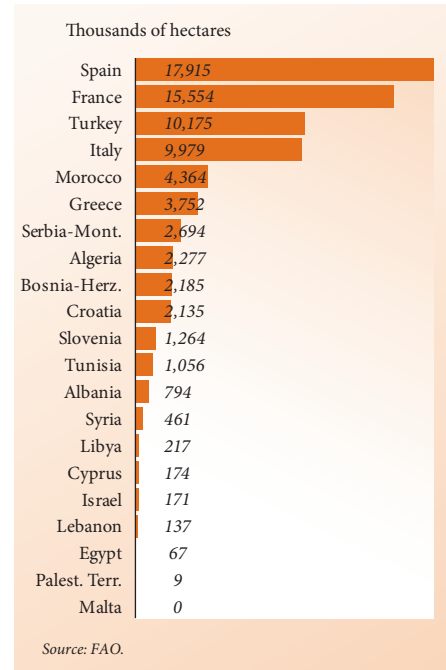


Chart 5 - Forested area, 2005



In Spain, the forestation rate (indicator AGR_C19) rose from 23.3% to 35.01% between the first forest inventory (1965-1974) and the third (1997-2006). In France, the rate is higher in the Mediterranean zone (43.4%) than at national level (29%). The preliminary results of the second Italian National Inventory of Forests and Carbon Reservoirs (IFNC)¹⁸ estimate the total area of forest resources at 10.7 million hectares.¹⁹ The forested area covers 35% of the territory of Italy (of which 90.5% is forest and 9.5% other woodlands) and 5%

of the European total. In the last twenty years, it has grown steadily by 7.2% resulting in a threefold increase in the total area since 1920.

Conversely, in the countries of the South and East, wooded areas are still under enormous pressure: clearing and cultivation of marginal land, over-grazing, over-exploitation for firewood. It appears, however, that for a few years in many places the situation has been

¹⁸ - www.ifni.it

¹⁹ - 218,000 hectares of fruit trees are added to commercial forest areas (poplars, walnut trees, cherry trees and oaks).

stabilising. This is true of Tunisia where human and animal pressure on forest zones is higher than the national average,²⁰ but seems to be falling due to more intensive efforts at reforestation: from 5,000 to 6,000 hectares per year up to the mid-1980s, it reached 15,000 to 21,000 hectares per year during the 10th plan 2002-2006. At the same time, the success rate (number of successful attempts/number of plantings x 100,) improved from 55% to 70%. These efforts at reforestation of forest and pastoral areas increased the forestation rate (indicator AGR_C19) from 9.6% in 1994 to 12.5% in 2006.²¹ If they continue, the overall coverage level should reach 16% in 2011 and exceed 18% by 2015-2020. In Algeria it is 11% – excluding the Sahara – (Mezali, 2003), and the Government's objective through the National Reforestation Plan (NRP) is to achieve 18% between now and 2020.

In Morocco, forest covers some 9 million hectares, but is retreating by close to 31,000 hectares annually, for several reasons: strong demand for wood products, cutting for firewood which exceeds re-growth, death before reaching adulthood of 40% of young plants, direct clearing, over-grazing and urbanisation. Several measures to conserve, restore and develop these resources have been taken but are still inadequate. The lessons drawn from them have led to the adoption of a new integrated, global and participatory approach to management and conservation of resources and the soil. Two major intervention frameworks are worth mentioning: the National Action Programme to combat Desertification (NAP 2001) and the National Watershed Management Plan (1995). It is planned to reforest 15% to 20% of the area each year, but the current reforestation rate is only 9%. Eight years ago, the High Commission for Waters and Forests adopted a Reforestation Master Plan which envisaged reforestation of 50,000 hectares per year. The objectives were not achieved: at the end of 2004, the total reforested area was 553,590 hectares, or 5.5% of the total forested area. One hectare requires between 6,000 and 10,000 dirhams and the resources allocated to reforestation fell from 200 million dirhams during the decade of the 1990s to 80 million in 2006.

Economic dimension of the forest

One hectare of temperate forest (or a Mediterranean forest well supplied with water) can make annually 10 to 20 tonnes of dry biological matter, half of which is wood which accumulates in the trees and half other matter following an annual cycle. "Normal" Mediterranean forests are generally much less productive (1 to 10 tonnes of dry matter per hectare per year).

The low productivity of the Italian forest (only 3 m³ per hectare per year produced) and the limited use of wood (some 10 million m³) places the country bottom in the European rankings. This situation is in part determined by the relatively small average size of forestry plantations (less than 7 hectares) which prevents optimal management. 65% of the wood produced, of low quality, is used as an energy source. The production of renewable energy from biomass, which accounted for 20% of renewable energy generated in 2004 at national level still covers only 2.5% of total energy needs compared with a European average of 3.5%.

²⁰ - With 90 inhabitants per km² (population density higher than the national average), 1 Tunisian in 10 and 1 rural dweller in 4 lives in a forest zone from which their resources, directly or indirectly, are chiefly drawn.

²¹ - Ministry of the Environment and Sustainable Development, National Report on the State of the Environment, 2006.

In the countries of the North, although some revival of the use of firewood is likely, using highly automated methods (briquettes), the higher average costs than in the forests of other regions, which are more accessible and more productive, limits its development. Furthermore, the Mediterranean region seems ill-suited to the development of powerful second-generation biofuel or heavy wood-based biochemical chains.²² Conversely, “niche” products could be developed.

In Italy, problems of a technical, economic and fiscal order are still holding back the use of biomass as an energy source. The activation of short chains or local markets should encourage development of this sector. In 2004, the quantity of bio-energy produced in Italy reached 5,220 kilo tonnes oil equivalent (ktoe), of which 1,305 from waste and 3,300 from firewood. In 2003, total bio-energy produced by the agricultural and forestry sectors was 434 ktoe and 1,153 ktoe respectively.

The lack of continuity in the Italian wood production chain makes the sector highly dependent on imported foreign wood, the effect of which on the trade balance is only offset by the high level of exported finished goods (furniture). The share of forestry production in the primary sector is still extremely marginal. During the last twenty years, the average value of raw timber production was only just over 1% of total production in the primary sector and 1.45% of its added value. Wood transforming enterprises represent 3.7% of the sector and are small-scale (3-4 employees). However, although labour productivity is modest, the wood industry is still inseparable from the highland rural economy. It offers many interesting development possibilities linked to clean technologies.

In Turkey, it is a very important sector: 14.7% of the national population and 49.5% of the rural population live in forest villages. Some 50% of wooded areas in Turkey are productive forest (10,225 million hectares), the rest consisting of degraded forest and grazing. During the last fifteen years, State forests have produced an average of 7 million m³ of industrial timber per year. Each year, 111 million dollars are invested in the sector (Konukcu, 2001) (779 watchtowers, fire fighting teams whose numbers are doubled in the risk season, 142,776 kilometres of forest roads, 8,899 kilometres of fire-breaks...).

Forestry resources also play a strategic role in protection and development of the environment, biodiversity, the hydro-geological system and landscape and alleviation of climate change. Although hard to evaluate in economic terms, these functions determine the multi-functional nature of the forest heritage. Forest management is increasingly oriented towards service activities and the adoption of sustainable management practices. Spanish forestry systems are generally multifunctional, with a clear predominance of ecological and protective functions in the Mediterranean zone where productivity is actually very low. But although the profitability of direct production is low, the environmental importance of its wooded areas in the broad sense is very great. In certain cases, however, this low profitability has led to the abandonment of agriculture and farming practices, which led to deficient forestation patterns by affecting their environmental functions and threatening their survival in the face of the spread of diseases and fire.

²² - 400,000 tonnes of biofuels were produced in France in 2004. The Agricultural Orientation Act and the Energy Orientation Act envisage a 7-fold increase in areas devoted to energy crops which accounted for 301,000 hectares in 2004, but probably not in the Mediterranean part.

Resilience of the environment, degradation and fires

The wooded Mediterranean ecosystems have demonstrated great resilience in the context of the stable climatic conditions of past centuries. They were then capable of returning to their previous state in a few decades (fifty to one hundred years for forests, ten to thirty for scrubland – *maquis* and *garrigue*), even after a major disturbance such as fire or temporary cultivation.²³ Today, a state of dynamic equilibrium has been established between fires and the natural reconstitution of the wooded areas after a fire. When fires are not too frequent, this equilibrium is to the benefit of the wooded areas which are expanding in the majority of countries of the Northern shore due to the decline in agricultural, pastoral and forestry pressures. What will happen in the future, when the fire risks are higher and difficulties of regeneration greater? Controlling major fires will be both more vital and more difficult. Some recent facts are alarming: 200,000 hectares burned in Greece during the summer of 2007, 300,000 hectares of forest burned in Portugal in 2003, a heat wave year, but which could seem normal by the end of the century (Plan bleu, 2008b).

Spanish forests are faced with a high risk of fires, which could be reduced if the treatment of forest plantations was improved by developing sustainable forest management, exploitation of biomass or traditional livestock farming practices. Livestock farming and exploitations of certain species traditionally well suited to their original environment have become beneficial practices which contribute actively to the clearing of undergrowth and thickets. It helps to prevent forest fires, with a positive effect both on the vegetation of hillsides and control of self-propagating plant species in natural pastures and fallow land, thanks to the selective pressure exerted on particular herbaceous species.

The Greek forest, which covers 20% of the national territory, chiefly in the uplands, offers a converse example of appropriate management. Essentially state-owned, it is governed by a restrictive legislative principle, limiting the possibilities of exploitation. Such a situation, allied to a lack of maintenance, has led to high exposure to the risk of fires which regularly ravage the national forest heritage, and the situation has been growing worse in the last ten years (1999, 2003, 2007).

Data from the Conecofor monitoring programme on the state of the Italian forests also shows a worrying situation: from the 255 observation points (7,000 trees) defoliation has been detected in 40% of cases. Data for the last ten years show severe defoliation in 18% of trees in 1993 and 36% in 2004. The time series of forest fires since 1980, despite major fluctuations due to climatic conditions, shows a slow reduction in the areas concerned. On the other hand, there was an increase in the number of fires which seems to have stabilised very recently. In 2005, 8,000 new fires were recorded and 47,500 hectares burned according to the Italian Forestry Service (Corpo Forestale dello Stato, 2006). In Italy, the lack of strategic planning, problems of eco-friendly forest management and the abandonment of pastoral and production activities due to the exodus of upland dwellers are considered to be the chief causes of the problems of preserving forest biodiversity.

²³ - If a forest burns on average once every hundred years, it will grow back as forest. But if it burns every twenty years, it will degrade into dry grassland. Conversely, if scrubland does not burn for fifty years, it will spontaneously and naturally be transformed into forest. The only phenomenon which is irreversible over a century is massive erosion. This occurs fairly rarely after a fire, but much more frequently in the case of clearing and ploughing of steep hillsides.

In Turkey it is considered that it was ancient practices of rural communities which led to over-exploitation of natural resources: 50% of the causes of degradation are attributed to them. Over the period 1963–2004, 1.9 million hectares have been reforested. Parallel to this, despite these efforts, 528,000 hectares of forest perished to fire and 473,000 hectares of land were excluded from the forest regime as a result of various laws. Turkish legislation does not grant amnesties for crimes against the forest. With the aim of preventing forest fires, the State has taken steps to raise public awareness, improve the structural organisation and strengthen the capacities of administrations and technical services.

Despite these increasingly numerous fires, the forest is showing a net gain in all the countries of the northern shore by the natural process of vegetation without the need, other than in exceptional cases, to reforest artificially after a fire. This spread of generally very overgrown wooded sectors, on the other hand, explains the increased number of fires. Prudent management of the forests and wooded areas is therefore more necessary than ever.

The forest and the test of climate change

The question is to what extent will the remarkable resilience demonstrated by wooded areas in the face of a known climate continue in the case of global climate change which is likely to be unfavourable for vegetation throughout the Mediterranean Basin and especially the arid and semi-arid zones. The rise in maximum summer temperatures, the lengthening of the dry season and the higher probability of seeing several dry years in succession will increase plant mortality. The regeneration of wooded ecosystems will thus become more difficult and chancy. It will only occur properly in wet years or, rather, a succession of wet years, which will become increasingly rare. Conversely, old trees will survive even longer as they will have a large root system spreading through a vast volume of soil. In this way they can form seed reservoirs allowing them to wait through the long dry years until wet years propitious to regeneration return. With climate change, however, the risk of drought will continue to worsen and with that, the risk of fire

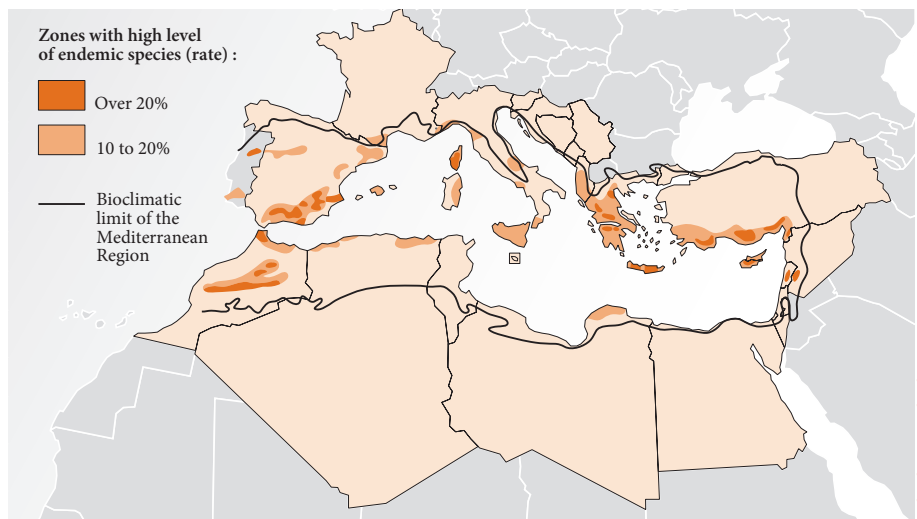
From the point of view of the distribution of species, especially insects, the effects of the recent warming of the last twenty years can be observed and could be reinforced in the future. In France, the face of the forest could change notably between now and 2100. According to a study by the National Institute for Agronomic Research (INRA) and Météo France, an increase of 2 °C in the average temperature would result in a tripling of areas under Mediterranean species such as the olive, holm oak and various species of pines. However, it would be the umbrella pine of the Landes and certain species of the South-West which would show the most spectacular advance.

While the forest may have much to fear from current changes in the climate, it should nevertheless be pointed out that it is a useful source of carbon to prevent the greenhouse effect. However, its role is relatively limited due to its low primary productivity, the scant accumulation of carbon in their soils and the increased risk of fire against a background of rising temperatures and decreased precipitation (in France, 14 million tonnes of carbon stored annually by the forest and 3 billion tonnes in the soil).

Haro²⁴ for bio!

The specific biodiversity of the lands bordering the Mediterranean and the large number of native species make the region a hot spot of global diversity. The diversity of landscape, which is the product of human occupation, the history of the region, the interlacing of agricultural land, pasture or woodlands and the changes in use over time, is also exceptional. Fires, paradoxically, provided that they remain small scale (a few hectares at most) tend to play a positive role, by maintaining open pioneering spaces in the mosaic.

Map 3 - The Mediterranean, sanctuary of world biodiversity, 2005



Source : Blue Plan from F. Médail and P. Quézel, "Hot-Spots Analysis for Conservation of Plants Biodiversity in the Mediterranean Basin", *Annals of the Missouri Botanical Garden*, 84 (1), 1997.

Climatic and human pressures

In the hardest climatic conditions, certain species could draw on their genetic diversity to adapt and their populations could evolve in situ and survive. Despite these possibilities of evolution, it is highly likely, in the course of the century, that we will see major shifts in the geographical ranges of the majority of them due to climate change. Each species will essentially keep the same pluviothermic area.

Situated essentially in the desert and partially in the lake zones (wetlands) in the North of the country, Egypt's natural spaces are characterised by their aridity but also by specific and fragile fauna and flora. The lake zones represent 25% of the Mediterranean wetlands and a unique ecosystem which shelters several aquatic species (Agrawala *et al.*, 2004). These environments are also an important natural habitat for numerous species of birds

²⁴ - "Haro" is a term which designated a legal protest with suspensive effect which had currency in the past, whereby one summoned a person to appear forthwith before a judge to complain in law in an action for civil damages which one claimed to have suffered.

and a migration corridor for birds from the North of Europe to Africa. Climate warming will increase the vulnerability of this ecosystem, as the rise in water temperature will seriously upset the natural environment.

In the case of Egypt, as elsewhere, climatic and human pressure combine together, such that the limits of resilience of Mediterranean ecosystems could be exceeded and irreversible changes could be unleashed. One of the best ways of combating the disastrous consequences of climate change, beyond the Kyoto Protocol, is to avoid this cumulative effect and thereby reduce the human pressures. According to the Egyptian national environment report, the principal factors in the destruction of ecosystems and threat to biodiversity are illegal hunting of the numerous migrant birds and certain rare species of gazelle, over-exploitation of plant resources and pollution caused by man which affects the wetlands and certain desert areas through tourist activities. Through its Ministry of the Environment (created in 1997) and the National Environment Agency (created in 1982), in addition to all the international conventions in the field of environment (biodiversity, climate change and desertification) Egypt drew up a strategy for the preservation of natural resources and biodiversity in natural areas. It is organised along four traditional lines: establishment of a system of management of natural resources, strengthening of scientific, technical and institutional capacity, mobilisation of all the actors, especially those of civil society, and strengthening and adaptation of the legislative framework to local conditions.

For its part, France ratified the Convention on Biological Diversity in 1994 and in 2004 adopted a national strategy for biodiversity which involves the implementation of sectoral action plans in favour of biodiversity. An action plan for agriculture was established to strengthen positive convergences and limit contradictions between biodiversity and agriculture so as to meet the challenges of maintaining profitable agriculture, protection and management of the environment and balanced and sustainable development of rural areas. To achieve this objective, the plan focuses on partnerships. Farmers must take these actions in conjunction with local actors, private business, associations and civil society in general

Five main orientations are proposed to improve the integration of biodiversity in French agricultural policy and in practices in the field: encourage farmers and their partners to take account of biodiversity in their local projects; spread farming practices which favour biodiversity and improve those which have a negative impact; protect and reinforce the diversity of genetic resources for agriculture and food; monitor the evolution of biodiversity in rural areas in conjunction with farming practices; strengthen awareness and capacities of actors in the agricultural sector, education, research and training to improve the relationship between agriculture and biodiversity.

The impact of agriculture on biodiversity

Between 1993 and 2003, a reduction of 600,000 hectares of pasture can be observed in France while cultivated areas increased by only 60,000 hectares. This phenomenon is cause for concern as it leads to the closing down of landscapes in highland areas, an increase in fire risk in the Mediterranean and affects biodiversity. On the other hand, the provisions on "wildlife" set aside land and the requirement for strips of grass in the

name of conditionality contribute to the preservation of areas favourable to wildlife, allow control of certain animals and insects harmful to crops, prevent the current decline in the index of abundance of species of birds common in agricultural areas. Furthermore, an increase is recorded in the diversity of varieties grown: in 1996, five varieties covered 70% of the area under soft wheat, while in 2001, the same proportion was covered by fourteen varieties.

The Italian peninsula is characterised by a wide biodiversity due to the immense variety of its habitats, in large part related to agriculture. Agricultural areas with a high natural value cover some 2.8 million hectares of UAA, or 21% of the agricultural area including forest areas with a high natural value. They are mainly concentrated in protected areas (including Natura 2000) which account for 20% of the national territory. Of these areas, 20% to 25% concern meadows and grazing especially. Agriculture, when linked to agro-forest areas with a high natural value and especially Natura 2000 areas, plays an important role in the preservation of biodiversity, the structure of traditional Italian landscapes and diversification in the rural environment.

This situation is not exceptional. In Spain, the Natura 2000 network covers an area of some 11.5 million hectares,²⁵ which is equivalent to almost a quarter of the national territory and includes 24.5% of forest zones. According to data for 2005, the UAA within Natura 2000 accounts for approximately 24% of the total UAA (or 6 million hectares) and 18.2% of the corresponding network of agricultural habitats which depend on extensive agricultural practices. In Spain, therefore, protection of biodiversity seems to be taken into account in the elaboration of programmes and measures concerning the agricultural sector and rural areas. Agriculture and livestock contribute directly to the protection of areas designated as of great environmental value, the only possible alternative to other economic activities in the secondary and tertiary sectors (which sometimes have damaging effects on the environment).

In the framework of rural development, agro-environmental measures, compensation payments and forestation of agricultural land also meet the objective of protection of biodiversity and habitats of Community interest. These measures were introduced in Spain in the framework of a global rural development strategy, directed towards a model of sustainable and multi-functional agriculture and a model of protection of the ecological heritage. Over the period 2000-2006, the budget for this aid was 1,194 million euros (of which 65% was financed by the EU for Objective 1 Zones and 40% for other zones). In order to push farmers to fulfil these conditions and make things easier for them, the Ministry of Agriculture drew up a "Guide on Conditionality" in which the forms for each aspect mentioned can be consulted.

Despite that, all the international studies show a general decline of biodiversity in all its components (genetic diversity, diversity of species and ecosystems). In spite of its fundamental importance and the services provided by ecosystems, human activities are leading to its loss at an unprecedented pace, up to 1,000 times the natural rate of loss of species. The biggest culprit over the last fifty years has been the transformation of habitats, chiefly due to the conversion of natural and semi-natural ecosystems into

²⁵ - This figure is close to 13 million hectares if marine zones are included.

agricultural land. The concentration of nutrients, especially nitrogen and phosphorus, largely from fertilisers and agricultural effluents is one of the principal drivers of change in terrestrial, freshwater and coastal ecosystems (UNEP, 2008).

Climate change will become in its turn one of the chief culprits of the loss of terrestrial biodiversity and a serious challenge for agriculture which, to adapt, will need to resort to the genetic diversity of crops and livestock, services provided by other components of agricultural biodiversity and alternative solutions. In this regard, aromatic and medicinal plants could offer a promising alternative for the rural areas of Morocco. Estimated at between 500 and 600 species, exploiting them could allow the export of 1,000 tonnes of essential oils and other extracts and some 400 tonnes of dried herbs. Currently, demand for products exported in the form of dried plants for the herb trade and food flavourings has spread from France to the United States, Japan, Spain, Switzerland and Germany. There is considerable potential for the development of two systems of production of natural and spontaneous plants. Their use for medication, conservation and flavouring of foods is entrenched in society. In regions where vegetal resources are found, they serve as a lever for local development, provided that growing this kind of crops can surmount the difficulties of a technical and organisational nature, starting with education and training in the sustainable management of natural resources.

Protecting biodiversity

With an index estimated at 0.55 against a European average of 0.43 and a maximum of 0.59, the level of biodiversity in Greece is one of the highest in the European Union. There are two reasons for this. Firstly, human intervention has been relatively benign up to now and, secondly, most of the ecosystems are situated, due to the geomorphology of the country, in mountain areas, thus contributing to the maintenance of this biodiversity.

Prior to the introduction of the Natura 2000 network by the European Union, protected zones accounted for only 3% of the Greek national territory. Unlike other European countries, they were all incorporated into the Natura 2000 network which, in 2006, covered 19.1% of the total area of Greece. This high figure can be explained to a large extent by the fact that the programme was seen at local level as an opportunity to finance management of natural resources. However, of the 359 zones classified Natura 2000,²⁶ only 27 have established management authorities.

Tunisia displays a great diversity of terrestrial ecosystems in bioclimatic and geographical terms. It has more than 250 wetlands, natural or artificial, not including upland dams and lakes. To protect these vulnerable ecosystems, Tunisia has created a network of protected zones composed of 8 national parks and 16 nature reserves, as well as 3 other protected zones, currently being developed²⁷. With a percentage of protected areas (indicator AGR_C17) of 10.6% in 2006, the objective of the MSSD up to 2010 (10% of ecosystems granted the status of protected area) has already been achieved in Tunisia.

²⁶ - Of the 359 Natura 2000 zones approved by Decision 2006/613/EU, 239 have the status of Community interest zone, 151 are special protection zones, and 31 have dual status.

²⁷ - Ministry of the Environment and Sustainable Development, *État de l'environnement*, 2006.

Table 6 - Protected zones in Greece

	Number of zones	Area (ha)
Fully protected natural zones	2	748
Forests of aesthetic quality	19	32 506
Nature reserves	5	4 323
Classified natural sites	51	16 840
Wet biotopes (Ramsar)	11	167 301
Zones scheduled as World Human Heritage	2	34 087
Biodiversity reserves	16	22 261
Total		346 908
Natura 2000 Zones (in 1998)	264	2 200 000

Source: Ministry of the Environment, Planning and Public Works.

Protection of natural sites in Tunisia

Among the protected areas in Tunisia, the Ichkeul natural ecosystem in the North of the country is registered under three international conventions. This national park was subject to a number of pressures from the early 1990s to 2000, with a slowdown in inflows of fresh water into the lake and a reduction in the area of marsh due to agricultural development works which increased the salinity of the waters, the degradation of the park's ecosystems and a decline in the number of migrating birds wintering on the lake. The combined efforts of all the stakeholders managed to restore the balance of the ecosystems and rehabilitate the park. In July 2006, it was removed from the list of world heritage natural sites in danger and its many functions were restored: environmental, economic, social, tourist, cultural and leisure. It is now one of the three national parks which have a development plan to consolidate sustainable management of these protected zones. In 2006, the Tunisian Government also carried out a census of over 80 natural sites which will progressively become the focus of protection programmes as a special natural site.

With 11 national parks of which 4 are biosphere reserves, 5 natural reserves, 4 hunting reserves and 5 cynegetic centres and 26 Ramsar (wetlands) sites, Algeria has 11% of protected areas out of the national territory. By 2010, the country plans to create 4 national parks with an area of 620,000 hectares, 5 natural reserves with an area of 500,000 hectares and 10 livestock centres.²⁸ Morocco, for its part, has a total of 113,156 km² or 16% of protected areas spread between national parks, biosphere reserves and biological reserves (cf. table 7).

In Turkey, this indicator increased by almost 76% over the period 1990-2004 continuing to grow at a rate of 5.16% in 2004. In Spain, it rose from 4.4% to 10.2% between 1990 and 2005.²⁹ In Italy, it is 10%.

²⁸ - Ministry for Development of the Territory and Environment, *Rapport national sur l'état et l'avenir de l'environnement*, 2003.

²⁹ - MAPA, *Facts and figures on agriculture in Spain*.

Table 7 - National parks, biosphere reserves and biological reserves in Morocco

Parks	Situation	Date of creation	Area (ha)
Toubkal	High Atlas	1942	38 000
Tazeka	Taza	1950	13 737
Souss Massa	Agadir and Tiznit	1991	33 800
Iriki	Zagora and Tata	1994	123 000
Al Hoceima	Al Hoceima	2004	48 460
Talassemtane	Chefchaouen	2004	58 950
Ifrane	Ifrane	2004	51 800
Eastern High Atlas	Errachidia and Khenifra	2004	55 252
Knifiss	Tan Tan and terfaya	2006	185 000
Total			607 999
Biosphere reserves			
Arganier Biosphere Reserve (RBA)	South-West	1998	2 500 000
Biosphere Reserve of the Oases of Southern Morocco (RBOSM)	Oases of Southern Morocco	2000	7 200 000
Intercontinental Biosphere Reserve of the Mediterranean (RBIM)	Tingitane Peninsula		1 000 000
Total			10 700 000
Biological Reserves			
Sidi Boughaba Reserve	Mehdia (South-West of Kenitra)	1974	650
Merja Zerga Biological Reserve	70 km North-West of Kenitra	1978	7 000
Total			7 650

Source: High Commission for Water, Forests and Combating Desertification.

The over-exploitation of the vegetal cover and the drying out of certain wetlands have endangered Egypt's natural spaces. However, since the late 1980s, the public authorities have introduced a protection policy whose chief instrument is the creation of natural reserves. Today, 24 reserves covering protected areas, or 10% of the national territory (it is planned to achieve 17% by 2017)³⁰ are distributed as follows: 10 in wetlands, 10 in desert zones and 4 in geomorphological zones (zones with rocky formations). Censuses carried out in the last ten years have helped in drawing up an inventory of different animal and plant species: 850 species classified as very rare and 567 species classified as

³⁰ - Egypt Yearbook, 2006.

Table 8 - Proportion of protected areas out of the total area of Turkey 1996 to 2004 (%)

1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
3.4	3.6	3.61	3.65	3.70	4.72	4.72	4.90	4.96	5.16

Note: These values differ (sometimes considerably) from those from international sources due to the definitions and classifications used, the legal status concerned or whether or not marine areas are included.

Source: Ministry of the Environment and Forests.

rare are in danger of disappearing. They also showed up gaps in the knowledge of some ecosystems and the need for information systems and databases.

Egypt has launched several projects for the census and protection of the genetic heritage, the most important of which since 2004 are:

- a project on the protection of medicinal plants which involves carrying out a census of local plants, practices and uses, establishing a database and drawing up an inventory;
- a project for a gene bank, the purpose of which is to take stock of and conserve the genetic heritage of local plants which are disappearing.

Table 9 - Census of animal and plant species in Egypt

Category	Number of species
Animal plankton	980
Arachnids	440
Insects	10 000
Mammals	132
Reptiles	91
Birds	515 Including 153 rare species and 17 species on the verge of extinction
Corals	276
Sponges	73
Fish	793
Molluscs	552
Aquatic plants in the Mediterranean	900
Aquatic plants of the Red Sea	13
Aquatic plants on the Nile	534
Desert plants	765
Plants specific to Sinai	527

Source: Ministry of the Environment, Report on biodiversity and natural reserves in Egypt, July 2006.

In Tunisia, the creation in 2003 of the National Gene Bank is a key component of the protection of vegetal and animal genetic resources. It came into operation in 2007, with valuable scientific equipment and a storage capacity for 200,000 samples. Its activity is centred around a network of groups in biological gardens where the number of species planted increased considerably between 2004 and 2006. The project is accompanied by an inventory of vegetal and animal species, especially those in danger of extinction, such as certain varieties of pear, the Slougui dog, the Mogod horse, the Nejdi cow, as well as the elaboration of the (third) National Report on Biodiversity, giving effect to the provisions of the United Nations Convention on Biodiversity and a major awareness raising programme on protection, sustainable development and the value of components of biodiversity. Several other countries have drawn up an inventory of vegetal and domestic animal resources (indicator AGR_C18). These include France and Algeria, where part of the available data was compiled by a research team. A 21-volume inventory of the entire Algerian biodiversity was produced as a result of their work.

Since the adoption in 1990 of a law on the protection of vegetal genetic resources in Greece, an inventory of vegetal genetic resources has been regularly updated by the National Agronomic Research Institute, Thessaloniki. The corresponding gene bank is being created and from 1995 to 2005, thanks to field work carried out throughout the country, the number of species listed rose from 7,220 to 10,650. The national programme for the creation of a gene database, financed by the operational programme for agricultural development 2000-2006, envisaged that a considerable number of missions would be carried out up to 2007, the objective being to record a further 4,000 species. Various institutions (universities and others) are also participating in the collection and maintenance of species. By way of example, the Cereal Institute, Thessaloniki has a collection of 1,582 Greek samples relating to 57 types of cereal, and the Vine Institute, Athens has an almost complete collection of Greek vine varieties (567).

In accordance with the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN), the country has introduced, under the direction of the Hellenic Zoological Society, an inventory of species financed by the Operational Programme for the Environment. This list classifies the 645 species identified according to their risk of extinction. The categories are as follows: Extinct (1 species); Extinct in the Wild, Critically Endangered (17 species), Endangered (25 species), Vulnerable (53 species), Near Threatened (64 species) and Least Concern (444 species). Two additional categories concern species for which data is deficient or which have not been evaluated for lack of data (41 species). Despite this progress, it is estimated that only animal species (25%) are known, while very little reliable data have been collected on micro-organisms and fungi, and only 700 animal species and 900 plant species are protected by law.

Research into preservation of natural resources is undertaken by agronomic and environmental schools or departments of universities and the National Agricultural Research Foundation and its various specialist research centres (Cereal Institute, Vine Institute of Athens, Institute of Olive and Subtropical Plants of Chania, Institute of Forest Research, Institute of Mediterranean Forest Ecosystems, etc) under the aegis of the Ministry of Rural Development and Food. They participate in various national and

European research programmes (EU-LIFE Nature, Interreg, Natura 2000, etc.) which offer the possibility of drawing up inventories and databases, organising a large number of exploratory missions throughout Greece and carrying out research work aimed at making more of genetic resources, such as the programme for the maintenance and promotion of the flora of the Balkans, financed under the Interreg IIIA programme.

Several Greek university laboratories are involved in the Natura 2000 programme and, under this umbrella, between 1994 and 1999, undertook a census, evaluation and mapping of Greek ecosystems, flora and fauna. The creation of regional universities allowed the development of new departments which play an increasingly active role in research into preservation of biodiversity. Unfortunately, budgets for research are not growing at the same pace. The national budget allocated to research into protection and management of the environment, it is true, increased almost threefold between 1995 and 2006 but its share (about 4.5%) has not increased. While research related to protection of natural resources and biotopes now accounts for 11% of environmental research compared with 5% in 1995, the share of that related to water resources fell over the same period from 19% to 9%.

Spain is particularly committed to conservation of biodiversity. It has equipped itself with an inventory of genetic resources of plants and domestic animals and a programme of conservation and utilisation of phylogenetic resources. In 1996, 13 of the 17 autonomous communities kept collections in the form of a germplasm bank, with the Phylogenetic Resources Centre of the National Institute for Agricultural and Food Research (INIA) acting as depository of the basic collections and data centre. Other bodies, such as the Higher Council for Scientific Research (CSIC) and the universities keep such banks, with special mention of the horticultural bank of the Polytechnic University of Valencia and the germplasm bank for autochthonous resources of North-West Spain in the Biological Mission of Galicia (CSIC). There is now in Spain a National Germplasm Bank of cultivated species and over 20 local banks devoted to specific crops.

Development models need adapting

A similarity can be observed in the evolution of agricultural production and practices in all the countries of the Mediterranean. While the impacts in environmental terms are more acute in the countries of the South and East, the causes, on the other hand, are wholly comparable. The intensification of land during the second half of the 20th century is a general trend now accompanied by an equally shared objective of reducing inputs and saving natural resources, especially water. Furthermore, the increase in irrigated areas, in quantity and percentage, is linked more to the immediate availability of resources than to the country's level of development.

The difficulty of maintaining in quantity and quality or renewing soil and water resources at the same rate as population growth affects both shores of the Mediterranean, despite a panoply of measures to optimise practices and limit their impact on the environment, such as the introduction of integrated cropping systems or conservation agriculture. Losses of arable land and biodiversity or the persistence of pesticide residues are examples which affect the whole region.

Differences in terms of efficiency of production and agricultural equipment between the countries of the North and those of the South and East should be highlighted. The disparities in equipment levels are greatest in water management in irrigated lands. The chronic shortage of water, of course, is not the prerogative of the SEMCs, but the differences in progress in terms of efficiency are still considerable. Levels of consumption of inputs (fertilisers and pesticides) set the Mediterranean countries apart, since those of the countries of the North are 10 times higher than those of the countries of the South and East, with the exception of Egypt and Turkey. A marked decline in the last ten years in fertiliser consumption in the North and a slight reduction in the quantities of inputs reported to the PIBA must not mask the efforts are still required. Finally, the intensity of phenomena emphasised above are not measured on the same scale between the countries of the North and the Southern and Eastern Mediterranean countries. In the latter, certain critical thresholds have already been reached and the concept of irreversibility accommodates the use of resources, often synonymous with non-renewal of arid and semi-arid zones (fossil strata, salinisation of soils, loss of fertility...). These effects differentiated between regions and ecosystems require specific policies capable of acting without delay both on the current destructive processes and in support of alternative endogenous processes.

Participation of local populations and sustainable management of rural areas

In the early 1990s, a more participatory approach in development strategies and programmes succeeded decades of centralised decision-making involving a top-down approach which did not involve local populations at any level of action, from design to implementation and monitoring and evaluation. The generally promising results of the first initiatives encouraged the extension of this participatory approach in the domain of agricultural and rural development to urban development also in the framework of local Agenda 21s.

In Tunisia, the Douar Development Plan (1994) in the North-West of the country is an eloquent example. Previously, the Sylvo-Pastoral Development Office for the North-West (ODESYANO) was involved in development missions centred on the geographical area, taking almost no account of the human factor. A research-action-training operation with German cooperation took place in 4 phases; identification of the needs of the population of each socio-geographical entity (or douar) and specific participation; technical feasibility, contribution of experts; planning; return to the populations and negotiation with the administration.

In Morocco, the Oued Lakhdar Basin Development Project,³¹ implemented between 1998 and 2004, was one of the first actions implemented in the framework of the National Watershed Development Plan. The project tried out a participatory and partnership approach to the sustainable small-scale management of natural resources, breaking away from large-scale management, over a short period and institutionalising the procedures for participation at various local levels. Of the 40 douar development plans, 26 have been implemented. The population affected by the project was larger than originally

³¹ - Classed among the basins with the highest risk of erosion.

planned (14,000 against 13,000 planned). 26 committees were set up, of which 16 were subsequently converted into recognised local development associations (LDA). At the end of the project, women had seats on the administrative boards of 7 LDA and the autonomy of the local organisations created was confirmed by development initiatives outside the scope of the project. The project was the starting point for a long-term programme whose objective was to improve on a sustainable basis the living standards of local communities and protect downstream hydro-agricultural facilities.

These experiences show both that the administrative approach on its own is not capable of managing this type of project and that a considerable task of education prior to economic development is required. Indeed, the level of education of farmers is a key factor in the success of projects which requires analysis of the question of collective “intellectual” investment.

Strengthening education and development research

One of the findings emerging from national studies carried out in the framework of the Ciheam/Plan Bleu partnership on Agriculture and Sustainable Development in the Mediterranean is the incomplete, indeed absence of knowledge of phenomena of regional importance which influence public policies and the evolution of societies. Indiscriminately projecting knowledge acquired in the North is a trap that it is vital to avoid.

It is quite astonishing that more is not known about a question as important as desertification. The evolution of policies from major works to programmes to combat exodus and unemployment shows a combination of poverty and desertification the sole effect of which is to drain funds under a minimalist approach incompatible with the participation of populations. The recent return to the land of a small farming family affected by globalisation is further justification of the value of local networked observation of priority areas which observatories strive to identify. Making these observatories accessible to communities would make them into more effective tools, as would linking their work to that of agronomic research, for example into forests and water consumption, catchment techniques, water storage rather than encouraging additional consumption, changing practices.³²

A return to greater pragmatism should at the same time refocus policies on longer-term priorities, greater stability and a grounding in reality of the concepts used. One can legitimately question the place of research in support of this thinking and implementation of the MSSD and, more generally, on the place of the whole system of creation and diffusion of innovation, in which the baton has been taken up by the private sector in the North but which is mostly non-existent in the South.

Integration of environment in public policies

One of the four general objectives of the MSSD is to improve governance at local, national and regional level through the introduction of instruments to allow stakeholder participation, integrated local approaches and decentralisation of responsibilities. These concepts are also those which have been applied in the framework of European

³² - Among them, conservation agriculture involves giving up ploughing, with the benefit of harvest residues which encourage the revival of life in the soil, facilitate infiltration of water and limit run-off.

Community actions in Italy since the late 1980s. The most innovative forms of public intervention in sectors of the economy and society are due to the stimulus given by the European Union in relation to national and regional policies. The Interreg, Leader, Equal programmes, territorial covenants, etc., for example, through the introduction of new tools, objectives, methods and procedures for intervention in the sphere of local development. The impact of this type of initiative on national and regional institutions for the implementation of national and regional policies is considerable, and highly eloquent in that it brought to light weaknesses and shortfalls of administrations and introduced modern ideas of public intervention.

With regard to rural development, these different methods of intervention at local level share, as well as crucial financial support, an approach centred in research and innovation. They operate within a well-defined area, adapted to the capacity of public finances, use different management tools, consider the needs of agriculture as a priority, focusing on rural problems rather than farms, involve local public and private actors and, lastly, manage funds in a decentralised manner, i.e. decisions are not taken by central government.

The decentralisation of the Spanish State and the application of the European Union development policy have also put into practice the principles of subsidiarity and co-management. This encouraged rural areas to take over the power of decision-making and management which formerly was the exclusive prerogative of the State administration, and contributed to strengthening the structuring and creation of the socio-economic fabric in areas which in the past had been somewhat fragmented. Nevertheless, one cannot point to success in every area, given the diversity of situations and the existence of certain negative aspects in the process of the emergence of democracy in rural areas (Ceña, Gallardo et Ortiz, 2005).

Since 2000, rural development programmes have incorporated environmental objectives in agro-environmental and forestry measures, eco-conditionality or the presence of an environmental strategic pillar. The Sustainable Development Plan (SDP) was introduced in the period 2001-2006 in the Los Alcornocales natural park, the third largest protected area in Andalusia. It marked the transition from a sectoral and vertical approach to a territorial vision of policies and horizontal coordination of activities, demanded the commitment of regional government and took into account pre-existing local initiatives. In this sense, the SDP is a participatory plan. Its success depends on the involvement of local society in the zone of socio-economic influence of the natural park. In its own way, it becomes part of policies for the protection of nature and the countryside, management of natural resources and sustainable development. The process has been supported by leading research, thanks to links between universities, research centres and local production. The ultimate goal of the SPD was to improve the standard and quality of life of the population in the zone of influence of the natural park in a way that was compatible with protection of the environment, considering the protected natural area as a major asset in the development of the local economy.

Bibliography

Aït Kadi (M.), Benoit (G.) and Lazarev (G.), "L'union pour la Méditerranée face aux crises alimentaire, de l'eau et du climat", paper written for the conference *Faire face aux crises de l'eau en Méditerranée. Quel rôle pour l'Union européenne?*, Paris, Sciences Po, 29 May 2008, 27 p.

Bedrani S. 2003. Développement et politiques agro-alimentaires dans la région méditerranéenne. Algeria Report.

Ceña, F., Gallardo, R. and Ortiz, D. (2005) *Rapport final portant sur l'étude institutions et organisations du développement rural en Espagne*. Project: PAR-PAA. Champ III: Développement rural et politiques agricoles dans le contexte de la mondialisation IAMM.

Cirad-INRA, "Pourquoi une prospective Cirad-INRA sur les systèmes agricoles et alimentaires mondiaux à l'horizon 2050?", Édito, *Agrimonde*, May 2008.

Eurostat, *Environmental Statistics in the Mediterranean Countries*, Brussels, European Commission, 2006.

FAO, 2005. Utilisation des engrais par cultures en Algérie. 56 p.

Konukcu (M.), *Forests and Turkish Forestry*, SPO, 2001.

Mesli M E. 2007. L'agronome et la terre. Editions Alpha. 279 p.

Mezali M, 2003. United Nations Forum on Forests. National Report. Algiers, 4 November 2003

Plan Bleu, *Les Perspectives du Plan Bleu sur le développement durable en Méditerranée*, Sophia Antipolis, Plan Bleu, 2005, 428 p.

Plan Bleu, *Les Perspectives du Plan Bleu sur le développement durable en Méditerranée*. Sophia Antipolis, Plan Bleu, 2008a, 26 p.

Plan Bleu, *Changement climatique et énergie en Méditerranée*, part 3, chapter 9, study prepared for the EIB, Sophia Antipolis, Plan Bleu, 2008b.

Plan Bleu, *Stratégie méditerranéenne de développement durable*, Athens, UNEP-PAM, June 2005.

UNEP, *Biodiversity and agriculture. International Day for Biological Diversity*, Bonn, 22 May 2008, 56 p.

Wittfogel, (K.), *Le Despotisme oriental*, Paris, Éditions de Minuit, 1964.

National studies

Abdelhakim (T.), National Study - Egypt, Plan Bleu-Ciheam, May 2008.

Ahouate (L.), National Study - Morocco, Plan Bleu-Ciheam, May 2008.

Ceña (F.) and Gallardo (R.), National Study - Spain, Plan Bleu-Ciheam, May 2008.

Civici (A.), National Study - Albania, Plan Bleu-Ciheam, May 2008.

Elci (A.), National Study - Turkey, Plan Bleu-Ciheam, May 2008.

Goussios (D.) (coord.), National Study - Greece, Plan Bleu-Ciheam, May 2008.

Hassainya (J.), National Study - Tunisia, Plan Bleu-Ciheam, May 2008.

Le Goff (A.) and Seiler (A.), National Study - France, Plan Bleu-Ciheam, May 2008.

Mantino (F.), National Study - Italy, Plan Bleu-Ciheam, May 2008.

Moulai (A.), National Study - Algeria, Plan Bleu-Ciheam, May 2008.



CHAPTER 2

REVISING WATER STRATEGIES

Gaëlle Thivet (Blue Plan) and Mohammed Blinda (Blue Plan)

In the countries bordering on the Mediterranean water resources are limited and unevenly distributed in terms of space and time. Three countries – France, Italy and Turkey – alone account for half of total rainfall, whereas the countries in the South together receive only one-tenth of the total volume. Twenty million Mediterraneans do not have access to drinking water, particularly in the rural areas in the countries in the South and East.

The context of growing shortages in part of the region and the uncertainty in connection with climate change make it all the more necessary to adapt water management and sectoral policies, to manage the various uses of water more efficiently, and to use resources more economically and to optimal advantage in order to meet the needs of the populations and current and future development needs. From this point of view, irrigated agriculture, which is the primary water consumer, holds the greatest potential for economising water consumption in the Mediterranean region. As a means of “sharing” water resources, which are unevenly distributed throughout the world, particularly in the Mediterranean region, strategies for importing virtual water in connection with international trade in agricultural commodities could also help to cope with water crises and shortages in that region.

Trend in agricultural water demand incompatible with the trend in available resources

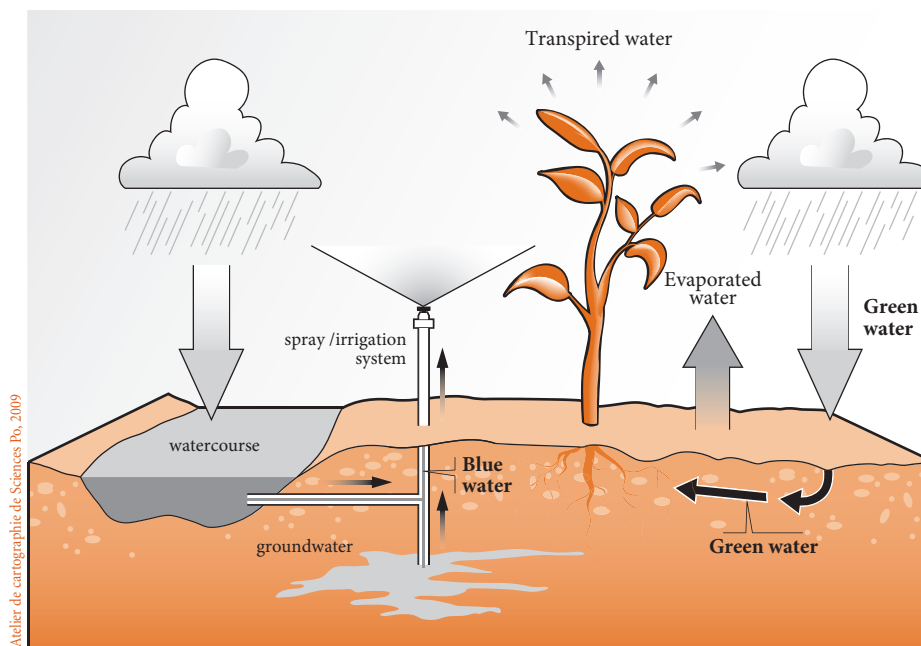
Irrigation, the primary water consumer, rapidly expanding

Of all water consumers in the Mediterranean, irrigated agriculture consumes the largest volume: having to contend with a precipitation deficit and growing export demand and/or demand in the southern and eastern countries, it is one of the main driving forces behind water demand: it accounted for 64% of overall demand in 2005 (45% in the North and 81% in the South and East).

Total water demand is defined as the total volume of water needed in order to satisfy the needs of the various users: agriculture, for irrigation purposes, domestic users, industrial users, and so on. It is the sum of water abstractions from resources (95% of the total), non-conventional production (desalting, reuse of treated wastewater, etc.) and water imports, and it differs from final water consumption by users in that it also includes all water losses during transport and use.

Agricultural water demand, on the other hand, is the sum of the quantities of irrigation water (still referred to as “blue water”), which are obtained from surface or groundwater and brought to plants by “artificial” means; it includes losses in distribution networks due to seepage and evaporation and the quantities of rainwater absorbed directly by plants and known as “green water” (cf. Figure 1).

Figure 1 - Green water, blue water and water evapotranspired by crops



The relative shares of green water and blue water in total crop consumption can vary considerably. Efforts to mobilise blue water aim to overcome the constraints of water shortage and rainfall variability; they generate much higher costs than does the use of green water. Table 1 presents an estimate of the volumes of blue and green water mobilised for agricultural production in the Mediterranean. It shows that irrigation water accounts for almost 30% of the total volume of water mobilised for agriculture throughout the Mediterranean and that this rate is over 50% for the countries in the South.

The irrigated acreage has more than doubled in 40 years, totalling 24,000,000 ha in 2005 (11 million in the North and 13 million in the South and East). The largest increases in absolute value have been recorded in Turkey (3.1 million ha), France (2 million ha), Spain (1.5 million ha), Greece, Syria and Egypt. It has also increased considerably in the Maghreb countries (1.53 million ha – 0.56 million in Morocco and 0.34 million in Algeria).

The share of irrigated land, although large, must be seen in proportion, since it accounts for only 20% of all arable land and permanent crops; rain-fed agriculture and pastoralism

Table 1 - Shares of rainwater and irrigation water in Mediterranean agricultural production in 2005

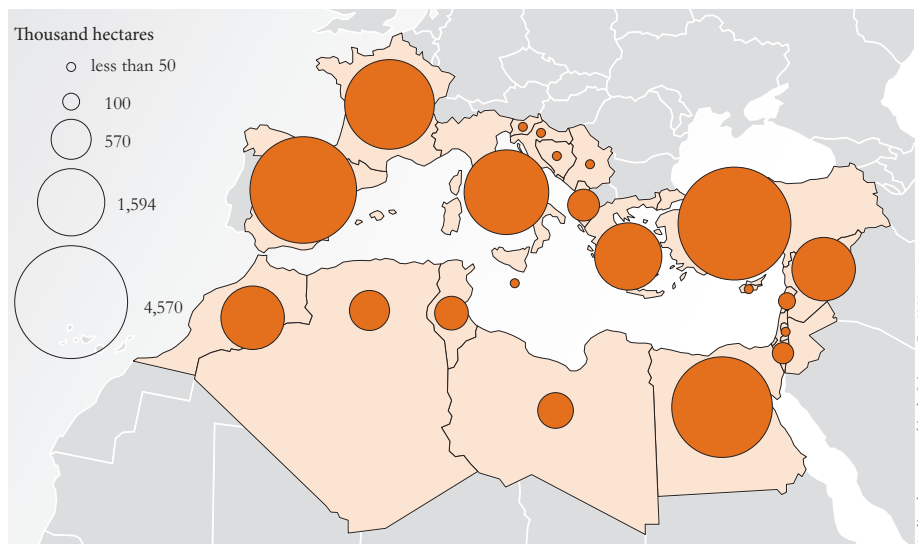
Quantities of water (km ³ /year)	Sub-regions of the Mediterranean Basin (countries taken as a whole)			Total
	North	East	South	
Blue water demand (irrigated agriculture)	58 17%	47 32%	77 52%	182 29%
Green water demand (rain-fed agriculture)	276 83%	101 68%	70 48%	447 71%
Water mobilised for agricultural production (blue water + green water)	334 100%	148 100%	147 100%	629 100%

N.B.: The three sub-regions comprise the following countries:

- North: Spain, France, Italy, Slovenia, Croatia, Bosnia-Herzegovina, Montenegro, Albania, Greece, Cyprus, Malta;
- East: Turkey, Syria, Lebanon, Palestinian Territories, Israel;
- South: Egypt, Libya, Tunisia, Algeria, Morocco

Source: Blue Plan (Blinda & Margat) (2008).

Map 1 - Irrigated area in the Mediterranean countries, 2005



Sources: FAO Aquastat, WDI, Blue Plan (2008).

still occupy an essential place in Mediterranean countries. Irrigated land is very unevenly distributed in the region:¹

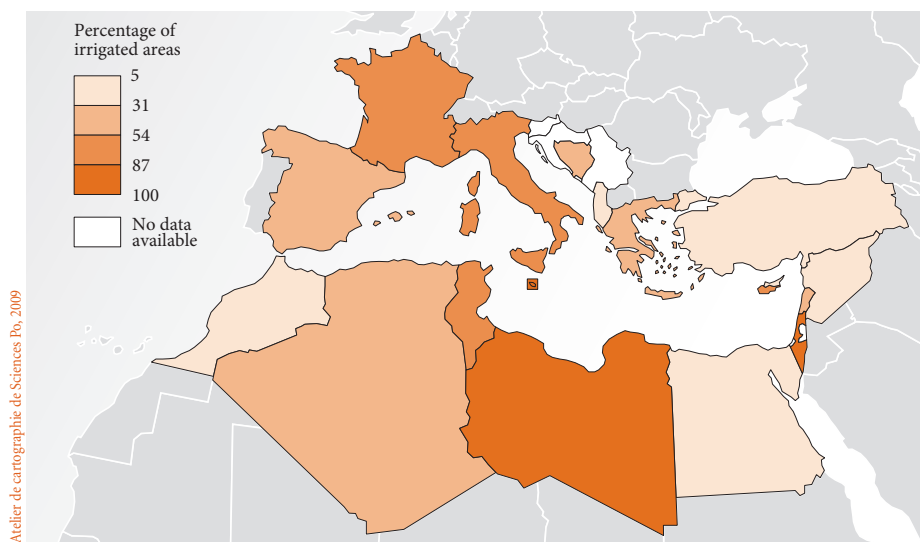
¹ - Sources: FAO, World Development Indicators (WDI), Blue Plan.

- Egypt, where 100% of acreage under crop is irrigated, remains a unique case. The broader issue of rural development is thus different in Egypt to other Mediterranean countries, where rain-fed agriculture and rangelands are generally predominant;
- the share of irrigated land is only low in the countries of the eastern Adriatic apart from Albania (Slovenia, Montenegro, Croatia and Bosnia-Herzegovina);
- in most of the other countries bordering on the Mediterranean the share of irrigated acreage is high; Israel (51% of arable land and permanent crops), Albania (51%), Greece (42%), Lebanon (31%), Cyprus (29%), Italy (25%), Syria (25%), Malta (22%), Libya (22%), Spain (20%), Turkey (17%), Morocco (15%), France (14%), Palestinian Territories (9%, but 63% for the Gaza zone alone), Tunisia (8%) and Algeria (7%).

Although gravity-fed irrigation is predominant in the Mediterranean, considerable efforts have been made in the past few years, particularly in the southern and eastern countries, to modernise plot irrigation systems by developing spray systems and drip irrigation techniques. The share of acreage equipped with modern systems in total irrigated acreage still varies from one country to another (cf. Map 2).

The water consumption index per irrigated hectare calculated for the Mediterranean countries in the period from 2000 to 2005 also shows widely varying situations (cf. Chart 1), blue water consumption per irrigated ha ranging from approximately 1 000 m³ (Croatia, France, Slovenia) to over 16,000 m³ (Egypt) per year. This consumption index depends on factors such as the type of crop, climate conditions (rainfall input, its influence on crop evapotranspiration), the plot irrigation system (water-greedy or economical), etc.

Map 2 - Share of irrigated acreage equipped with spray or drip irrigation systems, 2005



Sources: Blue Plan, FAO Aquastat.

The physical efficiency of irrigation water, which is the product of the efficiency of upstream irrigation water transport and distribution networks supplying agricultural parcels and the efficiency of the actual plot irrigation system, is shown to be between 35% and 90% in most Mediterranean countries (cf. Annex 1).

Analysis of blue water demand per sector shows that in most countries irrigated agriculture is the main user in terms of volume except in the countries of the eastern Adriatic and in France, followed by drinking water supply and then by industrial uses and the energy sector (cf. Chart 2).

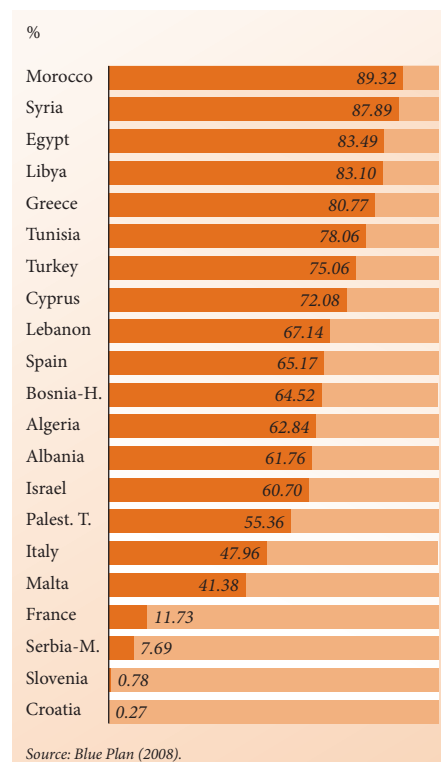
The development of irrigated acreage, which is of capital importance given its direct and indirect economic effects, should continue in countries which still have exploitable potential and which still allocate a significant share of public resources to large-scale hydraulic engineering projects.

In the North, the demand for agricultural water expressed in both absolute and relative values should be stabilised to a certain extent as the result of the stabilisation of, or slight increase in, irrigated acreage. The outlook is for rapid growth in the demand for irrigation

Chart 1 - Irrigation water demand per irrigated hectare in various Mediterranean countries, 2005



Chart 2 - Share of irrigation water demand in total water demand, 2005



water, on the other hand, in the south and in particular in the east of the Mediterranean Basin: according to an FAO study, irrigated acreage could increase by 38% in the South to 9,000,000 ha and by 58% in the East to 8,000,000 ha by 2030. The agricultural development policies pursued in most southern and eastern Mediterranean countries (Turkey, Syria, Lebanon, Egypt, Libya, Algeria and Morocco) make provision both for expanding irrigated acreage and increasing crop intensity coefficients (number of harvests per hectare per year).

The situation in Turkey is worth examining in detail, since irrigated acreage in that country could progress by almost 1.5 million ha without saturating its potential. One-third of that increase would concern areas in the Mediterranean bioclimatic field, mainly outside the Mediterranean catchment area. Turkey, which is already one of the main agricultural producers in the region in terms of acreage and potential, would thus be responsible for the expansion of over half of the irrigated land in the South and East.

According to Blue Plan projections, the demand for irrigation water could increase further by some 30 km³ by 2025 totalling almost 210 km³ per year (cf. Chart 3). However, the expected gain in efficiency in the use of irrigation water and more marked progression in the demand for drinking water could stabilise the share of agriculture in total demand in the eastern Mediterranean countries and could reduce it in the South: that share is expected to drop from 81% of total water demand in southern and eastern Mediterranean countries (in 2005) to 75% (by 2025) to the advantage of drinking water.

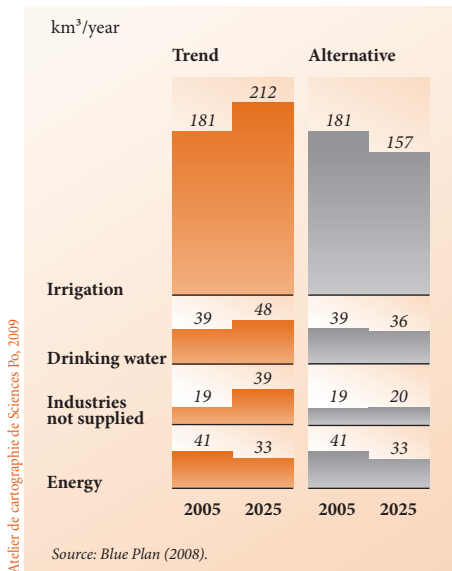
Growing pressure on water resources and ecosystems...

By 2025, the pressure of water demand (taking all sectors of use into account) on resources expressed by the exploitation index of renewable water resources shows a geography of the “water future” that is marked by contrasts and is in some cases a reason for concern (cf. Map 3). In some countries the volume of water abstracted is already close to, or even exceeds, the renewable resource limit. Present and future situations become even more alarming when the index is calculated at the level of the Mediterranean catchment area alone rather than at the level of each country.

A growing share of demand, particularly for agricultural use, is satisfied by the production of “non-sustainable” water at an estimated rate of 16 km³ per year, 66% of which it is obtained through the abstraction of fossil water and 34% through the overtapping of renewable resources. But there are also qualitative pressures on the resource. Pesticide and nitrate contents in particular are excessively high in many aquifers, particularly in the North.

The increase in large-scale irrigation projects can only accentuate pressures on resources and ecosystems, which are already seriously degraded. It will also increase the risks of soil salinisation, which is the main form of degradation of irrigated land. Seawater intrusion in coastal aquifers, the use of water with too high a salt content for irrigation and the rise in level of salt water tables due to faulty drainage are the main factors of aggravation to be taken into account. Countries and irrigator associations will have to make much greater efforts in this context to manage irrigated areas sustainably by taking or developing water demand management measures, developing drainage practices, controlling inputs, etc.

Chart 3 - Water demand by sector of use in the Mediterranean region, trend and alternative scenarios



In several countries, if the trend of polarising the bulk of water, capital and technology resources on a limited part of the territory continues, the development of major hydraulic engineering works is liable to further exacerbate internal dualities with rain-fed agriculture and dry mountainous zones. To remedy this, some countries have embarked on more balanced policies by investing in small and medium-scale water schemes or by improving agricultural run-off management, as Tunisia has done, for example with the “1000 mountain lakes” project combining the mobilisation of surface water and protection against water-induced erosion.

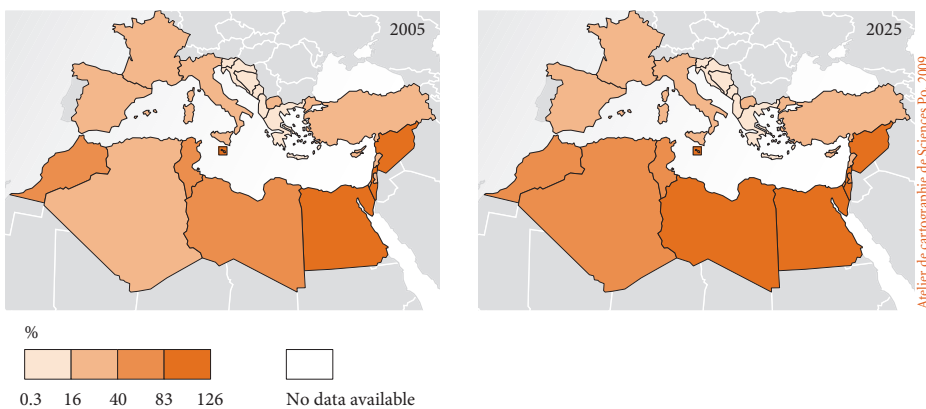
... exacerbated by the impact of climate change

The temperature and rainfall models will increase both quantitative and qualitative pressures on water resources. The Mediterranean region, which is already subject to

considerable water stress, is liable to be particularly exposed to a decrease in mobilisable water resources on all three shores (estimated at 10% to 40%) and to an increase in water needs for agriculture.

Some local hydrological models which include climate scenarios indicate a significant decrease in river flow rates (cf. Dankers, R.; Feyen, L., 2008a for southern Europe). Substantial drops in flow rate are expected, for example, in the Rhone, Po, Ebro and

Map 3 - Renewable natural water resources exploitation index, 2005-2025



Upper Jordan river basins (estimated at almost 23% in the latter case). Global warming is also liable to affect water quality, since the self-restoring capacity of rivers will decrease as the temperature rises and concentrations of pollutants increase as the result of the drop in flow rates and the increase in the salinity rate of surface water and groundwater. Rain-fed crops will be directly affected by the drop in rainfall, but irrigation zones will also suffer from the water resource depletion.

At the same time, as the result of the rise in evapotranspiration combined with changes in rainfall and temperatures, agriculture is liable to need more water, even if production levels remain constant. Projections based on case studies conducted in the Maghreb and in Egypt suggest, for instance, that agricultural productivity will vary between -30% and +5% in the case of horticultural output by 2050, and that water demand for spring crops will increase by 2% to 4% in the case of maize and by 6% to 10% in the case of potatoes. In Morocco, the CropWat water balance model² applied to winter cereal crops indicates drops in output in the order of 10% in normal years and of 50% in dry years by 2020, and a drop in national output in the order of 30%. The more frequent occurrence of extreme events at certain stages of crop development (such as heat stress during the flowering season or rain during the planting season) and the greater intensity of rainfall and longer dry periods are furthermore liable to reduce summer crop output.

Situations of water shortage and drought would affect the southern and eastern Mediterranean countries more specifically, which is precisely where water needs will increase in the years that lie ahead in order to supply drinking water to the populations as well as water for agriculture. Climate change will make arbitration even more necessary with a view to distributing water resources amongst the various users.

Better management of agricultural water demand

Economising 25% of irrigation water demand

Measures to increase supply, the traditional response to the increase in water demand, have reached – or are due to reach – their limit and are meeting with growing obstacles in the social, economic and ecological context in almost all Mediterranean countries. Although one of the primary fields where progress in water management is possible is that of protecting resources (measures to combat pollution or to sustainably increase the exploitable potential, etc.), water demand management has been emerging for the last 10 years as a crucial issue in view of the gains in efficiency that can be achieved. It comprises all measures that can enhance technical, social, economic, institutional and environmental efficiency in the various uses of water with a view to achieving efficiency in water consumption (greater need satisfaction) and in the allocation of water to its various uses.

In its report entitled “*Blue Plan outlook on environment and development in the Mediterranean*” (2005), the Blue Plan endeavoured to assess the extent of losses and of the inefficient use of blue water in each sector and, using a set of hypotheses that were admittedly ambitious but “feasible”, to estimate the losses that can be recovered in each

² - Created by the FAO in 1992 (http://www.fao.org/nr/water/infores_databases_cropwat.html)

sector and each sub-region of the Mediterranean. The saving potential was estimated at almost 25% of current water demand, i.e. approximately 70 km³ out of a total demand of 280 km³ throughout the Mediterranean region in 2005. And by 2025 the saving potential was estimated at around 85 km³ per year out of a total water demand of almost 330 km³ year. Although these estimations must be regarded with caution due to the paucity of available statistics, they nevertheless show the scale of progress that is feasible in terms of the purely physical efficiency of water use.

Table 2 - Estimation of recoverable losses by Mediterranean sub-region in 2005

Mediterranean sub-regions (countries taken as a whole)	Drinking water	Irrigation	Industries	Total (km ³ /year)
	Improved efficiency hypotheses			
	Network efficiency enhanced to 85% and user efficiency enhanced to 90%	Network efficiency enhanced to 90% and plot irrigation efficiency enhanced to 80%	Recycling generalised to 50 %	
North	4.6	18.2	9.5	32.3
East	1.8	11.3	2.2	15.3
South	1.6	18.4	4.1	24.1
Total	8.0	47.9	15.8	71.7

Note: This table concerns losses that are “recoverable” only from the point of view of available techniques.

Source: Blue Plan (Blinda & Thivet) (2008).

Irrigated agriculture has the greatest water-saving potential in terms of volume, accounting for 67% of the total potential identified in the Mediterranean region (the calculation is based on the reduction of transport losses by half to arrive at 10% and an increase in plot irrigation efficiency from 60% to 80%), but this potential is unevenly distributed. In the North, wastage is detected mainly in the major water supply networks, whereas in the South and East irrigation practices are also a cause. The water-saving potential in the agricultural sector is six times greater in terms of volume than in the domestic sector (Blue Plan - Blinda & Thivet, 2008); a volume of 55 km³ of water could be saved per year in the Mediterranean countries taken as a whole by 2025 (18 km³ per year in the case of the countries in the North and 37 km³ per year in the South and East), i.e. almost 26% of the irrigation water demand estimated in the trend scenario by 2025 (cf. Chart 3).

Since water that is “wasted” is costly in terms of mobilisation and distribution, these water savings would be a source of financial savings. With an average supply cost of € 0.40 per m³, almost € 220 billion could be saved in 20 years (i.e. an average of € 11 billion per year). In addition to the social and environmental aspects, there would also be benefits in terms of energy savings. When one considers that abstraction, transport and irrigation together cost 1 kWh per m³, irrigation water savings alone would bring savings of almost 55 billion kWh by 2025.

Stabilising water demand by reducing losses and waste and increasing the value added per m³ of water used are priority objectives of the Mediterranean Strategy for Sustainable Development, which was adopted by all of the Mediterranean countries in 2005. The efficiency improvement hypotheses presented above (a level of 90% being achieved for network efficiency and a level of 80% for plot irrigation efficiency as far as the agricultural sector is concerned) have been set as “desirable objectives” with regard to improving the physical efficiency of irrigation water at the regional level by 2025. It is now up to each individual country to set its own objectives at the national level.

Tools for better water demand management in the agricultural sector

Although numerous private and local initiatives are contributing to the improvement of water demand management, they will not alone suffice if the vast savings potential described above is to be turned to account; very deliberate public action will be needed in many cases. Too few Mediterranean countries have officially embarked on a course of action to achieve such improvement, efforts being focused mainly on mobilising new resources. Although water demand management is a concern that is more and more widely shared, it is rarely translated into specific quantified objectives.

However, the national reports on the subject of “Monitoring progress and promoting water demand management” drawn up by 12 countries in the run-up to the third regional workshop on water and sustainable development in the Mediterranean region (Zaragoza, March 2007) highlighted the progress actually registered over the last 10 years in terms of including water demand management in water management policies and in certain sectoral policies, particularly those concerning agriculture.

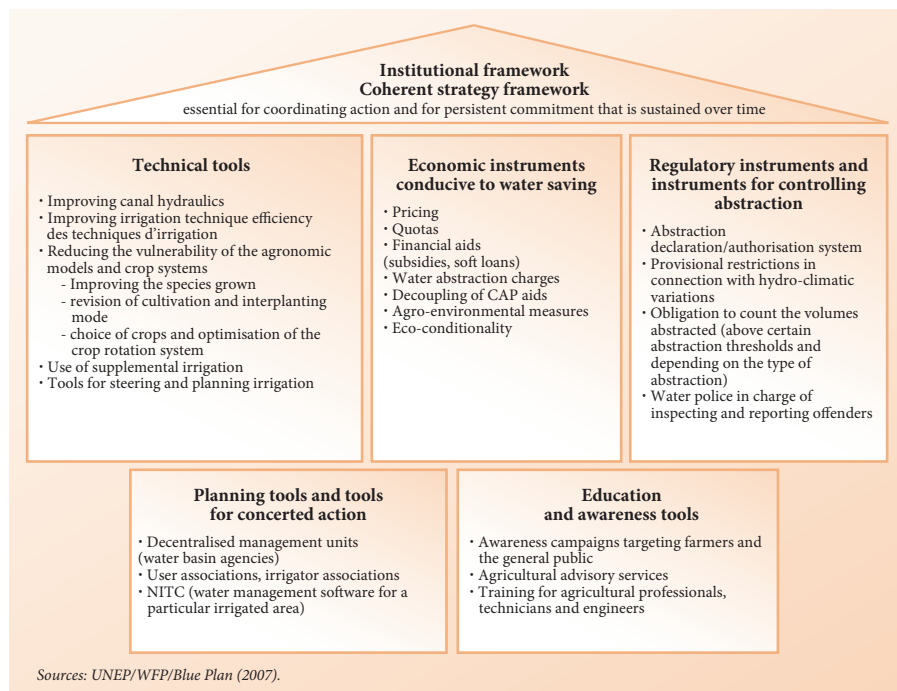
More and more Mediterranean countries, often the water-poorest (such as Israel, Malta, Cyprus, Spain, Tunisia, Morocco, etc.) have embarked on this course and have adopted official national water demand management policies combining legislative, regulatory, technical, economic, and institutional instruments with measures to mobilise actors or are planning to further develop these tools. Water management activities are being decentralised into units such as river basins, users are participating to a greater extent, and the role of the State is being redefined – all of these developments being conducive to the emergence of such strategies. Figure 2 presents various tools for managing agricultural water demand that have been implemented in the Mediterranean countries. These tools include technical measures for improving irrigation water efficiency, economic instruments, and tools for concerted action and planning, which will be presented in further detail below.

Technical measures for improving agricultural water efficiency

A variety of measures have helped to improve agricultural water demand management in the Mediterranean countries.

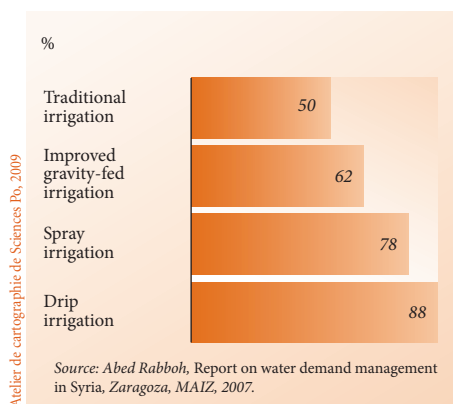
Improving canal hydraulics. As regards the management of large-scale hydraulic engineering schemes (dams, transport and distribution schemes), considerable progress has been registered in the last 40 years in dynamic flow regulation and automated

Figure 2 - Various agricultural water management tools used in the Mediterranean region



management methods in the waterworks projects implemented in certain countries. These methods have demonstrated their efficiency in matching supply to demand and have thus made it possible to minimise water losses connected with management. In

Chart 4 - Water efficiency according to various irrigation techniques in Syria, 2007



the oldest networks such as the Durance network in France, for example, work has been undertaken (concreting of canals, traps, intake automation) to reduce losses and improve water efficiency.

Improving the efficiency of plot irrigation techniques. Plot irrigation techniques are ranked according to their estimated level of performance. Drip irrigation is generally considered to be more efficient, for example, than sprinkler irrigation, which in turn is more efficient than gravity-fed irrigation (cf. Chart 4).

This ranking must be qualified, however. Gravity-fed irrigation, where outflow yield to the natural environment can be over 80%,

plays a predominant role in a large number of river basins, particularly during the dry season, for preserving downstream aquatic environments and sustaining the minimum water level of watercourses. It is essential to ensure that facilities are properly adapted to each situation, particularly the nature of the soil and the type of crop.

Reducing the vulnerability of the agronomic models and crop systems currently in operation. Maintaining and developing agricultural production in drought conditions while preserving the water source presupposes that farmers have alternative means of production with which they can guarantee an income. Various means can be considered for reducing the demand for irrigation water – or for optimising its use given that supply is limited or uncertain: 1) measures to improve crop or grazing species (selection of “water-economical” species or species which tolerate drought); 2) revision of cultivation and interplanting mode (cf. Table 3); 3) choice of crops and optimisation of the crop rotation system.

Table 3 - Strategies to reduce irrigation water needs through crop management and the management of interplanting

Strategy	Objectives and practices	Impacts on water needs
Conservation	To reduce evaporation losses and to maximise water storage during crop planting ► Simplified tillage	Better crop behaviour with regard to drought but no significant reduction of irrigation needs
Avoidance	To stagger the crop development stages most sensitive to water deficit (flowering) ► Choice of early varieties or early sowing	Encouraging results (profitability maintained, last watering round economised) Experiments to be continued in order to confirm the advantage over several years and in different regions
Rationing	To reduce transpiration during the growing period in order to hold over unused water until the grain-filling phase ► Choice of varieties with a moderate leaf-area index value or low stomatal conductance	Strategy justified for non-irrigated summer crops, but limited leeway in the case of irrigated crops where a higher yield potential is expected

Source: Debaeke, Bergez & Leenhardt (2007).

Given the difficulty of selecting varieties that are both productive and drought-resistant, the greatest margin for progress lies in changing cultivation systems (species grown, crop rotations), and even in changing farming projects such as diversification and conversion. These changes are in fact strategies adopted by farmers in the event of drought and economic restrictions, when they are planned sufficiently in advance and alternative crops can be grown. Where there is no irrigation, the key to adapting to drought lies in diversifying crop cycles and species in order to distribute climate hazards and to have avoidance solutions. The choice of species must be adapted to the soil water reserves.

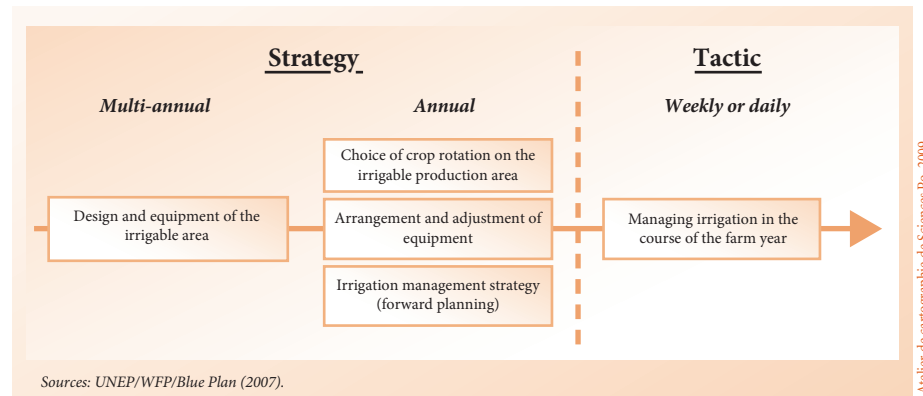
At farm level, diversification of irrigated plots can be used in order to better adjust the overall water demand to the availability of irrigation water (in terms of volume and time), watering methods and crop profitability. Maximum irrigation is not always the most profitable method: it can be of advantage to reduce the irrigation of a large number of crops known to be drought-resistant (sorghum, sunflowers, etc.), and to spread out the irrigation schedule by introducing crops that are sown in early spring or in winter (peas, cereals) thus using water that is less in demand elsewhere to best advantage in the spring.

Adopting mixed crop systems in irrigated areas can be an agronomic means of increasing value added per m³ water used through the reduction of the losses and inefficient use of irrigation water inherent in single-crop farming and through better management of fertilisation (example of the combination of potatoes and a fodder crop such as sweet vetch in Tunisia). However, changing crop rotation systems alone will not suffice to adapt to the new economic and regulatory context in water demand management, since the profitability of irrigated crops also depends on the extent to which irrigation installations can be offset, the agricultural aids granted – whether irrigation incentives or not –, market conditions, etc.

Supplemental irrigation. Supplemental irrigation is the supply of blue water to crops in the event of rainfall shortage, where rainfall is the main source of plant water supply. Experiments conducted in the West Bank and in Syria have shown that supplemental irrigation can both substantially increase yield and make production and farmers' incomes more secure. In Syria, wheat yield, which is around 1.25 tonnes per hectare in rain-fed cultivation, can be increased to up to 3 tonnes per hectare with supplemental irrigation. The productivity of 1 m³ of supplemental irrigation water is actually much higher than the level achieved through conventional irrigation, which requires a water input seven times higher than what is needed for supplemental irrigation (Sbeih, ANERA, 2007). Establishing an efficient irrigation schedule with which water can be economised thus requires switching from the concept of maximum yield to that of optimal yield (from the farmer's point of view – at the microeconomic level –, but not in terms of food security – at the macroeconomic level).

Using tools for steering and planning irrigation. Irrigation can be managed at several levels in terms of both space and time. Progress in rationalising the use of irrigation water will be made at each of these levels depending on local constraints on this resource. At farm level, tools will be implemented for improving irrigation control prior to or during the irrigation season (cf. Figure 3).

Computer tools have been designed to help technicians and farmers to optimise crop rotation choices and irrigation strategies. The purpose, for example, is to confer with irrigators and to study the possible trends in irrigated areas whenever substantial changes are made in connection with water legislation, agricultural water pricing or producer subsidies and to seek the best decision-making rules for irrigation in the event of various constraints of volume and flow rate. A set of strategies can then be defined for given water conditions for achieving optimal satisfaction of criteria laid down in advance (in terms of gross margins, yield, and water efficiency). There are also various tools for controlling water input more efficiently during the irrigation season: dissemination of information on crop water needs, tools based on the water balance forecast, tools based on the analysis of satellite images for advising irrigators.

Figure 3 - Timing of irrigation decisions at farm level

All of these tools help to adjust demand to supply. Some provide a basis for proposing optimal solutions in the event that resources are restricted, making it acceptable to reduce demand. There is still room for progress in irrigation management but it can only be achieved if farmers receive, accept and use the information that is transferred for advisory purposes. The problem thus is not purely agronomic and technical; it cuts across all sectors, involving human aspects and measures to provide training and raise awareness.

Mobilising economic instruments more effectively

Use of economic tools still limited. Although economic instruments (pricing, quotas, subsidies, taxation, etc.) are often regarded as primary instruments of water demand management, they are not yet used to a very large extent in the Mediterranean region, particularly in the agricultural sector. Yet they can contribute considerably to more efficient allocation of water resources at the sectoral and intersectoral level and can be effective in ensuring that environmental concerns are taken into account.

Of the range of economic instruments available in the agricultural sector (cf. Table 4) pricing is the tool most widely used in that the main objective remains that of covering the cost of supplying water to users. At the European level, the framework directive on water imposes in particular measures for total recovery of costs. The other instruments such as quotas or subsidies are much less widespread or are used in conjunction with pricing.

In some countries, however, pricing systems are now expected to include incentives for achieving balanced management of water resources (cf. Table 5) while retaining the objectives of intensifying irrigated agriculture for purposes of national food security or in order to balance the development facilities budget.

As regards results, the objective of recovering costs – even to a limited extent – is rarely achieved. It is precisely in the field of irrigation that prices and user coverage of operating costs, not to speak of investment costs, are lowest – yet this is the field offering the greatest water-saving potential.

Table 4 - Economic instruments and incentives for economising irrigation water in the Mediterranean region

Types of instrument	Examples of countries concerned	Level of water-saving incentive.
Pricing	Almost all Mediterranean countries	A tool that aims primarily to recover the cost of the water supply service but which can also act as a water-saving incentive. The incentive varies according to price structure and level (cf. Table 5).
Quotas	Cyprus, France, Israel	Introduction of a consumption limit which must not be exceeded, but no encouragement to economise water within the limit of the quota except in the case of special provisions.
Financial aids (subsidies, soft loans)	Cyprus, Spain, France, Israel, Morocco, Syria, Tunisia, etc.	Incentives to economise water and combat wastage by means of aid for purchasing more "water-economical" modern irrigation systems, planting drought-resistant crops, etc.
Water abstraction charges (pollution and resource)	EU countries, Israel, Morocco, Tunisia, etc.	Low incentive to economise water in that taxation levels are low.
Decoupling of CAP aids (2003 reform)	EU countries	Decoupling aiming to do away with all irrigation incentives through the mechanisms of the CAP (as far as irrigated acreage under cereals and oil protein crops is concerned).
Agro-environmental measures AEMs)	EU countries	AEMs operating as signals of water scarcity in specific regions. Voluntary measures which have little impact unless they are taken collectively at watershed level.
Environmental cross-compliance	EU countries	Strengthens coherence between water and agricultural policies. Granting of agricultural aids subject in particular to the obligation to count the volumes abstracted.

Sources: Country reports, UNEP-WFP-Blue Plan (2007)

Most countries where water is free or where pricing provides little incentive to economise water (which is the case with flat-rating) do not have any strong policy for raising prices or for changing their pricing system. Yet pricing systems that are more conducive to water savings, such as volumetric pricing systems which require the installation of metering systems, can be introduced in new irrigated areas (Spain, Greece, and Lebanon). Some countries which apply this type of pricing are planning to raise the scheduled prices (Morocco, Tunisia). Others (Cyprus, Lebanon, and Israel) make provision for occasional price increases through which water cost recovery can be improved.

Table 5 - Irrigation water pricing in the Mediterranean region and water-saving incentives

Price structure	Examples of countries concerned	Level of water-saving incentive
None	Albania, Egypt, Palestinian Territories	No encouragement.
Flat rating (per ha)	Spain, France, Greece, Italy, Lebanon, Syria	Combined with very low prices and subsidisation of irrigated crops, the system has tended to encourage the expansion of irrigated acreage and an increase in agricultural water demand.
Modulated flat rating (depending on the crop irrigated or irrigation technologies)	Turkey, Italy	Does not encourage water saving for a given crop rotation or irrigation technique but can be used to discourage the irrigation of certain highly water-greedy crops (maize and tomatoes in Turkey, for example).
Two-part tariff	Tunisia (pilot irrigated areas), Lebanon (new areas in South Beqaa)	Fixed rate depending on irrigable area, encouraging the irrigation of developed land. Proportional rate depending on the volume of water actually consumed and encouraging the rational use of water.
Uniform volumetric pricing	Cyprus, Spain, France, Morocco, Tunisia	Encourages water saving (depending on price level).
Stepped volumetric pricing (rarely applied to irrigation)	Israel	Strong water-saving incentive (depending on price escalation and price level) within the limit of the quota imposed.

Sources: Chohin-Kuper, Montignoul & Rieu (2002); Country reports, UNEP-WFP-Blue Plan (2007).

Irrigation water pricing in Tunisia

Measures have been undertaken over the last 10 years to reform the irrigation water pricing system with regard to three aspects: cost price transparency, flexibility (regionalised pricing, variation according to the designated use of the irrigated areas), and the associated national objectives (food security). From 1990 to 2000, water prices were increased regularly at the rate of 9% per year in real terms and considerable efforts were made at the same time to establish metering systems at farm level throughout the country.

An overall increase in water tariffs of approximately 400% was brought about between 1990 and 2003 and this served to recover a large share of the increase in water supply system operating and maintenance costs, the recovery rate for that period rising from 57% to 90%. Realising the limits of the monomial pricing structures in effect, the public authorities made plans for gradually introducing binomial pricing structures in the extensive irrigation areas in the north with a view to improving the water cost recovery rate and encouraging irrigated farming on the land already supplied.

Certain case studies show that the increase in irrigation water price had a significant impact on consumption. The fact that the water tariff in the Jebel Ammar irrigated area in the north of the country was multiplied by four thus helped to reduce the volume of water consumed by two-thirds.

Sources: Hamdane, *Rapport national sur la gestion de la demande en eau en Tunisie*, published in PNUE-PAM-Plan Bleu (2007); Chohin-Kuper, Montginoul & Rieu (2002).

Thus, even if raising water tariffs is intended more to achieve better cost recovery and is rarely used with a view to economising the resource, it nevertheless helps to signal shortage. It can have a limited impact on overall demand, however, where alternative resources are used (tapping of groundwater) as is the case in Morocco or Tunisia. To avoid this failing, all of the country's water resources – both surface water and groundwater – should be priced (one of the difficulties lies in the fact that groundwater is not always a public good).

Thus, the degree of irrigation water demand sensitivity in relation to the price of water depends, in brief, on:

- whether or not there are alternatives: where there is no alternative in terms of available water resources, possible crop rotation or even cessation of farming, farmers' reaction to a rise in price is less flexible;
- the irrigation techniques used: water demand elasticity in relation to price is generally lower in modern irrigation districts due to the higher cost of improving technical efficiency compared to the former systems;
- the significance of the cost of water compared to the margin provided by irrigated crops: the higher the value added of those crops, the more water demand is inelastic in the event of price variation;
- tariff features: the way in which an increase in the price of irrigation water affects consumption at farm level depends on the level of the initial price, the extent of the increase registered and the manner in which it is implemented over time.

Elasticity of irrigation water demand in relation to price - the case of Spain

The elasticity of irrigation water demand in relation to price depends on the productivity differential between irrigated and rain-fed crops. Modelling work carried out in Spain (Blanco Fonseca, 2007 – see below) shows that in the irrigated areas of the Guadiana basin the introduction of a water tariff of € 0.03 per m³ results in a 37% drop in water demand. In the case of high tariffs, only fruit trees are irrigated. In the irrigated areas of the Guadalquivir basin water demand is less elastic in relation to price in the case of low and moderate tariffs since the productivity differential between irrigated and rain-fed crops is greater.

Source: Blanco Fonseca (M.), *Advanced modelling tools for integrated assessment of water and agricultural policies*, Communication presented at the Zaragoza workshop on water demand management, published in UNEP/WFP/Blue Plan (2007).

Tools to be used with precaution and as a complement to other instruments. Although irrigation water demand can be managed more effectively through more extensive use of economic instruments, it is essential that certain conditions be fulfilled if those instruments are to operate properly and be socially acceptable. More specifically, these instruments must:

- take account of the other national policies or plans for avoiding rural-urban migration, guaranteeing adequate food production, etc.;
- be compatible with farmers' income constraints. Depending on the country, this can mean providing free water for farmers, raising water prices less than would actually be necessary, introducing a special price structure with a bonus for economising water, implementing a quota system, etc. In Morocco, for example, price rises have been staggered over time so that the rate of increase is not higher than the rate of technological progress in agriculture.

Good knowledge of the situation regarding water supply and demand provides a sound basis for adapting economic tools more effectively to the objective pursued. Sound knowledge of the volumes consumed for agricultural production, of users' reaction to prices and incomes and of whether there are other water resources with which users may possibly evade economic measures will facilitate the choice of tariff structures. Implementing and adapting economic measures thus presupposes that there is a monitoring and evaluation system based on audits and performance indicators – a system that is rarely available in these countries.

This review of economic instruments revealed that they are being used in the irrigation sector in the Mediterranean region, but not yet to a large extent. They could prove more effective in improving water demand management, although they do not provide any single, ready-made solution to the widely varying situations in the countries concerned. Numerous conditions need to be met if they are to function properly, the primary pre-requisite being that of defining a clear objective and a coherent framework and, as an imperative, combining them with other instruments.

The tariff instrument in particular cannot alone suffice to encourage users to economise water, since price sensitivity is generally fairly low and prices cannot be an adequate information vector in the event of a resource crisis. Other measures are used to complement it:

- incentive measures: water-saving awareness campaigns, installation of individual meters, subsidies for the implementation of more water-economical equipment;
- authoritarian measures for controlling demand: restrictions of use in order to cope with economic crises or structural shortage (the administrative quotas introduced in Israel to reduce irrigation water demand are an example of such restrictions).

Tools for concerted action and planning for shared objectives

Tools for concerted action and planning provide a basis for defining shared objectives, which can be taken up by all players, and are thus real levers for promoting better

management of water demand in the agricultural sector but also between the various sectors of water use. These tools must be developed at the various levels throughout the country – the national, regional and local levels.

At the local level, decentralised management units – around a river basin or aquifer, for example – are appropriate institutional frameworks and promote subsidiarity. River basin agencies can be effective bodies for political mediation in the water demand management sphere if users are convinced of their legitimacy because of their listening ability and awareness of social needs, their independence, their transparency and their controlling authority. User associations, in particular irrigator associations, are also bodies where consensus can be sought and where very effective rules can be defined and applied for promoting water demand management.

Wide experience in the field has shown the advantage of involving users in the management of common resources. Given the poor performance of water police forces in most Mediterranean countries, the limited means available and the persistence of illicit practices, the authorities are tending to resort to self-administered control at a more local level, which is often more effective, through a concerted management approach. The water-table or river contracts and schemes for developing and managing water at the level of major river basins that are developing in the Mediterranean region clearly illustrate the advantage of these approaches.

The advantage of approaches involving concertation with users

Egypt is developing projects for modernising irrigation and introducing participatory management in the irrigated areas of the Nile Valley. Besides the use of technologies based on modern equipment, centrally controlled downstream irrigation management and simplification of the network, these measures are based primarily on the involvement of user organisations in decision-making, management and maintenance through intensive education.

In Morocco, over 600 user associations have been set up since the law on agricultural water user associations was brought into force in 1990; these organisations take charge of the management of irrigation networks in the areas covered by small and medium-sized water schemes, where participatory management is an age-old practice. In the areas covered by major water schemes these user associations have also become effective arenas for concertation through which users are involved to a greater extent in decisions on network management (irrigation schemes, network maintenance and repair, propagation of irrigation techniques, etc.), and the results have been favourable in terms of both adaptation to user needs and water demand management.

In France, following the implementation of the 1992 Water Act a Masterplan for Water Development and Management has been drawn up for each river basin defining guidelines for management and planning for a period of 10 to 15 years. In the sub-basins the masterplan is supported by local structures and is the tool for managing and protecting the uses of the resource. The River Drôme Masterplan has been underway since 1992; all of the water users in the catchment area are involved, and an overall scheme has been established for limiting agricultural water demand throughout the area through set-aside of irrigated acreage and the development of real-time discharge data for the information of the managers.

Sources: Country reports, UNEP-WFP-Blue Plan (2007)

A sine qua non for improving the capacities of local management bodies, however, is legal and financial action to strengthen their legitimacy and decision-making authority and at the same time to increase the criminal liability and financial accountability of their leaders and the transparency of their transactions. And monitoring and management functions must furthermore be clearly separated. The increasing number of irrigator associations in the Mediterranean region can only bring effective improvement in water demand management if their byelaws and funding methods are reformed. In Tunisia, for example, collective interest groups, which currently manage almost 70% of public irrigated areas, have full authority to develop and manage their facilities collectively. Their status allows them to recover fees from users in order to cover operating expenditure. But sometimes little headway is made in implementing the necessary reforms. In Turkey, a reform project that was launched 10 years ago to enable irrigator associations to operate more independently within a well-defined institutional and legal framework and thus to ensure the sustainability of participatory irrigation management is still underway.

Moreover, although the new information and communication technologies can help to improve water demand management in a river basin or irrigated area, their effectiveness also depends to a large extent on the implementation of the endogenous participatory processes that are necessary to the construction of innovative water demand management tools.

The contribution of the new information and communication technologies

The Ador software programme, which was developed to promote traceability and water demand management in the irrigated area of the Ebro Valley in Spain, has made it possible to improve irrigation water management mainly through the establishment of indicators for monitoring water consumption (which are included on farmers' water bills) and the establishment of quotas in the event of water shortages, conflicts thereby being avoided and equity in access to water guaranteed. The success of this tool lies mainly in the fact that it is participatory, bringing together the agricultural users, the administration and private firms.

Source: Playan (2006), "Ador: a software for water management in irrigation districts", Communication presented at the Zaragoza workshop on water demand management, published in UNEP/WFP/Blue Plan (2007).

Levers and conditions for better management of agricultural water demand

One of the principal obstacles to the advancement of water demand management is that the importance of the issues at stake and the potential benefits are not well understood by the various water actors and the agricultural world. Only too often policymakers rely on technology for increasing supply, namely by building dams and developing activities for desalinating seawater or brackish groundwater – essentially in order to supply drinking water but also for agricultural purposes, as is the case in Spain – and water transfer systems; they underestimate the impacts of these measures and minimise the credibility of alternative options.

Systematic evaluations such as cost-benefit studies comparing several options are still very rarely carried out. By estimating water-saving potential on the basis of specific assessments and by internalising the environmental impact cost of the various options there is no doubt that studies of that nature would be a means of raising policymaker awareness of the opportunities and feasibility of water demand management. Conducted prior to investments, they should provide a basis for comparing measures to boost supply with demand management actions or for optimising allocations either within the agricultural sector or amongst various sectors of use. It very often transpires that water demand management is of much greater advantage in economic terms than measures to boost supply. But before that management can be improved the volume of the demand for agricultural water, including both blue water and green water, must be ascertained. The structure of that demand needs to be analysed in order to pinpoint the areas with the greatest efficiency potential or the most “profitable” areas to be exploited.

Over and above the need for such awareness, water demand management will also inevitably involve far-reaching changes in practices and mentalities and indeed require calling production and consumption patterns in question. The challenge is to succeed in combining “technicist” approaches (where emphasis is on supply infrastructures and plot irrigation techniques, for example) with “societal” approaches (with a view to acting with all players and agricultural user associations together in order to seek to use every m³ of water to the best possible advantage). More generally, the purpose is to make farmers – and users as a whole – the central players, for users are not only clients – they are also “citizens” responsible for the proprietary management of the water resource.

Besides this virtually “cultural” change in perspective, integrating water demand management objectives into agricultural policies and into all other sectoral policies presents a first level of difficulty that is institutional in nature, and integrating those objectives into the actions taken by the various players in a given region presents a further level of difficulty. In order to surmount it some Mediterranean countries set up coordination, consultation or arbitration bodies, which facilitate assessments and concertation. At the national level these can be interministerial water committees (as in Algeria) or national water councils (as in Tunisia and Morocco), which act in a more advisory capacity but are a platform for raising awareness and formulating proposals for developing the regulatory and legislative framework. At the local level, the water basin agencies and user associations are, as we have seen, bodies for concerted action, where effective measures for promoting water demand management are defined and implemented.

Although the various actors can hinder the implementation of water management measures, particularly farmers, who, like other users, seek to reduce the immediate cost of their water supply to a minimum, the main cause of resistance is very often ignorance of the issues at stake and of the potential for progress. Measures aiming to improve the efficiency of water use also enable them to modernise irrigation techniques and to increase farm income, which is why efforts to raise awareness and to explain the situation are crucial. Training for agricultural professionals and technicians and for operators in the water sector on the methods and issues of water demand management could be a major lever for the emergence of new, more integrated and more economical water

strategies. The innovative steps taken in several countries have thus helped to develop practices of agricultural water demand management.

Awareness-raising and education in water savings in Cyprus

In Cyprus, campaigns to raise public awareness are organised through advertising, press articles, and the distribution of brochures, posters, etc. Weekly radio and television broadcasts by the Ministry of Agriculture target farmers, and advertisements about water savings have had very favourable results.

Training courses organised by the Department of Agriculture on piloting and planning irrigation have resulted in better water demand management.

Source: Iacovides (2007), National report on monitoring progress and promotion of water demand management policies in Cyprus, published in UNEP/WFP/Blue Plan (2007).

Water demand management is thus a combination of tools and intentions. It can bring considerable benefits, particularly in the irrigation field. If this is to be achieved progressive approaches must be adopted and adapted in each case to local circumstances, users must be involved to a greater extent, and more active measures must be taken to promote policymaker awareness of the issues at stake. Continuing and extending this “cultural” change to other Mediterranean countries requires top-level State support through which a coherent strategic framework can be provided (such as the national plan for improving water efficiency that has been implemented in Israel or Tunisia’s national strategy for economising irrigation water); such a framework is essential for coordinating action and for persistent commitment that is sustained over time.

The recommendations of the 3rd regional workshop on water and sustainable development in the Mediterranean region (Zaragoza, 2007), which were submitted to the national public authorities in the Mediterranean countries and were adopted by the Contracting Parties to the Barcelona Convention in January 2008, underline the need to make water demand management a national strategy priority, to take measures to promote such management and to coordinate its various components as well as monitoring and assessment measures in the various sectoral policies, particularly agricultural policy and policies in the fields of energy, tourism, the environment and area management. The final declaration of the seventh meeting of Ministers of Agriculture and Fisheries in the Ciheam member countries (Zaragoza, February 2008) also highlighted the need to adopt an approach focusing on controlling demand and modernising infrastructures in order to improve efficiency in water demand management in Mediterranean agriculture.

Besides managing demand, measures to develop the reuse of treated waste water in the irrigation sector are also a field of potential that certain Mediterranean countries (Spain, Cyprus, Malta, Egypt, Tunisia, Syria) are exploring and encouraging to a large extent or even a government priority (as is the case in Israel or in Italy). This system requires that the water be stored before it is reused and that it be treated by reliable means prior to storage, since otherwise the health hazards and risk of soil contamination would be considerable. And above all it will depend on farmer and consumer acceptance.

Taking account of water demand management in the agricultural sector

Extract from the recommendations of the third regional workshop on water and sustainable development in the Mediterranean region, which were submitted to the national public authorities of the Mediterranean countries:

- water demand management should be made a national strategy priority and measures should be taken to ensure that its various components are included in the different sectoral policies, particularly agricultural policy, as well as monitoring and assessment measures;
- national objectives should be set for improving the efficiency of water transport and use and the various (regulatory, normative, technical, price-fixing, fiscal, contractual or market-based) instruments and tools that are available should be mobilised in order to achieve those objectives;
- the participation and accountability of the various actors concerned by water demand management (public, academic or private bodies, associations) should be promoted, particularly in the case of agricultural user associations;
- measures should be taken to promote the decoupling of agricultural support and production – particularly irrigated production – in order to progress towards achieving environmental objectives;
- every effort should be made to raise awareness in the general public and to educate users in water demand management by endeavouring to identify, implement and develop good practices in the field particularly regarding sustainable management in agriculture;
- the progress made in water demand management should be assessed and measures taken accordingly to ensure that that management is taken into account in water information systems and to document appropriate shared indicators.”

Source: *Blue Plan (2007)*.

Extracts from the Declaration of the seventh meeting of Ministers of Agriculture of the Ciheam Member States (Zaragoza, 4 February 2008)

“[...] In view of the geographical and climatic features of the Mediterranean countries, the development of their agricultural sectors is to a large extent contingent on the availability of water resources for irrigation. The stimulation of sustainable and competitive irrigated agriculture is a factor through which agricultural productivity can be enhanced, thus promoting food security and food quality and generating the development of the economy and the industrial sector. Irrigation plays a major social role in rural areas.

Water is not only a factor of agricultural production but also a necessary element for human and economic development in general. Access to quality drinking water is a priority which must be guaranteed. It must be ensured that policy on resources and agricultural policy are coherent. Irrigated production can be directed towards the

production of specialised crops for export or of staples for supplying the domestic market and insuring food security and food quality. These two lines of production generate both positive and negative externalities, which must be taken into account in the designing of the relevant policies which also include measures to safeguard and promote products of the Mediterranean diet and must take account of the qualities of the environment and landscape associated with those products.

Since water is a scarce resource, it is absolutely imperative that policies be designed for improving the efficiency of its management in Mediterranean agriculture aiming not only to expand the supply of that resource through measures including the tapping of alternative resources but also to promote an approach focusing on controlling demand. An appropriate irrigation policy thus cannot possibly be established unless there is active participation on the part of users and their associations. Action to develop irrigation can be promoted if private investment and measures to educate users are encouraged.

The expansion of irrigation is limited by the degree to which water resources are available and by its impact on the environment. The excessive use of irrigation water can result in soil deterioration, soil salinity problems or the overtapping of the water table and desertification.

Exchange of information and concertation on cooperation mechanisms in these fields are fundamental tools for devising national irrigation policies that are adapted to the economic, social and geographical conditions specific to each country.”

Source: The full text of this declaration is available in French at www.ciheam.org

Virtual water: a concept for guiding agricultural policies?

Unlike water, agricultural commodities can easily be traded over long distances. Questions involving both water resources and food thus arise at different levels, and international trade in agricultural commodities can influence local water management to a considerable extent. Quantification of the virtual water flows associated with the agricultural commodities that are imported and exported by all Mediterranean countries highlights the quantitative significance of these flows compared to the available water resources in those countries and the advantage which the concept of virtual water can have as a tool for analysis and decision-making in water shortage management and a basis for guiding agricultural policies.

A metaphor for stimulating discussion on the relevance of self-sufficiency in food production

Virtual water was first used as a metaphor by J. A. Allan (1993) to illustrate how countries that have to contend with high water stress, particularly in the Middle East, have been able to limit that stress mainly through their trade in agricultural commodities with the rest of the world, which has provided indirect, flexible and relatively inexpensive access to the water resources globally available. The concept itself at the same time provides insight into the progressive transition from a reference to self-sufficiency in food production to a reference to food security.

Water is thus transferred virtually from exporting countries to importing countries through trade in goods, since the production of those goods in the exporting countries has necessitated the consumption of a certain quantity of water. The virtual water contained in an imported or exported commodity is first of all the quantity of water consumed in the course of the production of that commodity. In the case of agricultural commodities, where trade accounts for almost 90% of the water traded virtually at the world level, virtual water is the water that is evapotranspired by crops. A distinction can thus be made between two components of virtual water: green virtual water which comes from rainfall and blue virtual water (cf. Figure 1).

This concept of virtual water was initially developed in a limited geographical area but subsequently attracted the attention of international research centres and organisations (including the University of Delft, the IWMI, the FAO, and the World Water Council). Considerable efforts were then made in the research field to establish statistics including figures on virtual water flows throughout the world and to evaluate the impact on water resource management at both the local and global level. Several definitions and accounting methods were proposed reflecting different visions of the concept and its implications.

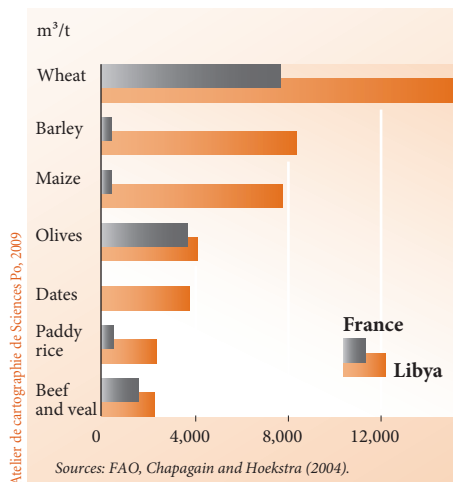
400 to 8000 litres of water are needed to produce 1 kg of wheat in the Mediterranean

A first attempt to quantify the virtual water flows associated with the agricultural commodities imported and exported by all of the Mediterranean coastal countries was made over the period from 2000 to 2004 (Fernandez, 2007). This selection of the commodities for analysis was based on two criteria – their significance in the trade of virtual water concerning Mediterranean countries and their strategic value for food security. The commodities thus selected (wheat, barley, maize, soy beans, olives, beef) and the crops specific to certain countries (dates in the case of Algeria, for example) account for 70% of the volumes of virtual water traded through trade in agricultural commodities from and to the Mediterranean countries.

The virtual water content of plant products was determined by simulating the water needs of crops by means of the CropWat water balance model through which a distinction can be made between blue water and green water inputs. The virtual water content of beef meat was estimated by taking account of the water needed to produce the crops forming the basis of the relevant animal feedingstuffs. Since the definition of typical food intake per country proved to be very complex, however, the quantification of the virtual water flows connected with trade in beef meat was based on the work carried out by Chapagain and Hoekstra (2004) on the virtual water content of beef, with specific figures for each of the countries concerned.

The quantity of water consumed in the production of an agricultural commodity varies widely depending on the nature of that commodity and on the producer country (cf. Chart 5). Climate conditions influence crop evapotranspiration, and yield depends on various physical, technical and socio-economic factors. The quantity of water needed to produce 1 tonne of wheat varies, for example, from 450 m³ (in France) to 7850 m³ (in Libya). The quantity needed to produce 1 tonne of beef meat is 10 times as great on average.

Chart 5 - Virtual water content per product, 2004



The virtual water flows involved in the trade of the agricultural commodities selected were calculated on the basis of the FAO trade statistics (from and to Mediterranean countries) and the virtual water contents of those products. Imports were estimated on the basis of the quantities of water which the importing countries would have needed in order to produce what they imported. With this approach the consequences of virtual water flows on the water resources and food security of the importing countries can be analysed and the (water savings) which those countries achieve by importing agricultural commodities rather than producing them themselves can be evaluated.

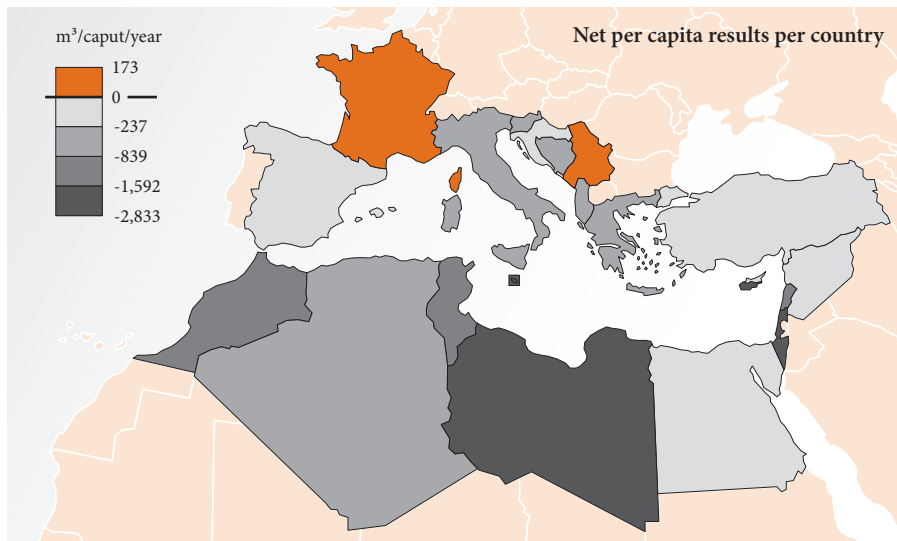
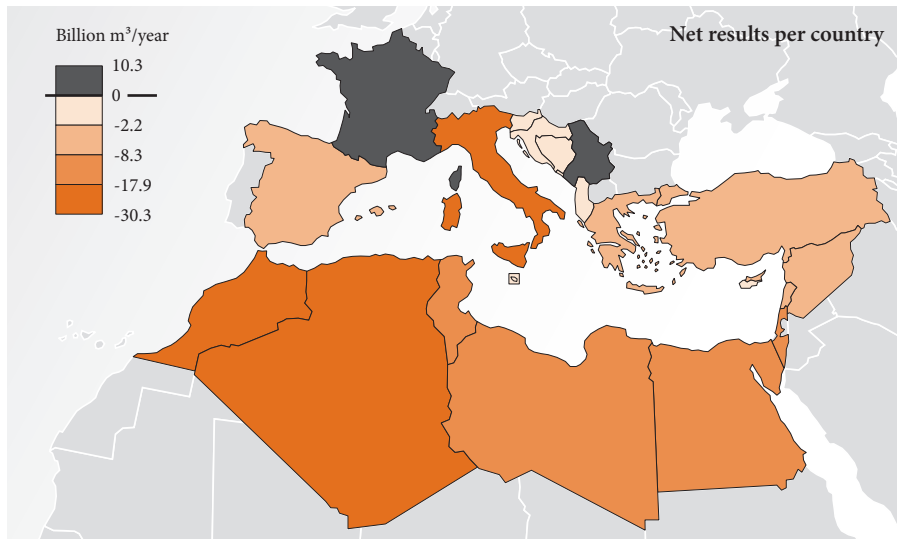
The Mediterranean, a region that imports vast quantities of virtual water

Taken as a whole, the Mediterranean region, with its 21 coastal countries, has been a net importer of virtual water since 1990 through its agricultural trade with the rest of the world. All of the countries in the southern and eastern Mediterranean are importers, Libya taking the lead with 2800 m³ per capita per year. Taking all of the products analysed as a basis, the virtual water imports associated with the net agricultural imports of all of the Mediterranean countries together currently amount to approximately 140 km³ per year, i.e. over 75% of those countries' irrigation water demand. France and Serbia-Montenegro are the only countries recorded as net exporters over the period from 2000 to 2004 (cf. Map 4). The virtual water import and export flows concerning plant products (220 billion m³ per year) are much greater than those concerning trade in beef meat (20 billion m³ per year).

The fact that the countries in the South and East are importers taken as a whole – a fact that is accentuated by the method used for evaluating virtual water imports – is closely correlated to the scarcity of their water resources. In some countries – including Malta, Libya, Israel, Tunisia, Algeria and Cyprus – the virtual water imports associated with cereal and soya bean imports by far exceed both the national exploitable water resources and the quantities of water consumed at the national level in order to produce the same type of product (cf. Chart 6). However, certain countries where there is stress on water resources export a considerable share of their irrigation water (Syria, Israel) (cf. Map 5).

Analysis of the respective shares of green, blue and virtual water in the total water demand of the Mediterranean countries for agriculture and food (cf. Chart 7) and in the net food demand of those countries (cf. Chart 8) demonstrates that:

Map 4 - Net results per country of virtual water flows connected with trade in cereals, soy beans, olives, specific crop products and beef and veal, average for the 2000-2004 period



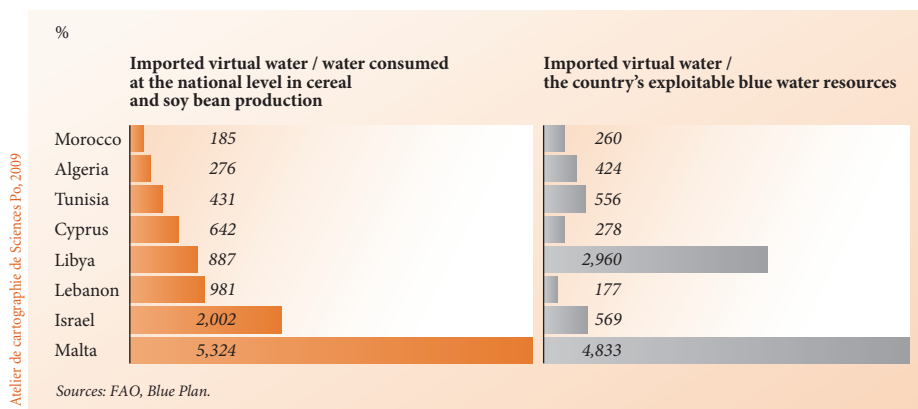
Sources: FAO, Chapagain and Hoekstra (2004).

Atelier de cartographie de Sciences Po, 2009

MEDITERRA 2009

- green water and virtual water account for the major part of total water demand for agriculture and food in almost all Mediterranean countries with the exception of Egypt (they thus account for 80% of that demand at the Mediterranean level);
- virtual water alone covers the bulk of food demand in Malta, Libya, Israel, Cyprus and Lebanon.

Chart 6 - Virtual water imports connected with cereal and soy bean imports, average for the 2000-2004 period



Map 5 - Share of irrigation water of the Mediterranean countries that is exported via gross cereal and soy bean exports, average for the 2000-2004 period

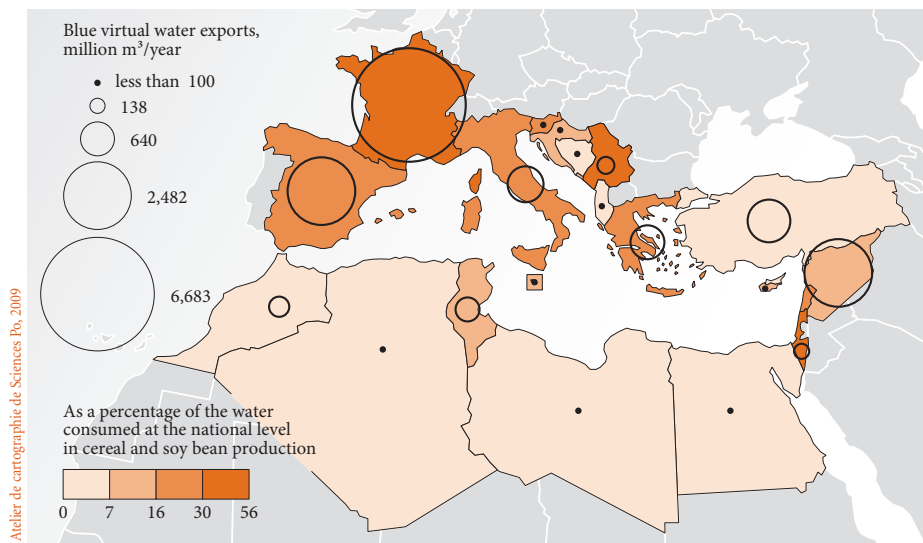


Chart 7 - Shares of green, blue and virtual water in the water demand of the Mediterranean countries for agriculture and food

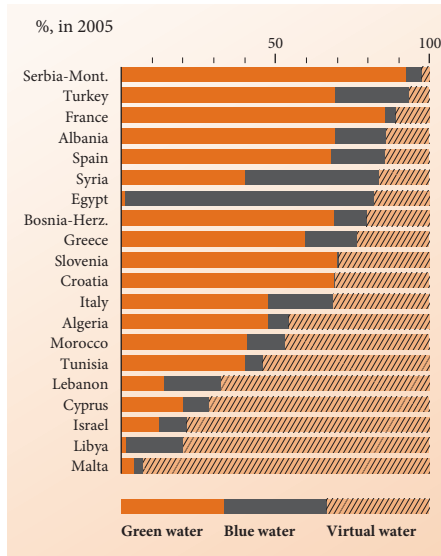
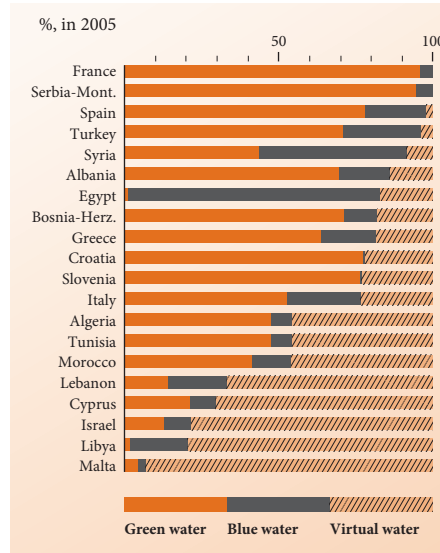
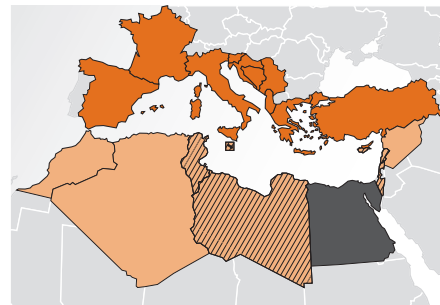
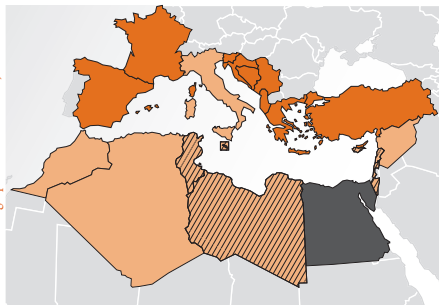


Chart 8 - Shares of green, blue and virtual water in the net food demand of the Mediterranean countries

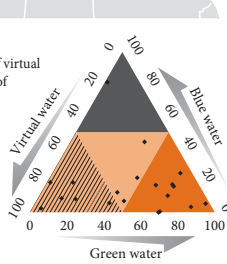


Atelier de cartographie de Sciences Po, 2009



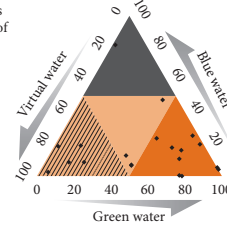
Atelier de cartographie de Sciences Po, 2009

N.B.: The virtual water demand is equivalent here to the quantities of virtual water imported via gross imports of cereals, soy beans, olives, specific crop products and beef and veal over the 2000-2004 period. The respective shares of blue, green and virtual water are thus calculated in relation to the countries' overall water demand for agriculture and food, irrespective of the final destination of the agricultural commodities (consumed at the national level or exported).



Sources: FAO and Blue Plan (2008).

N.B.: The virtual water demand is equivalent here to the quantities of virtual water imported via gross imports of cereals, soy beans, olives, specific crop products and beef and veal over the 2000-2004 period. The respective shares of blue, green and virtual water are thus calculated in relation to the countries' overall water demand for agriculture and food, irrespective of the final destination of the agricultural commodities (consumed at the national level or exported).



Sources: FAO and Blue Plan (2008).

Although there is a real dichotomy between the countries in the North and those in the south and east of the Mediterranean in terms of virtual water trade profiles, there are some exceptions connected with physical factors but also with trade and food security strategies, which influence water uses and virtual water flows. In Syria, a mass irrigation development scheme based essentially on the tapping of external surface water resources from Turkey and involving intensified use of groundwater resulted in substantial growth in agricultural production and exports in the period between 1990 and 2000. Despite its limited internal water resources, and in particular its limited green water resources, Syria ranks fifth in the list of Mediterranean virtual water exporters due to its cereal exports, even if the net balance was negative for the 2000-2004 period. The gross virtual water exports associated with these exports (equivalent to 160 m³ per capita per year) consist mainly of blue water (almost 90%), thus underlining the extent of irrigation (the figure for the Mediterranean as a whole is 50%).

Spain and Italy are net importers of virtual water, taken as a whole, whereas the level of per capita water resources is relatively high (2700 and 3340 m³ per capita per year respectively), approaching the level recorded in France (3350 m³ per capita per year). Spain, however, is the leading net virtual water exporter in the Mediterranean when it comes to the virtual water associated with trade in beef, a considerable proportion of that volume deriving from cattle feed imports.

Virtual water, an additional tool for decision-making

The purpose of this initial work carried out at the Mediterranean level was to test the tools available for evaluating virtual water flows and quantifying those flows in order to encourage reflection and open the debate. The results call for in-depth analysis country by country. According to the theory of comparative advantages, the concept of virtual water can result in emphasis on the potential gains of virtual water transfers in terms of efficiency in water resource mobilisation, distribution and utilisation. By importing food commodities for which prices on world markets are low, water-scarce countries can reduce the stress on their own water resources and/or mobilise those resources for purposes which use them to best economic advantage either within the agricultural sector by focusing on export crops with higher value added or by promoting other sectors such as industry and tourism. The water savings which can result from virtual water trade are achieved not only in the importing countries but also at the global level given the differences in productivity between exporting and importing countries. Virtual water transfers can also have consequences for exporting countries, since the greater mobilisation of their water resources can cause tensions amongst users or environmental degradation (the over-tapping of the coastal water table in the south of Spain in order to irrigate horticultural export crops is a relevant example).

However, the quantification of virtual water flows is primarily of analytical importance; its prescriptive value depends on the framework selected for the analysis. As regards agriculture it is primarily a means of illustrating the interactions between agricultural policies and water policies and their impacts on the use of the various countries' water resources. The degree to which agricultural policies are integrated into regional policies and the objectives pursued in the food security, trade and environment fields differ from one country to another. These factors condition the type of indicators to which precedence

should be given and the relevant level at which the analysis should be conducted. The social dimension of agriculture must furthermore be taken into account in import strategies. Virtual water flows and their impacts must thus be analysed in the contexts specific to each country and at the appropriate levels. In this respect, the concept of virtual water shows that water management and distribution issues are not limited to the watershed level alone. There are a number of factors determining the utilisation of water at watershed level that are external and “hydro-economic” in nature (Allan, 2003).

And finally, the advantage must be underlined of making a distinction between green water and blue water in virtual water trade, which, although physically mutually dependent, have different financial and economic implications. The mobilisation of the concept of virtual water brings us back to the debate on how water should be distributed between rain-fed agriculture and irrigated agriculture. By highlighting and quantifying virtual water transfers, which are proving to be a means of *de facto* “sharing” of water resources, which are unevenly distributed throughout the world, particularly in the Mediterranean region, the concept of virtual water can thus be an additional decision-making tool.

For a comprehensive global vision of water

In the Mediterranean countries agriculture consumes almost two-thirds of blue water demand and almost 90% of total water demand including green water obtained from rainfall and virtual water obtained from food imports. The water issue in the Mediterranean region is thus primarily an agricultural and a food safety issue (and vice versa), which must be apprehended in connection with the water productivity of rain-fed and irrigated agriculture, trends in diet and measures to optimise the agro-food trade balance – in short, with the food security objectives of agricultural policies. These objectives can only be defined through a comprehensive global vision of water that departs from the classical concept of blue water that can be mobilised and tapped and takes account of other forms of water resources – green water and virtual water. In certain Mediterranean countries where green water and virtual water together cover the major part of food demand, irrigation issues are more economic or strategic in nature: the aim can be namely to export agricultural goods which have high value added or to attenuate the adverse effect of frequent droughts.

Blue Plan research has provided the basis for evaluating the extent of losses and inefficient uses of blue water in each sector as well as the progress that could be made through better water demand management, which, as a combination of tools and intentions, must become a policy priority in the Mediterranean. Through measures to improve efficiency in water transport and plot irrigation 25% of irrigation water demand could be economised.

But the concept of the rational use of water should be extended to comprise all rain-fed agriculture, which uses the largest share of natural water resources. Green water can be used to better advantage through water and soil conservation measures, action to manage flood water and water run-off, water harvesting or measures to adapt crop species to the soil water reserves.

The strategic and prospective analyses carried out by the Mediterranean countries with a view to examining ways and means of developing irrigated acreage and facilitating arbitration on the distribution of water resources within the agricultural sector or amongst the various sectors of use – thereby integrating environmental needs – must take account of the opportunities provided by developing “non-conventional” water resources such as the reuse of treated waste water. Action will furthermore be needed to ensure food import security in the Mediterranean region, which is the world’s leading cereal importer, in order to cope with water shortages and the risk of food insecurity.

The impacts which climate change is expected to have in the Mediterranean region make it all the more crucial to adapt the water and agricultural policies of the coastal countries so that they are in a position to take up the threefold challenge of satisfying human needs, serving development and preserving the environment.

Bibliography

Aït Kadi (M.), Benoit (G.) et Lazarev (G.) (Conseil général du développement agricole), *L'Union pour la Méditerranée face aux crises alimentaire, de l'eau et du climat. Dix propositions concrètes pour une Euro-Méditerranée durable*, Rabat, 2008.

Allan (J.A.), “Fortunately there Are Substitutes for Water Otherwise our Hydro-Political Futures Would Be Impossible”, in Overseas Development Administration (ODA), *Priorities for Water Resources Allocation and Management*, ODA, London, 1993, pp. 13-26.

Allan (J.A.), “IWRM/IWRAM: A New Sanctioned Discourse?”, *Occasional Paper 50. SOAS Water Issues Study Group*, London, School of Oriental and African Studies, University of London, 2003.

Benoit (G.) & Comeau (A.) (Plan Bleu) (ed.), *Méditerranée, les perspectives du Plan Bleu sur l'environnement et le développement*, chapter on “L'eau”, La Tour-d'Aigues, Éditions de l'Aube, 2005.

Blinda (M.) & Margat (J.) (Plan Bleu), “Ressources et demandes en eau en région méditerranéenne, situations et perspectives”, communication presented to the 13th World Water Congress, Montpellier, 1-4 September 2008.

Blinda (M.) & Thivet (G.) (Plan Bleu), “Facing water stress and shortage in the Mediterranean”, *Blue Plan Notes*, 4, 2006 (www.planbleu.org).

Blue Plan, *Les Perspectives du Plan Bleu sur le développement durable en Méditerranée*, Sophia Antipolis, Blue Plan, 2008.

Chapagain (A. K.) & Hoekstra (A. Y.), “Water footprints of nations”, *Value of Water Research Report Series*, 16, Unesco-IHE, Delft, 2004.

Chohin-Kuper (A.), Rieu (T.) and Montginoul (M) (2002), “Economic Tools for Water Demand Management in the Mediterranean”. Paper presented to the forum on “Progress in Water Demand Management in the Mediterranean”, Fiuggi, 3-5 Oct. 2002.

Ciheam, *Déclaration finale de la VII^e réunion des Ministres de l'Agriculture et de la Pêche des pays membres du CIHEAM*, Zaragoza, 3-6 February 2008a (www.ciheam.org).

Ciheam, *Mediterra 2008. The future of agriculture and food in Mediterranean countries*, Presses de Sciences Po, Paris, 2008b.

Dankers (R.) & Feyen (L.), Climate change impacts on river flow in Europe. Manuscript in preparation, 2008.

Debaeke (P.), Bergez (J.-E.) & Leenhardt (D.) (INRA), *Perspectives agronomiques et génétiques pour limiter ou réguler la demande en eau d'irrigation*, proceedings of the colloquium on "Gestion sociale et économique de l'eau, comment agir sur la demande", SHF, Paris, 17-18 October 2007, 2007.

FAO, *World Agriculture: towards 2015/2030*, FAO, Global Perspective Studies Unit, Rome, April 2000.

Fernandez (S.) (ENGREF), *Virtual water in the Mediterranean: an indicator to contribute to analysing issues on water management and distribution?* Presentation of the results of the Blue Plan regional study, 2007 (www.planbleu.org).

Fernandez (S.) & Thivet (G.) (Blue Plan), "L'Eau virtuelle: quel éclairage pour la gestion et la répartition de l'eau en Méditerranée?", *Les Notes du Plan Bleu*, 8, 2008 (www.planbleu.org).

Hamdane (2007), Rapport national sur la gestion de la demande en eau en Tunisie, published in PNUE-PAM-Plan Bleu (2007)

Margat (J.) (Plan Bleu), *L'Eau des Méditerranéens: situation et perspectives*, MAP Technical Report Series, Athens, 158, 2004.

UNEP/WFP/Blue Plan (2007), *Gestion de la demande en eau, progrès et politiques*, proceedings of the 3rd regional workshop on water and sustainable development in the Mediterranean region, Zaragoza, 19-21 March 2007, MAP Technical Reports Series, 168, Athens, 2007 (www.unepmap.gr).

World Water Council, "E-Conference Synthesis: Virtual Water Trade – Conscious Choices", *Synthesis WWC Publication*, 2, 2004.

Annex

Annex 1 - Irrigation water efficiency in various Mediterranean countries

Country	Transport efficiency	Plot irrigation efficiency	Total efficiency
Spain (ES)	81	76	62
France (FR)	90	78	70
Italy (IT)	65	60	39
Greece (GR)	80	70	56
Malta (MT)	90	87	78
Cyprus (CY)	95	95	90
Slovenia (SI)	90	60	54
Croatia (HR)	90	60	54
Bosnia-Herz (BA)	90	70	63
Albania (AL)	68	70	48
Total North	75	69	52
Turkey (TR)	80	56	45
Syria (SY)	80	69	55
Lebanon (LB)	80	58	46
Israel (IL)	83	90	75
Egypt (EG)	80	47	38
Libya (LY)	90	70	63
Tunisia (TN)	80	72	58
Algeria (DZ)	80	45	36
Morocco (MA)	83	58	48
Total South and East	81	54	44

Source: Blue Plan (2008).

CHAPTER 3

ADAPTING AGRICULTURAL SYSTEMS TO CLIMATE CHANGE

Mahi Tabet-Aoul (ARCE, Algeria) and Rachid Bessaoud (ARCE, Algeria)

Concern over climate change began in the Maghreb with the Sahel drought in 1973. Since then there have been recurrent intensive droughts, which are increasingly mortgaging the agricultural and socio-economic development of the region and are a cause for concern both to States and to the scientific community and numerous organisations (AIACC, EGU, FAO, IISD, CNRS, WWF, etc.).

Progress has been made at the national and regional level over the last 15 years in understanding climate change and its impacts through projects conducted by the World Environment Fund (WEF), which help to build the Maghreb countries' capacities for contending with the phenomenon (RAB/94/G31 project run by the WEF) and provide support for the compiling of the initial national communications for which provision is made in the United Nations Framework Convention on Climate Change (UNFCCC) and which the Parties have undertaken to submit.

The national climate services have tended more to provide data than to produce studies on climate change in the region. The work carried out in the context of the projects run by the WEF or by the national research institutes, universities and various consultancies in the region have provided a basis for:

- analysing the recent climate trend in the three countries,
- projecting the future climate,
- up-dating medium-term socio-economic projections,
- compiling inventories of greenhouse gas emissions, evaluating potential sources for mitigating those emissions and proposing options and mitigation measures,
- estimating the quantitative impacts on water resources, agriculture, and the coastline and proposing options and measures for adapting to climate change,
- evaluating the qualitative impacts of climate change on other sectors (health, energy, ecosystems, humid zones, etc.),

- proposing institutional and regulatory measures to combat climate change,
- taking an active part in the activities of the Conferences of the Parties to the UNFCCC.

The changing climate in the Maghreb is intensifying certain scourges (drought, desertification, deforestation, erosion, floods, heat waves and the resurgence of old diseases in connection with spreading poverty and water scarcity), which are threatening natural resources, food security and socio-economic stability. The region is also having to cope with the arrival of African migrants, “ecologically displaced persons” who are the victims of natural and environmental disasters that drive them to new, less vulnerable zones. Examining the impact of climate change in the Maghreb also involves dealing with issues concerning both the sustainability of natural resources and the trends in agricultural systems as well as analysing the political and socio-economic issues at stake in the food security and stability of these countries.

Panorama of the agricultural sector and water resources

Compared to the northern Mediterranean countries, the Maghreb lacks arable land and water resources. Every hectare must today feed two to three times more inhabitants than was the case at the beginning of the 1960s. In 2003 the average area of cropland per agricultural worker was 3 ha in Algeria, 2.2 ha in Morocco and 5.1 ha in Tunisia, compared to 12.5 ha in the European Union. Farmers with holdings of less than 10 ha account for 73% of the total number of farmers in Tunisia, 70% in Algeria and 82% in Morocco. This fragmentation of land reduces productivity and increases vulnerability: in Tunisia, the number of small holdings with an acreage of less than 5 ha and of holdings with 5 ha to 10 ha increased by 89% and 26% respectively in the period from 1961 to 1994.

According to the figures provided by the Blue Plan (Benoit & Comeau, 2005), the average annual shares of acreage devoted to crops and vine is decreasing, probably in connection with the climate trend in the Maghreb (-9.6% in Tunisia, -2.0% in Algeria and -1% in Morocco as regards crops and -0.5% in Tunisia, -2.3 in Algeria and 0.0% in Morocco as regards vine) and olive grove acreage is increasing (+0.6% in Tunisia, +0.3% in Algeria and +2.5% in Morocco).

Soil quality in the region is also deteriorating. Climate variability is obviously exacerbating the current degradation factors (erosion, salinisation, organic losses, soil compaction, desertification, and so on). Current research in the Maghreb is unfortunately geared more to land use than to knowledge of the soil and how it functions, yet such knowledge is essential to efficient land use.

Worrying medium-term outlook for soil

The mediocre quality of land combined with urban expansion is limiting farmland extension potential, which is already restricted by the desertification of rural areas, mountain zones and steppes due to climate change and anthropic degradation.

Urbanisation in the Maghreb is a problem that calls for special attention on the part of the public authorities and socio-economic actors. The urban encroachment on coastal

Adapting agricultural systems to climate change

areas that is common to all Mediterranean countries is causing considerable loss of farmland, and this is also the case with the urban expansion observed around inland towns and villages as the result of population growth. Speculation is exacerbating pressure on this land, since it promotes land acquisition by capitalists, who divert it from its agricultural purpose, a dynamic which is a major handicap for food security in the Maghreb. In Morocco, for instance, farmland shrinkage due to the urban spread concerns some 3500 ha every year, and it is estimated that 70,000 ha, i.e. 0.8% of AAU, will have been eaten up by 2025. Farmland may have shrunk by 100,000 ha in Algeria by the same date and by 25,000 ha in Tunisia. This reduction of agricultural area and the food question in the Maghreb are indissociable issues. In the case of Morocco, which will have a population of 38 million by 2020, per capita AAU will be 0.23 ha compared to 0.34 ha in 2007, i.e. it will have shrunk by 32%. If these trends continue the economic cost could be 1.75 billion Moroccan dirhams in terms of production losses, and damage caused to unmaintained facilities could amount to 2.24 billion Moroccan dirhams.¹

What is more, the desertification process would seem to be irreversible, particularly since means of combating the phenomenon are as yet too limited and it is only through a large-scale strategy that any impact can be made on the general trend, even in terms of mitigating its effects. In Algeria, the national centre of spatial techniques (CNTS) evaluated the phenomenon in the steppe regions of the country in 1996 in a survey covering 13 million ha (70% of the total steppeland area). Almost 9 million ha (67% of the area studied) are sensitive or very sensitive areas, and 500,000 ha (4% of the areas studied) have already become desert. According to an evaluation carried out in Morocco by Abdellah Louina (Mohammed V University) in 2001 on an area of 19 million ha, over 17 million hectares are degraded (94%), 7,903,000 moderately so and 8,316,000 seriously degraded. In Tunisia, the arid zone in the south of the country is facing severe desertification, as is the Jeffara region, where desertified land is covered with shifting dunes, and the Nefzaoua region, which is facing expanding humid salt flats (*sebkhas*).

Between State intervention and participatory approach

The State has always steered agricultural policy in the Maghreb through agricultural investment codes. The main concern of the public authorities has been to cover domestic demand for so-called strategic foodstuffs as far as possible, and this has justified protection measures, subsidisation, incentives and market regulation. Farmers have had to operate in line with these measures in order to receive State aid. The State continues to play a predominant role for historical reasons. Until the last few years it confined its action to managing crises (paying crop farmers compensation or providing aid for animal farmers), and it is only recently that the State has gradually begun to withdraw, delegating more and more responsibility to crop and animal farmers. However, with the exception of a few large farms that have sufficient financial capacities, the vast majority of farmers in the Maghreb cannot afford to upgrade their farms or adapt to climate change. The State has to continue to intervene to guide them, encourage them to take responsibility, and provide aid in the technical, organisational and marketing fields.

The participatory approach is often quoted nowadays as an approach for involving rural communities in the planning stage of development projects. Although a large number

¹ - Ministry of Agriculture, Rural Development and Maritime Fisheries (MADRPM), INAT/DAF, Rabat, Morocco, 2004.

of NGOs are present in the region, they play a minor role and their impact on rural society is limited; there are fewer such organisations operating in rural areas than there are in urban districts. The means and organisational capacities of many of these NGOs are limited.

In Algeria, the National Agricultural Development Plan, which was drawn up by the technical departments and specialised institutes of the Ministry of Agriculture, was first submitted to farmers in the country's 17 *wilayas* (in the eastern, central, and western regions) with a view to debating the acceptability of the technical measures proposed. Partnership at the local level is strengthened by the establishment of wilaya coordination boards composed of representatives from administrative bodies and associations, the social partners and professionals. The associations have difficulty in getting organised, however, and the institutional structures do not always manage to deal with problems connected with joint tenancy, the drainage of polluted water or the introduction of crops requiring less water. Farmers' unions are in the process of establishing themselves, but they need support and extension services to encourage awareness and provide training. The rural population takes part both financially and physically in agricultural development activities, action to improve living standards and create jobs, measures to mobilise water and steps to promote rural women. The associative movement is seen as the mainstay of efforts to implement the national agricultural development plan.

In Morocco, the State has carried out an ambitious and deliberate irrigation policy, through which over 1 million hectares of land have been irrigated, but it is mainly the big farms that have benefited. The public authorities have not only mobilised water and created external facilities but have also financed these infrastructures and laid down crop rotation systems and crop-growing techniques. The agricultural investment code, which was promulgated in 1969, provided the permanent budget support for this policy. However, by marginalising rain-fed agricultural areas and areas covered by small and medium-sized water schemes, the State has helped to accentuate the duality of the agricultural landscape and, consequently, to impoverish large segments of the rural population. Various corrective measures were introduced to remedy this state of affairs: the areas of rain-fed agriculture were the targets of successive integrated development projects and projects to develop dry crop-farming. A huge project for rehabilitating small and medium-sized water schemes was recently launched with the assistance of the World Bank. And since 1990 and the elaboration of the national watershed management plan a participatory approach has been adopted and local communities are now involved more in identifying priorities.

In Tunisia, the State has been pursuing a policy of liberalising agricultural trade since 1995 through the implementation of the WTO agreements (Uruguay Round and its Agreement on Agriculture): Tunisia undertook to reduce internal support by 13% over a period of 10 years from 1995, to eliminate all non-tariff measures and to reduce the customs duty levied on agricultural commodities by 24% over the same period. In this context the creation of a favourable environment has allowed agriculture and the agro-food industry to flourish, as is witnessed by the rapid development of certain sectors (meat, milk, early fruit and vegetables, etc.). Important measures were taken such as investment, action to upgrade the agricultural sector and enhance the professionalism

of the various food chains. The subsidy system was partially done away with and agricultural commodity prices were liberalised.

How is the Mediterranean Strategy for Sustainable Development to be assessed?

The evaluation of the Mediterranean Strategy for Sustainable Development² concludes that “agriculture continues to play an important social and economic role in the southern and eastern countries, although productivity is low on the whole and the authorities do not devote adequate attention to the efficient and sustainable management of water and soil resources. Rural populations are still large, despite emigration, and most rural people are poor and have a low level of education. Women, who do a large share of the farming work, are socially marginalised and have limited access to economic and financial tools. There is considerable pressure on natural resources with serious consequences in terms of deforestation, heightened erosion, dam silting, lower discharge rates, desertification and the irreversible loss of biodiversity. The people concerned see emigration as the answer to this persistent poverty.”

The difficulties that farmers encounter are often organisational or are the result of a legislative framework that is unsuited to supporting their activities. Although legislation in the Maghreb allows associations and cooperatives to be set up, they enjoy very little support and lack structures. Lack of means and taxation together limit NGO participation in rural development projects.

Table 1 - Public measures and constraints

Public measures	Constraints identified
1. Land register	Lengthy procedures and obstacles due to lack of political will
2. Fragmentation of land and reparation	Difficulty in separating the farming system from the ownership system
3. Information and development of crops with high value-added	Absence or widespread inadequacy of operational structures
4. Investment in conversion schemes	Lengthy application processing procedures and inadequate monitoring of the funds granted
5. Credit geared to farmers' needs	Centralisation, ponderous bureaucratic procedures, refusal of applications from poor peasant farmers, no gender distinction, age limit criterion (age of farmers > 50 years)
6. Insurance	Initial moves to apply this measure but absence of official indicators for compensation payments
7. Measures to upgrade farms	Centralised management and absence of transparency

2 - INFO/RAC-MAP, United Nations Environment Programme, www.inforac.org

Table 1 - (Contd)

Public measures	Constraints identified
8. Extension services and research & development	Administrative structures unsuited to farmers' needs
9. Forming of producer organisations	The associative culture is lacking in rural society
10. Participatory approach	Conflicting interests and gradual dying out of traditional structures and powers
11. Involvement of women	Difficulty in integrating and involving women due to their traditional status
12. Information and training	Remoteness, illiteracy, lack of motivation, lack of skilled staff, and training establishments that are unsuited to rural needs

Measures taken by international institutions to contend with climate change

These measures are financed by multilateral funds (World Environment Fund [WEF], World Bank, United Nations Environment Programme [UNEP], FAO, International Fund for Agricultural Development [IFAD]) or bilateral funds (French fund for world environment [FFEM], French development agency [AFD], US Country Studies Program [USCSP], German cooperation agency [GTZ], NGOs [WWF or AIACC]). All of these funds concur to promote the sustainability of agriculture, forests and humid zones with a view to preserving biodiversity, and to meet a number of combined challenges:

- preserving biodiversity and combating soil degradation and erosion,
- providing sanitary and phytosanitary surveillance and early warning systems,
- creating dams in order to inject water into underground aquifers,
- rehabilitating certain forest areas,
- developing fruit-tree crops,
- developing humid zones, watersheds and protected areas,
- improving rain-fed (zero tillage) agriculture and promoting the diversification of farming activities and of agro-pastoral rangelands,
- protecting oasis areas,
- supporting small acreage irrigation,
- enhancing the competitiveness of the agricultural sector (improving product quality and elaborating international self-administered control and labelling standards).

Although it has been possible to relieve poverty through bilateral and multilateral aid schemes financing specific projects, this aid has nevertheless failed to lead to a dynamic of change in the agricultural sector. The projects that have been run in the international framework have rarely been assessed objectively by neutral bodies. In many cases the local communities were not included in the running of the projects, and since neither the sponsors nor the administration were involved in the follow-up phase the projects have not been sustained. The funds that are allocated are of more benefit to the experts in charge of running the projects and the local administrative structures than to the actual target communities. Efforts are generally targeted at remedying the degradation of natural resources rather than improving the living conditions of the people who depend on them. The role played by sponsors consists more of supplying funds than of monitoring the implementation of activities in the field and checking how those funds are actually used.

International institutions and bodies contribute to the development of sustainable agriculture in the Maghreb by providing technical and financial aid. The FAO-UCEA CLIMAGRImed project³ on climate change and agriculture is intended, for instance, to facilitate the transfer of methodologies developed by CLIMAGRI in collaboration with the FAO concerning:

- the modelling of future scenarios of agricultural systems in the Mediterranean region in connection with climate variability and climate change;
- techniques for assessing farmland adequacy at various levels (from the local to the national level) in order to estimate the risks involved with climate variability;
- the measurement of sources of CO₂ accumulation in cropland systems;
- the exchange of current knowledge via the Internet of the effects of the desertification process on agricultural production in the Mediterranean region;
- the “quality and homogeneity of meteorological data”.

Recent climate trends and future projections

Recent climate trends

Analyses of temperature and precipitation observations are carried out over long periods in the three countries of the Maghreb, mainly in Casablanca, Oran and Tunis, and they all conclude that the temperature is rising and that precipitation is decreasing. In Morocco, the average annual temperature has risen significantly (by more than 1°C) over the last 50 years, and total precipitation fell by more than 30% over the 1978-1996 period compared to the 1961-1977 period. The average annual temperature in Oran increased by 1.5°C between 1926 and 2006, i.e. twice the average global rise in temperature – 0.74°C – in the course of the 20th century (IPCC, 2007), and the average annual volume of precipitation dropped by about 15%. The same increase in average annual temperature was also registered in Tunisia in the period from 1950 to 2004, with a decrease in precipitation of over 20%.

³ - FAO/UCEA CLIMAGRImed, programme SDRN/RA251S1001003, development of a network on climate change and agriculture in the Mediterranean region.

In addition to the temperature and precipitation trends, droughts, floods and heat waves are becoming more frequent. Analysis of annual growth rings in trees shows that drought is a recurrent phenomenon in the Maghreb, which occurred very frequently over a considerable expanse of territory during the second half of the 20th century. In Morocco, drought frequency has risen from one drought every 10 years in the 1950s and 1960s to two or three droughts per decade (seven periods of general drought were registered over the 1955-2004 period, five of them occurring since 1975). In Tunisia, there were 23 dry years over the period from 1907 to 1997.

The trend in floods is just as alarming. There were extremely wet years in the period from 1975 to 2004 with very heavy rainfall concentrated on very short periods of the year: hundreds of millimetres of water fell in arid regions within a few days and then there was nothing for the rest of the year. Arid soil, serious erosion and excessive run-off combined with anthropic factors such as the unregulated occupation of sub-watersheds invite disasters, especially flooding in the event of heavy rainfall (January 1990 in Tunisia, November 2001 in Algeria and November 2002 in Morocco) with particularly disastrous effects on economic activities, infrastructures, housing and agricultural production.

These climate trends are having numerous secondary effects: a decrease in run-off and snow cover, more intensive erosion, increase in water demand due to higher evaporation and evapotranspiration (mainly in irrigated areas), degradation of water quality due to the decrease in precipitation and in the dilution rate of pollutants from wastewater and liquid and solid discharge, shortening of the plant cycle (as the result of a warmer climate), northward displacement of alfa and replacement of the species by more drought-resistant species, increasingly visible desertification of the landscape in semi-arid zones and considerable eolian transport of sand from the Sahara northwards, modification of the migration period of migratory birds, more frequent occurrence of forest fires (25,000 ha gutted per year in Algeria and Morocco, resurgence of weeds, plant diseases and parasites.

Climate projections

Each country has developed climatic projection scenarios for 2020 and 2050 in the context of studies conducted for the RAB/G31/94 regional project and the initial national communications.

The Algerian climate projections⁴ were based on the MAGICC model (Model for the Assessment of Greenhouse Gas Induced Climate Change) coupled with a regional climate SCENario GENerator (SCENGEN). The seasonal projections of temperatures by 2020 compared to 1990 thus show an annual rise in temperature for the various regions of the country of between 0.65°C and 1.45°C and a drop in precipitation of between 5% and 13%; these estimates could double by 2050. The north-west and south-west regions of the country will be the worst affected, and it is estimated that the sea level will have risen by between 38 cm and 55 cm by the same date.

In the case of Morocco⁵, the results of the projections for the country as a whole, which are based on the IPCC average scenario, show a clear upward trend in average annual

4 - Algerian initial national communication.

5 - Moroccan initial national communication.

temperature of between 0.6 °C and 1.1 °C. The changes in precipitation, on the other hand, vary more widely than the changes in temperature, ranging from a maximum decrease of 12% in the annual volume to an increase of up to 4% in the southern extremities of the country (Dakhla region). A downward trend is predicted in the average annual volume of precipitation of around 4% by 2020 compared to 2000 (a drop of – 7% to 0% in the north of the country and a drop of - 7.5% to an increase of + 2.8% in the south) (Alibou, 2002).

Tunisia⁶ will certainly be very sensitive to the direct effects of climate change. The country will in particular be very exposed to the threats of an accelerated rise in sea level, which could have considerable repercussions on several economic sectors that depend on the sea or coast, on the physical and biological coastal environment and on human settlements.

The study on the impact of climate change on temperature and precipitation in Tunisia (AIACC, 2006) has produced the following results for the year 2100: a drop in precipitation of 20% and a rise in average temperature of 2.5°C (pessimistic hypothesis); a drop in precipitation of 5% and an increase in average temperature of 1.3°C (optimistic hypothesis); a drop in precipitation of 10% and a rise in average temperature of 2°C (average hypothesis).

These national projections have been complemented by international studies on the region of the Maghreb as a whole. In the report for policymakers which the IPCC issued on physical scientific bases in 2007 (IPCC, 2007), the Panel drew up the climate projections produced by various coupled atmosphere-ocean models at the global level averaged over the 2020-2029 and 2090-2099 decades. In the case of the first decade studied, the rise in temperature will be around 1.5°C in all three emission scenarios (B1, A1B and A2), and in the case of the 2090-2099 decade, the rise in temperature will be around 3°C compared to the 1980-1999 period in scenario B1, 4°C in scenario A1B, and 5°C in scenario A2. Precipitation will probably decrease in most of the sub-tropical regions in which the Maghreb is situated. The IPCC only provides precipitation projections for the 2090-2099 decade, however, and for two seasons – winter and summer. In winter, the decrease in precipitation will range from - 10% to - 20% compared to the average for the 1980-1999 period, and in summer it will be around - 20%.

The WWF has also produced a study on climate change in the Maghreb (Giannakopoulos *et al.*, 2005). It is based on the A2 and B2 emission scenarios of the IPCC and focuses on the 2031-2060 period, during which it is predicted that the global temperature increase will be 2°C compared to the 1961-1990 period. The average annual increase in temperature in the Maghreb will be around 2°C on the major part of the coast and 3°C inland in the case of scenarios A2 and B2.

The projections also give the seasonal rises in temperature (average, minimum and maximum):

- in spring, the increase will be 1°C to 2°C on the coast and in Tunisia, and 2°C to 3°C inland in Algeria and Morocco;
- in summer, the increase will be 2°C to 3°C on the coast and 3°C to 4°C inland;

⁶ - Tunisian initial national communication.

- in autumn, the increase will be 2°C to 3°C throughout the Maghreb;
- in scenario A2, there will be an increase in the number of weeks of heat wave with temperatures higher than 35°C (2 to 3 weeks on the coast, 3 to 4 weeks inland, and 5 to 6 weeks in the south).

In scenario A2, average annual precipitation will decrease by 20% in Morocco and by between 10% and 15% in the rest of the Maghreb. In scenario B2, there will be a decrease of 10% in the north and west of the Maghreb and of 20% in south-eastern Algeria and southern Tunisia.

Scientific monitoring mechanism established in each country

Bodies have been created in the Maghreb for dealing with climate change on a scientific and technical basis:

in Algeria⁷, the national agency on climate change (ANCC) and the national authority designated by the Clean Development Mechanism (CDM) have been created within the Ministry on Area Management, Environment and Tourism.

In Morocco⁸, it is the Ministry of Area Management, Urban Development, Housing and the Environment, and more specifically the Department for the Environment, which is in charge of activities connected with climate change. This Department vested itself with a unit on climate change as well as a national committee on climate change (CNCC) in 1996, a national scientific and technical committee on climate change (CNST-CC) in 2001 and a CDM unit.

In Tunisia, an institutional structure comprising a national council on climate change (CNCC) has been set up within the Ministry of the Environment and Area Management (MEAT).

The many different impacts of climate change

The impact of climate change on soil

Climate change will exacerbate the anthropic degradation factors which reduce soil productivity such as the inappropriate use of land, land clearing, deforestation, forest fires, salinisation, erosion and desertification. Erosion has already seriously degraded agricultural and forest zones and has damaged steppelands – in some cases irreversibly; this in turn has destabilised traditional pastoral life. Climate change will bring more variable precipitation and will make both the soil and farming activities more vulnerable. It is first and foremost the intensification of evapotranspiration due to the rise in temperature and the decrease in precipitation that will adversely affect soil water reserves. Studies carried out in Algeria and Morocco⁹ also show that the run-off rate is decreasing. Furthermore, during the periods of drought induced by climate change the soil dries out and becomes more sensitive to wind erosion, mainly when there is no plant cover

⁷ - Executive Decree no. 05-375 of 26 October 2005.

⁸ - Moroccan initial national communication, October 2001.

⁹ - National water resources agency, National Seminar on Drought, Algiers, 1994, and UNEP (1998).

or if dry-farmed cropland is ploughed. Intense precipitation can cause serious water erosion when it occurs after a long dry period. A series of high temperatures (heat waves) can also cause a decrease in soil fertility due to high decomposition rates and loss of organic matter affecting the nutrition cycle of the soil. A drop in rainfall or an increase in evaporation due to higher temperatures can intensify the salinisation of soil that is already affected, particularly shallow soil or soil that has poor drainage. And finally, the fertile land along the coast can be engulfed by the sea as the result of the rise in sea level. It is estimated that over 15,000 ha will be lost in Tunisia (in the Gulf of Tunis, Gulf of Hammamet and Kerkenna Islands). The coastal aquifers will also be affected by salinisation due to the intrusion of sea water.

Impacts of climate change on water resources

Taking the above climate projections as a basis, an average scenario can be adopted with a 10% decrease in potential exploitable water resources and a more extreme scenario with a 20% decrease. Since the rate of decrease in run-off is practically twice the rate of decrease in precipitation, it can be estimated that the potential exploitable water resources will have decreased by between 20% and 35% by 2025. Table 2 shows the effects of climate change in detail. In the average scenario the potential exploitable water resources would decrease by 20%. In the more extreme scenario they would drop by 35%. The decreases can be offset in part by treating and recycling waste water (10% of the exploitable potential) and reducing losses due to leakage in distribution networks by 20% (these losses are currently estimated at 40%). The impact of climate change can be offset in the case of both scenarios through measures to recycle waste water, to reduce water losses due to leakage, and to use non-conventional water resources (brackish water and desalinated water). The losses through evaporation and evapotranspiration due to the rise in temperatures and the losses due to silting will be offset by the water gained through the reforestation of watersheds and the injection of rainwater into underground aquifers.

Table 2 - Impact of climate change on potential exploitable water resources by 2025 (in billion m³)

	Potential exploitable water resources	20% Decrease	35% Decrease
		Average scenario and silting effect	More extreme scenario and silting effect
Algeria	9.0	1.8	3.1
Morocco	12.6	2.5	4.4
Tunisia	4	0.8	1.4

Source: Calculation by Mahi Tabet-Aoul based on two scenarios (a 20% and a 35% decrease in precipitation)

Impacts of climate change on yields

Due to the importance of cereals in all three Maghreb countries, Algeria and Morocco have studied the impact of climate change on winter wheat yield by 2020 in the context of the initial national communications. In this study, the increases in temperature and

decreases in monthly precipitation provided by the climate scenarios were used as input for the FAO's CROPWAT simulation model. The climate change will also affect vegetables: it was calculated that yields will have decreased by 10% to 30% in Algeria and by almost 40% in Morocco by 2030 (Bindi & Moriondo, 2005).

In Algeria, the simulations for three types of farm near (optimal, normal and dry) show drops in yield by 2020 ranging from 5.7% to 14% depending on geographical region and type of year. Table 3 shows decreases in yield based on the IS92a average emissions scenario of the IPCC using the ECHAM3TR climate scenario.

Table 3 - Impact of climate change on winter cereal yield by 2020, Algeria

	Average dry year		Average normal year	
Reduction of winter cereals	10 %		10 %	
Cereal output (in million quintals)	Present	2020	Present	2020
	18	20	40	36

Source: Mahi Tabet-Aoul, Étude de vulnérabilité et adaptation. Impacts du changement climatique sur les céréales d'hiver, Initial National Communication, Algeria, 2000.

The process followed by the Moroccan experts who carried out the study on the impact of climate change on cereals is the same as that followed in Algeria, since both studies were conducted in the context of the same Maghreb project (RAB/94/G31). The simulations carried out show a drop in yield ranging from 10% to 50% depending on geographical region and type of year.

Table 4 - Impact of climate change on winter cereal yield by 2020, Morocco

	Dry year		Normal year	
Decrease in winter cereals	50 %		10 %	
Cereal production (in million quintals)	Current	2020	Current	2020
	13	25	61	55

Source: Initial National Communication, Morocco, 2001.

In Tunisia (Abou Hadid, 2006), the DSSAT model was used to simulate winter cereal yield with an increase in temperature of 1.5°C by 2020 and a decrease in precipitation of 10%; the result showed a decrease in yield ranging from 10% to 48% depending on geographical region and type of year.

Factors limiting yields

There are several factors which limit yields: water shortage, wide interseasonal and intraseasonal variability in precipitation, greater frequency of major extreme phenomena (floods, droughts and heat waves), increase in salinity and development of pests. The water shortage due to the decrease in precipitation and the increase in evapotranspiration induced by the rise in temperature will affect both irrigated and non-irrigated systems. The increase in dry sequences may cause dry-farmed crop desiccation. As the result of

heat waves in any season there will be a risk of shrinkage during the crucial periods of crop cycles, and pests (locusts), parasites and other pathogens will move northwards. The northward shift of agro-climatic boundaries will make certain crops more vulnerable. In rain-fed agriculture cereal farms will be more threatened than tree-growing farms.

Analysis of the impact on free-range husbandry and forests

Climate change will reduce pasture productivity, particularly in the steppe regions where the bulk of livestock in the Maghreb is concentrated. It will also change the suitability of the animal production zones, affect livestock and insects (sweating, heat stress, greater need of water), cause considerable loss of livestock during extreme phenomena (drought, floods, strong winds) and increase the incidence of diseases such as leishmaniasis, brucellosis, bluetongue and horse sickness.

The rise in temperature, drop in precipitation and increase in the frequency and intensity of droughts will make forests increasingly vulnerable and will weaken certain forest species physiologically, causing stand dieback, propensity to disease and to parasite attacks in weakened stocks, perturbation of the natural regeneration dynamic of forest species, and depletion of fauna. The greatest threat at the present time is the occurrence of large-scale forest fires, which devastate forests. With a current annual loss of 50,000 ha of forestland on average (for all three Maghreb countries together), the forests in the region are liable to disappear in the medium term. The socio-economic consequences of such a situation could be disastrous for the ecological balance of the Maghreb, and in particular for the riparian populations.

Climate change and displacement of vulnerable population groups

The vulnerability of rural people to climate change depends both on the extent to which they are exposed to the hazards of changing natural conditions and on their ability to adapt to those changes, which in turn is connected with the prevailing social, political and economic circumstances (Brac de la Perrière, 2002; Nargisse, 2006). The effects of climate change have already been sorely felt in arid regions in the last few years. Local communities report periods of more severe drought interspersed with short periods of violent precipitation. Drought causes a drastic drop in crop yields, including hardier local varieties, decimation of livestock and desertification due to the degradation of plant cover and soil. It is compounded by water erosion and wind erosion on sandy soils with sparse plant cover.

Experts estimate that thousands of hectares of land are lost as the result of this erosion process every year: 20% to 30% of farmland and rangeland is thus seriously jeopardised. This desertification is adversely affecting animal husbandry, which is in decline, and is forcing young people to migrate to urban areas. In Morocco (FAO, 2001), the 1980 and 1990 droughts exacerbated rural-urban migration: 200,000 migrants moved to the towns and cities every year in the period from 1994 to 1990 compared to 167,000 per year in the 1982-1994 period. Throughout the Maghreb there is now renewed interest in equitable rural development policies: basic services in rural areas are being consolidated and there are many new initiatives involving integrated and participatory rural development schemes with a view to stemming the rural exodus.

The ever-increasing occurrence of extreme phenomena in the steppelands of the Maghreb in the past few years such as strong gusts of wind (transporting sand), drought, persistent heat waves (90 days in Ain Sefra, Algeria, with temperatures of 36°C or higher in the course of 1999) and violent rain are jeopardising traditional extensive pastoralism and transhumance. Recurrent losses (decimation of livestock) compounded by living conditions that are becoming increasingly intolerable are forcing small farmers to leave their land and swell the ranks of city-bound migrants.

Processes specific to climate change

The principal causes of desertification are climate variations, population trends and human activities resulting in the inappropriate use of land, but also the fact that due to the pressure of socio-economic or specific political factors the environment is inadequately protected. Destitute, poverty-stricken population groups that depend on the land for survival are tending to overexploit it in order to feed and house themselves and to have sources of energy and income. As the result of desertification the land is prone to flooding and its salinity is increasing, water quality is deteriorating and water courses and dams are silting up.

Agriculture is one of the human activities causing desertification. Bad irrigation practices in the arid zones of the Maghreb are causing a rise in salinity, with the result that some areas become wasteland. Overgrazing due to the plethora of livestock beyond the natural regeneration capacity of the rangelands and the advent of off-land livestock farming with mechanised means of livestock and water transport are destroying the plant cover that protects the soil. The deforestation resulting from the collection of wood, land clearing operations and forest fires are weakening the soil and causing loss of organic cover and biodiversity, and this in turn is resulting in intense water and wind erosion. Wood is the source of domestic energy in rural areas (it is used for lighting and cooking). Climate change and the overexploitation of forest resources that is induced by population growth and human activities are a serious threat to forestland. The rise in temperature and drop in precipitation as well as the more frequent and increasingly intense droughts brought by climate change are preventing the plant cover from regenerating.

Impact of atmospheric carbon on fertilisation

The increase in the concentration of carbon affects CO₂ absorption during photosynthesis and CO₂ emission by respiration. Climate change and the increase in carbon concentration cause two types of reaction:

a major positive metabolic reaction connected with climate warming: the rise in temperature will bring higher plant and microorganism respiratory rates, and higher emissions of CO₂ will be released into the atmosphere.

a negative metabolic reaction associated with the increase in carbon concentration and the rise in temperature: the increase of carbon concentration will stimulate the process of photosynthesis and the carbon stock in ecosystems will increase.

The question of whether the effects of these climate changes and of the increase in atmospheric carbon will have a fertilising effect on ecosystems will depend on the balance

between these two types of reaction. Water availability is also bound to play a major role. It must be pointed out that most of the research that has been carried out throughout the world on the impact of the concentration of CO₂ on plants has been done in laboratories or in greenhouses, and it is difficult to transpose these results into the real and much more complex conditions of the Maghreb. Several results can be noted regarding the impacts of CO₂:

- species with a high conductance for CO₂ diffusion will have higher growth rates than species with low conductance (most species that are grown have high conductance);
- increase in CO₂ concentration causes partial closing of stomatal pores in leaves and reduces evapotranspiration in many species, which means that a certain amount of water is economised.

Crossing climate data and productivity losses or gains

Two approaches are adopted: the experimental approach and the ricardian approach. The first is based on trends in yield depending on climate trends and the biophysical attributes of crops. The second is a monetary approach based on price trends throughout the agricultural production chain.

The scarcity of water and soil resources in the Maghreb adversely affects agriculture. The following section is based on the results obtained in a study conducted by Robert Mendelsohn *et al.* (2000) on the Maghreb countries, focusing on 2100. This study is the result of three climate projections: an MOY model which uses the average of the projections of 14 General Circulation Models (GCM) of the IPCC calculated with the COSMIC software programme, a POLD model based on the GENESIS model with sea-glacier flow, and a UIUC model developed by the University of Illinois. The latter model maximises both the rise in temperature and the drop in precipitation in Africa and, consequently, the economic losses in terms of gross agricultural product. The costs of the impacts are calculated by means of the Global Impact Model (GIM), which integrates the output provided by COSMIC and calculates the impacts on each market sector using two alternative response functions measured on the basis of cross-cutting experimental models used in the United States. Since the climatic sensitivity of agriculture in Africa has not been measured, this analysis is based on climatic sensitivity studies conducted in the United States and is merely a tentative simulation for the Maghreb. The results obtained are set out in Table 5.

Table 5 - Impact costs expressed as a percentage of gross agricultural product (GAP) by 2100

	Experimental models			Cross-cutting models		
	POLD % of GAP	UIUC % of GAP	MOY % of GAP	POLD % of GAP	UIUC % of GAP	MOY % of GAP
Algeria	18.20	30.58	22.83	1.58	4.85	2.96
Maroc	20.51	31.93	26.08	3.47	-0.34	-1.42
Tunisia	29.58	58.19	41.67	-1.53	4.72	0.97

Source: Mendelsohn *et al.* (2000).

If one takes the climate projections by 2100 of the UIUC model, which gives a rise in temperature of 3.22°C and a drop in precipitation of 10% – which would seem low –, the negative impact cost for the three Maghreb countries, expressed as a percentage of the gross agricultural product (GAP) according to the experimental and the cross-cutting response function can be estimated as follows: between 4.85% and 30.58% (average 17.8%) for Algeria, between 0.34% and 31.93% (average 15.8%) for Morocco and between 4.72% and 58.19% (average 36.4%) for Tunisia. On the basis of these results, it can be said that the average cost of impacts will be close to 25% of GAP by 2100.

The probable cost of the impacts of climate change have to be estimated in order to plan investments and the expected return by a given date. The results obtained for the Maghreb are set out in Tables 6 and 7.

Table 6 - Impact costs by 2100 in billion dollars

	GAP	GDP	GAP as % of GDP	Experimental models			Cross-cutting models		
				POLD	UIUC	MOY	POLD	UIUC	MOY
Algeria	36.1	1 347.2	2.68	6.57	11.04	8.24	0.57	1.75	1.07
Morocco	17.6	559.7	3.14	3.61	5.62	4.59	0.61	-0.06	-0.25
Tunisia	7.2	255.9	2.81	2.13	4.19	3	-0.11	0.34	0.07

Source: Mendelsohn et al. (2000).

Table 7 - Estimate of impact costs expressed as a percentage of GDP by 2100

	Experimental models			Cost-cutting models		
	POLD % of GDP	UIUC % of GDP	MOY % of GDP	POLD % of GDP	UIUC % of GDP	MOY % of GDP
Algeria	0.49	0.82	0.61	0.04	0.13	0.08
Morocco	0.64	1.00	0.82	0.11	-0.01	-0.04
Tunisia	0.83	1.64	1.17	-0.04	0.13	0.03

Source: Mendelsohn et al. (2000).

The study concludes that the Maghreb is vulnerable to climate change. The impact costs can be considerable both in absolute terms and expressed as a fraction of GAP. The estimates presented can even be regarded as too optimistic, given that they are based on response functions specific to the United States, which are based on a capital-intensive and considerably adaptable agricultural system. If one takes the UIUC model, the annual impact cost of climate change by 2100 will be between 1.75 and 11.04 billion dollars in the case of Algeria, between 0 and 5.62 billion dollars in the case of Morocco, and between 0.34 and 4.19 billion dollars in the case of Tunisia. These climate trends will be felt all the more since the Maghreb countries, like other developing countries, are suffering from underinvestment and misinvestment in agriculture. Amongst other consequences,

the current trend on food crop markets and the exacerbation of the constraints induced by climate change will result in growing food dependency, and at the national level the ability of production systems to guarantee food security will be questioned.

Strategies for adapting to climate change

The strategies for coping with climate change must pursue several objectives: food security, more efficient use of water, and measures to take account of the potential impact of climate change and the three constraints entailed by globalisation (foreign investments, trade and the transmission of ideas conveyed through information and communication technologies). It is the transmission of ideas that will have the greatest impact, for there will be pressure on governments to join forces in efforts to reduce poverty, to develop basic infrastructures in the rural world, to promote gender equality, to provide security and to protect the health of those who work the land. These ideas are part of the Millennium Goals, to which the Maghreb countries have subscribed. Good governance requires local community involvement and participation. It is the duty of the State to act as regulator in order to reconcile the conflicting interests of farmers and consumers.

The constraints that weigh heavily on the agricultural sector are not a recent phenomenon. The problem lies in the scale of State intervention, on the one hand, which still falls short of what is needed in order to combat soil degradation effectively and ensure that natural resources (soil, water, forests, rangelands) are managed efficiently, and on the other hand in the absence of an overall vision of the measures to be taken: there must be a matching of the agricultural uses of land and effective production systems. Agricultural strategy must take account of the vulnerability of the agricultural economy with regard to climate variations, the internal socio-economic constraints connected with the national context and the positive or negative external constraints resulting from the globalisation of the economy and in particular from competition on international markets. Any strategy must include good governance, active local community participation, development of the human factor through training and education, scientific research and partnership with the North.

Food safety

Our analysis will concern only cereals, which are the staple food in the Maghreb. It is preferable for production in the Maghreb countries to cover at least 50% of their cereal needs for reasons of food security.

It has been calculated that cereal demand in Algeria will amount to around 10 million tonnes by 2025, which, in the context of this food security strategy, means that 5 million tonnes will have to be produced. In the study conducted in the context of the national programme for agricultural development, 1.2 million hectares of the 6 million hectares devoted to dry-farmed cereals are suitable for crops, with a yield of 25 quintals per hectare; this would mean that 3 million tonnes could be produced. So a further 2 million tonnes would need to be produced on irrigated land. With a cereal yield of 40 quintals per hectare, this would require an irrigated area of 0.5 million hectares, i.e. 50% of the total area of potentially exploitable irrigated land. Given the climate hazards, this choice must be based on an adequate supply of available groundwater for guaranteeing irrigation

in dry years and controlled irrigation management. Groundwater management must thus be revised; underground aquifers must be listed and rehabilitated by means of the technique of injecting surplus surface water. With the option of keeping 1.2 million of the former 6 million hectares for cereal crops, almost 5 million hectares would be converted to export crops with high value-added. This conversion to the advantage of more profitable new crops and tree crops, which are less vulnerable to climate change, would mean that the recurrent recourse to State aids and subsidies could be replaced by better use of land, and it could help to sustain and safeguard biodiversity by avoiding monoculture and developing local species.

Irrigation water and irrigated areas

It is presumed that the maximum area that can be irrigated will have been reached by 2025, i.e. 1.66 million hectares in Morocco, 1 million in Algeria and 0.51 million in Tunisia. Taking an irrigation rate of 5610 m³/ha as a basis, irrigation water needs would amount to 6.4 billion m³ in the case of Morocco, 5.6 billion m³ in the case of Algeria and 2.8 billion m³ in the case of Tunisia. Table 8 shows the current situation and the outlook regarding irrigation water and irrigated areas.

Table 8 - Outlook regarding irrigation water and irrigated areas by 2025

	Irrigation in 2000 (billion m ³)	Irrigation in 2025 (10 ⁹ m ³)	Irrigated area in 2000 (million ha)	Irrigated area in 2025(106 ha)
Algeria	3.9	5.6	0.51	1
Morocco	11.0	8.4	1.46	1.66
Tunisia	2.1	2.8	0.37	0.56

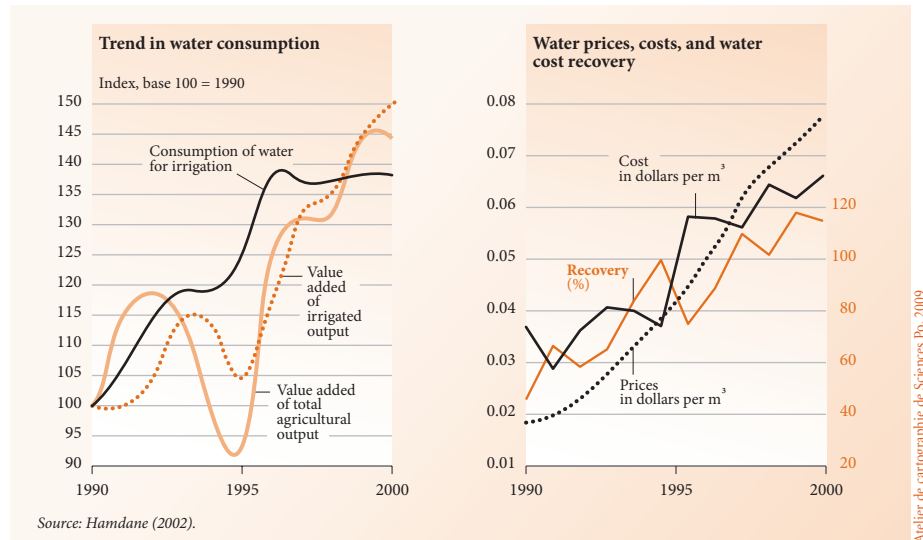
Source: Evaluation by Mahi Tabet-Aoul.

The hypotheses concerning the distribution of consumption by 2025 consider that the following volumes of water will be exploitable¹⁰: 9 billion m³/year in Algeria, 12.6 billion m³ in Morocco and 4 billion m³ in Tunisia. The estimate for Morocco is to be explained by the scale of the surface water exploitation programme that has been implemented over the last 10 years and by the increasingly drastic restrictions that will be imposed on water abstraction from underground aquifers, which are currently being overtapped. The situation will be a cause of considerable concern for all three countries in the Maghreb after 2025, when the limit of exploitation potential will have been reached.

Sustainability prospects

The sustainability of the agricultural sector is inconceivable without sustainable incomes for rural people. The sustainability of natural resources (water, soil, fauna, and flora) cannot be dissociated from action to meet the needs of local communities, whose incomes or livelihoods depend on those resources. The mixed results obtained in biodiversity projects are to be explained by the fact that local communities have not been involved in managing that biodiversity.

¹⁰ - Algerian initial national communication to the UNFCCC, 2002.

Chart 1 - Trends in water consumption and costs in Tunisia, 1990-2000

Small farmers are the essential component of the agricultural fabric in the Maghreb. Agricultural development will inevitably involve measures to improve small farm profitability and promote local communities by matching crop types to the land (conversion or new species), adopting new technical itineraries and introducing new para-agricultural or off-farm activities to guarantee employment and develop participatory structures amongst farmers. And in the case of medium-sized and large farms sustainability will inevitably require optimising production on the basis of the availability of irrigation water, diversifying organic crops and adopting quality standards and labelling, developing efficient real-time export channels through optimal management, and providing the appropriate means (storage and conditioning facilities, transport, constant monitoring of international markets, etc.) and legal instruments promoting free trade within the framework of the regional or global negotiations (within the MAU, EU and WTO).

Involving communities and developing traditional know-how

It is essential to stabilise the rural world if the migratory flows to urban areas and foreign countries are to be stemmed. Development projects must involve local communities in the planning stage in order to take account of their concerns and also to identify any constraints from the outset which might hold up or frustrate such projects. The communities themselves can sometimes hold the keys to project success, yet projects are still being planned by central or regional authorities, which are often oblivious to the contribution which the target groups could make. In many cases projects are designed on a sectoral basis, whereas they are implemented horizontally and involve several sectors in the field. One of the major reasons for failure is that sociocultural aspects are disregarded. Measures must be taken from the outset to raise awareness, motivate and win the support of the "third sector", that is to say, communities, producer associations and NGOs, whose participation boosts the effectiveness of the sustainable management

of natural resources as well as the ability to resolve any conflicts that may arise. Participation paves the way for democracy and for sustainable local development.

Involving communities presupposes that the traditional know-how that has been passed on from father to son for generations (as in the case with oasis agriculture and qanats in the case of water management) be respected. This knowledge is the result of the adaptation of human activities to climate and soil conditions in the course of history. Agro-biodiversity is thus the fruit of the activities of many generations of rural populations, and local communities should therefore be entitled to freely use the various genetic resources, including seeds, which they have cultivated throughout their history. Their farming methods are based on using hardy plant and animal species and managing the technical itineraries and available resources that are specifically suited to the various local areas. Traditional agriculture is essentially organic, and there is now renewed interest at the world level in organic products with a strong identity appeal that come from areas with their own special features and are produced in response to evolving consumer demand. This traditional know-how is not inalterable, however – it must evolve and include the results of new scientific and technological advancement, and it must be constantly evaluated so that the positive aspects can be preserved and the negative eliminated.

Technological transfer

Technological transfer must help to consolidate local development by implementing the instruments for enhancing the quality of local products and increasing the sustainability chances of farms by interlinking production systems and helping the actors involved to enhance their professionalism. In particular, local agriculture needs better technologies for managing soil, water resources and livestock and for establishing viable and sustainable farming systems, particularly by using crop varieties that are more resistant to harmful organisms, disease and drought. By employing methods based on organic and ecological processes it will thus be possible to reduce the use of external production inputs and in particular of agricultural chemicals. Such methods include anti-erosion crop-growing practices, improved fallow, green-manure cover crops, soil conservation and pest control based on biodiversity and organic means in preference to the use of pesticides.

Anti-erosion (zero tillage) crop-growing practices are one of the major successes of the last twenty years in the agricultural field. Better methods of managing modern agricultural production inputs can also make rain-fed agriculture more viable in ecological terms. However, the advantages of most new technologies differ from one location to another. At all events, these technologies must be adopted in the context of a decentralised participatory approach that is backed by collective action on the part of farmers and communities. Although the progress that has been made in the biotechnology field could bring considerable advantages for producers and consumers, current investments, which are effected mainly by the private sector and governed by commercial interests, have a limited impact on the productivity of the agricultural sector in developing countries. Difficulties often arise at the political level when it comes to carrying out reforms. Technological advancement such as the progress made in precision irrigation (remote sensing) and improvements in the quality of irrigation services can

generate political support for reforms that have been at a standstill. The ecological certification of products – in the fair trade context, for instance – also enables consumers to pay for ecologically sustainable management.

Risk management

It would seem more necessary than ever to devote efforts to risk management rather than the crisis management approach that has prevailed hitherto. The Maghreb is subject to periodic droughts, floods and heat waves, whose frequency is increasing. The State compensates farmers affected by disasters either by paying financial compensation (in the case of crop farmers) or by providing livestock feed (in the case of animal farmers). In the livestock sector the State builds up security stocks of feedingstuffs with a view to contending with crises and uses motorised transport to water livestock in the event of drought. This aid can adversely affect crop growers, for example, in that it counteracts the declared objectives of market liberalisation and means that farmers are incapable to cope with the laws of the marketplace. As a regulator the State must set up a system of organisation and instruments for managing risk. This is a new approach, which will inevitably involve creating monitoring and early warning systems for droughts and floods. Morocco has established an observatory in this context, which is responsible for drought management. New disaster response mechanisms will have to be devised which operate through production chains and insurance bodies.

Competitiveness of large farms on international markets

The competitiveness of large farms is not merely a question of improving production in terms of price and quality; it also requires know-how and organisation in the marketing field. The assets entailed in the diversity of the natural environment, the wealth of biodiversity, traditional know-how and the proximity of the European market create opportunities for large farms in the Maghreb to diversify their agricultural production. Such diversification can promote the progressive development of conventional food-crop farming systems, in which cereal crops are predominant, towards more profitable systems which are geared more to the market and develop the aptitudes of local natural resources to best advantage. This diversification or conversion will be a qualitative leap in the effort to reduce poverty and protect the environment and an appropriate means of adapting agriculture to the requirements of the liberalised international agricultural markets. It can concern the production of foodstuffs for which demand is steadily growing (labelled local produce, “organic” products, products with high value-added). This dynamic can only be created, however, with the sustained support of both State and local communities. Research must also focus on identifying new production niches and their technical itineraries, and efforts must furthermore be made to provide extension services for producers in order to help them innovate, condition target products, create producer organisations and obtain market access. As regards competitiveness on international markets, there are two types of forcing which must be borne in mind: economic forcing due to globalisation, and climate forcing induced by climate change.

There is still much uncertainty inherent in the globalisation process. If the liberalisation trend is confirmed, it is difficult to predict the rate at which the process will progress, and this poses visibility problems for economic agents, who hesitate to invest because

of the risks entailed in the payback period. In order to reduce those risks the State can take specific measures to boost the private sector and steer it towards investments, which are bound to enable private enterprise to enter international markets (measures to step up upgrading schemes, for example, as have been taken in the industrial sector, and public investment in agricultural infrastructures). There is also a conflict in strategy between the State and farmers. The State intervenes frequently, for instance, to keep the prices of agricultural commodities low, and this is an obstacle to the free interplay of market mechanisms and harms farmers.

Climate forcing is marginal; it affects the trade cycle performance of the agricultural economy and should therefore be taken into account to a greater extent in agricultural policy on the basis of socio-economic forcing. Medium-sized and large farms in the Maghreb use irrigation and are geared mainly to exports. Climate change thus affects them indirectly. In the event of drought large farms can be penalised by the restrictions on water abstraction, the bulk of the volumes abstracted being used for drinking water. This can disrupt the normal course of crop production, which can collapse. Floods can also affect these farms, but to a lesser extent, as can heat waves, which can damage crops if they occur during certain critical phases of the plant cycle. On the other hand, since climate warming is more significant in the southern Mediterranean countries than in the northern countries, large farms in the South have the advantage of being able to produce early vegetables and citrus, which gives them a definite advantage on international markets.

Technical upgrading and training

With the benefit of international cooperation the Maghreb could take advantage of the results of research and development in order to exploit the various types of crops to best advantage. But since farmers in the Maghreb are elderly their succession is becoming a crucial issue. Incentives must be created (allocation of land, loans, extension services) to encourage young agriculturalists to devote their energies to the agricultural sector, and at the same time the State must support upgrading measures in the technical, economic and commercial field.

Measures for adapting to climate change

The marked climate variability in the Maghreb makes it essential for farmers to take measures to retain advantages and minimise losses on their farms. These adaptations vary depending on the size and structure of each farm, the bioclimate and market accessibility. There is no single adaptation method; what is needed is a pragmatic approach based on local know-how and the accumulation of knowledge and experience. Due to the way socio-economic systems are evolving (in the national and international context) and the way agricultural systems are developing (farmers are opting for highly profitable crops), it is becoming increasingly difficult to adopt new measures. The current trend is to adopt a preventive approach by diversifying or converting crops within farms and engaging in several different activities in order to improve farm incomes. These activities can cover several types of employment depending on the social situation of the farmer and the level and regularity of the income they provide.

For most small farms the extra income obtained from off-farm activities is a sine qua non for survival and for withstanding the effects of climate hazards. In the case of medium-sized farms, which are embarking on a process of capitalist accumulation, it is the injection of funds that enables them to develop. From this point of view, diversifying activities and sources of income is a preliminary to intensifying and diversifying production. In the case of large farms, capital from agriculture that is economised is invested in more profitable activities such as the building industry and real estate or in the acquisition of land capital as a form of security. Certain studies conclude that medium-sized farms adapt best to the current constraints.

Structural adaptation mechanisms and anti-cyclical measures provide a means of responding to the constraints of climate change. The former are introduced in order to anticipate variations in production following variations in climate conditions, and the latter serve as a means of creating resources in order to meet needs in critical periods.

Structural mechanisms

These mechanisms concern diversification of crops and monetary resources, producer partnerships, investment partnerships and stock-building. By diversifying crops the risks of changes in weather can be reduced and their effects mitigated. Several different animal and plant species can be combined using species and varieties from strains that are chosen for their relative hardiness and have been selected by generations of farmers (wheat, barley, sheep, etc.). By promoting this diversity farmers can also take advantage of the complementarities between the various products. Livestock, for example, can add value to the by-products of a cereal. In dry years, a cereal intended for grain production can be converted to fodder; the amount of plant mass harvested is thus minimal and at the same time livestock can be saved. Staggering the various production cycles also makes the system flexible, for it ensures first and foremost that risks are spread out and that all or part of the system is saved, in addition to the spreading of sales and expenditure periods which is possible with product diversity. Pulses are sometimes sold fresh, for example, in March or April, which brings in money at a time when there are cash flow difficulties. Olive trees are also severely pruned in dry years in order to feed sheep stock and also to preserve the trees. The development of hay and oat crops is more a question of cash flow necessity than of diversifying crop systems or combining animal husbandry and crop farming.

Producer partnerships are based on the principle of solidarity: by joining forces, although one earns less in good years one loses less in bad years. Risks can be shared amongst partners and minimised, and farms can be managed more flexibly by boosting production after a bad year while ensuring a minimum harvest, the only contribution required being the land that is contributed. From the point of view of the person receiving the contributed land, partnership for crop growing is a means of increasing the total acreage of the farm without having to mobilise a large sum of money: all he needs is an available stock of seed and the working equipment. This type of partnership is found in animal husbandry, where the animals of a farmer in difficulty who is anxious not to lose his livestock or of non-farmers who want to invest in animal farming are taken over. The practice is developing in Tunisia in agricultural subsectors and also in the field of water management on irrigated land.

Investment partnerships are less common. They concern big landowners who are non-residents or large demesnes, which set up companies for developing agriculture. In Morocco, the Maamora Prime company in the Kenitra region specialises in the production, processing and export of early fruit and vegetables.

Stock building is a traditional method for coping with contingencies, whereby the resources of good years can be put aside for bad years. The system was widespread in the past, as is evidenced by the underground silos on some farms, but it now seems to be practised less frequently. Large livestock farms continue to build up very large stocks to ensure that they can feed their flocks and herds. The technique is still used in all three Maghreb countries, but it presupposes that capital is available.

Anti-cyclical measures

Adaptations alone do not suffice. They must be combined with anti-cyclical mechanisms through which resources can constantly be matched to needs. This matching is necessary in particular in the case of dry-farmed crops, which are more vulnerable to extreme climate variations during two specific periods in the farm year – autumn (when some 60% of expenditure is effected) and spring. Decisions taken in autumn disregard the weather history of the year; they concern the area to be sown and the types of crop to be grown, and this depends on the cash balance of the past farm year. As the year progresses decisions are modified according to weather conditions, although they still depend on the farmer's available cash. The matching process is based on continuous efforts to reduce expenditure or increase liquidities, or both at once. The measures to be taken depend on how climate conditions affect the most vulnerable products.

Adaptation dynamic in the course of each type of production

According to a survey conducted by the regional centre for agricultural development in the Kairouan region in Tunisia, the number of cereal farms has dropped in the past few years from 3500 to 2000. Almost 1500 farmers have opted to switch to horticultural crops or to combine fodder crops with animal husbandry. The farms practising the latter combination build up stocks of fodder over several years in order to ensure that they can feed their livestock in dry years. Sheep rearing is regarded as an advantageous adaptation strategy, since sheep are resistant to unfavourable climate conditions and can consume various types of feed. The Tunisian example illustrated below (MARH, 2005) gives an overview of the main trends for all crops. As is the case in Morocco, it shows a decrease in acreage devoted to growing cereals and pulses and an increase in fodder and tree acreage and illustrates autonomous adaptation based on a conversion process that is already underway (cf. Table 9).

Taking all three Maghreb countries together, the acreage devoted to cereal crops is leveling off or even decreasing and cereals are being replaced by tree crops (cf. Table 10).

A certain degree of geographical specialisation is observed amongst producers in the animal husbandry field (*Cahiers d'études et de recherches francophones. Agricultures*, 2007). In Tunisia, following the dry years from 1998 to 2002, breeders, who are less affected by drought, were concentrated more in the north of the country, and fatteners were concentrated in the central and southern regions. But after the next two good years

Table 9 - Trends in land use in Tunisia during the 1961-2003 period

Crops	1961-1962		1994-1995		Trend (1995- 1961)	2003		Trend (2003- 1995)
	Acreage (1 000 ha)	%	Acreage (1 000 ha)	%	%	Acreage (1 000 ha)	%	%
Cereals	1 810	92 %	1 531	38 %	- 15 %	1 176.9	30 %	- 23 %
Fodder	35	2 %	219	5 %	6 times	417.7	10 %	88 %
Pulses	80	4 %	102	3 %	28 %	65.8	2 %	- 35 %
Horticultural crops	31	2 %	157	4 %	5 times	142.7	4 %	- 9 %
Other crops	81	0.4 %	35	1 %	- 57 %	21.6	1 %	- 38 %
Tree crops	No data	0.0 %	1 982.6	49 %	-	2 139.9	54 %	8 %
Total	1 964	100 %	4 026.6	100 %	205 %	3 958.6	100 %	- 2 %

Source: MARH (2005).

Table 10 - Trends in cereal acreage (in hectares)

	1970	1980	1990	1998
Algeria	3 228 170	3 181 380	2 365 990	3 690 350
Morocco	4 513 200	4 428 550	5 603 300	5 938 499
Tunisia	1 272 700	1 307 200	1 427 730	1 240 000

Source: Faostat.

(2003-2004) the breeders in the centre and central south of the country opted again for a strategy of sheep livestock capitalisation. In favourable zones in Morocco and Tunisia a veritable activity of straw and hay stock-building is developing in the anticipation of drought. Fodder mobility has thus replaced livestock mobility with considerable speculative risk connected in part with the liberalisation of input prices.

Farm conversion in connection with climate change or anticipation of such change

Since the volume of conventional water resources that can be mobilised has decreased as the result of recent climate conditions and the more frequent occurrence of extreme phenomena (droughts and floods), a land conversion policy has been developed in all three Maghreb countries, particularly in the case of rain-fed crops. But it is mainly in the water field that sustained action is being taken in order to guarantee that farmland is irrigated in normal circumstances and good weather conditions and to protect watershed downstream areas from flooding.

The shift towards tree crops (citrus trees, olive trees, etc.) is growing in the Maghreb, despite the fact that climate warming can have a direct impact on these crops, particularly by producing early flowering. At that stage, climate conditions influence the major components of fruit yield formation either directly or indirectly (sensitivity to frost, bloom overlap, pollination). Some studies that have been conducted in parallel show that physiological bud drop is induced by mild winter conditions. In Algeria (MADR, 2000), the national agricultural development plan has been based since 2000 on a geographical map of the viable distribution of crops according to agro-pedo-climatic conditions. That distribution is one of the criteria on which the loans that are granted in the context of the scheme are based, and tree and other crops are developing rapidly to the detriment of cereal crops. Efforts are also being made to label products that are intended for export.

The Moroccan government (European Commission, 2006) is pursuing a policy for developing agriculture which includes measures to protect agricultural activities from climate hazards and to make farms more competitive by converting to more competitive crops including crops that are grown organically; the government is furthermore implementing the law on quality standards that was adopted at the end of February 2006 with a view to contributing to the development of registered designations of origin (RDO) and protected geographical indications (PGI). In addition, operations are currently underway to privatise the management of 56,000 hectares belonging to two State enterprises. Efforts are also being made to improve marketing channels and to bring about land reform in order to reduce the constraints connected with the scarcity of arable land and the fragmentation of farms.

And lastly, Tunisia (Audinet Tunisie, 2007) has drawn up regional agricultural maps based on adaptation to climate conditions with a view to minimising yield irregularity, limiting the effects of climate conditions on the growth of the agricultural sector, achieving a higher growth rate and participating in the national development effort while ensuring sustainability, given the scarcity and precarious state of natural resources, on which ever-increasing demands are being made. The aim is to enhance the competitiveness of agricultural commodities on both domestic and foreign markets and to bring products into line with foreign market requirements regarding stricter and more specific criteria.

Recommendations for agriculture faced with climate change

Sustainability with regard to public environmental goods and services

In view of the interaction of agricultural activities, which contribute to the greenhouse effect and to climate change, State regulatory measures must aim to gear the agricultural sector to sustainability in order to preserve both natural resources (to protect water against pollution and conserve the soil by fighting erosion, salinisation, compaction, and organic degradation) and the environment (to mitigate GHG emissions, preserve biodiversity and combat desertification). Over and above the technical aspects of agricultural development, sustainability must be based on local sociocultural values.

Agriculture must be reconstructed through measures to revitalise rural areas, which have been very much neglected in the former development approach, by involving local communities.

The sustainability of the agricultural sector will inevitably require action to reduce poverty and create rural-urban equity in living conditions as well as measures to develop information and communications – which are causing more and more rural communities to put forward the same demands as those of their urban counterparts. The multi-functionality of the agricultural sector attracts attention to the synergies and inter-dependencies between agriculture and other rural activities; these linkages can be exploited in order to stimulate the sustainable development of the agricultural sector and of rural areas in general. Operators must organise in order to become veritable partners of the State and facilitate sustainable agricultural development.

In the context of food security strategy the State must facilitate foreign direct investments in agriculture involving crop diversification, which can help to meet food needs, and technological transfer. It must also ensure the necessary synergies between measures that are taken in the context of the three Rio conventions (climate change, biodiversity and measures to combat desertification) in order to ensure that human and material means are economised and avoid wastage and the dispersion of authority. At the international level, the current concept of focal points for each type of convention must be revised so as to group them in one single body for greater efficiency, economy and transparency. For these three conventions all concern the same ecosystems.

Public policies

The public authorities must establish a basis of regulations with a view to promoting agricultural product quality and protecting the environment while encouraging farmers to manage their resources in an efficient and ecologically viable manner. If public programmes are to be successful they must recognise the role played by farmers in preserving the environment. At the current stage of development in the Maghreb the State must finance operations to convert crops, thereby regulating production and initiating a process of gradual disinvestment to give way to market regulation mechanisms. It must establish an efficient mechanism for compensating small farms in the event of natural disasters (floods, droughts, locust plagues, diseases) and must develop basic infrastructures and support facilities (wholesale markets, bulk storage terminals and conditioning centres, and means of transport).

If these policies are to be successful they must:

- take account of the opportunities and risks involved in the liberalisation of world trade in order to confirm access for Maghreb agricultural products to world markets by developing quality labels and organic agriculture in order to avoid breakdown in social and environmental structures;
- promote the technical and commercial adaptation of Maghreb agriculture with a view to increasing its value-added and sustainably exploiting the most threatened production inputs – water and soil;

- reduce the poverty of the rural world by establishing infrastructures and basic services, diversifying the economy and improving local governance;
- reduce the irreversible loss of farmland and biodiversity, prevent landscape degradation and enable the agricultural sector to adapt more effectively to climate change.

The local and the national level

The participatory approach must be promoted in the project planning stage involving local communities, NGOs, vulnerable groups, and in particular young people, given that elderly farmers sometimes account for over 50% of the working farm population. Financial, technical, institutional and regulatory mechanisms must be set up in order to ensure that local communities participate and to empower them with a view to sustainable local development. That participation must begin in the project planning stages and continue throughout the implementation cycle. The measures to be taken will concern:

- introducing a democratised credit policy that is adapted to farmers' needs and measures to make credit structures more accessible (simplification, access for farmers to economic instruments);
- involving women through credit incentives;
- combating land fragmentation and encouraging reparcelling, thereby giving precedence to the farming system rather than the ownership system;
- providing support for investment in conversion including measures to decentralise decision-making bodies and bring them closer to local communities;
- launching awareness campaigns to encourage producers to set up organisations;
- establishing a differentiated farm-based insurance system;
- upgrading medium-sized and large farms on the basis of objective and transparent criteria;
- creating rural outreach structures to ensure better dissemination of information and training by means of literacy schemes and programmes to raise awareness of local management issues. The authorities must reach out to farmers rather than vice versa. Projects must be supported with financial aids, and tax burdens must be eased; there must be an efficient and transparent system of information circulating from one level to another, from the rural individual who uses the land to the national and international bodies and institutions, in order to promote participation and acceptance of innovation;
- developing a targeted programme of extension services and research & development for the benefit of farmers through action to set up operational teams which must assist farmers as long as is needed so that they can acquire the necessary skills, particularly with regard to developing crops with high value-added (organic crops, medicinal plants).

The regional level

Mediterranean experts have already held numerous meetings and have put forward a number of proposals which can serve as a basis for cooperation between the northern and southern shores. The results of the research that has been carried out on applicable techniques that can be adapted locally to agriculture and to the use of resources must be disseminated widely in order to ensure the sustainability of agriculture and of land use.

Regional cooperation must be part of the rational approach adopted in programmes, projects and action through which real development can be achieved and measures can be evaluated on the basis of criteria involving sponsors, implementation structures and target groups. This cooperation must be based on:

- awareness in future euro-Mediterranean negotiations of the risks of too rapid liberalisation and of the need to adopt measures to protect vulnerable population groups;
- regional and national initiatives aiming to include agricultural concerns in future euro-Mediterranean programmes and agreements;
- a regional strategy aiming to strengthen local agricultural varieties and promote recognition of the quality of typical products such as olive oil, vegetables, fruit, dates, flowers, wheat and animal products;
- a favourable regional environment in order to help the Maghreb countries to devise effective quality labelling, foodstuff certification and marketing policies and procedures and to promote the Mediterranean diet;
- measures to build on the negotiating and governance capacities of local communities and actors by encouraging local initiatives and schemes aiming to involve women in decision-making processes to a greater extent;
- the creation of networks amongst Mediterranean countries for disseminating and applying suitable and innovative farming practices, with a view in particular to reducing the consumption of water, fertilisers and pesticides, encouraging organic agriculture, local agricultural varieties and traditional know-how, using alternative energies and restoring soil fertility;
- action to give impetus to Mediterranean regional cooperation mechanisms (in particular the FAO's Silva Mediterranea network for cooperation amongst forestry administrations); this could help to ensure that renewable resources are managed sustainably, to delay the exhaustion of non-renewable resources and to reduce pollution;
- regional consultations amongst Mediterranean countries with a view to adapting the current legal framework according to their needs; that framework guarantees national sovereignty in questions of gene pools, biodiversity and the right to control the use of GMOs;
- the promotion of partnerships in the investment context throughout the agricultural production chain (production, processing, storage, wholesale markets, cold storage facilities, agricultural banks and insurances, transport, and marketing);

- the creation of a regional Mediterranean climate centre (CCRM) providing monitoring and early warning services (droughts, floods, heat waves, seasonal forecasts) and the elaboration of common regional climate scenarios with a view to planning medium and long-term adaptations; this centre will benefit from the experience of the European climate modelling centres and satellite information applications;
- the regionalised application of the Kyoto Protocol including the establishment of a “carbon fund” involving the mobilisation of funds and expertise towards the Mediterranean as a priority. Anticipation and upgrading are crucial issues in the southern and eastern Mediterranean countries. By financing mitigation (decoupling) projects the European countries could acquire carbon emission rights at lower cost (low energy intensity of the southern and eastern Mediterranean countries), thereby contributing to the sustainable development of the Maghreb and the protection of the ecoregion. The southern and eastern Mediterranean countries would receive transfers in return, which would ease their financial constraints and reduce their energy and environment bills.

Institutional measures

Institutional measures aim to improve decision-making and management processes. Certain economic instruments need to be modified, in particular rural institutions, savings and credit services, the tools for evaluating the range of functions of the agricultural sector, and the investment assessment and long-term outlook tools. These measures must provide the basis for ensuring the sustainable development of natural resources (water, soil, forests, and rangelands), by mitigating the effects of climate change, as well as that of rural areas and for ensuring that the Maghreb countries effectively enter the world market (WTO membership, accession to the European Union and to the free-trade areas). They will be adopted in order to boost local development, promote decentralisation and ensure good governance with a view to triggering a dynamic of participation incentive, local decision-making and action to improve the living conditions of marginalised population groups (efforts to reduce poverty and stem rural-urban migration). Through decentralisation the management of public affairs and State services can be effectively improved at the local level. It gives local people more influence, which means in turn that they are more inclined to participate responsibly.

The sustainable development of natural resources

These measures consist of clarifying land status, facilitating access for those who wish to invest and to work the land, combating speculators, protecting soil against erosion, salinisation and desertification, safeguarding and restoring forests, and rehabilitating steppelands. They must involve:

- the elaboration of regional agro-climate maps based on the matching of the agricultural uses of land and effective production systems, which will provide a means of optimising the soil-water-plant complex;
- clarification of the status of land through measures to eliminate the constraints connected with the status of land tenure (land is a decisive factor for access to credit) and finalisation of land registry operations by introducing a Geographic Information System (GIS) for sharing knowledge on farmland;

Adapting agricultural systems to climate change

- simplification of the procedures for access to land through measures to decentralise decision-making to a greater extent and to disseminate information on access procedures;
- access for non-residents in certain regions and measures to encourage family entities in order to ensure the cohesion of the groups farming the land.

The State must guarantee that affordable inputs of acceptable quality are available (seed, pest control products, fertilisers, other products), avoid interruptions of supplies, and develop awareness measures and extension services to ensure that they are probably used. New water resources must furthermore be mobilised in order to meet irrigation needs, and action must be taken at the same time:

- to conduct in-depth studies on the principal underground aquifers and their turnover rates as well as studies monitoring the abstraction of water from those aquifers;
- to encourage the exploitation of collective drilling;
- to promote the exploitation of dams by associations;
- to develop hillside levees for recharging underground aquifers;
- to encourage the exploitation of non-conventional water resources;
- to develop irrigation systems that are highly economical in terms of water consumption;
- to apply supplemental irrigation (Tabet-Aoul, 2006) to rain-fed crop-growing systems – studies conducted in the Maghreb show that supplemental irrigation of 100 mm water spread over the last 10 days of February and the first 10 days of March can guarantee an average winter cereal yield.

The water mains networks must also be rehabilitated by replacing open-channel systems with closed-channel systems in order to reduce the high evaporation rate. Furthermore, water-saving irrigation techniques must be applied. Recharging underground aquifers with surface water is the strategy of the future which would seem to be the most promising in the Maghreb if pursued rationally. But it requires integrated watershed management and appropriate reforestation in order to avoid erosion sediment as well as the construction of hillside levee pools, which serve as aquifer buffers. Since there are numerous underground aquifers distributed throughout each country of the Maghreb, water resources that are geographically well-distributed are available, provided the water stocks of those aquifers are properly replenished. The Tunisian experience in this field will help to validate this option, with which in the event of heavy rainfall surplus water can be mobilised and stocked underground so that overtapped aquifers can be rehabilitated, considerable evaporation losses can be avoided, and natural underground reservoirs are available, thus providing an alternative to the major investments required for constructing dams and water transport pipelines.

Regional cooperation: an imperative

Agro-climatic boundaries are moving north, and there is no return. For the Maghreb States the priority is to stabilise steppelands bordering on deserts to prevent the inexorable northward migration of sand. Similarly, mountain lands and degraded land must be rehabilitated and stabilised. As advocated by the FAO, adapting to climate change is a matter of efficient management of land, water, crops and animal husbandry, and it requires action to strengthen rural institutions, which should be placed in a better position to cope with the extreme phenomena of climate change.

Due to population growth and the continuous degradation of land, the traditional production systems, which can no longer meet the needs of rural populations, are no longer maintainable. A national policy for developing local areas must be devised for the benefit of the rural world, creating new off-farm activities that provide jobs and reduce poverty. It is essential to diversify the economy in rural areas in order to stabilise the population and prevent rural-urban migration. It is up to the countries of the Maghreb to develop their industrial systems so that they can absorb the surplus rural population, which is currently exerting strong pressure on natural resources.

Agricultural strategy must be part of an overall integrated strategy for socio-economic development. It is up to the State to invest in the conservation of natural resources and to provide financial and technical support for farmers. The objectives of rural sustainability cannot be achieved if human development indicators remain below acceptable world standards.

The challenges which Maghreb farmers have to meet in order to ensure that their activities are sustainable are threefold: the first challenge concerns water and soil, which is threatened by erosion, salinisation, pollution and desertification; the second concerns the market: production must be developed and an adequate income ensured; and the third is an organisational and legislative challenge, for agricultural activities must be supported and new activities created. If the Maghreb is to develop it must engage resolutely in cooperation at the regional and Mediterranean level in the fields of research, technology transfer, and efforts to develop common projects in partnership with the countries on the northern shores so as to benefit from technological advancement and improve farm yield.

Bibliography

AIACC, *Assessment of Impacts, Adaptation and Vulnerability to Climate Change in North Africa: Food Production and Water Resources*, Final Report n° AF 90, The International START Secretariat, Washington (D. C.), April 2006.

Aït Amara (H.), "Les échanges Europe-Maghreb à l'épreuve du GATT", in M. Allaya (ed.), *Les Agricultures maghrébines à l'aube de l'an 2000*, coll. "Options méditerranéennes", série B, 14, Ciheam-IAMM, Montpellier, 1995.

Allaya (M.) (ed.), *Les Agricultures maghrébines à l'aube de l'an 2000*, coll. "Options méditerranéennes", série B, 14, Ciheam-IAMM, Montpellier, 1995.

Alibou (J.), "Impacts des changements climatiques sur les ressources en eau et les zones humides du Maroc", report presented to the Mediterranean Water Week, Athens, December 2002.

Audinet Tunisie, Loi sur la carte agricole, 11 January 2007.

Badraoui (M.), "Connaissance et utilisation des ressources en sol au Maroc", Centre national de documentation du Maroc, February 2006.

Benbekhti (O.), Saifi (A.) & Boualem (B.), "De la Réforme agraire au développement rural, l'évolution des interventions en milieu rural", International Conference on Agrarian Reform and Rural Development, Porto Alegre, 7-10 March 2006.

Benoit (G.) & Comeau (A.) (eds.), *Méditerranée, les perspectives du Plan Bleu sur l'environnement et le développement*, Éditions de l'Aube, La Tour-d'Aigues, 2005.

Bessaoud (O.), Chassany (J.-P.), Abdelhakim (T.) & Nawar (M.), "Le développement rural durable en Méditerranée", in Ciheam, *Agri. Med. Agriculture, fisheries, food and sustainable rural development in the Mediterranean region*, Annual report 2005, Ciheam, Paris, 2005.

Bindi (M.), Moriondo (M.), "Impact of a 2°C Global Temperature Rise on the Mediterranean Region: Agriculture Analysis Assessment", in C. Giannakopoulos, M. Bindi, M. Moriondo, P. LeSager & T. Tin, *Climate Change Impacts in the Mediterranean Resulting from a 2°C Global Temperature Rise*, WWF Study, July 2005.

Bourbouze (A.), "Pastoralisme au Maghreb: la révolution silencieuse", *Revue Fourrages*, 161, 2000.

Brac de la Perrière (B.), "Synthèse de la région Maghreb en Afrique du Nord", *Growing Diversity Project*, January 2002.

Cahiers d'études et de recherches francophones. Agricultures, "Synthèse", 16 (4), July-August 2007.

Ciheam, "Panorama stratégique et prospectif de la situation agricole et agro-alimentaire en Méditerranée", Étude COPEIAA, Ciheam, Paris, December 2006.

Ciheam, "Sustainable Agriculture and Rural Development in Mountain Regions Project (SARD-M)", *Mediterranean Region, Brief Summary*, Bari, February 2007.

Courade (G.) & Devèze (J.-C.) (eds.), "Agriculture familiale au Maghreb", *Afrique contemporaine*, 219, 2006.

European Commission, *Communication from the Commission to the Council and the European Parliament on Strengthening the European Neighbourhood Policy*, COM (2006) 726 final, Brussels, 4 December 2006.

FAO Forestry Department, *National outlook document – Morocco: "Moteurs du changement et tendances attendues"*, 2001.

Giannakopoulos (C), Bindi (M.), Moriondo (M.), LeSager (P.) & Tin (T.), *Climate Change Impacts in the Mediterranean Resulting from a 2°C Global Temperature Rise*, WWF Study, July 2005.

Hamdane (A.), "Évolution de la consommation d'eau et des coûts", Fiuggi Forum, Blue Plan, 2002.

Hervieu (B.), "Agriculture: A Strategic Sector in the Mediterranean Area", *Ciheam Analytic Note*, 18, December 2006.

Hervieu (B.), Capone (R.) & Abis (S.), "Changes and Challenges Facing Agriculture in the Maghreb", *Ciheam Analytic Note*, 16, October 2006.

INFO/RAC-MAP, United Nations Environment Programme (www.inforac.org).

Intergovernmental Panel on Climate Change (IPCC), Working Group I, *Climate Change 2007: The Physical Science Basis*, Fourth Assessment Report, Summary for Policymakers, February 2007.

Jouve (A.-M.), "Évolution des structures de production et modernisation du secteur agricole au Maghreb", in A.-M. Jouve & N. Bouderbala (eds.), *Politiques foncières et aménagement des structures agricoles dans les pays méditerranéens: à la mémoire de Pierre Coulomb*, coll. "Cahiers Options méditerranéennes", Ciheam-IAMM, Montpellier, 1999.

Jouve (A.-M.), Belghazi (S.) & Kheffache (Y.), "La filière des céréales dans les pays du Maghreb: constante des enjeux, évolution des politiques", in M. Allaya (ed.), *Les Agricultures maghrébines à l'aube de l'an 2000*, coll. "Options méditerranéennes", série B, 14, Ciheam-IAMM, Montpellier, 1995.

Mendelsohn (R.) (Yale University, New Haven [Conn.]), Dinar (A.) (World Bank) & Dalfelt (A.) (World Bank), *Climate Change Impacts on African Agriculture*, 12 July 2000.

Ministry of Agriculture and Water Ressources (Tunisia) & GTZ, *Changements climatiques: effets sur l'économie tunisienne et stratégie d'adaptation pour le secteur de l'agriculture et les ressources naturelles*, report on stage 1, 11 October 2005.

Ministry of Agriculture and Rural Development (Algeria), *Programme de reconversion agricole*, Government Council, 8 March 2000.

Nargisse (H.), *Les écosystèmes agricoles et pastoraux. État des lieux et voies d'évolution*, Centre national de documentation du Maroc, 21 October 2006.

New Medit. Mediterranean Journal of Economics, Agriculture and Environment, 6 (1), 2007.

Sadourny (R.), *Le Climat de la terre*, Paris, Flammarion, 2000.

Skouri (M.), "La désertification dans le bassin Méditerranéen: État actuel et tendance", dans Ciheam-IAMZ, *État de l'Agriculture en Méditerranée. Les sols dans la région méditerranéenne: utilisation, gestion et perspectives d'évolution*, coll. "Cahiers Options méditerranéennes", Ciheam-IAMZ, Zaragoza, 1993.

Tabet-Aoul (M.), *Vulnérabilité et adaptation de l'agriculture au changement climatique en Algérie à l'horizon 2020*, Association de recherche sur l'environnement et le climat (ARCE) d'Oran, Projet RAB/94/G31, 2000.

Tabet-Aoul (M.), "Changement d'affectation et d'utilisation des sols et les ressources en eau", *La lettre de Medias*, 13 bis, March 2002.

Tabet-Aoul (M.), Communication on the supplemental irrigation of winter crops, Workshop on sustainable development, IISD, CoP12, Nairobi, November 2006.

UNDP, *Changement climatique et ressources en eau des pays du Maghreb (Algérie, Maroc, Tunisie). Enjeux et perspectives*, Projet RAB/94/G31, Rabat, 1998.

Viegas (D. X.), Bovio (G.), Ferreira (A.), Nosenzo (A.) & Sol (B.), "Comparative Study of Various Methods of Fire Danger Evaluation in Southern Europe", *International Journal of Wildland Fire*, 9 (4), 1999.

Viegas (D. X.), Pinol (J.), Viegas (M. T.) & Ogaya (R.), "Estimating Live Fine Fuels Moisture Content Using Meteorologically Based Indices", *International Journal of Wildland Fire*, 10 (2), 2001.

CHAPTER 4

FIGHTING DESERTIFICATION

Mélanie Réquier-Desjardins (OSS, Comité scientifique français de lutte contre la désertification), Sandrine Jauffret (OSS) and Nabil Ben Khatra (OSS)

Desertification, a phenomenon where the soil loses its productivity, is an environmental issue as well as being a question of development (Cornet, 2002). It is connected with anthropic action and climate variability but also with changes in biodiversity, particularly in the Maghreb (Hobbs *et al.*, 1995). Although specialists regard desertification in the North African steppes (Algeria, Morocco and Tunisia) as a matter of considerable concern, the wide range of statistics available and of disciplines mobilised as well as the absence of national reference standards are obstacles to the methodical analysis of trends in this field (Abaab *et al.*, 1995).

Yet monitoring the environment is a strategic challenge for the development of the Maghreb countries, as is evidenced by the numerous documents and national environmental action plans that have been drawn up since the Rio Summit in 1992 and by the fact that these plans are being translated into action through a growing number of projects for rehabilitating critical zones. If these information facilities are to be effective, to serve decision-making and to provide material for visions of development in the longer term they should be multi-sectoral with regular input at the regional, national and international level. The UN Convention to Combat Desertification (UNCCD) plays a crucial role in the monitoring and evaluation of the desertification process.

In the Maghreb countries, anti-desertification action, which has traditionally been defined and organised centrally by the State, has recently been integrated into the rural or economic and social development of the various countries. The extent to which the countries are endeavouring to implement the UN Convention is measured on the basis of an inventory of the projects and programmes that have been launched and the cost of those efforts. Although large amounts are quoted in the implementation of sectoral reforestation and water and soil conservation programmes, it is difficult to measure how effective these schemes are. This is due on the one hand to the fact that the budgets that are actually expended are often lower than the amounts originally planned, with the result that the schemes fall short of forecasts, and, on the other hand, to the fact that the information on the schemes' impact on the living conditions of the population groups concerned – the primary objective of combating desertification – is inadequate. And lastly, developments in the rural world, which for several decades have been marked by major changes, particularly in the socio-economic field, suggest renewal of national methods and strategies for fighting desertification.

Definition and physical processes of desertification

How can this process be defined?

The definitions of the term of desertification have been many and varied (Aubreville, 1949; Le Houérou, 1962, 1968 and 1977; Dregne, 1977; Meckelein, 1980; Bernus, 1980; UNEP, 1991), but since the UN Convention to Combat Desertification was signed in 1994 the term designates “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities”.

The Convention specifies that “land degradation” means “reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical and biological or economic properties of the soil; and (iii) long-term loss of natural vegetation” (UNCCD, 1994).

Growing anthropic pressure is the main cause of desertification, and climatic conditions merely exacerbate the damage caused by human activity (Mainguet, 1994). Once certain processes get underway they can continue even if environmental conditions become favourable again (rainfall, nutriment inputs, etc.) and if anthropic activity diminishes.

Desertification processes and mechanisms generally become manifest gradually through changes in the composition, structure and functioning of ecosystems. Vegetation and soil can be regarded as two completely separate subjects, even if the phenomena are totally interlinked in nature (Jauffret, 2001). Changes in vegetation actually directly affect the functioning and structure of soils and vice versa.

The effects of desertification can be apprehended at several different levels:

- locally, through the loss of soil productivity and the erosion of fertility (cf. box entitled “The stages of desertification”);
- at a distance, because wind erosion engenders phenomena of sand deposits in neighbouring zones, while water run-off causes spate and flood problems and the destruction of infrastructures (particularly roads); and lastly, it gives rise to uncontrolled international migratory movements.

Desertification in the Maghreb – an irreversible phenomenon?

North Africa is one of the regions that has become most vulnerable due to the consequences of the arid climate and the impact of human activities on the natural environment. Desertification problems are particularly acute in the steppe zones.¹

¹ - The arid steppes in the northern Sahara cover an area of 630,000 km² extending from the Red Sea and the Suez Canal in the east to the Atlantic Ocean in the West; the region is between the 100 mm and 400 mm isohyets of average annual rainfall.

The stages of desertification

In the case of vegetation that is under growing pressure, several major stages of degradation can be defined before the irreversibility threshold is reached:

- variation in biomass and in the composition of vegetation resulting from stochastic climate cycles and events (exceptional drought, fire, disease, etc.);
- changes in the composition of the flora through the action of grazing animals and through cultivation: regression of palatable plants (or those relished by livestock) to the advantage of less palatable species;
- replacement of steppe species by post-harvest species;
- decrease in diversity and productivity;
- reduction of the perennial plant cover, and decrease in plant biomass and plant volume; diminishment of the natural environment's potential for growth and reproduction.

This process can be adapted to characterise the gradual disappearance of animal populations (whether domestic or wild animals) in a context of desertification.

The degradation of soil quality, which goes hand in hand with the action of water, takes place in three separate stages:

1. modification of the state of the soil surface (forming of a thin crust, sand encroachment, etc.); degradation of the hydrous functioning (decrease in soil water availability, in water use efficiency and in infiltration capacity, increase in water run-off, etc.); erosion of fertility (organic matter level, nitrogen level, cation exchange capacity);
2. reduction of structural stability;
3. water or wind erosion;
4. anthropic salinisation as the result of unsuitable irrigation, which causes soil sterilisation.

This desertification is thus a continuing, progressive process which can lead to the irreversible transformation of the natural environment. There are thresholds for each stage that are connected with the climatic and geo-socio-economic contexts. It is the result of both natural phenomena and processes triggered by the misuse of areas and their resources by man. And it is only through intervention by man that it can be curbed and halted.

Sources: Adapted from Milton et al. (1994), Cornet (2000) & Jauffret (2001).

Drought, a structural factor in this region, is a natural phenomenon which aggravates the impact of anthropic activities and triggers desertification processes. Man has exerted many different forms of pressure in order to cover his various needs by exploiting plant resources, particularly for raising domestic animals – sheep and goats –, planting crops, and collecting firewood (Jauffret, 2001). At the beginning of the 1980s it was estimated that in Algeria, Morocco and Tunisia 80% of national territory was affected by desertification (Dregne, 1984).

The development of human activities in pre-Saharan Tunisia since the 1970s is presented below with a view to studying the causes and consequences of land degradation in the steppe zones in greater detail. As is the case in the other countries on the southern shores of the Mediterranean, ploughing, overgrazing, the eradication of woody vegetation and

the cultivation of marginal land that is vulnerable to erosion are recognised as the main factors of desertification in this region (Skouri, 1993).

The initial effect of overworking the soil, in particular by ploughing with poly-disc ploughs, is to totally destroy the plant species of the steppes, especially the perennial species. This lack of plant cover combined with reworking of the top layers of the soil results in considerable increase in wind erosion. In certain environments the original vegetation is thus destroyed and at the same time the top layers of the soil are loosened (Floret & Pontanier, 1982).

Where a fairly high stocking rate is maintained on rangelands that are often unproductive this also results in the reduction of plant cover with perennial species, the depletion of palatable species, the trampling and consolidation of the soil and in some cases the development of non-palatable species. Rangeland stocking capacity in Tunisia is estimated at between 0.15 and 0.2 sheep units per hectare (Chaïeb *et al.*, 1991). By the end of the 1990s, stocking rates had increased rapidly to between 0.25 and 0.70 sheep units per hectare (Genin, 2000), an increase that was connected with the increase in livestock but also with the extension of agricultural acreage and the ensuing reduction of rangeland areas (Le Floc'h, 1976). The ill effects of overgrazing, which take longer to materialise than those of ploughing, have become visible and have resulted in the rapid decline of rangeland plant cover, which is a cause of concern.

The practice of taking woody shrubs and bushes for domestic energy (firewood) has resulted in the disappearance of the higher tree and shrub stratum of the steppes. Some experts (Floret *et al.*, 1978) stress the real gravity of the phenomenon in this context, since the fact that the roots are taken prevents the bushy tufts, which “produce” the most wood, from growing again, with the result that people have to “pick” smaller and smaller plants that are growing more and more sparsely.

There are several sociopolitical factors which explain these changes. Development policies in particular have promoted the expansion of cultivated land to the detriment of collective rangelands without clearly measuring the impact of this development in terms of desertification. As the result of three policies – nomad settlement,² privatisation of collective land³ (Auclair *et al.*, 1996), and gradual integration of the region into the national economy (Auclair & Picouet, 1994) – more and more steppeland has been cleared and cultivated for cereal crops, which have expanded rapidly to fulfil the dual purpose of increasing the living standards of the local people and providing access for them to private land ownership.

The combined effects of drought and growing anthropic pressure on land and plant resources in North Africa have induced many forms of ecosystem malfunctioning and loss of biodiversity in these regions. Due to its climate, North Africa has a vast number of diversified landscapes and environments, and many types of ecosystems can be identified: coastal, insular, mountain, desert, oasis and humid zone systems. Part of the Mediterranean biodiversity hotspot, which has some 25,000 plant species and 14 endemic species, is located in Africa (Quézel *et al.*, 1999). The flora of the North African steppe,

2 - combined with a natural growth rate of 0.8% in the period from 1956 to 1994.

3 - Privately owned land accounted for 10.7% of the agricultural area in use in 1970 and 67.5% in 1996.

for example, comprises 2,630 plant species that are known as species of the Saharo-Arabian zone: 60% are species with Mediterranean affinity and 30% with tropical affinity. With 687 endemic species, the endemism rate in the North African steppes is 26% (Le Houérou, 1995 and 2001).

Experts (Floret *et al.*, 1990) refer to a series of research projects conducted in the northern and southern Sahara and underline the following: “Anthropic disruptions induce the depletion of natural vegetation, soil degradation (water and wind erosion), and deterioration of the soil water regime, and they reduce the efficiency of water use by plants.” The consequences of these disruptions thus affect the biological resources and potential of land, and they in turn cause disruptions in the course of human activities, which can go as far as causing populations to abandon the land and to emigrate to zones considered to be more hospitable. The fact that these population groups are concentrated on the least arid parts, particularly the dry sub-humid zones, increases the risks of environmental deterioration of these formerly relatively stable regions, causing the impoverishment of the agricultural world (ROSELT/OSS, 1995).

Erosion phenomena are now developing in the cereal-growing plains in central Tunisia, which were formerly spared, and on the slopes of the ridge of the country. This anthropic stress on natural resources is compounded by a higher frequency of drought in the north of the country since the 1980s, as transpires from the climate surveys on the last 30 years conducted by the Tunisian national meteorological institute on the basis of the rainfall data measured at the meteorological stations.⁴

Monitoring desertification and the environment

The UNCCD and desertification information systems

Following the Rio Summit in 1992, the international community adopted the United Nations Convention to Combat Desertification (UNCCD) in 1994. There are now 193 States that have signed the Convention, whose principal objective is “to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievement of sustainable development in affected areas.” (UNCCD, 1994) This Convention is the foundation of anti-desertification efforts in a decentralised bottom-up approach that is based on the participation of local population groups.⁵

Its implementation at the regional and sub-regional level involves the designing of regional and sub-regional action programmes to fight desertification. The Maghreb Arab Union (MAU) drew up its regional action programme in 1999 as a framework for dialogue,

4 - These studies calculate the Standardised Precipitation Index (SPI) on the basis of the monthly data available in the stations. They identify the periods of drought that have been recorded since 1940 (at the stations) in the various regions of Tunisia over different time steps (from one month to one year). Drought frequency has increased on the whole throughout the country since the 1980s. It should be noted that, contrary to the 20 previous years, there were more meteorological droughts in the stations in the south of the country during the period from 2001 to 2006 (Laatiri, 2008).

5 - It gave new impetus to the action plan to combat desertification that was adopted in Nairobi in 1977 at the United Nations Conference on Desertification, focusing the debate on the future of the populations concerned.

coordination and action. Three of the seven components of this programme concern measuring and monitoring the phenomenon and involve the creation of a database and a system for circulating information on desertification in the Maghreb, the evaluation of the status and dynamics of desertification, and the establishment of a regional network for constant ecosystem monitoring (General Secretariat of the MAU, 1999).

The national action programmes to combat desertification are strategic tools for implementing the Convention at country level. They are drawn up and implemented under the responsibility of the individual countries, and they develop many aspects connected with desertification, promoting in particular the establishment of information systems on desertification (cf. box entitled “National action plans to combat desertification – the examples of Algeria, Morocco and Tunisia”).

National Action Programmes to Combat Desertification - the examples of Algeria, Morocco and Tunisia

The national action programmes to combat desertification are the strategy documents drawn up by the various countries on a participatory basis in line with the principles of the Convention. The texts of these programmes:

- explain the procedures to be followed in this participatory approach and present the forms of dialogue used, often placing emphasis on the gender approach;
- form the link between the broader issue of desertification and the two other Rio conventions (biodiversity and climate) from the point of view of synergies;
- present the natural resources and constraints of the country in question, identify desertification factors and draw up a general inventory of desertification per major region or per major land use system as well as per acreage of endangered and desertified land; the figures quoted in the national action programmes are based on a compilation of many different scientific, sectoral and project documents;
- list the measures the State has taken to fight desertification, listing the details of the major reforestation and water and soil conservation projects as well as rural development projects and projects for supporting crop and animal farming and improving rural infrastructures;
- present the institutional machinery that has been established to facilitate project implementation, in particular the decentralised setup and the national body that has been created for coordinating anti-desertification action – the UNCCD relay, which is generally accommodated in the Ministry of the Environment;
- describe all of the measures that must be taken in order to implement the national action programme and the UNCCD, sometimes quoting estimates of the cost of those measures, and make proposals as to how such action can be financed and the partnerships envisaged;
- underline the need to observe the status of desertification regularly and to monitor and evaluate the national action programmes mainly on the basis of the information systems implemented.

Sources: *National action programmes of Algeria (People's Democratic Republic of Algeria, 2004), Morocco (Kingdom of Morocco, 2001) and Tunisia (Republic of Tunisia, 1998).*

From local ecosystem monitoring to management: the ROSELT local observatory network

The network of local long-term ecological monitoring observatories (ROSELT/OSS) was set up from 1994 onwards in the arid zones of the Saharan periphery with a view to harmonising methods for collecting and processing ecological and socio-economic data.⁶ A ROSELT observatory is an organised system for collecting, processing and analysing data on the environment so that information can be exchanged and knowledge can be updated on how ecological, social and economic systems are evolving and interacting. Its purpose is to provide decision-making products on a regular basis that are useful and comprehensible for policymakers and managers. In addition to monitoring the many different facets of desertification (ecology, biodiversity, uses of natural resources, climate) by producing targeted indicators on a regular basis, the object of this network is to understand desertification mechanisms and to anticipate them by producing forecasting tools.

In order to evaluate the changes that are recorded in the observatory monitoring the steppes of the high plains south-west of Oran (Algeria) and in the Menzel Habib Observatory (Tunisia) in the period between 1970 and 2000, a multi-data analysis was undertaken in which land use maps drawn up on various dates were compared. Both of these observatories are situated in the North African steppe plains, and the data they collect are representative of the desertification problems encountered throughout the sub-region. The comparison highlights the same phenomena in both locations:

- degradation of pastoral areas (*Stipa tenacissima* or alfa grass steppes in Algeria and *Rhanterium suaveolens* steppes in Tunisia), with a marked decrease in area in both observatories;
- a change in steppe physiognomy and a decrease in the grassland quality of the steppes due to changes in flora composition, and in particular to the fact that good pastoral species (perennial grasses) or species with a high economic value (esparto grass in the plains in the case of the Algerian observatory and in the mountain regions in the case of the Tunisian observatory, a species used for producing paper) are disappearing (or becoming extremely depleted) and being replaced by less valuable species in terms of grazing quality (such as *Lygeum spartum* in Algeria and *Astragalus armatus* in Tunisia).

Alfa grass disappearing in the Algerian observatory

The observatory in the steppes of the high plains south-west of Oran (Algeria) is situated in the western part of the high steppeland plains and covers an area of 1,548,000 hectares; it has twelve municipalities characterised by rapid population growth and urbanisation: 63% of the population live in agglomerated housing units in 1988.⁷ Sheep-farming is still by far the major economic activity, accounting for almost 80% of the local economy. The activity is in decline, however, since only 25% of the working population were occupied in sheep-rearing in 1998, compared to 75% in 1966. Crop-farming is progressing on the other hand.

6 - The pilot network is composed of 11 observatories in 10 countries: Algeria, Cape Verde, Egypt, Kenya, Mali, Mauritania, Morocco, Niger, Senegal and Tunisia. A total of 30 observatories are now involved in the ROSELT network, which has been financed mainly by the French Cooperation and Research Agency and by the Swiss Cooperation Agency.

7 - National Statistical Office, Algeria.

The three monitoring stations represent the main types of steppeland and the major constraints and perturbations to which they are subject. When they were set up their physiognomy was marked by three main features related to the three predominant species: esparto (*Lygeum spartum*), alfa (*Stipa tenacissima*) and white artemisia (*Artemisia herba alba*).

Analysis of the trend in land use in the period from 1978 to 2005 reveals that the “steppes” have undergone major changes both in terms of flora composition and as regards the area of their various physiognomical units, the prominent features being a decrease in alfa steppeland from 520,000 ha in 1978 to 140,000 ha in 2004, a decrease in white artemisia (13,000 ha in 2004 compared to 130,000 ha in 1978), and a decrease in a esparto grass (58,000 ha compared to 570,000 ha) (ROSELT/Algeria 2005). This estimate actually masks a further decrease – that of the density of the predominant species. Compared with the status in 1978, by 2004 54% of the plant landscape was composed of ecologically less demanding and/or low-palatability species (steppes referred to as “degraded steppes”), which had replaced the former predominant species. As regards plant cover, by 2004, the overall vegetation cover was less than 10% on 85% of the observatory area. In this observatory the land is used predominantly as pastureland, and the degradation that has been recorded is to be explained virtually entirely by overgrazing (cf. Map 1).

The destruction of alfa has been caused by overgrazing, which is surprising given its low palatability. The plant has been consumed massively as an ordinary “straw” combined with feed in the form of external feed concentrates (Aidoud & Nedjraoui, 1992). It has also been overexploited for manufacturing paper pulp. The irreversible loss of alfa, which is now acknowledged – it is difficult to regenerate – has resulted in the local extinction of numerous species which were ecologically specific to the plant. Although most of the species involved are neither rare nor endangered, this “extinction” is nevertheless a significant ecological event, since it indicates that an entire ecosystem encompassing both the biocenosis⁸ and the ecological resources connected with it has been lost.

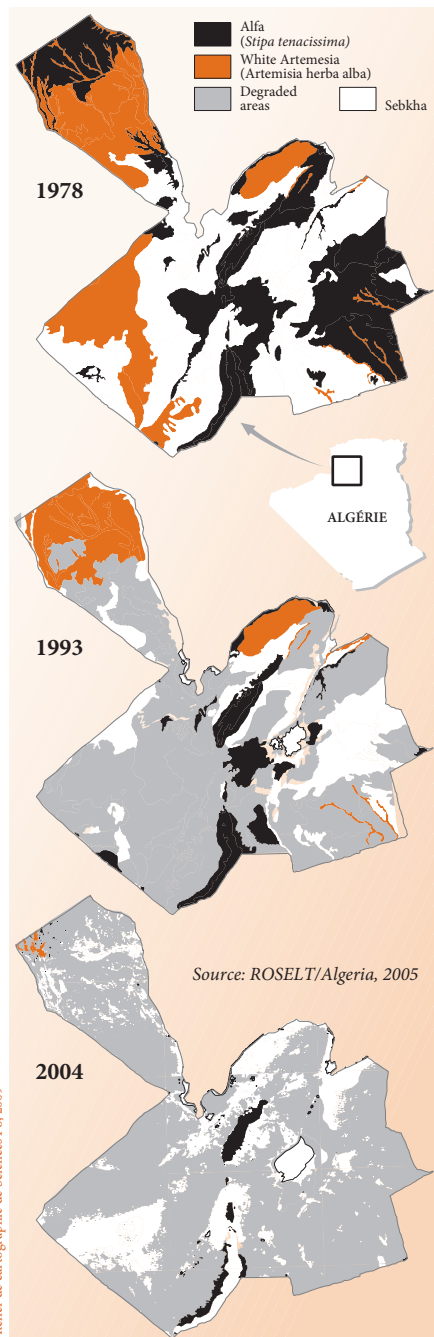
Some ecological systems are no longer in equilibrium with current ecological and economic requirements. The experts regard them as relicts which may be irreversibly lost as the result of a major environmental crisis. The decrease in alfa in the Algerian steppes has been rapid compared to the trends in Morocco and Tunisia (Le Houérou, 1995). It has certainly been promoted by a particularly unfavourable economic trend to which the resistance/resilience of the species and the ecological system has been inadequate. Other species or systems such as those involving artemisia or esparto grass have proved to be more resistant.

Stabilisation of desertification in the Menzel Habib observatory in Tunisia

The Menzel Habib Observatory is situated in the low plains in the south of the country (at a latitude of 34° 00' and 34° 20' N, and a longitude of 9° 15' and 9° 58' E) and covers an area of 100,000 ha. It had a population of 11,700 in 1994, grouped in 1818 households. In addition to low rainfall, the other environmental constraints are due to low water and

⁸ - All of the living beings, animals, plants and microorganisms present in a station in a given period. A biocenosis is established in a biotope, which is sometimes also called an ecological niche. The biotope and biocenosis together form an ecosystem

Map 1 - Trends in land use in the steppe observatory south-west of Oran, 1978-2004



soil resources; the soil is particularly sensitive to erosion and its fertility is limited. The main plant communities comprise the following steppeland species:

- > *Rhanterium suaveolens* on sandy soils,
- > *Arthrophytum scoparium* on loam soils,
- > *Artemisia campestris* in post-harvest communities that are replacing *Artemisia herba alba* steppe, and *Gymnocarpus decander* and *Atractylis serratuloides* on crusted soils,
- > *Stipagrostis pungens* on stable sandy dunes.

At the socio-economic level, the last four decades have been marked by major changes which have radically modified the environment and how it is used as well as lifestyles and how people adapt to new circumstances. Population growth, the settlement of pastoralists, land privatisation, the liberalisation of the economy, and the “modernisation” and expansion of agriculture are all factors of the ecological and socio-economic dynamics of the region.

Far-reaching changes were recorded in the observatory in the period from 1975 to 2000 (Le Floc’h *et al.*, 1995; Jauffret, 2001; cf. Map 2). *Rhanterium suaveolens* pastureland on sandy soils has been decreasing – either as the result of cultivation (and in particular through soil truncation), or because of overgrazing – and *Stipa tenacissima* (alfa) steppes have been virtually lost. White artemisia (*Artemisia herba alba*) steppes seem to have progressed as the result of a grazing ban. Since this steppeland is frequently cultivated, another variety of artemisia, *Artemisia campestris*, which can be described as a post-harvest species, is predominant. It is also observed that *Astragalus armatus* facies are expanding; the grazing value of this plant is virtually nil. Practically all of the steppeland area where there is water run-off

has been cleared. Cereal crops are now grown on sandy soils, which were formerly reserved exclusively for extensive grazing. These changes in use exacerbate the omnipresent erosion phenomena – wind erosion of sandy soils and water erosion of loamy soils. In addition to the agricultural activities that are expanding, the main forms of steppeland use are grazing on increasingly reduced areas of rangelands – hence the overgrazing – and the collection of woody shrubs and bushes for use as domestic fuel and as a source of fibre for local crafts.

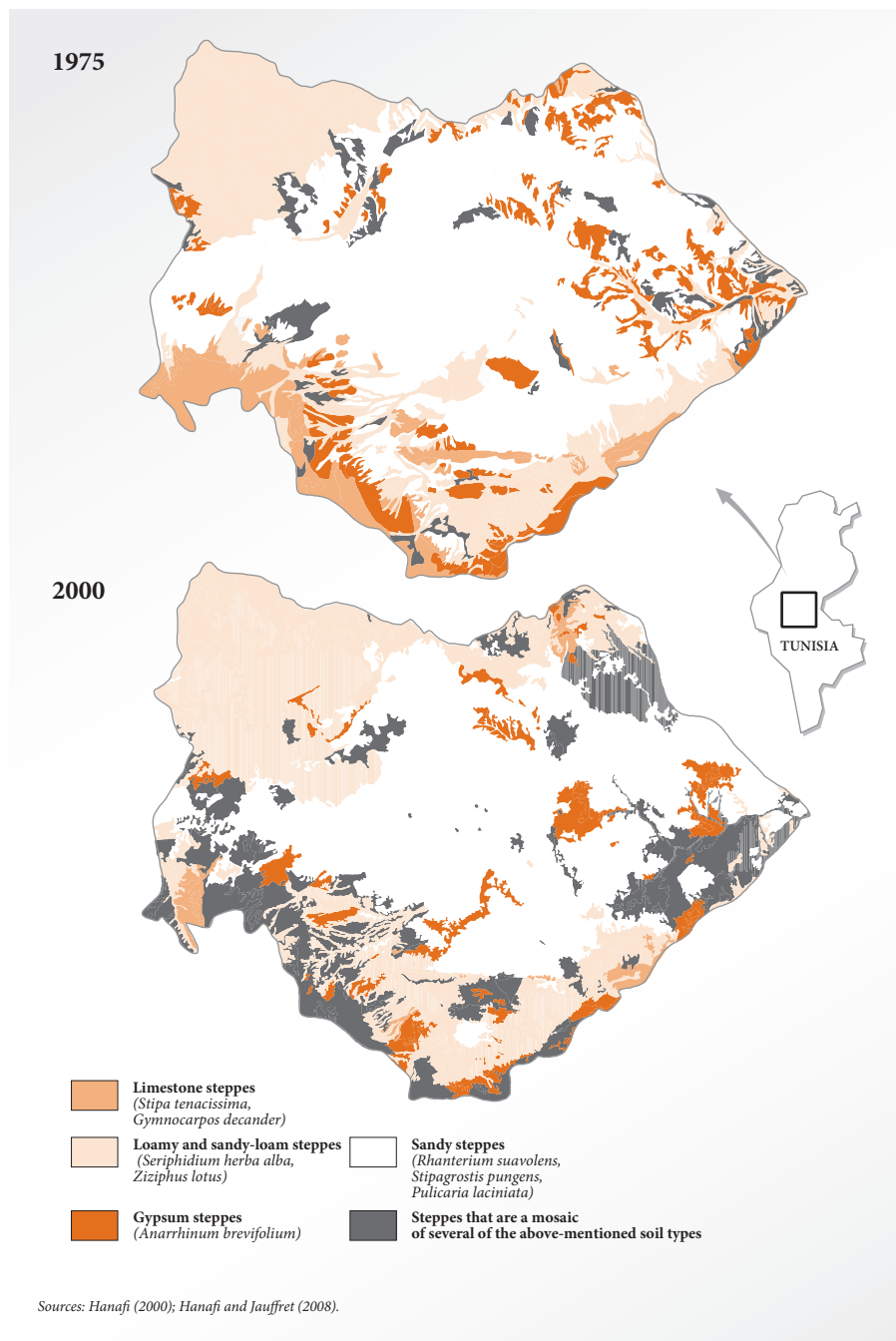
However, comparing the status in 1978 and 2004 masks to some extent what has really been happening in the course of the last 25 years. There was in fact an “active” phase of degradation in the form of considerable sand encroachment on the area under review, and by the end of the 1980s the plant cover had decreased considerably (Auclair *et al.*, 1996), as is revealed by a series of intermediate Landsat MSS satellite images). This erosion has been partially stabilised as the result of extensive development work financed by the State, and the plant cover will probably grow again at least on the fallow land. There may have been a series of different scenarios, at least as far as the “cultivated” area is concerned. The question that comes to mind is thus whether a new dynamic is not in fact being created by the “corrective” action combined with the diversification of households’ economic activities – for people are tending to seek work outside the area and outside the agricultural sector –, the decrease in population that has been recorded in the observatory, and the increase in large farms practising intensive agriculture (Sghaier *et al.*, 2008). According to the experts, this new dynamic is marked to some extent by the replacement of species and the predominance of *Astragalus armatus* on *Rhanterium suaveolens* steppes and of *Artemisia herba alba* on post-harvest fallow land, and the low rates of perennial plant cover are possibly temporary in certain environments that are slower to regenerate. Regular updating of the vegetation sequence maps and ecological systems according to the methodology proposed above would provide a basis for establishing a new process for monitoring trends in the arid areas of Tunisia based on remote sensing.

The far-reaching changes in the ecosystems that are now affecting both observatories are due essentially to overgrazing and to the expansion of cultivated areas. The same trends have been observed in the Oued Mird observatory in Morocco (Yassin *et al.*, 2005). But in the Tunisian observatory refined analysis combining trends in household behaviour and household use of land tends to show that new trends are underway and that desertification has been stabilised to a certain extent.

Tools for concerted action in the elaboration of local plans

Modelling work has been developed within the regional ROSELT network, particularly in the Tunisian observatory, on population and environment interaction, the purpose of this local-level environmental information system being to carry out prospective simulations of desertification hazards (Loireau, 1998; Loireau *et al.*, 2008). The system provides a basis for assessing crop-growing, animal husbandry and wood collection practices, establishing the ratio of the resources used to the available resources in the observatories within the framework of spatialised models. The simulations that are carried out provide a basis for measuring desertification hazards and identifying the most vulnerable areas. Two simulations are presented below concerning the Menzel Habib

Map 2 - The Menzel Habib region:
a landscape now heterogeneous and fragmented



observatory in Tunisia. The first evaluates the concomitant impact of stable population growth (equal to that recorded in the 1994-2004 period) and the doubling of stocking rate. The second simulates the impact of a 4-year drought by modifying the parameters connected with agricultural output and the quantity of plant biomass. The prospective maps that have been drawn up (cf. Maps 3 and 4) show that in both cases there is maximum risk of desertification in over half of the observatory area.

This tool has recently served as an aid for concerted action in the elaboration of the local action programme to combat desertification in the Menzel Habib zone.⁹

Evaluation of the costs of desertification in North African countries

Studies conducted by the World Bank in 2003, which are summarised below, evaluated the cost of land degradation for individual countries. In North Africa they concerned Algeria, Egypt, Morocco and Tunisia. A common analytical framework was used throughout, and a distinction was made between the consequences of such degradation for health and quality of life on the one hand and for the country's natural capital on the other, in the case of six environmental categories: water, air, soil, forest, waste, shoreline, plus the general environment (climate and biodiversity). The present section focuses on the damage concerning the countries' natural capital.

The economic evaluation was carried out in three stages: identification of the types of damage and impacts per category, quantification of that damage and estimation of the damage in monetary terms. The translation of the data into commercial terms, that is to say, the fact that the prices of economic goods were used, limits the scope for taking many factors into account. Agricultural losses, water losses, wood losses and losses of non-wood forest products were the main losses considered. The quantification factors and corresponding values are presented in Table 1 below.

The cost of soil degradation amounts to around 1% of GDP in Algeria and Egypt and around 0.5% of GDP in Morocco and Tunisia. The same procedure was followed to establish all four estimates (Requier-Desjardins & Bied-Charreton, 2006):

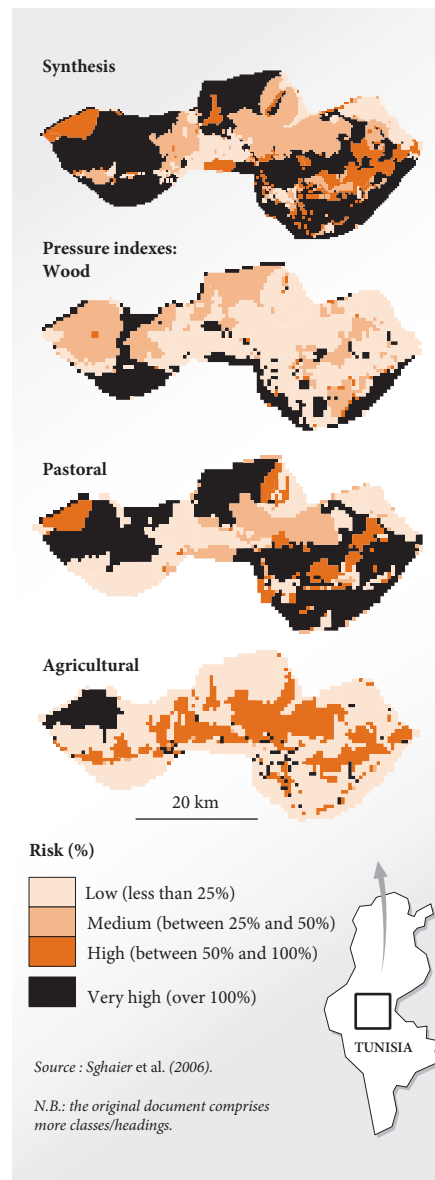
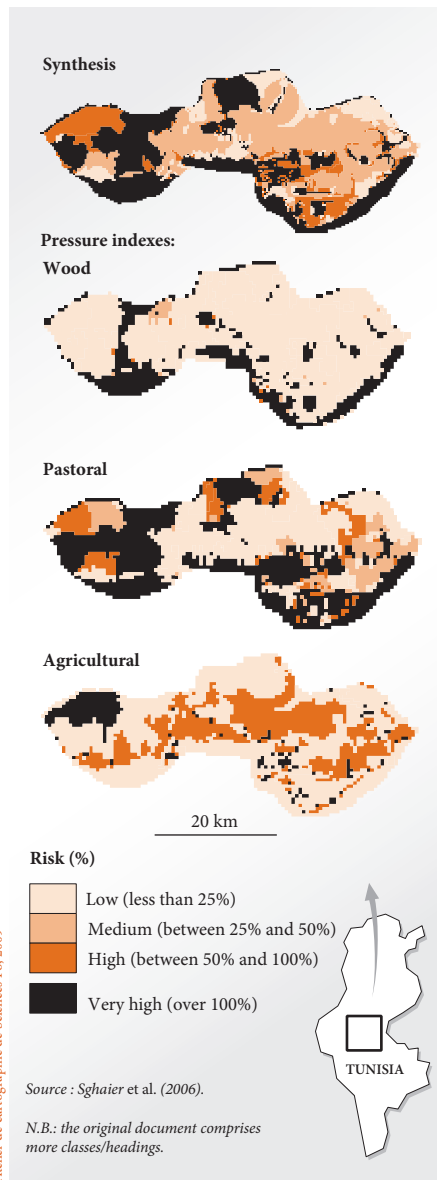
- the degraded areas were quantified on the basis of cartography research and national or international censuses (FAO data);
- the loss of productivity was evaluated, generally on the basis of expert opinions or the extrapolation of local general-value surveys;
- the annual losses were then translated into monetary values on the basis of cereal prices – wheat and barley – and wood prices.

The information listed in the calculation columns is not homogeneous: the cost of rangeland degradation is not included in Tunisia; agricultural losses connected with the salinisation of soil is mentioned but not evaluated in Morocco (despite the fact that

⁹ - This experience is related on the site of the Tunisian Ministry of the Environment and Sustainable Development (www.environnement.nat.tn/indicateurs.htm).

Map 3 - Spatialisation of the risk of desertification, scenario 1

Map 4 - Spatialisation of the risk of desertification, scenario 2



irrigated acreage accounts for 15.5% of cropland); Algeria is the only country to take account of the impact of urbanisation on loss of agricultural acreage and production. These disparities illustrate both on the contextual nature of the evaluations (matching and relevance of the headings) and the data available for environmental monitoring (national statistics). The evaluations are general in nature, a fact which does not take

account of the wide diversity of agricultural production systems in North Africa: the quantifications are based on acreage under crop, mainly wheat and barley; the palm groves in the oases, tree farming (in particular olive groves) and the acreage under horticultural crops, which are also affected by desertification, are often omitted or are not included in any quantified analysis.

Table 1 - Annual impact of environmental degradation on the natural capital, 2003 (% of GDP)

	Algeria	Egypt	Morocco	Tunisia
Soil				
Erosion – agricultural losses	0.65	0.6-0.8	0.36	0.1-0.3
Irrigation (salinisation)		0.4-0.6	No estimate	0.3
Soil – rangelands		No estimate	0,05	No estimate
urbanisation	0,3	No estimate	No estimate	No estimate
SOIL - TOTAL	0.95	1.2	0.41	0.52
Water	0.62 Losses in the networks Siltng	0.1 Fisheries losses	0.03 Siltng of dams	0.06 Siltng of dams
Water Quality/ecosystems	No estimate	No estimate	No estimate	No estimate
Forests* Woody vegetation and non-wood products	0.05	No estimate	0.03	Not significant
Forest/firewood	No estimate	No estimate	No estimate	No estimate
Air/agricultural loss	0.01	No estimate	No estimate	No estimate
TOTAL natural capital**	1.21 + 0.63 1.84	1.6	1.04	0.84
General environment Biodiversity	0.21	No estimate	No estimate	No estimate
General environment (CO ₂)	1.20	0.6	0.89	0.59
Total cost ***	7.01	5.4	4.59	2.69

* Most of the forests are situated in mountain and coastal ecosystems.

** including the coastline.

*** Air, water, soil, waste, forest, coastline, general environment (climate, biodiversity), impact on health and the natural capital.

Sources: World Bank (2002 and 2003), Country reports, Metap (Republic of Algeria, 2002; Sarraf, Larsen & Owaygen, 2004).

The cost of desertification can also include the cost of forest degradation in that where there is a decrease in forestland and the areas concerned are not converted¹⁰ this contributes to soil erosion and aridification. The estimates are based on the monetary evaluation of the quantities of wood lost as the result of forest fire and produce results which are of little significance at GDP level. The impact of the collection of firewood on the degradation of the natural capital has not been estimated. Yet in rural areas these wood collections are a common source of domestic energy, despite the fact that an increasing number of households are using butane for cooking and heating purposes.¹¹ And lastly, loss of biodiversity could also be part of the cost of desertification. However, the calculation of the costs available in the Algerian evaluation is based on an estimate of the average expenditure on the management of biodiversity parks, and the results thus do not concern desertification.¹²

If the cost of soil degradation alone is expressed in relation to annual agricultural growth in these countries, approximately 25% of agricultural growth would be cancelled out by these costs (agricultural losses). Yet in these countries the primary sector's contribution to GDP (around 10% to 15%) and the percentage of the working farm population (ranging from 20% to 45% depending on the country) are far from negligible (World Bank, 2008).

These surveys in fact propose measures for restoring the environment which cost much less than does degradation and which involve using water and soil conservation techniques and water quality and waste-water treatment methods, particularly in the case of oases and rural-urban fringe areas.¹³ The evaluations are based mainly on the estimates produced in the countries' environmental strategy documents and action plans or on the extrapolation of the data available on specific projects to the entire territory (cf. Table 2).

Table 2 - Restoration costs as a percentage of (annual) GDP

	Soil	Forest	Biodiversity	Water
Algeria	0.94			0.70
Egypt	0.5 (erosion) 1.5 (salinisation)		No estimate	0.44
Morocco	0.04 (WMP, 1995)	0.11	No estimate	0.33
Tunisia	0.1 (NAP,1998)	0.04	0.02 (BDAP,1998)	0.35

NAP: national action programme to combat desertification

WMP: watershed management plan

BDAP: biological diversity action plan

Sources: World Bank (2002 and 2003), country reports, Metap (Republic of Algeria, 2002; Sarraf, Larsen & Owaygen, 2004)

10 - Conversion means transforming the ecosystem for a new use; it is different from restoration, which aims to restore biodiversity and functions (Aronson *et al.*, 1995).

11 - In 2000, the firewood collected accounted for 30% of total energy consumption in Morocco, 12% in Tunisia and 3% in Egypt.

12 - There is in principle no anthropic action in these protected areas.

13 - The costs quoted for restoring water resources also take account of the cost of rehabilitating infrastructures.

Regional monitoring of desertification: sensitivity to desertification in MAU countries

A map of sensitivity to desertification was drawn up in 2003 covering the Maghreb Arab Union. It was designed for evaluating readily available and compatible data at the MAU level in order to extract effective common indicators, and it pursued several operational objectives: locating major homogeneous zones in terms of natural resources, delineating cross-border environmental problems, highlighting the desertification hazards threatening the sub-region and, lastly, identifying priority target zones for measures to be implemented within the framework of the national action plans and sub-regional action programme to combat desertification. The factors indicating an ecosystem's sensitivity to desertification that were selected for drawing up this map are both biophysical (climate, soil and vegetation) and socio-economic (population, employment, customs and practices). The methodology adopted was based on the Medalus¹⁴ approach, which takes account of the following four indexes: soil quality, climate quality, vegetation quality, and soil management quality.

Since there was no spatialised information available on the quality component of soil management, the socio-economic aspect was not taken into account in the first version of this sensitivity map. The map highlighted sensitivity to desertification progressing from north to south in the region, which was not surprising. This result is now a subject of controversy, however, particularly since the northern regions of the Maghreb are now more threatened than the southern regions, which have been affected by the desertification process for several decades.

Limits of the evaluations

Desertification is a multi-dimensional phenomenon concerning various sectors in the fields of agriculture, forestry, water management, environmental management, rural development and human (social) development. There are thus many different administrative departments in charge of supplying the necessary data for evaluating desertification, and coordination is essential. The most accessible data for the estimates carried out are biophysical, and the least available are socio-economic: the impact of desertification on households' loss of income is not known, for example; in particular, there are no statistics classed in a general typology of farms.

Establishing an information system at the national level which would provide a basis for measuring the physical phenomenon and for translating it into economic terms is a complex operation.¹⁵ The reliability of data is limited on the whole: the absence of a system of reference impairs both the verification and the (multi-date) interpretation of the existing data; secondly, the choice of percentage of farmland and pastureland

¹⁴ - *Mediterranean Desertification and Land Use*: this project, which was launched in 1991 with the support of the European Union, models and quantifies the desertification processes in the Mediterranean region with a view to a better understanding of these processes, particularly in Spain, Italy, Greece and Portugal.

¹⁵ - At world level, the only study in which desertification is evaluated in both physical and economic terms was conducted at the beginning of the 1990s (Dregne & Chou, 1992). It estimates levels of desertification on a spatial basis, broken down according to how the land is used (irrigated agriculture, rain-fed agriculture and pastoralism), by crossing the percentage of the territory affected with the level of desertification. It calculates the costs associated with desertification by extrapolating micro-economic studies on per-hectare costs by type of land use.

affected is decisive. Various sources of figures actually quote results that differ considerably for the same country. Some estimates go as far as 100% of the territory affected and propose several degrees of desertification and differentiated productivity losses. And lastly, in these general approaches, farming practices, which are of crucial importance in desertification phenomena, are not taken into account to any great extent, or are not considered at all, in the evaluations carried out. The results presented are thus more estimates that are calculated according to a relatively well harmonised methodology at sub-regional level, which in theory provides a basis for cross-country comparison. These country results would seem to be relevant, however, since the statistics do not differ widely from one country to another.

Quantification of the areas affected by desertification provides a basis for developing arguments in favour of investing in action to combat the phenomenon. Cost measurement in particular is regarded as an institutional instrument, a strategic negotiating tool with which public funds and the funds provided through international cooperation can be attracted towards implementation of the UNCCD. This can result in overestimation of the areas affected (Jaubert, 1997) and thus of the costs involved. Consensus on terminology and methodology is absolutely essential to implementing regional monitoring of desertification.

Techniques for fighting desertification

The main techniques used in the Maghreb

In the countries of the Maghreb the rural populations have traditionally used techniques for maintaining and developing the natural environment, some of which date back to antiquity (Ben Oueddou *et al.*, 2006). They have been improved over time and new solutions have also been introduced as a result of research, scientific experiments or innovations created by farmers themselves. From the beginning of the 20th century these techniques have been implemented through actions and projects conducted under the auspices of the technical services of the State in charge of area management and of action to protect natural environments (and in particular pastoral and agricultural environments). The anti-desertification measures or activities to conserve water and soil include mainly the following:

- grazing bans aiming to promote natural regeneration;
- structures for combating water and wind erosion such as:
 - the construction of *tabias* to supplement irrigation (soil banks that are sometimes raised by means of dried palms or sheets of fibre cement) or of *jessours* (dykes built of earth that are strengthened on the upstream and downstream face, with a central spillway) to protect cultivated plots from water erosion while promoting water infiltration;
 - the construction of dry-stone crests and terraces on sloping land;
 - recharge works (small gabion dams) and spate irrigation works (small dams linked to canals) across the wadis for collecting and discharging water run-off;

- the erection of windbreaks with a sheet of fibre cement in order to limit sand encroachment in the steppes;
- the creation of *Eucalyptus sp.* forest plantations along roads in order to combat sand encroachment on highways;
- the creation of plantations of various tree species which stabilise shifting sand dunes (*Prosopis juliflora*, *Acacia horrida*, *Acacia ligulata*, *Acacia saligna*, *Calligonum sp.*, *Tamarix sp.*); a rooting rate of over 70% is required if this type of action is to be successful;
- the sinking of recharge wells for recharging aquifers (Ouessar *et al.*, 2006);
- action to build up forage reserves followed by the plantation of various species such as spineless and prickly cactus as well as *Atriplex nummularia*, which contribute to animal feed and help to reduce pastoral pressure on steppelands;
- the creation of tree nurseries in order to promote the multiplication of local species such as *Acacia tortilis subsp. raddiana*, *Rhus tripartitum*, *Periploca laevigata*, *Atriplex halimus subsp. schweinfurthii*, and *Retama raetam* with a view to reintroducing them *in situ*.

All of these measures promote steppe restoration through natural regeneration (grazing bans) and rehabilitation through the planting of trees and specific forage shrubs that are tolerant of arid conditions: *Cactus*, *Atriplex*, *Acacia*, *Agave*, *Prosopis*, etc. Remarkable productivity rates can furthermore be achieved with these shrubs with rainfall efficiency coefficients of 10 kg to 75 kg of dry matter per hectare per year and per millimetre that are 3 to 5 times higher than those registered under the same ecological conditions in steppelands with relatively minor degradation. It must be stated in this context that reseedling measures in the steppes have not met with any success worthy of note either in North Africa or in the Near East, despite several hundred attempts. Fertilisation attempts are inconclusive, particularly since aridity levels are high. Even when fertilisation is favourable from the technical and biological point of view, it is never economically justified in the case of steppe rangelands.

Jessours, *tabias* and small dams are used both for agriculture and for protecting the infrastructures and the towns and villages in the plains adjacent to the catchment areas. In the south of Tunisia, for example, the *Jessour* system is used traditionally for tree farming, particularly olive trees, and occasionally for a few annual crops. These structures are useful for mobilising water run-off along watersheds and are particularly efficient in years when rainfall is low. The *tabias* reduce water run-off to virtually zero by reducing peak discharge (Nasri, 2002, cited by Ouessar *et al.*, 2006). They lack maintenance, however, and their constant deterioration can promote erosion. The recharge and spate irrigation works that are designed to recharge groundwater and to control flood water also allow the water to infiltrate the soil. Their retention capacity decreases with time due to the accumulation of the products of wind and water erosion and the silting that ensues. Surveys carried out on river basins show clearly that this recharge capacity decreases as one moves upstream. When technical facilities for combating desertification are not properly maintained or are used inappropriately they can themselves become vectors of desertification.

Factors of economic efficiency

The ways and means of combating desertification have been studied at length, and appropriate measures have been identified and improved over time. Few efficiency analyses have been carried out, however, or at least there is very little information on such analyses. Yet they would provide a basis for setting standards in terms of performance of practices in a given context and of cost-effectiveness.¹⁶ Where such analyses are conducted they are generally carried out by teams of scientists in support of projects. The feasibility study carried out on a water and soil conservation project that was run in the Jeffara region in Tunisia between 1990 and 2000 is presented below as an illustration.

The Oum Zessar watershed in the north-west of the Jeffara region covers an area of 33,600 ha from the highlands down to the plain with a population of 25,000 people. The water run-off is estimated at 4.7 million m³ per year. Large-scale development works were carried out in the period from 1990 to 2000 to curb erosion and desertification involving a State investment of 9.86 million Tunisian dinars. The activities focused mainly on developing watersheds (49%), mobilising water (22%) and maintaining and strengthening existing works (29%) (Ouessar *et al.*, 2006):

- creation of jessours, tabias and other anti-erosion structures extending over 7000 ha;
- construction of more than 175 recharge and spate irrigation works;
- installation of 10 recharge wells;
- repair and maintenance work on old anti-erosion works, and planting of trees, in particular fruit trees, with which 8500 ha of farmland can be conserved and consolidated.

The economic evaluation took account of environmental phenomena as well as economic and social effects (Sghaier *et al.*, 2002).¹⁷ A representative sample of 120 crop farmers and animal farmers, 50 percent of whom benefited from these development works, were included in the survey in order to carry out this cost-benefit analysis. The economic return on the various land rehabilitation and maintenance techniques is first calculated (cf. Table 3): the jessours bring the best return, followed by the tabias and then by the dry-stone crests.

Table 3 - Variation in average agricultural output following measures to combat desertification (Tunisian dinars per ha)

	<i>Jessours</i>	<i>Tabias</i>	Dry-stone crests
Before (WSC)	182	26	27
After (WSC)	515	173	68

WSC: water and soil conservation
Source: Sghaier *et al.* (2002).

¹⁶ - Yield, or return in financial terms, is the capacity of capital to generate income – following an investment, for example.

¹⁷ - The FORCES-MOD model of the FAO and World Bank was used with a discount rate of 10%.

In order to calculate cost-effectiveness, the study estimates the variable costs (production costs in terms of labour, mechanical and animal traction and supplemental irrigation) and the various advantages brought by the works, including:

- increase in plant cover;
- expansion of fruit plantations and increase in cereal harvests in the area treated;
- contribution to the recharging of groundwater;
- improvement of the quality of life of the local people;
- reduction of the differences between the various levels of the watershed.

The rate of return is calculated over a 30-year period, which is considered optimal for maximising return on investment. The benefits brought by the project exceed the costs from the twelfth year onwards. The financial analysis covers all products which have a market price. The internal rate of return is relatively low: 5.5%.¹⁵ The first economic analysis reduces market distortions (subsidies, taxes, etc.); this makes the investment more advantageous, since the rate goes up to 13%. The second (more extensive) economic analysis takes account of the reduction in costs relating to the (estimated) damage that would have been caused to infrastructures had these works not been carried out; it gives an internal rate of return of 18.44%. And lastly, the third (more extensive) economic analysis considers two favourable non-market impacts (or externalities) of the works involved in the project. One concerns the environment: it is the impact of the recharging of groundwater on the expansion of irrigated agriculture; and the other concerns the improvement in quality of life (estimated at + 5 Tunisian dinars per capita per year), which brings the rate up to 26%.

The rate of return varies from 1 to 5 depending on the factors taken into account in the valuation of the favourable impact of the project. This cost-effectiveness study provides a basis for listing and measuring all of the benefits generated by actions to combat desertification from the point of view of their contribution to local well-being (living standards and the preservation of natural resources) by expressing them in relation to their cost. It requires setting up a rather costly scientific survey and monitoring system. Within the framework of the measures to monitor and evaluate the UNCCD, the impact of these actions are measured in terms of quality for reasons connected with the human and financial capacities of the parties concerned.

Institutional response: monitoring and evaluating UNCCD implementation

The impetus provided by the Rio Summit in 1992

Monitoring and evaluation emerged in an international context that was marked by mixed results of several decades of programmes and projects for combating desertification and land degradation which had lacked focus. As a follow-up to the Rio Summit

¹⁵ - The internal rate of return (IRR) is the discount rate that delivers a net present value of zero for a series of future cash flows (generally relating to a project involving an initial investment followed by positive financial returns).

in 1992, many actors in the international community proposed work on the formulation of environmental indicators. The OECD first coordinated studies providing a basis for measuring performance in environmental management with a view to facilitating the elaboration of country reports on the state of the environment and proposing numerous indicators based on the “Pressure - State - Response” framework (OCDE, 1994). Then in 1995 the UN Commission on Sustainable Development had a series of 134 indicators elaborated for use by governments in their efforts to evaluate and list the progress made in the implementation of sustainable development, and the World Bank made a significant contribution to these efforts with its *Land Quality Indicators initiative* (Pieri *et al.*, 1995). All of this work contributed to the elaboration of monitoring and evaluation frameworks in the UNCCD context, whose purpose was to provide a frame of reference and steering tools for implementing the national action programmes to combat desertification. This vision is expressed specifically in articles 10.2 and 16 of the text of the Convention (UNCCD, 1994):

“Article 10.2: The national action programmes shall.... (g) require regular review of, and progress reports on, their implementation.”

“Article 16: “The Parties shall, as appropriate,... c) support and further develop bilateral and multilateral programmes and projects aimed at defining, conducting, assessing and financing the collection, analysis and exchange of data and information, including, inter alia, integrated sets of physical, biological, social and economic indicators.”

The approach developed by the Convention makes anti-desertification efforts an integral part of the strategies and programmes for developing arid regions (cf. box entitled “Country profile for the purposes of the UNCCD”). More specifically, the monitoring and evaluation framework validated by the international community at the Fifth Session of the Conference of the Parties held in Geneva in October 2003 comprises the following three components:

- observation and monitoring of natural environments expressed by monitoring indicators;
- evaluation of the results of anti-desertification action by means of implementation and impact indicators;
- assessment of the stage reached in the implementation of the commitments made by the parties to the UNCCD. The indicators adopted, which are known as progress and investment indicators, refer to the stage reached at the institutional level in the elaboration and implementation of the programmes to combat desertification and to the financial commitments involved.

These three components are integrated into a global mechanism which constitutes the information system on desertification.

Country profile for the purposes of the UNCCD

The country profile was adopted in 2003 with a view to harmonising the reports of the parties to the Convention on the impact of desertification and the remedial action taken. This multi-dimensional profile focuses on the two broad issues of the fight against desertification – the biophysical and socio-economic aspects.

Biophysical indicators of desertification and drought

1. Climate;
2. Vegetation and land use;
3. Water resources;
4. Energy;
5. Types of land degradation;
6. Restoration.

Socio-economic indicators of desertification and drought

7. Population and economy;
8. Human development;
9. Science and technology (number of scientific institutions working on desertification).

Source: UNCCD (2003).

Implementation of monitoring and evaluation in Morocco and Tunisia

In North Africa, the implementation of the monitoring and evaluation system has been supported by international cooperation. The system was developed in a harmonised sub-regional process (cf. box entitled “Implementation of the monitoring and evaluation process in Morocco and Tunisia”) based on concerted efforts to develop three tools in collaboration with the national structures (OSS, 2006):

- the monitoring and evaluation indicators are designed to evaluate the measures taken to combat desertification; in theory, this pluridisciplinary information is provided at the sub-national level (implementation rate, impact) and then aggregated at the central level;
- the performance charts present the indicators that have been designed and calculated as well as factors pertaining to analysis and guidance for the decisions to be taken. They present the information in synthetic form and are designed to support decision-making at various levels (adopting of strategies, designing of projects, technical choices). They are first drawn up at the decentralised level in cooperation with the central administrative departments;
- the system for circulating information consists of a communication network linking various sub-systems, which produce and process the available information at a given level – generally the central level. The aim is to decompartmentalise institutional procedure in order to break with sectoral approaches for combating desertification

so that the monitoring and evaluation process can be integrated into the development process (Ben Khatra & Essahli, 2006).

Implementation of monitoring and evaluation in Morocco and Tunisia

The coordinated activities at the sub-regional level were carried out in three phases:

Phase 1: launching of the process (2002-2004)

- The methodology to be followed was distributed to all of the teams participating in the project.
- Efforts were then coordinated to adapt it to the specific features of the respective countries: training needs were identified, measures were taken to strengthen capacities, lists of monitoring and impact indicators were drawn up jointly and the calculation of these indicators was tested.

Phase 2: establishment of the various mechanisms (2003)

- The monitoring and evaluation tools and mechanisms were then established at the various levels, i.e. at the national and sub-national level in the case of Morocco and Tunisia, and at the sub-regional level in the case of the Maghreb Arab Union.
- The concomitant training was provided in the structures in charge of conducting the action programmes to combat desertification.

Phase 3: appropriation and internalisation (2004)

The national and sub-regional (MAU) institutions where training sessions had been held in the previous phases then disseminated the techniques and tools that had been developed.

Technical coordination at the sub-regional level facilitated the establishment of the monitoring and evaluation process: opportunities were provided for the various persons involved in the project to exchange notes on experience. With the support of the MAU this coordination promoted the integration of the monitoring and evaluation process into the national development strategies.

Source: OSS (2004).

Morocco and Tunisia created national frameworks for cross-cutting concertation in order to facilitate the implementation of this system and to integrate it into their development strategies,¹⁹ and furthermore presented institutional innovations for the progress indicators in the reports they submitted to the UNCCD.

Morocco created a Directorate for Natural Resources and Action to Combat Desertification within the High Commission for Water, Forestry and Desertification Control. The network which this directorate coordinated with a view to defining and implementing the monitoring and evaluation process first elaborated a common model²⁰ for the fact sheets on the subjects considered to be the most crucial in efforts to fight desertification:

¹⁹ - More generally, monitoring and evaluating the environment is a recommendation that is put forward in strategy documents on sustainable development (Tunisia, 1995) and human development (Morocco, 2006).

²⁰ - making a distinction between the broader issues, the main indicators selected, graphical illustrations, general assessment of trends, fields and recovery strategies.

socio-professional situation in rural areas, population trends and pressure on resources, water resources, forestry, pastoralism and rangelands, rain-fed agriculture, irrigated agriculture, oases, improvement of institutional organisation, improvement of knowledge of desertification (Wakrim, 2006). The indicators for monitoring and evaluating anti-desertification action were then selected on this basis; they are listed in detail in Annex 1.

In Tunisia, the National Council for Combating Desertification, which is composed of the main partners involved in the field, has the function of monitoring implementation of the national action programme on a regular basis; it also reports to the National Committee on Sustainable Development. As regards the actual concept of fighting desertification, Tunisia's efforts embrace a series of management and development actions, which can be physical, biophysical, socio-economic or institutional (Hajje & Ben Khadra, 2006). The implementation and impact indicators for each action are integrated into the performance charts: the evaluation of implementation is quantitative (number of measures taken and what they have cost), and that of impact is qualitative.

The monitoring and evaluation process thus involves three levels of decision-making: the national level or strategy level, where information is centralised and the final decisions are taken regarding choices and methods; the sub-national level, where the operations are actually carried out and followed up; and the scientific level, where the measures taken to fight desertification and the monitoring and evaluation methods can be improved.

Assessment of results, limits and outlook

The purpose of monitoring and evaluation within the framework of the Convention is to produce the necessary information for the country reports which are drawn up on the stage reached in the implementation of the national action programmes and which evidence the progress made. The monitoring and evaluation process is designed as a central planning tool for each individual country and as a decision-making tool through which policies, strategies, programmes and projects for fighting desertification can be rationalised. It is part of a long-term strategy with two essential functions:

- the function of integration at the institutional level: the National Coordination Body is the official framework within which the actors in charge of managing natural resources and producing information on the environment coordinate their action;
- the function of improving and constantly updating knowledge.

The impact of the monitoring and evaluation process has been limited, however, in terms of institutional and organisational improvements. First of all, at the central level the fact that the national administrations are sectoral in nature remains an impediment to the sharing of information and the integration and perpetuation of the results produced by the various projects. Secondly, it has transpired that tools and methods are not transferred evenly to the decentralised level, where human and financial resources have proved inadequate for monitoring operations on a regular basis. The trend in current projects is now in fact to design monitoring and evaluation systems at the sub-national level in order to strengthen the links between the National Coordinating Body and the actors operating at the decentralised level. This decentralisation of monitoring

and evaluation should make it easier to adjust to local realities, since the capacities of the administrative units in the field will be strengthened. Caution is called for, however, when it comes to assessing the efficiency of this process. A long-term analysis of the arid zones in Syria puts forward the hypothesis that since the development of international law frameworks on natural resources is becoming an issue of international relations, the State is tightening up regulations and the decentralised application of these rules according to this umbrella legislation without taking account of local realities, and in particular of the way in which users negotiate and organise the use of their territories (Jaubert, 2006).²¹ And lastly, the fact that the work on monitoring and evaluation that is underway in the Maghreb depends to a very large extent on international co-operation weakens the results achieved. By way of comparison, the box entitled “Stage reached in the monitoring and evaluation systems in the northern Mediterranean region” summarises the UNCCD’s assessment of the progress made in those systems in the countries on the northern shores of the Mediterranean.

Stage reached in the monitoring and evaluation systems in the northern Mediterranean region

At the Conference of the Parties held in Madrid in September 2007, the UNCCD group of experts produced a document on the stage reached in the systems for monitoring and evaluating desertification in individual regions.

Northern Mediterranean: environmental monitoring is more a matter of research than a problem of sustainable development

In the northern Mediterranean countries, the system for monitoring and evaluating desertification is based on a full review of the national action programmes. Many indicators are available, but the quantitative data are often lacking. Desertification hazards have been mapped in certain countries or for certain regions. Multi-disciplinary and regional projects on desertification have been developed and produce figures, maps and models, but the results obtained are not used to an adequate extent in decision-making, since these indicators do not adequately meet the needs of users and natural resources managers. The supply of indicators thus does not adequately match demand.

Central and Eastern Europe: towards integrated systems for monitoring and evaluating desertification and drought

In most Central and Eastern European countries the databases and systems for environmental monitoring are structured essentially around biophysical aspects (vegetation, soil, hydrology, aridity, air quality, etc.). They produce mainly descriptions of desertification in terms of these biophysical parameters. Some countries in the region have developed integrated systems for evaluating and monitoring desertification at the national level, which include certain socio-economic data that are available, particularly for drought management.

Source: UNCCD (2007).

²¹ - It must also be stated that the UNCCD adopted a ten-year strategic plan and framework in 2007, which involves reexamining monitoring and evaluation from the point of view of performance indicators.

Public strategies and measures taken since the 1970s

The first techniques for fighting desertification were implemented back in the early 20th century and focused on containing the sand encroachment that was threatening infrastructures, particularly roads and urban settlements (OSS-CENSAD, 2008). Efforts to combat desertification were then combined with measures to support the advancing desert – a misinterpretation that is still widespread. In the three countries of the central Maghreb projects were launched from the 1970s onwards including in particular the Green Dam Project in Algeria, water and soil conservation policies in Tunisia and watershed works in Morocco.

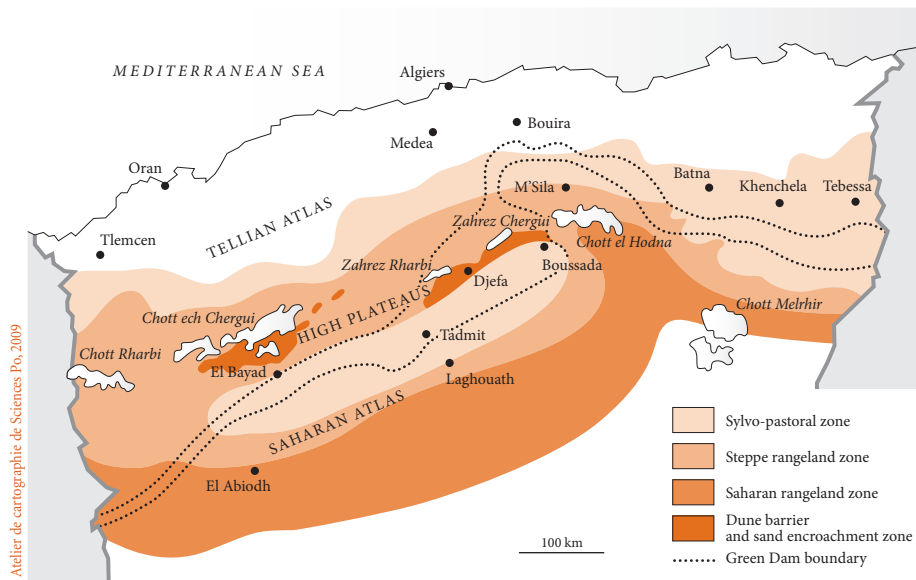
Algeria: from reforestation to rural development (1970-2000)

The Green Dam is a project for the reforestation of 3 million hectares rehabilitating the area with Aleppo pine on an arid east-west stretch of pastureland running from the Tunisian border to the Moroccan border between the 200 mm and 300 mm isohyets (cf. Map 5). The work was first carried out by the army and subsequently, from the mid-1980s onwards, by the forestry administration through state forestry enterprises. The Green Dam concept developed at the time into a set of agro-sylvo-pastoral measures in which the reforestation component was predominant (86% of plantations) but more diversified as regards the choice of tree species.

The concept was abandoned in the early 1990s and then taken up again in the context of agricultural and rural development from 1995 onwards. The reforestation measures were integrated into the national agricultural and rural development programme and combined with action to develop infrastructures and improve the incomes of the various population groups on a sustainable basis of market gardening, fodder crops and tree farming (cf. Table 4). The results obtained over thirty years are regarded as a failure: approximately 122,680 hectares have been reforested, i.e. just over 10% of the acreage planned, and the success rate of these plantations is 36%. The clearing operations carried out with a view to monospecific reforestation in the initial phase have adversely affected the environment and have disrupted the pastoral uses of these areas. At the economic level, on the other hand, the reforestation activities have created seasonal jobs for steppe population groups. The failure of the Green Dam Project can be traced back to a variety of causes: incorrect implementation combined with lack of skills, high costs and poor cost-effectiveness. It was considered with hindsight, that it would have been more advisable to involve the users in measures to develop the steppes, to place knowledge and appropriate technologies at their disposal and to create incentive mechanisms (Bedrani, 1993).

Through the experience gained with the Algerian Green Dam Project more attention is gradually being devoted to the people of the steppes in the designing of efforts to combat desertification. The (2001-2003) programme of support for economic recovery included a component of anti-desertification action involving projects similar to those of the Green Dam Project of the 1990s.

Map 5 - The Green Dam Project in Algeria



Source: Bensaïd (1995).

Table 4 - Projects conducted within the national agricultural and rural development programme in Algeria, 2000-2007

	2000	2007
Aggregate number of jobs created by the end of 2007	142 300	1 161 000
Aggregate number of farms targeted by the end of 2007	0	431 000
Number of projects registered in the <i>Young Investors Scheme</i>	0	8 700
Aggregate acreage developed (ha of AAU)	37 900	585 000
Forest plantations carried out from 2000 to the end of 2007 (ha)	13 800	172 400
Pastoral plantations carried out from 2000 to the end of 2007 (ha)	72 471	218 500
Grazing bans at the end of 2007	1 447 400	1 975 000
	2001	2007
Measures to stimulate the economy and create services enterprises	2 226	22 240
Construction of tracks to open up areas (expressed in km)	2 347	9 000
Rural electrification (expressed in km)	615	2 000
Clearing of new tracks	-	8 000

Source: Ministry of Agriculture data (2008).

Fighting desertification in Tunisia – cross-cutting strategies, 1980-2006

The integrated rural development programmes that have been set up in Tunisia since the 1980s have contributed considerably to raising the living standards of the rural populations (Elloumi, 2006). These programmes (1986-1994 and 1994-2002) are sometimes referred to as integrated agricultural development schemes and are directed mainly at the poorest rural areas, which are labelled priority areas (the centre and west of the country in particular) and focus on developing infrastructures, promoting agriculture (incentive price policy during the initial period), crafts and trades and the services. This strategy has helped to reduce the urban-rural imbalance. The predominant socio-professional categories in rural areas always involve the lowest income levels, however (non-agricultural labourers followed by agricultural labourers and farmers) (Elloumi, 2006). The implementation of these programmes also brought an increase in the number of farms, which led to the reduction of the average acreage per farm and greater pressure on resources.

From the 1990s onwards, the second generation of projects laid emphasis on income-generating activities, action to promote rural women and the participation of target groups in the measures to identify development actions as well as in the financing and implementation of those actions. The Tunisian economy was then gradually liberalised and emphasis was laid on the competitiveness of production chains. In the same decade, the measures taken to implement national water and soil conservation strategies and strategies to mobilise water resources (1990-2000) endeavoured to combine action to promote agriculture with action to conserve natural resources. State intervention focused on environmental management interlinked with agriculture and on creating a favourable environment for producers (Elloumi, 2006). The declared objectives of the 10-year (1990-2000) forestry and pasture development strategy (Directorate General for Forests) and of the water and soil conservation and water mobilisation strategy (Directorate General for Water and Soil Conservation) were ambitious. The measures planned in each of these strategies²² concerned over one million hectares, with implementation rates of approximately 45% (Rouchiche & Abid, 2003) and 65% (Helal *et al.*, 2007) respectively. The budget amounts actually allocated were in fact lower than the amounts originally planned (37% of the planned amounts in the case of forests), and the measures did not enjoy the same popularity everywhere. In particular, the rural communities opposed the plan to introduce forest tenure for land and collective rangelands. The Directorate General for Forests also elaborated a 10-year strategy to combat desertification over the period from 1990 to 2000, which focused on measures to halt sand encroachment;²³ the implementation rate is estimated at 71% (Rouchiche & Abid, 2003).

As regards development plans, the budgets planned for public investment in agriculture in the 9th, 10th and 11th plans (1997-2001, 2002-2006 and 2007-2011) do not have any

22 - In the case of the forest and pastureland development strategy, these are forest plantations, pastoral plantations and management of rangelands and pastoral reserves, and in the case of the water and soil conservation strategy: watershed works and cereal cropland development, water mobilisation units and works for combating silting and sand encroachment.

23 - Activities involve constructing and maintaining *tabias*, stabilising dunes and erecting tree belts and shelter belts as wind-breaks. The budget for the strategy amounts to one-tenth of the budget finally committed in the forest and pastureland development strategy.

specific budget lines devoted to action to combat desertification (cf. Tables 5 and 6). Water schemes for agriculture were the main sector on which these plans focused on the whole, followed by forestry and water and soil conservation. The integrated agricultural development projects accounted for only 8% of investments in agriculture in the 10th plan, although this was already a 25% increase in budget compared to the 9th plan.²⁴

Table 5 - Distribution of public investments in agriculture in the 9th and 10th development plans, Tunisia (in million dinars)

Activities	9th plan	10th plan (planned)	Variation (%)
Agricultural water schemes	1 072	1 206	+ 13
Animal farming	139	102	- 27
Fisheries	53	31	- 42
Studies, research and extension services	45	56	+ 24
Forests and rangelands	250	310	+ 24
Water and soil conservation	181	228	+ 26
Integrated agricultural development projects	124	216	+ 74
Miscellaneous	231	51	-
Total	2 095	2 200	+ 5

Source: Republic of Tunisia, Ministry of Agriculture (2002).

Table 6 - Trends in the share of the various activities in public investments in agriculture in the 10th and 11th development plans, Tunisia (in million dinars)

Activities	10th plan (implemented)	Share (%)	11th plan (planned)	Share (%)
Agricultural water schemes	1 014	51	1 242	56
Forests and rangelands	234	12	333	15
Water and soil conservation	238	12	229	10
Integrated agricultural development projects	167	8	169	7

²⁴ - The activities involved in the integrated agricultural development projects and the corresponding amounts can be divided over the various budget lines, more specifically agricultural water schemes, agricultural mechanisation, crop growing, forests and rangelands, and water and soil conservation (Republic of Tunisia, Ministry of Agriculture, 2002).

Table 6 - (contd.)

Activities	10 th plan (implemented)	Share (%)	11 th plan (planned)	Share (%)
Fisheries	46	2	61	3
Animal farming	120	6	83	4
Studies, research and extension services	71	4	68	3
Crop production	4	-	33	1.5
Agricultural mechanisation	13	1	13	0.5
Miscellaneous	69	4	6	-
Total	1976	100	2237	100

Source: Republic of Tunisia, Ministry of Agriculture (2007).

These budget data clearly underline the fact that action to combat desertification in Tunisia cuts across many sectors and is perhaps a secondary concern. The trends observed indicate that anti-desertification measures are included in local development activities, particularly agriculture, and that the local population groups are involved to a greater extent. Although the integrated agricultural development projects and integrated rural development schemes certainly provide a basis for reconciling biophysical and socio-economic aspects at the local level, the biophysical approach of protecting soil against erosion is predominant in the efforts to fight desertification, as are the sectors traditionally in charge of protecting physical environments. And lastly, the question of biodiversity, which is closely connected with the desertification phenomenon, is not taken into account.

New models of participatory development in Morocco

The Moroccan national plan for fighting desertification that was drawn up in 1986 focused on two sectors, which were considered to be the priority: pastoralism and the supply of wood fuels. It was never implemented due to lack of funding, but was subsequently updated when the national action programme to combat desertification was being drawn up, and the principles of the 1999-2003 economic and social development plan were taken as a basis. The Report on the State of the Environment in Morocco (1999) lists the following performances:

- just over one-third of the objectives of the national reforestation plan of the 1970s, which involved 662,000 hectares, had finally been achieved; the reforestation masterplan which succeeded that plan made provision for reforestation work involving 1.5 million hectares by 2025;
- the 1995 national plan for watershed management and the rangeland development strategy had resulted in measures to conserve water and soil on 440,000 hectares

(protective reforestation, fruit plantations, pastoral and sylvo-pastoral improvement and development measures, mechanical gully treatment).²⁵

As is illustrated by the distribution of public investments allocated to the economic and social development plan, the ratio between the agricultural sector and the forestry sector is 10 to 1 (cf. Table 7). As is the case in Tunisia, reforestation and agricultural water schemes receive the most generous budget allocations.

Table 7 - Public investments involved in the Economic and Social Development Plan in Morocco, 2000-2004

Components	Amounts (million dirhams)
Forestry sub-sector	
Action to fight erosion	117 240
Afforestation	734 370
(Sylvo-pastoral) forest management	75 370
Forest estate management	154 760
Integrated development of urban and rural-urban forest areas	228 860
Biodiversity	124 150
Measures to strengthen research institutions	74 650
Subtotal	1 509 400
Agricultural sub-sector	
Large-scale water schemes	4 022
Small and medium-scale water schemes	3 163
Land improvement	59
Integrated agricultural development projects	2 285
Crop product chains	964
Animal product chains	599
Quality management	267
Training, research, extension services	1 216
Studies and information systems	112
Other actions (to boost investments, to economise water)	3 486
Subtotal	16 173

Source: National Action Plan to Combat Desertification, Morocco, 2001.

²⁵ - The National Report on the implementation of the Convention to Combat Desertification (Morocco, report submitted to the Third Conference of the Parties, 1999) gives much higher estimates for these achievements.

In the Moroccan national action plan precedence is given to an approach integrating the various sectors traditionally in charge of protecting physical environments and the development sectors on the basis of the concept of participatory development, which can be achieved by promoting income-generating activities and developing microcredit to finance local investments. In 1995, the national watershed management plan made proposals for replacing the narrow concept of “watershed management” by a broader concept of “developing mountain areas” that would be based on small-scale schemes designed in a participatory approach and planned for the long term. And in its Strategy 2020 for rural development Morocco commits itself to fighting desertification as part of integrated rural development. However, although desertification is conceived as a phenomenon that cuts across many sectors and an issue of rural development in Morocco, it is not included in the National Report on the Millennium Development Goals (2003). The chapter on natural resources emphasises the energy question and biodiversity (reafforestation and protected areas indicator) and, in particular, water.

Protecting oases and reducing poverty

Oases are traditionally exploited at several levels in various ways (date palms, fruit trees, fodder, for example) and are also a focal point for animal farming (Bedrani & Chehat, 2005). They are a heritage of culture and biodiversity, which offer opportunities for tourism. This traditional exploitation of palm groves is being replaced by date palm monoculture, which is more profitable but also more harmful for the soil. The current irrigation race to develop these monocultures and greenhouse market gardening, which has a high value added, is causing groundwater depletion and soil salinity, which are contributing to the degradation of the oasis systems (OSS, 2008). Oasis tourism, which is undoubtedly a source of development, has in certain instances been a major contributing factor to the pressure on water resources (as is the case in the major Tunisian oases). The desertification of palm groves is thus generally the result of poor water resource management.

The measures to protect oases in the Maghreb that were included in action to fight desertification were limited initially to combating sand encroachment, after which other factors and realities began to be taken into account in the national action programmes. Measures were then taken to protect oases as part of the action to reduce poverty and combat desertification and to preserve heritages of culture and biodiversity. They targeted sites that were facing increasing prospects of poverty and abandonment.²⁶ In Morocco, the Directorate for Area Management drew up an oasis assessment and strategy document in 2004, which gave precedence to measures to rehabilitate and conserve these systems in the form of local participatory projects including anti-desertification action (cf. box entitled “Conserving and developing oases in the province of Tata, Morocco”).

²⁶ - It should be pointed out that some oases were created in the 20th century in order to settle the nomad populations or, later, for development experiments.

Conserving and developing oases in the province of Tata, Morocco

There has been serious degradation in Moroccan palm groves, which have lost almost three-quarters of their trees, and these losses have accelerated over the past 10 years (due to disease and overtapping of water resources). The populations of the oases in the south of the country in particular have seen their sources of income gradually diminish and as a result of this impoverishment have abandoned their oasis plantations and emigrated to the towns and cities.

Measures to conserve the oases are a fundamental component of the Moroccan strategy to combat desertification in the territories in the south of the country. The programme for developing the oases in the province of Tata pursues the objective of maintaining a viable and ecological exploitation system by restoring the agro-system in the oases and promoting local area development through four types of demonstrative action:

1. measures to economise/optimize the use of water resources in order to demonstrate in the areas where plots have been abandoned due to water shortage that it is still possible to develop agriculture there and thus keep the oasis alive;
2. measures to create economic value added with which date growers and their families can earn a living and thus improve their living standards and, in particular, stay in the oasis;
3. measures to consolidate the regional and associative structures that are currently the principal agents of local development;
4. ecological measures to restore the oasis ecosystem so as to regenerate and perpetuate the environmental framework for population groups that are subject to considerable natural constraints.

Source: (French) site of the United Nations Development Programme (UNDP, www.pnud.org.ma/P00050750.asp) in Morocco and of the Centre d'actions et de réalisations internationales (CARI, www.cariassociation.org/?section=programmes&subsection=oasis_maroc).

Social solutions

Local development and efforts to combat desertification

Local development involves the concepts of space and territory. In developed countries it is associated with area management and decentralisation; in developing countries it is based on action that mobilises local initiatives in small communities and amongst the inhabitants themselves, with external technical or financial aid as the case may be. The fight against desertification lends itself to this type of action and provides a basis for the concerted efforts of civil society, local authorities and scientists (Bied-Charreton & Réquier-Desjardins, 2007).

In the countries of the Maghreb, State administration has been decentralised as the result of structural adjustment programmes, and this has concentrated administrative structures in disadvantaged zones. At the same time reforms in Morocco and Algeria have facilitated the creation of associations, producer groups and cooperatives in an economic environment that is gradually being liberalised (Antonelli *et al.*, 2008). Local initiatives have flourished in this context in many different sectors, also in the zones

that had been “forgotten” by the administration, and international cooperation has supported this new form of social commitment.

This process has been particularly dynamic in Morocco for more than 10 years. Successful small-scale projects have emerged that combine human development and environmental protection, such as action to combat desertification and reduce poverty, for example, through the organisation of income-generating activities, and have gained momentum. They are geared to training, debate and the empowerment of users and they encourage the local people to think about local development; they also promote linkages with the local authorities, both contemporary and traditional (cf. box entitled “Involving local communities in action to preserve argan trees, Ibn Albaytar Association, Morocco”).

Involving local communities in action to preserve argan trees, Ibn Albaytar Association, Morocco

The argan tree is a highly drought-resistant species, which is endemic to Morocco and grows in zones with an annual rainfall of 120 mm. Its presence prevents erosion and desertification. Its fruit contains nuts from which argan oil is extracted, a product which is recognised as having medicinal and cosmetic properties. These trees support some three million Moroccans. Argan oil extraction is developed in particular by rural women in disadvantaged arid zones.

The NGO Ibn Albaytar has been supporting these oil producers since 1996, helping them to set up production cooperatives, which operate the entire production chain from extraction to export. Five cooperatives have been established in five different provinces, and Ibn Albaytar provides training for the members in the organisation of cooperative activities and in the human development field in the form of modules covering technical aspects (extraction), legal aspects (how to form a cooperative), educational aspects (literacy training, health and environmental issues), management, and quality (traceability).

These cooperatives have now created a professional association (Economic Interest Grouping) in order to defend their interests more effectively, negotiate with other producers and define strategies with other actors in the industry with a view to improving the image of argan oil:

- they take part in the elaboration of standards and decrees (to promote quality);
- the oil they produce has gained international recognition (the Slow Food label) and has been certified by Ecocert as organically produced; it has also been awarded the “fair trade” label;
- they play a role in the development of their local communities, helping, for example, to promote tourism in the areas.

Source: Association Ibn Albaytar (www.association-ibnalbaytar.com).

In Tunisia, efforts to fight desertification are included in the objectives of the local development plans that are implemented by decentralised authorities. The actual participation of the local population in the measures to combat desertification in this context is often limited to the projects supported by international cooperation. It was encouraged, for example, in the implementation of the pilot project run by the European Union on “Strategies to combat desertification in arid lands with direct involvement of local agro-

pastoral communities”. The final report on the integration of the participatory approach into this project as a central aspect proposes the following conclusions: “Although there are encouraging signs of mobilisation of local populations, there is still a great deal to be done to ensure that their action is effective. The producer structures and cooperatives are not yet in a position to manage their own affairs autonomously and the fledgling associations lack experience. [...] The participatory process costs a great deal of time and effort, no matter what is said or done. There are no quick fixes, no ready-made answers. [...] But the real opportunities for populations to participate always arise primarily at the local level. Discussions will no doubt be held in non-structured groups and at organised meetings. The official regional authorities have a crucial role to play and can help tremendously to promote cooperation and coordination amongst the various communities.” (Bellal, 2007).

Socio-economic approach to desertification in southern Tunisia

Over and above the strategies for combating desertification and their implementation by the public authorities, rural societies are also developing solutions to the trends in their environment of which desertification is but one aspect. These solutions differ from one context to another (producer resources, economic environment, country and region). National policies for fighting desertification can be improved by taking them into account from the point of view of agricultural and local development, and this can promote further support for local initiatives.

In Tunisia, agriculture is still the primary activity in the rural world, and there is little diversification of incomes in rural areas on the whole. It is in the regions in the south of the country which are most affected by desertification that agriculture is most important. The Jeffara region (in southern Tunisia) has pre-desert features. Rainfall varies between 100 and 200 mm. The relief is diversified: watersheds, mountain ranges, foothills, and plains extending to the coast in the west. Human pressure on the natural resources of the region has been steadily increasing since the 1960s (Genin, 2006). The region has been gradually opening up for some time and has a long tradition of migration to the neighbouring towns and cities, regions and countries as well as emigration abroad (migrants move to the tourist resorts on the coast and to Tunis, Libya, or Europe) (Boubakri, 2006). The rural migratory balance is negative at the present time and the agricultural sector is in the throes of restructuring. Most farmers have several jobs, and agriculture has become a secondary activity in family incomes, although it provides a significant supplement, particularly in the form of food (Picouet & Sghaier, 2006; Genin *et al.*, 2006).

In the past, it was pastoral activities, the only activities in the plains, which governed how space was organised. Agriculture was concentrated on limited areas, where crops were grown using the rainwater and water run-off that was harvested along the watersheds or occasionally as rain-fed crops. Since the 1970s, far-reaching changes have come about in the uses of natural resources: irrigated agriculture has been extended down into the plains thanks to the use of groundwater resources, commercial crops have been developed, fruit trees and vegetables are now grown, and the pastoral sector has declined. Olive production, which is now practised by virtually all farms, is

predominant in both rain-fed and irrigated agriculture. Rain-fed agriculture is practised one year in two or three, depending on rainfall. This is a marginal form of agriculture, where the acreage used is limited and cereals are the predominant crop and are grown for family consumption.

Agricultural activities in the irrigated areas, most of which are State-owned and supplied with State-financed collective drilling, are geared to commercial crops for export, fruit trees, and vegetables (sometimes grown in greenhouses). Choices of this nature require high yields (price competitiveness) and efficient chain-type organisation for delivering produce to sales points (reducing transaction costs). As the result of the decline in sedentary animal farming on rangelands and the extension of agriculture, various systems of combined crop and animal farming have developed in the plains and in the hill country (Guillaume *et al.*, 2006). Animal farming practices have become less dependent on rangelands in general since they are more intensive and combined with fodder crop farming or involve the use of the available feed supplements. Exclusively pastoral animal farming involving large migratory flocks still exists. The development of private irrigated areas is slow due to the high cost of such investments – farmers can rarely afford them. If these private irrigated areas are to be economically successful they require a high level of technical expertise and equipment to produce yields that will make them profitable and allow them to be integrated into commercial exporting channels (Guillaume *et al.*, 2006).

The agricultural sector in this region is evolving towards a dichotomy between a limited number of large farms, which have benefited from the collective land privatisation policies and are based on the latest technologies, and a multitude of small family farms, whose produce simply helps to improve family income. A new category has emerged of wealthy farmers, who keep access to land for themselves and who have considerable investment capacities – for growing oil crops on large areas, for example, market garden crops in greenhouses, or fodder crops – and for developing sharp practices. Another (large) segment of the rural farm population is becoming impoverished, as is evidenced by the abandoned farms, the marked ageing of heads of household and the migration of the young generation. Outside the agricultural world the growing disparities have become accentuated between the interior of the country and the coastal area, which has been boosted by the development of the tourist and agro-food industries.

In this social landscape that is being recomposed desertification is not only connected with poverty but is also a hazard for the lands of the wealthiest farms practising intensive agriculture, including those that have high-tech irrigation. Thought should thus be devoted to agricultural production systems on a broader scale, including crop production systems, which are crucial to food supply in North African countries. Should anti-desertification action also take account of all of the related aspects and involve a more systematic approach to addressing non-agricultural economic activities and the relationship between urban and rural areas, for example from the point of view of employment, diversification and migration? These questions which arise again and again when one observes realities call for answers in public development and cooperation policies.

New strategy frameworks for fighting desertification

The countries of North Africa are facing far-reaching changes in both their natural resources and their environment, which are the result of both natural and anthropic factors such as the deterioration in climatic conditions, population growth and the increase in livestock, and the replacement of the traditional collective methods of managing space. Furthermore, the globalisation of the economy is encouraging people to adopt new consumption patterns and production methods in order to improve their living conditions. These factors mean that there is more pressure on natural resources, with serious consequences in ecological, economic and social terms. Faced with this situation, the bodies in charge of managing the environment and natural resources and of planning development must collect, manage and appropriately process the environmental data which describe natural environments and how they are being developed in order to subsequently disseminate reliable information on the state of the environment and on how those resources are being distributed and are evolving. This has become all the more necessary since by ratifying the international conventions on the environment these countries have undertaken to vest themselves with instruments for monitoring and evaluating action programmes as well as mechanisms for managing environmental data and information.

The Maghreb countries have considerably developed their approach to desertification over the past 10 years thanks to the process for preparing the UNCCD national action plans for combating desertification. They have promoted the coordination of multisectoral approaches and have integrated their programmes for fighting desertification into their rural development plans. The pace at which anti-desertification measures that are based on the lifestyles of rural societies and on local production system realities are developed differs from one country to another. In their efforts to establish monitoring and evaluation systems the institutional actors are gradually gearing their action to evaluating the cost-effectiveness of programmes for combating desertification on the basis of a multidisciplinary, multi-level and participatory approach, but they are meeting with operational difficulties. Although observation instruments and products do exist (thematic maps, satellite images, flora and fauna inventories, etc.) they vary widely from one country to another and are even disparate and often sectoral within individual countries. Despite the efforts of the Maghreb countries, performance levels vary and reveal the following shortcomings:

- the data that are generated in the context of one-off projects are inadequate for producing and updating information on a regular basis;
- the fact that maps on land use as well as certain statistical data are incomplete and/or obsolescent and that few such data are available is an obstacle to developing an integrated vision of desertification and rural development;
- the absence or scarcity of information on data (metadata) and the fact that the available information is not standardised (in terms of format and quality) are impeding the circulation, use and development of information.

This state of affairs is not conducive to the interpretation and cross-analysis of all bio-physical and socio-economic data, which would provide a basis for monitoring and evaluating the state of the environment (changes, trends, and so on), of habitats and their biodiversity, and of water resources and a means of identifying the causes (climate factors, anthropic factors such as the load capacity of ecosystems) and the consequences (water and wind erosion, salinisation, loss of arable land, etc.) in terms of resilience of natural environments. And lastly, knowledge is still inadequate as regards:

- the dynamics of agro-sylvo-pastoral production systems and the dynamics of local markets;
- human activities, agricultural practices and the impact on the natural environment in the peripheral regions to the north of those generally affected by desertification;
- population distribution and population trends as well as economic activities in the various regions.

Both decision-making instruments such as the network of monitoring and research stations which provide information for quantifying and evaluating the dynamics of environments and natural resources (degradation/regeneration) and for producing environment alert bulletins are also inadequately developed in a context where climate changes are worsening. The solutions that are advocated for remedying the most serious shortcomings in the information field are based on the establishment of synergy frameworks with a view first of all to strengthening communication amongst the various systems that exist and promoting the regular production and exchange of relevant information (indicators) as a source of input for the (current or future) performance charts to be used by the different users/policymakers at various levels.

In a context that is marked by growing liberalisation, the decline of agriculture as a source of wealth, growing insecurity for many farms in arid zones, increasing economic disparities, also in the rural world, and pressure on natural resources, it should be borne in mind that the agricultural produce of small farms is a fundamental complement to household income. It is in this context that action to combat desertification can be placed in order to enable and encourage rural populations to adjust to the major economic and environmental upheavals that have been taking place in the Maghreb for the last 10 years. These choices are matters of central policy, to be sure, but it is also to their advantage if they are guided by the decentralisation process, which enhances the participation of local authorities and civil society in local development and area management.

Bibliography

Abaab (A.), Bedrani (S.), Bourbouze (A.) & Chiche (J.), "Les politiques agricoles et la dynamique des systèmes agropastoraux au Maghreb", in M. Allaya (ed.), *Les Agricultures maghrébines à l'aube de l'an 2000*, Ciheam-IAMM, Montpellier, "Options méditerranéennes" collection, série B, 14, 1995.

Aidoud (A.) & Touffet (J.), "La régression de l'Alfa (*Stipa tenacissima*), graminées pérennes, un indicateur de désertification des steppes algériennes", *Sécheresse*, 7, 1996.

Aidoud, (A.) & Nedjraoui (D.), "The Steppes of Alfa (*Stipa tenacissima* L.) and their Utilisation by Sheep", in C. A. Thanos (ed.), *Plant-Animal Interactions in Mediterranean Type Ecosystems*, Medecos VI, Athens, 1992.

Antonelli (A.), Bessaoud (O.), Malorgio (G.) & Pugliese (P.), "La gouvernance des mondes ruraux et agricoles", in Ciheam, *Mediterra 2008. Les futurs agricoles et alimentaires en Méditerranée*, Presses de Sciences Po, Paris, 2008.

Aronson (J.), Floret (C.), Le Floc'h (E.), Ovalle (C.) & Pontanier (R.), "Restauration et réhabilitation des écosystèmes dégradés en zones arides et semi-arides. Le vocabulaire et les concepts" in R. Pontanier, A. M'Hiri, N. Akrimi, J. Aronson & E. Le Floc'h (ed.), *L'homme peut-il refaire ce qu'il a défait?*, John Libbey Eurotext, Paris, 1995.

Aubreville (A.), *Climat, forêts et désertification de l'Afrique tropicale*, Société d'éditions géographiques maritimes et coloniales, Paris, 1949.

Auclair (L.), Chaize-Auclair (M.), Delaitre (E.) & Sandron (F.), "Dynamique sociale et désertification: le cas de Menzel Habib dans le Sud Tunisien", *Acquis et perspectives pour un développement durable des zones arides*, international seminar, Jerba, 5-7 December 1996.

Auclair (L.) & Picouet (M.), "Dynamique démographique et utilisation des ressources: le cas de la Tunisie rurale", *Comptes rendus de l'Académie d'agriculture de France*, 8, 1994.

Bedrani (S.) & Chehat (F.), *Données agronomiques et socio-économiques sur la zone SASS en Algérie*, Rapport de projet SASS (Système aquifère du Sahara septentrional), OSS, 2005.

Bedrani (S.), "Les aspects socio-économiques et juridiques de la gestion des terres arides dans les pays méditerranéens", *Cahiers du Cread*, 1993.

Bellal (N.), *Rapport final sur l'intégration de l'approche participative dans le projet SMAP, Projet pilote sur les stratégies de lutte contre la désertification dans les régions arides avec implication directe des communautés agropastorales locales*, SMAP, European Union, 2007.

Ben Khadra (N.) & Essahli (W.), "Desertification Information System – Information System and Environmental Monitoring on Internet: Commentary and Outlooks", *Role of Information Circulation Systems in Scientific and Practical Approaches to Combat Desertification*, Proceedings of the AID-CCD Seminar, Windhoek and Ondangwa, Namibia, 2-7 April 2006.

Ben Oueddou (H.) & Ben Kehia (H.), "Un long passé de valorisation des ressources en eau. Le cas du bassin-versant de l'oued Hallouf", in *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRAD, 2006.

Bensaïd (S.), "Bilan critique du barrage Vert", *Science et changements planétaires. Sécheresse*, 6 (3), 1995.

Bernus (E.), "Les causes de la désertification: les thèses en présence", *Bulletin de la Société languedocienne de géographie*, "La Sécheresse au Sahel", 18 (3-4), 1980.

Bied-Charreton (M.) & Requier-Desjardins (M.), "Sciences et sociétés civiles dans le cadre de la lutte contre la désertification", *Les Dossiers thématiques du CSFD*, 6, 2007.

Boubakri (H.), "L'autre face de la Jeffara: mobilité transfrontalière, migration internationale et dynamiques territoriales", in *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRAD, 2006.

Chaïeb (M.), Floret (C.) & Pontanier (R.), "Réhabilitation d'écosystèmes pastoraux de la zone aride tunisienne par réintroduction d'espèces locales", 4th International Rangeland Congress, Montpellier, 1991.

Cornet (A.), "La désertification à la croisée de l'environnement et du développement: un problème qui nous concerne", World Summit on Sustainable Development, Johannesburg, 2002.

Cornet (A.), "La désertification: un problème d'environnement, un problème de développement", conférence, La Londe-les-Maures, 2000.

Dregne (H. E.) & Chou (N.-T.), *Global Desertification Dimensions and Costs. Degradation and Restoration of Arid Lands*, Texas Tech University, Lubbock (Texas), 1992.

Dregne (H. E.), "Combatting Desertification: Evaluation of Progress", *Environmental Conservation*, 11 (2), 1984.

Dregne (H.E.), "La désertification aux États-Unis d'Amérique", *Nature et ressources*, 13, 1977.

Elloumi (M.), "Les politiques de développement rural en Tunisie: acquis et perspectives", in J.-P. Chassany & J.-P. Pellissier (eds.), *Politiques de développement rural durable en Méditerranée dans le cadre de la politique de voisinage de l'Union européenne*, Ciheam-IAMM, Montpellier, "Options Méditerranéennes" collection, série A, 71, 2006.

Floret (Ch.), M'timet (A.M.) & Pontanier (R.), "Caractérisation écologique des régimes hydriques et de l'érodibilité des sols en zone aride", *Bases écologiques du développement rural intégré et lutte contre la désertification en zones arides et semi-arides*, Atelier interrégional Afrique/Amérique latine MAB-Unesco, *Terra arida*, 7, 1990.

Floret (C.) & Pontanier (R.), "L'aridité en Tunisie présaharienne: climat, sol, végétation et aménagement", *ORSTOM research and document*, 150, 1982.

Floret (C.), Le Floc'h (E.), Pontanier (R.) & Romane (F.), "Modèle écologique en vue de la planification et de l'aménagement agro-pastoral des régions arides: application à la région de Zougrata", *PNUE/CEPE/ORSTOM/IRA/DRES, Document technique*, 2, 1978.

Genin (D.), "Introduction", in *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRAD, 2006.

Genin (D.), "Élevages extensifs, environnements et systèmes de production en mutation en Tunisie rurale", Essai d'analyse à partir des données du programme DYPEN II. CNT, CREDIF, IRA, INRA, IRD, 2000.

Genin (D.), Hanafi (A.) & Cialdella (N.), "L'agriculture dans la Jeffara: entre permanence et bouleversements, quelle place dans la reproduction de systèmes sociaux?", in *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRAD, 2006.

Genin (D.), Guillaume (H.), Romagny (B.) & Sghaier (M.) *et al.*, "Du devenir de l'agropastoralisme à un développement multisectoriel régional: quelles perspectives?", dans *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRA, 2006.

Guillaume (H.), Genin (D.) & Nouri (H.), "Entre jessour, oliveraies et steppes: des dynamiques agro-territoriales en question", dans *Entre désertification et développement. La Jeffara tunisienne*, Tunis, Cérès éditions, IRD, IRA, 2006.

Hajje (M.S.) & Ben Khatra (N.), "Articulation du dispositif de suivi-évaluation du PAN/LCD au processus de développement en Tunisie", *Suivi-évaluation des programmes d'action de lutte contre la désertification*, Tunis, OSS, 2006.

Hanafi (A.), *Cartographie des systèmes écologiques et étude de leur évolution depuis 1978 dans la région de Menzel Habib (Gabès)*, post-graduate diploma dissertation in geography, Tunis, FSHST, CNT, IRA, IRD, 2000.

Hanafi (A.) & Jauffret (S.), "Utilisation des données spatiales pour le suivi de la dynamique des écosystèmes dans le milieu aride tunisien. Cas de la région de Menzel Habib entre 1975 et 2000", *Revue française de photogrammétrie et de télédétection*, forthcoming.

Hanafi (M.) & Jauffret (S.), "Are long-term vegetation dynamics useful in monitoring and assessing desertification processes? A case study of arid southern Tunisian steppes", *Journal of Arid Environment*, 72, 2008.

Helal (S.), Mc Connel (R.) & Thirong (P.), *Relier les programmes forestier nationaux aux stratégies de réduction de la pauvreté, cas de la Tunisie*, FAO Forestry Department, FAO, Rome, 2007.

Hobbs (R. J.), Groves (R.), Hopper (S. D.), Lambeck (R. J.), Lamont (B. B.), Lavorel (S.), Main (A. R.), Majer (J. D.) & Saunders (D. A.), "Function of Biodiversity in Mediterranean Ecosystems in Australia", in G. W. Davis & D. M. Richardson (eds.), *The Function of Biodiversity in Mediterranean Ecosystems*, Berlin, Springer-Verlag, 1995.

Jaubert (R.), "Conclusion: exploitation des ressources, négociations et bureaucraties", dans R. Jaubert & B. Geyer (dir.), *Les Marges du croissant fertile, peuplements, exploitation et contrôle des ressources en Syrie du Nord*, Maison de l'Orient et de la Méditerranée, CNRS, Lyon, 2006.

Jaubert (R.), "La relance du plan d'action de lutte contre la désertification: les populations au centre des négociations", in C. Becker & P. Tersiguel (eds.), *Développement durable au Sahel*, Sociétés, Espaces, Temps, Karthala, Dakar/Paris, 1997.

Jauffret (S.), *Validation et comparaison de divers indicateurs des changements à long terme dans les écosystèmes méditerranéens arides. Application au suivi de la désertification dans le Sud tunisien*, doctoral thesis, Saint-Jérôme Faculty of Science and Technology, Aix-Marseille University (3), Marseille, 2001.

Laatiri (L.), "Projet SMAS. Mise en place d'un Système d'alerte précoce à la sécheresse en Algérie, au Maroc et en Tunisie. Activités réalisées par l'INM, Tunisie", communication presented at a regional workshop on drought early warning systems in the Maghreb, Algiers, 12-14 May 2008.

Le Floch (E.), Neffati (M.), Chaïb (M.) & Pontanier (R.), "Un essai de réhabilitation en zone aride. Le cas de Menzel Habib (Tunisie)", in R. Pontanier, A. M'hiri, J. Aronson, N. Akrimi & E. Le Floch (dir.), *L'Homme peut-il refaire ce qu'il a défait?*, Libbey Eurotext, Paris, 1995.

Le Floch (E.), *Évolution de l'utilisation du sol et de la dégradation des milieux en Tunisie méridionale. Cas de la zone test de Zougrata. Projet "Parcours du Sud"*, provisional document, INRA Tunis, CEPE-CNRS Montpellier, 1976.

Le Houérou (H.-N.), *Les Pâturages naturels de la Tunisie aride et désertique*, Institut des sciences économiques appliquées, Paris, Tunis, 1962.

Le Houérou (H.-N.), "La désertisation du Sahara septentrional et des steppes limitrophes", *Annales algériennes de géographie*, 6, 1968.

Le Houérou (H.-N.), "La végétation de la Tunisie steppique", *Annales INRAT*, 42 (5), 1969.

Le Houérou (H.-N.), "Biological Recovery Versus Desertization", in D. L. Johnson (ed.) "The Human Face of Desertification", *Economic Geography*, 53 (4), 1977.

Le Houérou (H.-N.), *Bioclimatologie et biogéographie des steppes arides du Nord de l'Afrique. Diversité biologique, développement durable et désertisation*, Ciheam-IAMM, Montpellier, "Options méditerranéennes" collection, série B, 10, 1995.

Le Houérou (H.-N.), "Biogeography of the Arid Steppeland North of the Sahara", *Journal of Arid Environments*, 48, 2001.

Loireau (M.), Sghaier (M.), Fétoui (M.), Ba (M.), Abdelrazik (M.), d'Herbès (J.-M.), Desconnets (J.-C.), Leibovoci (D.), Debard (S.) & Delaitre (E.), "Système d'information à l'échelle locale (Siel) pour évaluer le risque de désertification: situations comparées circum-sahariennes", *Science et changements planétaires. Sécheresse*, 18 (4), 2008.

Loireau (M.), *Espaces-Ressources-Usages: Spatialisation des interactions dynamiques entre les systèmes sociaux et les systèmes écologiques au Sahel nigérien*, doctoral thesis, Department of Geography, Montpellier University (3), Montpellier, 1998.

Mainguet (M.), "Désertification: Quels sont les vrais problèmes?", *L'Information géographique*, 58, 1994.

Meckelein (W.), "The problem of desertification within deserts. An introduction and several conclusions", in W. Meckelein (ed.), *Desertification in Extremely Arid Environments*, Stuttgart, Geographisches Institut der Universität, 1980.

Milton (S. J.), Dean (W. R. J.), du Plessis (M. A.) & Siegfried (W. R.), "Conceptual Model of Arid Rangeland Degradation. The Escalating Cost of Declining Productivity", *Bioscience*, 44 (2), 1994.

Nasri (S.), *Systèmes agraires et organisations spatiales en milieu aride: cas d'El Ferch et du Dahar de Chenini-Guermessa (Sud-Est tunisien)*, doctoral thesis, Paul Valéry University Montpellier (3), 2002.

OECD, *Environmental Indicateurs*, Paris, 1994.

OSS, *The North-Western Sahara Aquifer System: Concerted management of a transboundary water basin*, "Synthesis" Collection No. 1., OSS, Tunis, 2008.

OSS (coord.), *The monitoring and evaluation of National Action Programmes to Combat Desertification*, OSS, Tunis, 2007.

OSS, *Concepts et approche méthodologique d'élaboration des outils du suivi-évaluation du PAN/LCD. Application au cas de la Tunisie*, report on the Tunisia-Italy project, 2004.

OSS-CEN-SAD, *The Great Green Wall Initiative of the Sahara and the Sahel*, Introductory Note No 3, OSS, Tunis, 2008.

Ouessar (M.), Yahyaoui (H.), Ouled Belgacem (A.) & Boufalgha (M.), "Aménagement et techniques de lutte contre la désertification: inventaire et bilan", in *Entre désertification et développement. La Jeffara tunisienne*, Cérès éditions, IRD, IRA, Tunis, 2006.

People's Democratic Republic of Algeria, *National action plan for environment and sustainable development (NAPE-SD)*, Metap, 2002.

People's Democratic Republic of Algeria, *National action programme to combat desertification*, Ministry of Agriculture and Rural Development, Directorate-General for Forestry, 2004.

Pieri, (C.), Dumanski, (J.), Hamblin (A.) & Young (A.), "Land Quality Indicators", World Bank Discussion Papers, WDP 75, 1995.

Picouet (M.) & Sghaier (M.), "Dynamiques socio-démographiques et pluriactivité", in *Entre désertification et développement. La Jeffara tunisienne*, Cérès éditions, IRD, IRA, Tunis, 2006.

Quézel (P.), Médail (F.), Loisel (R.) & Barbero (M.), "Biodiversity and Conservation of Forest Species in the Mediterranean Basin", *Unasylva*, 197, *Mediterranean Forests*, 50 (2), 1999.

Requier-Desjardins (M.) & Bied-Charreton (M.), *Évaluation économique des coûts économiques et sociaux de la désertification en Afrique*, AFD, Paris, 2006.

Republic of Tunisia, Ministry of the Environment and Area Management, *National action programme to combat desertification*, 1998.

Republic of Tunisia, Ministry of Agriculture, *11th Development Plan (2007-2011)*, 2007.

Republic of Tunisia, Ministry of Agriculture, *10th Development Plan (2002-2006)*, 2002.

ROSELT/Algérie, *Observatoire des hautes plaines steppiques. Bilan final du projet ROSELT/OSS (2002-2005)*, USTHB-CRSTRA, 2005.

ROSELT/OSS, *Conception, organisation et mise en œuvre de Roselt/OSS*, coordination régionale Roselt, Montpellier, IARE, 1995.

Rouchiche (S.) & Abid (H.), *Role of Planted Forests and Trees Outside Forests in Sustainable Forest Management: Republic of Tunisia - Country Case Study*, working paper FP/27F, FAO Forestry Department, FAO, Rome, 2003.

Kingdom of Morocco, *National action programme to combat desertification*, Ministry of Agriculture, Rural Development, Water and Forests, 2001.

Kingdom of Morocco, Directorate for Observation, Studies and Coordination, *Report on the State of the Environment in Morocco*, Chapter 2: "Physical Milieu", 1999.

Sarraf (M.), Larsen (B.) & Owaygen (M.), *Cost of Environmental Degradation, the Case of Lebanon and Tunisia*, World Bank, Metap, Environmental Economic Series, Paper 57, 2004.

Secretariat-General of the MAU, *Programme d'action sous-régional contre la désertification au Maghreb*, MAU, 1999.

Sghaier (M.), Fetoui (M.) & Tbib (A.), "Contribution à l'analyse des évolutions des systèmes "population-exploitation des ressources naturelles" dans l'observatoire de Menzel Habib (Sud-Est tunisien)", *Science et changements planétaires. Sécheresse*, 18 (4), 2008.

Sghaier (M.), Ben Abed (M.A.), Fetoui (M.), Bennour (L.) & Jaouad (M.), *Système d'information sur l'environnement à l'échelle locale (SIEL): cas de l'observatoire de Menzel Habib et installation de MDweb (Tunisie)*, Scientific report of the ROSELT/OSS programme, 2006.

Sghaier (M.), Mahdhi (N.), De Graaff (J.) & Ouessar (M.), "Economic Evaluation of Water Harvesting at Catchment's Scale: An Application of the Forces MOD Model", in J. De Graaff & M. Ouessar (eds.), *Water Harvesting in Mediterranean Zones: An Impact Assessment and Economic Evaluation*, TRMP Paper 40, Wageningen University, Wageningen (Netherlands), 2002.

Skouri (M.), "Desertification in the Mediterranean Basin: Present State and Future Trends", *The Situation of Agriculture in Mediterranean Countries*, "Options méditerranéennes" collection, 1, Ciheam MAI, Zaragoza, 1993.

UNCCD, *Benchmarks and Indicators for Monitoring and Assessment of Desertification*, Report of the Fifth Meeting of the Group of Experts of the Committee on Science and Technology, Addendum, Committee on Science and Technology, session 8, "Conference of the Parties", ICCD/COP (8)/CST/2/Add.1, Madrid, 4-6 September 2007.

UNCCD, *National reporting process of affected country parties*, explanatory note and help guide, ICCD/CRIC (3)/INF3, Bonn, May 2003.

UNCCD, *United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, text with annexes published by the Secretariat of the Convention, Bonn (Germany), 1994.

UNEP, *Status of Desertification and Implementation of the United Nations Plan of Action to Combat Desertification*, Nairobi, Report of the Executive Director, 1991.

Wakrim (M.), "Monitoring-evaluation, a tool for sustainable management of natural resources and combating desertification", in *The monitoring and evaluation of national action programmes to combat desertification*, 2006.

World Bank, *Agriculture for development*, World Development Report, 2008.

World Bank, *Arab Republic of Egypt: Cost Assessment of Environmental Degradation*, Metap, 2002.

World Bank, *Kingdom of Morocco: Cost Assessment of Environmental Degradation*, Metap, 2003.

Yassin (M.), Mandouri (T.), Oudadda (A.), El Ouadi (M.), Taleb (M.S.), Hanane (S.), Ramdane (A.), Benidir (M.), Hammoudou (M.) & Belayachi (K.), *Deuxième Rapport de surveillance de l'observatoire Roselt/OSS de l'Oued Mird*, HCEFLCD, Morocco, 2005.

Annex

Annex 1 – The indicators selected by Morocco for monitoring and evaluating the national action plans

Reducing poverty

- Population growth rate
- Proportion of rural population in the total population
- Per capita GDP
- Illiteracy rate
- Share of the employed rural labour force working in the agriculture, forestry and fisheries sector
- Gross (primary) enrolment ratio
- Percentage of rural households connected to the drinking water mains
- Percentage of rural households with electricity
- Poverty rate
- Rural unemployment rate

Water resources

- Volume of surface water mobilised
- Volume of groundwater mobilised
- Rate of water resource mobilisation
- Per capita volume of water available
- Dam filling rate (September)
- General water quality indicator
- Dam reservoir silting rate

Forest areas

- Forest area
- Reforested area
- Regenerated area
- Approved delimited forest area
- Area treated against water erosion
- Area of stabilised dunes
- Acreage of protected areas that have been developed

- Gutted area
- Cleared area
- Degraded forest area

Rangelands

- Trends in small ruminant stock
- Number of animal watering points
- Share of developed rangeland
- Land used for rain-fed agriculture
- Share of the AAU that is annually under crop
- Share of the AAU that is annually under fallow
- Share of the total mechanized acreage that is treated with cover crop
- Acreages of the main crops (crop rotation)
- Total area of tree plantations
- Area planted annually within the framework of the National Plant Oil Production Plan
- Annual outputs of the main crops
- Annual irrigated crop acreages
- Share of irrigated crop acreages that are extremely “water-greedy”
- Quantities of fertilisers and pesticides used annually
- Yields and outputs of the main irrigated crops

Land used for irrigated agriculture

- Volume of water consumed by irrigation
- Area of irrigated farmland
- Developed areas
- Recovery rate of water charges

Oases

- Number of seedlings distributed in the context of the national plan for restructuring and rehabilitating palm groves

General indicators

- Vegetation index (NDVI)
- Surface temperature (ST)

CHAPTER 5

DEVELOPING LOCAL AREAS AND THEIR PEOPLE

Grigori Lazarev (consultant)

How far do rural development policies take the “local area” into account? Subsumed within this question, which forms the starting point for this study, is another. How far does the concept of “local area” add anything to rural development? In what way? How? Local areas did not wait for this to exist as geographical entities configured, to varying degrees, by natural factors, social history and the strength or weakness of their economic activities. Assemblies of these factors in the Mediterranean Region reveal multi-dimensional arrangements which transcend national boundaries, charting regions, sub-regions and more compact areas cemented around urban centres and, ultimately, the micro-localities formed by rural communities. The economic networks which govern trade in agriculture and rural economies tend, moreover, to be overlaid by cross-cutting boundaries of an occupational, commercial or cultural nature. What sort of area do we mean when we discuss how local areas relate to rural development?

In practice, rural development has always had a geographical base. The experience of the last few decades shows that rural development actions nowadays have to be framed in the context of the relations between stakeholders and the milieu in which they live, the relations between their multiple needs and the services which a region can provide to satisfy them and, ultimately, the relations between their activities and sustainable management of their overall environment. This is a new way of looking at the problem, essentially putting rural societies at the centre of their local area.

To try and understand this problem at Mediterranean level, the study starts with a review of the *status quo*. Based on a documentary study and the direct experiences of certain Mediterranean countries, it examines the rural development strategies, the regional approaches adopted and their interaction with rural development. The different types of regional approach adopted in the Mediterranean countries will then be analysed. This dual geographical and thematic approach will give us the keys to the problems which emerge from the facts. Lastly, we will examine the conceptual aspects of local/rural development measures and the political and practical aspects which flow from them which may be of value to decision-makers. Based on the questions raised in this part, a localised approach to local development emerges in which rural development has a pre-eminent place.

Documentary references

The political approach adopted for this study was an invitation to focus on information about existing processes. One of the key criteria in selecting the documentation was accessibility of its content. For this reason the research was largely based on Internet sources. The second criterion was the relevance of the documents, priority being given to broad-based summaries, albeit not neglecting more specifically targeted studies which shed light on certain aspects of the study. It was a delicate exercise, as it was necessary not to fall into the trap of extensive bibliographies which would have been difficult to access and the only value of which would have been as an inventory or academic justification. The aim was not to compile lists of documents but to know their content and assess their relevance. Nevertheless, several published works and articles not accessible via the Internet were consulted.

The documentary study sought to collate information along two axes: a geographical axis assembling summarised information on rural development and local policies in the majority of Mediterranean countries, and around it, a thematic axis with information focussed on rural development strategies and local approaches and strategies. The inventory therefore gives the references of these documents and an abstract of the most important of them. It is presented in the document titled "Documentary Study"¹ (370 references) which accompanies the full-length version of this article and can be consulted on the Plan Bleu website. Also to be found there is a geographical dossier and a thematic dossier which present the verbatim content of the majority of the documents listed.

The bibliography below is very brief and refers only to a few of the documents among those most used in the writing of this study. The cited documents are accompanied by a digital reference to the documents in the documentary study and the dossiers showing the content of uploaded documents. We refer to the documentary study for the many thematic documents consulted, broken down by country.

The status quo: rural development policies and local approaches in the Mediterranean countries

The Mediterranean countries of the European Union

Parallel to the market-oriented Common Agricultural Policy (CAP), the European Union has put in place a policy of development aid to rural areas. Rural development is defined as a global and coordinated approach to rural areas involving their various components: social, economic, environmental. It seeks to make better use of the complementarities between town and country and the benefits of the specific resources of rural areas. In a nutshell, European rural development policy seeks to support changes in rural areas which make up 92% of the area of Europe.

Due to this political framework, the EU Mediterranean countries (Spain, Portugal, France, Italy, Greece, Cyprus and Malta) face a dual problem, one common to Europe as a whole and the other involving Mediterranean policies and strategies as such. This situation undoubtedly gives an advantage to these seven countries, but generates a gap between them and other countries of the region. The neighbourhood policy was conceived to mitigate this gap, but this asymmetry certainly makes it harder to develop

¹ - The documentary study was coordinated by Astrid Gerz.

a shared vision and effective action programmes. Common strategies such as the Mediterranean Action Plan or the Mediterranean Strategy for Sustainable Development Strategy, therefore, can only be harmonised along very general lines and the conditions in which they are implemented are necessarily out of alignment.

Spain, the primacy of regional and local initiatives

Spain took an approach which viewed rurality as a whole and not just the agricultural component. This approach is shared both at central level, notably through the Rural Development Act, and in the Autonomous Communities. In general, political intentions are not translated into significant specific action programmes at national or regional level. Rural development in Spain is still dominated by programmes co-financed by European funds. These programmes tend to operate at a local level, in the “*comarcas*”, which represent a level of organisation somewhere between communes and provinces. They are becoming more and more widespread but, except in the case of Catalonia, lack decision-making powers. A highly original characteristic of Spain, and probably one of the reasons for the success of policies adopted in the Community framework, is the routine recourse to ad hoc groups to plan, implement and manage the actions envisaged. These bodies are grouped into “regional rural development networks”, which in turn are represented by the “Spanish rural development network”, the institutional counterparty of the public authorities in agreements relating to rural development.

France, a plural response to the challenges of decentralisation of development

France is characterised by a complex web of infranational levels. The Ministry of the Interior favours intercommunality, ideally by grouping two or three cantons. National Development encourages the emergence of small local regions or “*pays*”. Other policies favour localisation in the framework of regional parks or even Leader local action groups. The regions have adopted different strategies, in some cases giving priority to the network of “*pays*”, while other seek a combination of intercommunality and “*pays*” which simultaneously take into account several local approaches depending on the areas into which the region is divided. The resulting complexity of these various approaches makes the political and local organisation hard to decipher. It gives rise in practice to multiple problems of cohesion, reconciliation of conflicts of territorial jurisdiction and setting priorities in identifying the actors in the different local bodies, compounded by the inertia inherited from the centralising culture of the State. The localisation of public policies still seems, in the main, to be a centralised concept.

Italy, a pragmatic approach based on areas of production

An analysis of the policies of the last few decades shows that rural development in Italy takes two forms apparently quite independent of each other, although to a large extent overlapping. The first is built around the emergence of what might be called “areas of competitiveness”. The second is identified with local development programmes implemented in the framework of the EU Leader programmes. These programmes concern all the regions of Italy. They were the basis of the formation of the 132 local action groups which cover 53% of the country and involve 10 million people (18% of the total population).

The regions concerned by the former are located throughout northern and central Italy. Their development model is highly characteristic of the Italian economy. There is in practice very little distinction between town and country, industry and agriculture. Regionalisation is achieved in a pragmatic way, based on regional realities. Nowadays, it is beginning to arouse serious question marks as these increasingly numerous localised areas are entering a spiral of imbalances which threaten their future. Housing is encroaching increasingly on agricultural land, the towns are asphyxiating the rural areas, industries are being set up just anywhere, the countryside is being degraded, desertification threatens many areas and the cultural heritage is ill-protected. The price of the decades of *laissez-faire* which went along with these little regional miracles is becoming an ever-increasing burden. Suddenly, people are discovering that there never were any “area policies”.

Greece, from the area of identity to the “network” area

Until recently, Greece was a highly centralised State. Its territory is still deeply marked by rurality with two main types of rural area: on the one hand, the plains and certain mountain forelands with a concentration of modernised and competitive agriculture, and on the other, the disadvantaged mountain areas and the islands which are home to the bulk of the rural population. The regionalisation of rural development is above all the result of the interplay and intersection of a multiplicity of internal and external factors. It reflects a matter of fact and is not the product of a deliberate policy. In the highly productive areas, it is based, as in Italy, on local concentrations of often specialised and competitive agricultural activities, agro-food processing activities, small industrial estates and services. In other rural areas, one also sees the emergence of *de facto* regions. Their economy tends to be based primarily on multiple activities but with original features linked to emigration. Here one sees forms of local organisation structured informally on a very broad and mobile base of networks of actors. A great many small regions suffer heavily from emigration and are relatively marginalised. Despite this, depopulation, ageing and lack of capital are offset by a wide variety of contributions from the diaspora and its frequent participation in local decision-making. However, it can be seen that the conditions are not such as to allow regional dynamics to culminate in an “area project” backed by its own decision-making system.

The Maghreb countries

Algeria, the pursuit of voluntary local projects driven by the State

The rural areas are deeply marked by multiple imbalances. They all suffer from the same problems of scarcity of water, soil degradation, deforestation, over-grazing, spreading desertification, exacerbated by the absence of policies in the past on local management of resources. Set against the background of crisis in the rural environment, the recent formulation of a National Sustainable Rural Development Strategy looks like a radical change of course. The rural environment is no longer seen as the sectoral base of agricultural production or viewed as a mere contrast between modern agriculture versus subsistence farming and assistance. It has now entered the political arena as a social objective (with “human development” of the rural population a priority), a specific economic objective (taking into account the multi-functionality of rural areas) and a vehicle for sustainability (with a vision incorporating rurality in sustainable management of the

environment). This strategy is one of breaking with the past and shifting from a sectoral approach to an integrated local and sustainable approach. Local rural development projects have been conceived as the operational instruments of the new approach.

Morocco, clear ideas in search of a geographical home

The localisation of rural development is now defined in terms of three axes: community development policy, implementation of integrated rural development policies financed by international institutions, and localisation policies advocated under the Rural Development Strategy 2020 and the National Development Plan. The inadequacies of the first two approaches have increasingly highlighted the need for a rethink of local development. Strategy 2020 suggests an approach involving “small rural regions”, identified in such a way as to satisfy local development needs. This geographical level is big enough to be able to manage the interactions between an urban centre and its rural surroundings, and small enough for local actors (elected representatives of local communities, economic actors and civil society) to be genuinely involved in programming and decision-making mechanisms. The work of developing the National Regional Development Scheme (SNAT) led to similar conclusions.

Tunisia, effective pragmatism despite administrative inflexibility

In the 1980s, rural development policy was built around major regional integrated rural development projects financed by international aid. They were the chief armoury of rural development. During the 1990s, these regional projects were re-launched in the framework of international aid policies to combat poverty, promote community participation and implement the integration of development activities. The outcome was a new generation of integrated rural development projects which attached great importance to sustainability and good environmental management, as well as strengthening mechanisms for participation. Communities still have limited room for manoeuvre but the newly introduced mechanisms of dialogue seem to have brought about real changes in the way communities and administrations see each other. The fact remains, however, that the projects are still mainly managed by central administrations.

Mashrek and the North-East Mediterranean

Egypt, promotion of agriculture and the stony road to decentralisation

The decentralised local approaches in Egypt are recent and still largely experimental. The fact is that Egypt has a highly centralised structure which leaves little room for local decision-making. Nevertheless, the Government has embarked on new programmes to encourage participation and local development, and to strengthen community mechanisms, notably by creating participatory development committees in villages, districts and provinces. Despite the lack of real involvement of communities, the lack of technical capacity in committees, the elitism of the representatives on committees and, by default, the weight of local officials in decision-making, these programmes nevertheless constituted the first institutional mechanism in Egypt open to participation of NGOs and women's groups and the first capable of acting in the most disadvantaged villages. They can also be given credit for the emergence of new leaders. After more than ten years, these programmes are well established in the landscape of rural development.

Syria, rural areas fashioned by development projects

Agricultural development has long remained focussed on state development of agricultural infrastructure. Over the last two decades, policies have changed, evolving from sectoral projects oriented towards irrigation or land improvement into integrated rural development approaches. The change of direction was chiefly due to the international financial institutions which launched the first integrated rural development projects. These now form the core of experience of rural development in Syria. However, they are still highly controlled by the Government, despite the intended participation and partnerships advocated by the financing institutions. There are some signs of progress, however, as shown by the evaluations of IFAD which finances the principal projects.

Lebanon, localisation at odds with political history

In recent years, Lebanon has been preoccupied with the re-launch of a rural development policy based on localisation of the country's development as a platform for a global and concerted approach to the development of each region. The local approach is tasked with preparing a development master plan and determining the "dominant vocations" of each area taking into account all the stakeholders and partners in development. In conjunction with the FAO, the Ministry of Agriculture, albeit with difficulty, is pursuing pilot activities to encourage the involvement of communities in localisation and to train them in the decision-making process. In this regard, FAO is developing a philosophy of local mediation. The work of implementing a localisation policy continues despite the many political tensions which divide Lebanon into highly localised factions. Paradoxically, the local approach to rural development could provide some of the answers to the country's political fragmentation. By giving substance to diversified "development areas" within which communities could discover a local identity, it would offer a way out from "political" and "factional" localisation to "development localisation". This policy could, in the future, be seen as a federative force and a powerful development tool in a context of multiculturalism.

Turkey, priority to the structuring of agricultural activities

In the years from 1970 to 1980, regional policy focussed on the notion of central village. The objective was essentially to bring the State's services to communities. Policies in the agricultural sector were then essentially characterised by a centralist and protectionist interventionism. From the 1980s onwards, this policy was called into question by structural adjustments. A new priority was then attached to projects chiefly funded by international financial institutions targeted on regions with high agricultural potential. These policies considerably strengthened the place of Turkish agriculture in the Euro-Mediterranean whole. The downside of this targeting, however, was the abandonment of the less favoured regions. These projects concern the Centre North/North-East of Turkey. In practice, these are more a case of regional policies put in place in as coherent a manner as possible with a view to Turkey's eventual membership of the EU. Several regional rural development projects have been launched since to fill this political gap but the results so far are modest. The Ministry of Agriculture and Rural Affairs and the National Planning Office have adopted a rural development strategy which should serve as a basis for the drafting of an action plan.

Albania, rurality and areas of rapid change

Albania's economy has undergone fundamental changes since 1991, when the country embarked on the transition to a market economy. However, agriculture remains the cornerstone of the economy. There has been marked progress with the implementation of major reforms, including massive privatisation of collective farms. The key factor of change was the movement of populations. Highly restricted and controlled up to 1990, such movements expanded enormously as soon as the controls were relaxed. The rural population declined by 10% between 1994 and 1997. The agricultural development strategies implemented since 1991 essentially concerned the adoption of reforms and bringing the agricultural sector up to scratch. The first was called the "Green Strategy for the Development of Agriculture". Since then, several initiatives have been launched with the aim of influencing rural development. The Decentralisation Strategy is intended primarily to decentralise many services. At this stage, however, there is no evidence of any specific policies to localise rural development or, more generally, local development approaches.

Local policies and approaches: an overview

How do the policies of the Mediterranean countries take local areas into account? What are these areas? The question is not an easy one if you consider that areas are far from constituting an immediately definable geographical framework which could be treated in a uniform way. The fact is that areas can be categorised in several ways. They exist according to how one defines them. As a field of action, their existence is as diverse as the policies of which they are the product or the projection. Can rural development involve all possible areas? Are some areas more pertinent than others? Are there several possible solutions? The way forward, it would seem, is to consider the various approaches and policies which define the factual area and those which characterise measures taken.

Local administration and decentralisation policies

The administrative divisions and powers which are devolved to each level are the most widespread and most eloquent expression of the local reality and its rural configurations. The centralising traditions of the governments of many countries tend to favour top-down systems of administrative control. In the old democracies with a centralising tradition, these top-down mechanisms often restrict the decision-making powers of decentralised local bodies with elected representatives. In countries without a democratic tradition, the top-down structure is general identified with a chain of command whose lowest levels are still remote from the grass-roots communities.

In the last few decades, regional administration systems have undergone profound changes. Two political processes have converged to create new social and geographical dynamics: democratisation and decentralisation policies. In several countries in the South, step-by-step democratisation has made great progress. Local communities have won much greater powers. A sign of this democratisation is that some countries have embarked on genuine decentralisation policies, starting with decentralisation to regional level followed by real devolution of powers. This process is slow, but where it occurs, is evidence of enduring political progress in the long term. For all that, the pace of democratisation in the Southern and Eastern Mediterranean Countries is still varied.

The local approach to rural development strategies

The most recent rural development strategies or forecasts are distinguished from those of earlier periods in that they fall outside the traditional sectoral juxtapositions (agriculture, infrastructure, drinking water, health, etc.) and conceive integrated actions in a clearly defined geographical framework. They strongly associate the ideas of local regions and participation of local stakeholders. In the full-length study, these observations are illustrated by some examples which show how this new development approach is expressed in strategic intentions and proposals. The analysis shows localisation in the EU strategies, local development in the approach taken by FAO, the “area and local development” approach in rural France to 2030, the local approach in the strategy and planning of Morocco, the rural development strategy and community projects in Algeria, the Mediterranean Strategy for Sustainable Development, and local approaches based on environmental action plans.

Local approaches focussed on rural development projects

While strategies increasingly envisage “areas” as well established and well defined points of reference in national localisation, the fact is that localisation of rural development in practice owes more historically to the proliferation of separate initiatives in the framework of “projects” than to the implementation of concerted local policies. In the South, this is mainly the result of the investment projects of development aid institutions which often differ in their methods and objectives. Some projects are on a regional scale, but others target much smaller local areas. In the North, these approaches emerged with the implementation of the “rural development” pillar of European agricultural policy and the activation of the Leader programme, its principal instrument for intervention.

The Leader approach

Launched in 1991, the Community Leader initiative offered a multi-sectoral “bottom-up” approach, involving partnerships and integrated development in rural areas. It emphasises promotion of competitiveness of areas and the implementation of local rural development strategies. This approach converged with the national and rural development policies implemented by the European countries since the 1990s, such as the Italian “*contratti d’area*”, the “*Dorferneuerung*” (village renewal) policies in Germany, the “*comarcas*” in Spain, etc. The first three Leader programmes, despite their geographical coverage, were regarded as laboratories and learning workshops for those involved. The CAP programme 2007-2011, on the other hand, considers that Leader has reached maturity and the programme can now serve as the basic instrument for the implementation of its “second pillar”, rural development.

The local area approach, conceived on the basis of a “project area” is the cornerstone of the Leader programme. By inviting public and private stakeholders, organised into local partnerships, to formulate local development programmes, negotiated globally with the regional or national authorities concerned, the Leader initiative allowed the formation of 217 project areas in the first phase (1991-1994), around 1,000 in the second phase (1994-1999) and 893 under the programme for 2000-2006. The initiative has had many positive effects. For example, it filled the gap between a “top-down” programme and the needs and aspirations of the local population. It transferred responsibility to local part-

nerships and contributed to development by renewing the links between public and private activities, commercial and non-profit activities, and activities related to infrastructure and enterprises. It brought about a change in attitudes among local stakeholders, from passive to active. The leverage effect on private financing was in every case higher than expected, as shown by the EU's evaluations of the Leader programme.

Approaches involving integrated rural development programmes

In the Southern and Eastern Mediterranean countries (and, at one time, in some European countries, such as the former Yugoslavia), localisation of the rural environment was, and still is to a large extent, a product of the implementation of development projects financed by international aid. This form of localisation is almost always "top-down" based on agreements between governments and experts of financing institutions. Most often, it was determined on the basis of technical or political criteria reflecting the strategies of those institutions.

The "village" approach

The so-called "village management" approaches were conceived around the idea of regionalisation of rural development based on micro-regions of rural communities and their local hinterland. The most successful cases of participation emphasise the prime place of grass-roots communities, chiefly at village level, in designing and managing local projects, and managing local natural resources or grazing areas. This level is undoubtedly an area of convergence, where the most powerful motivations derive from traditional solidarity or, failing that, a perception of the collective interest (such as drinking water or social infrastructure).

This approach is interesting because it relies heavily on approaches to management of the local environment. Village experience shows that this geographical level, or in some cases, land or grazing covering a number of villages, is the best level for understanding methods of management of natural resources, identifying the related usage rights and, from there, finding counterparts who can be mobilised responsibly.

Local development approaches

By "local development approaches", we mean those based on objectives of local construction, both in terms of the local area and local governance. By inference, they are more integrated than rural development approaches with a local objective (such as the Leader approaches). This heading covers two approaches, the "pays" approach and the "regional park" approach.

The "pays" approach

The "pays" approach is a French form of localisation of local development. The "pays" is defined as "a project area characterised by geographical, economic, cultural or social cohesion, and place of collective action which brings together communes, groups of communes, socio-professional organisations, enterprises and associations around a common development project. It is a preferred level of partnership and contracting which facilitates the coordination of initiatives of local authorities, the State and Europe in favour of local development". The French experience shows that the "pays" are a fairly

technical concept (legal definition of “*pays*” as an instrument of regional development, initial proposals for dividing into “*pays*”, preparation of charters, usually by consultants). This is a far cry from an area and a vision born of a “local will”. The challenge, however, was to bring these stakeholders together in the new contexts proposed to them and to identify with them. Prospects of financing and support seem to have played an important role in the initial motivations. Seen from this angle, the policy was not a matter of “recognising” these “*pays*” but of giving a substance and an identity to a geographical framework defined by law. The success of many “*pays*” shows that the challenge could be met. Intercommunality is a form of regional organisation which has its own logic but which tends to be fully integrated in the “*pays*” approach.

In Spain, the “*pays*” approach is known as *comarcalización*. This approach is implemented in quite different ways in each autonomous region. Only in Catalonia does one find, for historical reasons peculiar to it, well structured *comarcas* with powers which make their management councils comparable to small local governments. In the other regions, *comarcalización* is a work in progress but which is the subject of debate, often due to contrasting local interpretations of *comarca* depending on the policy concerned. This situation, which is tending to ease, however, in favour of stable localisation, is well illustrated by the case of Andalusia where the situation seems to be the extreme opposite of the situation in Catalonia.

The “regional parks” approach

Natural regional parks are one of the oldest instruments of public action in rural France. They were the pioneers of the local approach to sustainable development and the first project areas supported by the regions. This approach has been replicated in many European countries, for example, in Spain, Greece and Italy. In the countries of the South, although this formula has been envisaged, for example, for the Tetouan region in Morocco, the mechanisms of decentralisation are not yet sufficiently developed for the institutional implementation of this approach.

A regional natural park is an inhabited rural area which is recognised at national level for its important heritage and landscape value. It is organised around a joint sustainable development project. Its purpose is to protect and promote the natural, cultural and human heritage of its area through an innovative policy of improvement and economic, social and cultural development which respects the environment. Nowadays, regional natural parks are primarily “project and development areas” rather than protection. They have a constituent charter and are managed by an independent body representing all the local authorities which have approved it. Their management structure is currently evolving towards the mixed syndicate model.

A problem of “purposes” has arisen, however, in relation to regional natural parks with the creation of “*pays*” whose mission as a vehicle for the area project is in competition with them. As regional natural parks generally cover several “*pays*” or parts of “*pays*”, one might expect duplications and competition between programmes. In practice, it seems that these duplications often lead to serious competition. The “*pays*” are still young structures, while the parks, with thirty years’ experience behind them, seem to respond well to the environmental concerns, or at least better than the “*pays*”, and have

proved their worth in revitalising areas weakened by urban development. Is it necessary to choose between areas or accept their plurality? The question is still a matter of debate.

Local development approaches

The local development approaches should not be confused with the local policies which are analysed above. The latter interpret and take into account lines of force and options that can be envisaged to promote or optimise local functions. While local policies have legislative force, local development, on the other hand, is indicative. It proposes a functional structuring of the various levels of the local area.

Local development models

Operating on the basis of multi-functional local diagnostics, the identification of polarisations, basins of employment and flows of products and services, local development models form architectures which best promote the functions of the region and contribute best to growth, “local cohesion” and the reduction in imbalances and inequalities. They always reflect the political choices of the Government to the extent that they favour the growth of certain sectors, local balance, trade flows or various combinations of these priorities. The majority of Mediterranean countries, in various guises, have bodies responsible for the development of national and regional models. Depending on circumstances, this function may fall to central or regional services. Local development models can serve simply as an indicative master plan, act as a guide to the location and direction of investment flows or even form a restrictive mandatory framework (for example, in the case of “mountain” or “coast” legislation which defines zones where building is not permitted).

Regional development policies come face to face with rural development and local development policies depending on their decentralisation and regionalisation. When one passes from the national to the regional, then from the regional to local level, national development must increasingly take into account the hierarchy and organisation of regional and local areas. These exercises often lead to identifying functional local units which do not necessarily correspond to the administrative areas or elected constituencies.

Basins of life

The “basins of life” approach seeks essentially to define the categories of “rural” in a country where the polarisation of urban areas and the distribution of services and economic activities often blur the traditional distinction between rural and urban. According to the promoters of the concept, the basin of life, in a rural setting, is the smallest area in which the life of the inhabitants is organised (access to employment, intermediate level facilities). Implemented by Insee and Datar in 2003, the approach to the structuring of rural areas by “basins of life” is definitely the most detailed approach to categorisation of rural areas in the countries of the Mediterranean. It can be replicated in any country which has comparable statistical tools.

The “small rural region”

The concept of the “small rural region” was put forward in Morocco by the Rural Development Strategy 2020 to define a geographical area which is able to take into account the primary interactions of rural activities with towns and service centres. This

geographical unit is a de facto area. It does not exclude links with other geographical levels. The small region itself includes subsidiary levels but also forms part of a province or a region. Its stakeholders belong to cooperative networks or professional organisations which do not necessarily have the same geographical boundaries. The small region corresponds to a concentration of primary services, networks of flows which cause a given geographical area to gravitate around a fairly large urban centre. Although identifiable, these small regions are not yet distinguished by a collective project.

Approaches based on the competitiveness of local areas

Globalisation and opening of markets during the last two decades have profoundly changed the goals of localisation policies in rural areas. Originally, the latter were designed around objectives centred on the existence of areas and approaches which might endow their development with an endogenous cohesion. The emphasis was placed on the “constituent” themes of local cohesion, integration and “multi-sectoriality”, the emergence of new forms of local governance, associated with the participation of stakeholders and local exploitation of the benefits of progress. These themes remain the pillars of local approaches to rural development, whether expressed in independent rural development projects or in the framework of local area development policies. However, with the increasing openness of markets, a new political dimension has taken over, that of the competitiveness of areas.

A look back over the Mediterranean reveals forms of localisation which were designed outside local policies and outside specific approaches to rural development. These areas can be identified as “areas of actors”. They exist because, for various reasons, their actors were able to develop specific local features or continued to exploit the specific legacies handed down by history. Just about everywhere in the rural environment there appear strong pockets of economic development centred on local specialisation. The dynamism of these areas is based essentially on local production of quality, its name and identification of the region with its product. It is defined in terms of local products, quality labels, *appellation contrôlée*, biological certification, etc. The geography of “specialised” areas, which is constantly being extended to new areas, is incontestably one of the most striking effects of the current rural geography of the North Mediterranean and is beginning to take root in certain countries of the South and East. Today, local and rural development policies have made the promotion of new specialised areas the lynchpin of their strategies. One thing is clear. These policies merely amplify a dynamic the foundations of which were laid not by local policies but by the initiatives of local actors.

Some reflections on common problems

Practically all the countries of the Mediterranean have been faced, in one way or another, with localisation policies. The variety of contexts and localisation policies between them paint a picture of extreme diversity. However, four major common problems seem to stand out quite clearly. The first concerns recognition of areas: how to identify the areas relevant to local development? The second is the question of geographical levels, which concerns the universal priority attached to the “local” level and that of the “lived space”. The third invokes the problem of local governance, with different solutions in the coun-

tries of the South or the North. The last problem is that of financing and its role in local development. Other questions, such as rurality, the rural environment, participation of communities, elaboration of development programmes and methodologies are left aside here. They are addressed in the full-length version of this study.

Recognition of areas

An area is not just a geographical vehicle for a productive activity. Nor is it just a site for development in which to place infrastructure, roads and new housing estates. When it is justified by a project, an area is more. It has a purpose judged by the nature of the project. Experience shows, however, that the project may have multiple configurations, depending on whether or not, or only marginally, it is an “area vehicle”.

The meaning of the word “area” varies considerably according to how the concept is intended to be used. Definitions fall into two main categories. The first is a geographically descriptive one which observes the existence of “*de facto* areas”, whose existence and level vary according to the criteria chosen to “localise” the space. The second is that of “areas of actors”, which covers all regions defined in terms of functions and actions. It is the latter which is relevant to the question of local development. It is based on an idea of “action”. An area is defined in terms of how it reflects the functions attributed to it.

“Areas of action or actors” include all areas defined in relation to development policies based on three major approaches. The first concerns “development projects” and especially projects of international development aid institutions. It defines a project and its components and projects it on to an area. It necessarily involves the creation of a project management structure which, in varying ways, associates administrations and private sector actors and civil society. The objective of these projects is to implement actions corresponding to the available funding, not to build regional governance. In most cases, the management structure disappears with the closure of the project: for example, the functions of the World Bank or IFAD project management teams in the Maghreb countries cease when the loan financing is exhausted.

The second approach to defining areas of actors is that of “area projects”, of which the Leader programme is a good illustration. It is based on the idea of a voluntary association of actors who place their action projects in a local framework which they themselves define. The area defined in this way by the project stakeholders is only indirectly integrated in the local socio-political structure. This approach is distinguished from the previous one in that the programmes are founded from the outset on an organisation associated with decentralised and sustainable institutional mechanisms.

The third approach, that of “project areas” starts from the definition of an area in which the actors can be identified because it is a recognised framework of their life. It consists of a “passive” identification which the approach seeks to transform into an “active” identification by encouraging the actors to cooperate in developing and participating in the implementation of a project for the area. This approach lies behind the concepts of “*pays*”, “small region”, “regional parks”, “village areas”, “intercommunality”, etc. It seems more effective because it founded on a pre-defined convergence between a geographical area and a population. The population in question is the one which has

both its lived space and its social space in that area. It is also the most complex, not least because it is notoriously difficult to bring the actors to build sustainable forms of governance. Despite these difficulties, it is probably the most promising model for the localisation of rural development.

Local levels and the local area

The experiences analysed above all concern, in one way or another, geographical levels. Nearly all of them highlight the importance of “geographical proximity”. That is the lesson drawn from the “pays” approach, “area projects” and Leader projects. Whether or not the formulation is clear, this idea is generally understood as being closely associated with any real chance of the actors being able to manage the complexity of their development. Above a certain geographical level, the problems of the rural can only really be managed by sectoral approaches or master plans and strategic orientations. At these levels, decision-makers do not share the same problems and judgements are made by politicians or professionals who only indirectly represent the local actors. The latter, on the other hand, meet and communicate at levels which are described as “local”.

How can the local area corresponding to the human, social and economic convergences on which local development dynamics can be built best be defined? There is no easy answer to this question because the actors in complex societies are always involved in activities at a variety of local levels. They act by taking decisions but, depending on their objective, must refer to powers and prerogatives at different levels of geographical organisation. The localisation of the lived space involves many intersecting boundaries, hierarchical institutions and cross-cutting interests, as well as evolving and changing spaces. The lived space of the actors has a geometry which is both variable and multi-dimensional. The question is then entirely a matter of learning to recognise the degree of concentration of institutions and the intensity of interests of the actors, such as to justify a collective regional project. These concentrations then define the boundaries of the “local space”.

The local level plays a special role in the configuration of the identity of an area. Broadly, it corresponds to all the collective perceptions of its habitants about their past, their traditions and their know-how, their productive structure, cultural heritage, material resources, their future, etc. It is not an exclusive and uniform identity, but a complex whole incorporating a multitude of identities specific to each social group. Each place, each centre of specialised production, etc. This “plural” identity is not immutable, but may evolve, strengthen, modernise. Experience shows, however, that “local” identity tends to be specially important because it corresponds primarily to the “lived space”.

The social actors interact and make decisions within the local framework where their common interests or their conflicts meet. These multi-dimensional frameworks range from the nation to the village. At each level, they may or may not correspond with institutional or administrative structures, political structures or other forms of social solidarity. These levels of social and political organisation may or may not have the means to decide and act and may or may not (or to varying degrees) have the ability to govern. It is at level of the local area and the lived space that these demands are most strongly felt and shared by the social community.

Governance and regional development

The meaning of governance

Governance involves a complex assembly of actors and institutions, not all of them belonging to the sphere of government. It reflects an interdependency between the authorities and institutions associated with collective action. Governance involves networks of autonomous actors and starts from the principle that it is possible to act without reference to the power of the State. This definition, which is widely accepted, gives a broader meaning to the concept. It substitutes a new understanding of social and political relationships for one which essentially saw “governance” as the attributes of good government. However, this misconception has not yet been entirely eliminated. For those international institutions, UNDP in particular, which are involved in improving governance, the term is still largely used in the sense of improving services and the quality of governments. Applied to local government, for example, good governance is defined by its legitimacy, representativeness, capacity for transparency and accountability.²

In EU policies, on the other hand, governance is understood in its broader sense. In the countries of the South, the meaning is still ambiguous. Sometimes, the concept is applied to progress and improvement of the system of government, including its representativeness, i.e. a dimension of governance which relates to progress in democratisation. Sometimes, it is understood in its broader sense, meaning, for example, the role of associations, partnerships, progress in participation, involvement of women and young people in development, etc. Analysis of local development experience shows clear convergences in favour of the latter definition of the concept of governance. The debate therefore seems to be over. However, it will still take much work to explain this definition if it is to become generally accepted in all the Mediterranean countries. Throughout the Mediterranean, everything seems to point to the emergence of local governance as a shared objective. In practice, however, the effects are still very unequal, especially when it comes to associating development with mechanisms to encourage the actors to participate and take responsibility.

Lessons learned from the experience of local governance in the countries of the South

In the countries of the South, the broader concept of governance only emerged through somewhat scattered pioneering initiatives. Participatory approaches were one of the chief vectors. These approaches, promoted by rural development projects financed by international aid, are still encountering severe constraints. In these countries, dominated by regional projects financed by external organisations, the main roles are reserved to administrations and staff of international organisations. Administrations generally operate in a highly centralised environment, sometimes devolved to regional level. Despite policies of disengagement of the State, stimulated by structural adjustment policies, administrations are still the prime operators in rural development activities. Staff of international financing institutions, for their part, play a crucial role in identifying and formulating projects submitted for financing. Although they must essentially fall within the ambit of national priorities, projects are nevertheless chosen in accordance with the policy of each institution in a given country. Some countries of the South, however, are seeing the emergence of a new type of actor in the form of associations.

² - Accountability expresses the duty of governments to account for their actions to their constituents.

Although generally placed under the umbrella of administrations, the multiple local management structures established in the framework of local development projects often led ultimately to the emergence of a local leadership, by introducing forms of participation of women and young people and creating a certain group awareness. Aid institutions see in this the roll-out of the process of “empowerment”, i.e. a process of autonomy in the rural environment. This new idea increasingly complements the concept of governance by introducing the idea of individual and collective capacity building. Empowerment, unlike governance, does not relate to the socio-political organisation of rural communities, but to individuals. The concept is neither a policy nor a method, but reflects the recognition of a state and its evaluation: to what extent are rural communities gaining in “autonomy” or otherwise?

Experiences of regional governance in the countries of the North

In the countries of the North, the social dynamic has been fundamentally determined by democratic mechanisms (still quite recent in Spain, Greece and Portugal), the diversification and establishment of professional organisations and the activism of civil society organisations. These mechanisms are merging gradually in several countries of the South but their impact is not yet enough to modify fundamentally the rules of the game dominated by the power of States. Local policies cannot avoid taking into account the existence of the local communities which make up rural areas. These communities are governed by elected bodies, have a budget and, in all these countries, constitute the basis of the regional fabric.

The experience of local development in the EU Mediterranean countries shows the efforts deployed to involve civil society partners and the private sector in local “governance”. The common idea, which has been implemented with varying degrees of enthusiasm and success, is to promote new forms of localism which can respond to the needs of “integrated” development and can be “governed” by flexible structures involving all the actors concerned. This idea is doubly unusual in that, on the one hand, it involves recognition of “project areas” which are not constrained by the boundaries of administrative constituencies and, on the other, by partnership between elected representatives, administrations and civil society and the private sector. This idea underlies all the local experiences, whether Leader projects, “pays” type approaches, models of the “regional park” type, or competitive areas on the Italian or Greek model.

The successful experiences of local development confirm the need for effective articulation of top-down and bottom-up approaches. “Pays” contracts concluded in France between the State or regions and associations representing the “Pays” illustrate the multiplicity of possible arrangements, from top-down (along decentralisation policy lines) and bottom-up (expressing the expectations of projects of local actors). These experiences show, however, that successful adjustment relies heavily on the capacity of agents of “local mediation” to support them. They also show that the long-term commitment of these intermediaries is undoubtedly an important guarantee of the sustainability of the processes which have been begun.

Local governance and power of the actors

The involvement of the actors in area projects is also a matter of redistribution of powers. An area project is a powerful means of consolidating the existing powers or causing the

emergence of new powers. The fact that these two tendencies often appear simultaneously should be seen not as a difficulty but, on the contrary, as a factor in stimulating localisation processes. We need to avoid the simplistic model which puts the existing elites on the side of the status quo and the emerging elites on the side of innovation. When an area project is put in place, all the actors tend to position themselves in relation to the opportunities that they perceive, primarily in relation to their personal interest. The question is knowing what each has to gain or lose in terms of political power (in the case of elected representatives or administrators), in terms of economic profit (in the case of enterprises) in terms of social space (in the case of associations) and in terms of personal situation (in the case of individuals or families).

Determining factors in offers of financing

Another way of considering problems of localisation is to examine the role of offers of financing and the forms they take. Apart from the rhetoric of regionalisation, it is financing opportunities which, in the last analysis, cement the area project and motivate the actors. The real question, then, is to know whether the area has other justifications for its development and continuation. Does experience not tell us that the majority of area projects created by the opportunity for financing do not survive when the financing ends?

The weight of financing in the formulation of local development policies is obvious. It is a major factor. Beyond that, the question arises as to what extent the modalities of financing in each case influence the local policies supported by that financing. Conversely, one can also consider the conditions which allow local development in response to other types of opportunity. The EU procedures do not provide a clear answer for the Mediterranean member States. The mechanisms for allocation of the EU structural funds for rural development are fixed by a single set of regulations. However, it is up to States to define the procedures for the internal application of the regulations, and that is where the most marked differences occur. In practice, it is clear that EU financing does not have mechanisms to ensure a proper convergence between projects based on local initiatives and their role in a long-term process of sustainable development. The same disparities can be seen in the national local policies of the EU countries. The fact remains, however, that it is the existence of specific financing instruments which give cohesion to the majority of local structures, whether “pays”, intercommunality or regional parks.

In the countries of the South, local policies are generally determined by the convergence of budgetary mechanisms and international financing. Leaving aside credit mechanisms, all the financing passes through the budget. Added to this are procedures for committing expenditure designed to ensure total State control of the implementation of development actions included in the budget. The major procedure, on which the international financing institutions insist, is the invitation to tender. These mechanisms, which are not always sufficiently transparent, rely entirely on administrative procedures. The other actors in local development have no hand in the programming of actions or their implementation. At best, they can express an opinion. Faced with these findings, the international financing institutions have for a long time been questioning the contradictory effects of their procedures, on the one hand shackled by the financial regulations of States, offset on the other by aspirations to delegate power under their “participatory”

policies. They have not yet found a satisfactory solution, although they remain convinced that no local governance is possible without delegating some degree of responsibility for financial management.

We should underline the essential place of sound financial management in this process. All the experience concurs in this point. It is not enough to have financing. There must also be control mechanisms and procedures to make efficient use of the available resources. Evaluations show clearly that shortcomings in this area are one of the weak points of the majority of projects, with much more marked consequences for “area projects”. The highly integrated character of these projects makes it all the more necessary to have effective management systems, procurement procedures, financial control and internal audit of the internal consistency of budgetary programmes, etc.

Financial institutions, whether international, multilateral, bilateral or national (budgets, national development funds, etc.) have all developed increasingly strict control procedures. But these systems only apply to the components financed by these institutions. The problem is still very much in evidence when local approaches are based on highly decentralised structures or contained in partnership arrangements, or public and private financing. Many procedures have been tried and some work well. But major lessons still have to be learned for local development.

The concept of local development

Rural development and local development

All the thinking of the last decades on rural development highlights both the diversity and complexity of the development needs of rural areas and the need to respond through so-called “integrated” approaches. An examination of past failures of integrated projects shows that they failed because they were conceived and implemented in a technocratic way and they lacked a key dimension, the “socio-political” dimension. The “areas” problem requires new responses. It essentially involves the relationship between the actors and the areas where they formulate and implement their development projects. It invokes notions of identity, governance, participation and also a notion of common interest. These observations suggest that the problem of rural development should be re-stated in the broader framework of “local development”.

The concept of local development is thus essentially a “socio-political” concept. Its meaning is broader than the geographical base in which local development actions take place. It means more than the factual map of economic networks, polarisations or spatial hierarchies. A socio-political concept of an area implies an arena and environment in which the actors concerned, or potentially concerned, with its integrated development and sustainable management act out their parts. Because it refers to a notion of integration, the concept of area encompasses both a socio-political dimension, a development function and an environmental function. By virtue of the interactions which link the rural to the rest of the economy, it necessarily involves local urbanisation. The experience of the Mediterranean countries shows that the concept of local development can be given substance through a few “constituent” notions.

Areas and area actors

The first of these notions assumes the existence of an area. It is not just a geographical definition. An area only exists in terms of local development as a “construction”. It is necessarily associated with an “area project”, shared by the actors who live there. In the context of sustainability, it is a collective measure which should be considered as the basis of the local approach. Several conditions need to be met for an area to be relevant in terms of local development.

The area is a place of belonging

The first condition regards the area as a “place of belonging”, i.e. a place with which a population identifies or can identify. Belonging to an area involves a dual relationship, that of a given population with the space in which it lives and that of the individuals with each other. It is thus a form of social bond as well as a factor of identity. Social geography shows that this belonging is multi-faceted. An individual belongs simultaneously to several spaces. A sustainable local policy is not possible without belonging to an area, whether inherited or to be constructed. Ideally, an area of belonging should only exist if it is self-defined by the population which identifies with that area. Local development creates this “need for space” because it invites the population to enter into a process.

The focus on the “local space”

The second condition gives pride of place among the many levels of “area” to the local space. This space is where the strongest convergences are found between the interests of populations and the specific characteristics of the area. The local level is generally recognised as relevant in tackling the toughest problems of managing local development, regional development and sustainable management of the environment in an integrated manner. This dimension refers to experiences described above in the summary review of local policies implemented in the Mediterranean region.

The local space must have a geographical cohesion and act as a place of convergence of the multi-functionality of an area. It must also be a potential space of social cohesion and thus close to its representative structures. A certain spatial dimension, encompassing a sufficient number of functions, is necessary to make it a space really lived by its population. In articulating the rural and the urban, the core towns and small country towns, the local space must not be too big as it runs the risk, by expanding, of losing its geographical and social cohesion. It also includes smaller units which have their own geographical logic, villages, communes, intercommunal structures, all of them linked with political and administrative structures at a higher level. The local space is thus marked by centripetal convergences and, at the same time, by a multi-dimensionality which is both internal and external. Finally, the local space must be able to evolve in line with changes in economic flows, the attractiveness of the regional fabric, etc.

The local space as a “project area”

The third condition refers to the area as a project area. While the first two dimensions are relatively static (they “exist”), the third sets the area in a process relating to a possible future. It gives the area a significance in relation to action and thus adds a notion of construction to the other two dimensions. Single criteria, such as an administrative

division or localisation of a sectoral activity, are not sufficient to identify pertinent areas. From this starting point, the concept of local development takes into account the relationships and dynamics which associate actors with an area project based on an integrated vision of the future of the area.

Local development and the “area project”

Local development is based on an “area project”. Promoted by the regional actors, it explores possible futures in order to enhance choices in the present. They demonstrate the cohesion and effectiveness of action by the expected outcomes. As a project area, the area is thus constructed in relation to ends. The convergence of local development actions thus in itself becomes the vehicle for a social, political and, if relevant, institutional construction. The “area project” can only exist, however, if it is wanted and then identified by the population of an area or, at the very least, by the actors who drive the social dynamics in that area: elected representatives, managers of enterprises, heads of associations, local government officials, personalities from the world of culture, etc.

How can one want an “area project”? After all, it must reflect a convergence around a common vision, a desire to act together to add value to the sum of the individuals initiatives of the actors. Yet social practice does not seem to take that path, but rather to show us individual behaviours without any need for such a convergence. Individuals or actors who live in an area pursue objectives which put them into competition with the body of society. The perception of a collective future is not seen as a gain. In contemporary societies, increasingly marked by individualism and personal achievement, the collective vision has no place. People get on without it. It is not surprising, therefore, to find that an area project has little chance of emerging spontaneously from existing social dynamics. Mobilising actors around a collective project demands a kind of cultural revolution which would allow them to join in a “project culture”.

Local development as a vehicle of the new forms of governance

The promotion of new forms of governance is another constituent notion of “local development”. It can only be built in the long term as the actors involved in it can only develop their roles in the dynamic of a “process”, as the local vision takes shape and the conditions are created for the emergence of collective and individual projects. These projects are necessarily found in a collective idea of local cohesion. The rules and practices which allow this process to be managed in the long term must be supported by appropriate forms of governance.

Public-private partnerships and contractual approaches

Area projects introduce two essential notions in terms of governance: the notion of partnership and that of the partnership contract. The mobilisation of development funds invites the actors to operate in the framework of public-private partnerships. This approach is probably the most innovative but also the most difficult to develop a sound balance between the parties. It is not easy to create conditions of dialogue between administration, elected representatives and civil society. The “public” side may, depending on the circumstances, be represented by local authorities, regions, the State or several

of these. The possible forms of partnership are many. They range from a simple association to the formation of mixed companies. The major differences relate to the powers granted to the categories of actor.

The second notion, the partnership contract, is found in all the advanced experiments in local development (for example, the “*pays*” contracts in France). The contract is a legal expression of the commitments negotiated between the public partners and other actors. It may be global, for example, an area contract, or targeted on the activities of a specific group of actors. The diversity of contractual forms and the flexibility of forms of partnership organisations prevent the dynamics of participation becoming bogged down in the bureaucracy of institutional structures.

Autonomy of the actors and the “project culture”

Everything in this process relies on the capacity of the actors to act independently and their ability to find flexible compromises. Partnership structures are only viable in the long term if they guarantee the autonomy of the civil society actors from the apparatus of political or administrative governance. The responses vary and depend, in reality, on the evolution of State policy on decentralisation and democratisation.

The construction of the area project is based on approaches as varied as the areas themselves. It must be emphasised, however, that these processes are generally put in motion with the intervention of outside elements. The role of mediators and “local mediation” is crucial in this regard. The “project culture” reintegrates the actors of an area in a “community” vision of the area. It shows that it can add value to the inevitable competition between individual behaviours.

Local development: restoring identity and social cohesion

Local development approaches the question of identity in a new way by proposing a new evaluation of the area and its “local personality”. The project revives the notion of belonging by restoring it to its place in relation to a process of action. Its “performance” or successes create new forms of identification with the area. This is shown, for example, by the relations of populations with images of their area communicated to them by labels, local products, craft products, promotion of certain sites, festivals and markets for local products, products offered to tourists, etc. These new forms of identification with “images of the area” are ultimately more vivid than those fashioned by a cultural or historical heritage.

Local development as a lever of globalisation

The socio-political approach to localisation assumes public policies based on volunteering. They can only operate their choices by taking into account the effects of liberalisation of trade which exacerbates competition between areas and carries within it a more or less unavoidable imbalance between dynamic and competitive areas and those which are rejected and marginalised. Local development provides a response to these challenges by giving back a perspective of competitiveness to local areas in a global environment. This penetration gives areas an existence and legitimacy in their own right independent of administrative or political regions. It can consolidate their openness to

the market and verify the priorities attached to their products. Local legitimacy is also verified by the capacity of local partnerships to join with other areas in cooperation networks, and the capacity of areas to enter into North-South cooperation agreements, as shown by certain pioneering interregional experiments.

Local development as a vehicle of integration and environmental sustainability

Sustainable rural development is necessarily associated with the concept of the area. The best known definition of sustainable development is that of good management of natural resources and constant efforts to eliminate degradation of the environment (the famous theory of the earth passed down to future generations). The terrestrial ecosystem provides the biosphere with commercial and non-commercial services which it is the task of sustainable development to maintain or improve. The concept must also be understood in terms of societal development. The well-being of individuals depends on access to a panoply of services (security, access to food, water and housing, access to education and health services, freedom of choice within society). Sustainable provision of these services is heavily dependent on good management of the environment.

The meeting point is in the spaces where members of society interact and decide. They are the ones chiefly responsible for the improvement or degradation of their environment and their well-being. These spaces are multi-dimensional, according to the problems encountered, but they relate sustainable development to notions of region. Local levels of space are the most relevant in this respect. It is primarily at the level of rural communities, villages and communes that problems of management of the environment can best be resolved. Due to individual or collective property rights, it is at the level of their land that the actors can be made responsible and find compromises on the management of natural resources. At the same time, broader levels, intercommunal or "*pays*" are necessary to ensure the consistency and applicability of environmental policies.

The risks of climate change, the advance of desertification, the water crisis, the obligation to reduce greenhouse gas emissions all combine to give a collective dimension to environmental policies. Local development offers an appropriate framework for their implementation. Solidarities are all the more necessary considering that the Mediterranean is one of the regions most at risk. A whole current of thought is beginning, in this regard, to conceive new roles for farmers or other country people as managers of the rural space, landscapes, sites. The most recent scenarios on the impact of climate change on the evolution of the biosphere show that its effects on the geographical region will render the problem of management of local areas ever more acute. In the course of a generation, indeed, one may expect constraints of desertification or water shortages to give rise to abandonment of inhabited and cultivated areas, the resettlement of migrant populations, exponential urbanisation, etc. More than ever, these scenarios call for good management of the areas.

Rural and regional development

What will be the place of rural development in the Mediterranean of tomorrow? The Council of Europe has suggested some answers by identifying three scenarios. The first

is a trend scenario which envisages difficult tomorrows unless Euro-Mediterranean multilateral cooperation is re-launched. The second is a scenario of fragmentation, in which the Mediterranean region, on a wave of unregulated liberalisation, would break into pieces, in a future full of fear and introspection. The third scenario, on the other hand, proposes a mobilising response, where Europe and the Mediterranean choose to work together in order not to weaken separately. Because agriculture is the basis of the identity of the area and represents a strategic area of cooperation, this pragmatic alliance would take concrete form in the “agricultural proof”.

If Europe wants to carry weight on the international scene, it cannot ignore the region which borders it to the South. The Mediterranean of tomorrow can be a wonderful space of experimentation in building a new globalisation. The strategic interdependence of Europe and the Mediterranean has become such that special partnerships are essential. In response to the crises in the region, especially the imbalances in agricultural trade and the precariousness of food security and taking into account the strong individual characteristics of the Mediterranean countries, the Euro-Mediterranean scenario proposes making agriculture a core priority.

The Mediterranean Strategy for Sustainable Development (MSSD) takes a very similar approach. It is based on a possible vision of another Mediterranean which is analysed in depth in the Plan Bleu Report on Development and Environment in the Mediterranean. Rural development occupies a central place, at the intersection between the principal actions, primarily agricultural, cultural and landscape, to promote the advantages of the Mediterranean, to diversify economic activities and to combat poverty and manage soils, water and biomass resources in a sustainable way. The MSSD emphasises that the EU and the developed countries of the northern shore would have an important role to play in implementing it. If they genuinely wish it to succeed, the partners of the North will have to adopt more energetic forms of commitment than in the past.

The dual importance of Mediterranean cooperation and agricultural and rural development are found in almost all the national strategies. The Agricultural Outlook prepared in Morocco in 2007 is particularly relevant in this regard. Agriculture is an inescapable sector of development in achieving balance growth. Rural development, for its part, is the keystone of all poverty reduction policies, policies to reduce geographical inequalities and sustainable management of natural resources. It should also be a key component of Mediterranean strategies. In the long term, they are part of wider global problems which relate to possible changes in the Mediterranean region as a whole. Despite asymmetries and different levels of development, rural development must be seen in its regional context, a context of Mediterranean convergence, trade and complementarities between North and South. It must be viewed in the context of the multiple relations between the components of rurality and other sectors of the economy, and, lastly, the collective commitment to protecting the environment and tackling climate change. Rural development is a matter of specific actions which must take account of all the synergies of policies to promote competitiveness and diversification of economic activities, urbanisation and regional development, policies to combat inequalities and environmental policies. Rural development is not a sectoral policy. Despite differences between the North and South, it lies at the heart of sustainable development policies.

All the countries of the Mediterranean, in one way or another, have formulated rural development policies or strategies. This overview shows that these policies have in most cases taken into account the multi-functionality of agriculture and the Mediterranean dimension of trade. It shows that localisation is a fairly widespread concept. The meaning attached to this localisation, however, seems to be strongly marked by different interpretations and, all too often, by a considerable gap between declarations of intent and actual practice. We have tried to show how taking areas into account in rural development policies was linked to the federating concept of “local development”. The evolution of rurality, albeit at a varying pace from one country to another, the explosion of multiple activities, competition between areas, heightened by globalisation, the taking of responsibility by the actors, taking into account sustainability and protection of the environment, all these have combined to express the problem of rural development in new terms.

Rural development is now seen as a complex approach in which the area is both the socio-spatial reference, unique in every case, and the arena of its political management. It is based on local development. Areas, like their actors, have multiple dimensions. However, concentrations at local level, even if varying according to their context, tend to give primacy to the local area, the area of identity, whatever that may be. Furthermore, these local areas are attached successively to other levels, regions, nations or the global economy. The area project is the necessary cement of a construction which transforms a more or less local geographical space into a political entity. Local development is a socio-political concept. It associates a space to the actors who plan their future in it and defines a privileged field of action to allow management of its complexity.

Bibliography

Parliamentary Assembly of the Council of Europe, *La Politique agricole et rurale euroméditerranéenne*, Rapport de la Commission de l'environnement, de l'agriculture et des questions territoriales, Walter Schmied (rapporteur), 2007 (19).

Auriac (F.) and Brunet (R.), *Espaces, jeux et enjeux*, Paris, Fayard, 1986.

Ciheim and Réseau Agricultures familiales comparées (Rafac), *Agricultures familiales et développement rural en Méditerranée*, Paris, Karthala, 2000.

Ciheim, *Politiques de développement rural durable dans le cadre de la politique de voisinage de l'Union européenne*, Montpellier, Ciheim-IAMM, coll. “Options méditerranéennes”, série A, “Séminaires méditerranéens”, 71, 2006.

Cluniat (R.), Roubaud (J.) and Roux (A.), *Évaluation des démarches contractuelles des Pays*, Conseil général du génie rural des eaux et forêts, Paris, DIACT, 2006 (107).

European Commission, *Ex-post Evaluation of the Community Initiative Leader II*, Final Report, 1, Principal Report, ÖIR – Managementdienste GmbH, December 2003 (84).

European Commission, *Ex-post Evaluation of the Leader I Community Initiative 1989-1993*, Final Report, Brussels, European Commission, 1999 (85).

Datar, *Quelle France rurale pour 2020? Contribution à une nouvelle politique de développement durable*, Paris, La Documentation française, 2003 (264).

El Harizi, (K.), *Empowerment: Actors, Institutions and Change. In Natural Resource Policies in the Near East and North Africa: from Management to Governance*, Alexandria, IFAD-IFPRI and Library of Alexandria, July 2006 (43).

Epson, *L'Impact territorial de la PAC et de la politique de développement rural. Résumé opérationnel du rapport final*, Projet Orate 2.1.3., Luxembourg, European Spatial Planning Observation Network (Epson), 2005 (15).

FAO, *An Approach to Rural Development: Participatory and Negotiated Territorial Development (PNTD)*, Rome, FAO, April 2005 (202).

Ferguène (A.), *Gouvernance locale et développement territorial. Le cas des pays du Sud*, Paris, l'Harmattan, coll. "La librairie des Humanistes", 2005 (37).

Gomez Moreno (M. L.), *Teoria y practica de la comarcalizacion. El caso de Andalucia*, bibliography, Malaga, University of Malaga, (263).

Insee, *Structuration de l'espace rural: une approche par des bassins de vie*, Rapport de l'Insee (avec la participation de IFEN, INRA, SCEES) pour la Datar, rapport principal, annexes, July 2003 (153).

Institut de la Méditerranée, *Les Ateliers méditerranéens d'aménagement du territoire*, Annexe Gouvernance, (35).

Lazarev (G.) and Arab (M.), *Développement local et communautés rurales, approches et instruments pour une dynamique de concertation*, Paris, Karthala, 2002 (181).

Ministry of Agriculture and Fisheries, *Rapport de la mission ruralité en Europe. Mission Europe et régions*, Paris, 11 October 2006 (2).

Leader European Observatory, "La Compétitivité territoriale. Construire une stratégie de développement territorial à la lumière de l'expérience Leader", fascicule 1, *Cahiers de l'innovation*, 6, December 1999 (70).

Parcs nationaux et régionaux, *Bilan qualitatif de la mise en œuvre du programme Leader+ dans le cadre des parcs*, Paris, Commission Aménagement du territoire, February 2005 (95).

UNEP, *Mediterranean Strategy for Sustainable Development. A Framework for Environmental Sustainability and Shared Prosperity*, Mediterranean Commission on Sustainable Development in collaboration with Plan Bleu, (51).

Pypaert (Ph.), *De l'environnement dans l'aménagement à l'aménagement de l'environnement. Belgique, Croatie, Italie. Pour une planification locale de gestion territoriale de l'environnement au service du développement durable*, Arlon, Fondation universitaire luxembourgeoise, (64).

Kingdom of Morocco, *Stratégie de développement rural 2020. Maroc*, Rabat, Conseil général du développement agricole, 2000 (319).



CHAPTER 6

RURAL LIFE

Florence Pintus (Blue Plan)

Because the primary sector still plays a major role in terms of jobs and social stability in the rural economy of Mediterranean countries, including the European Union of twenty-seven, improving living standards and working conditions of rural communities, especially agricultural communities, must figure prominently on the list of agricultural and rural development objectives.

It is essential to begin by studying populations and the places in which they evolve, their permanent characteristics and emerging trends. The capacity of these populations to adapt and innovate and to cooperate with each other (Crozier, 1970) is crucial to understanding the diversity of social phenomena on which rural society is based. Identifying the profound changes at the heart of societies demands a coordinated inter-disciplinary approach to grasp the complexity, the extraordinary diversity and extent of the inequalities in Mediterranean rural areas. The material on which this chapter is based shows the great value of an integrated approach to territorial questions.

Indeed, the demography, independencies and new functionalities of urban and rural environments and increased mobility bear witness both in the North and the South to rural societies on the move, where collective intelligence sometimes comes to the aid of failures of States. Conversely, education, poverty and governance reflect the paradoxical lack of mobility of rural societies blocked in the South by the weight of tradition, lack of mutual trust and state of knowledge (Ould Aoudia, 2008), and in the North by the scant interest in human capital and inflexibility of governments (Portnoff, 2008).

The rural world: plural realities

It is impossible to consider rural areas as a homogeneous whole. The examples which follow illustrate the wealth of criteria and categorisations adopted both in different countries and even within countries to characterise them. In Europe, although rural development policy has taken on a general meaning, concepts of “ruralness” are defined chiefly in terms of differentiation between agrarian and agro-food systems and the degree to which they are integrated in the urban and industrial economy.

In Italy, for example, the territorial demarcation of rural areas takes into account their characteristic of economic and social development processes. The resulting classification distinguishes between four categories: periurban areas, rural areas with intensive and

specialised agriculture, intermediate rural areas and rural areas with a low level of economic development. This classification serves as the basis for the National Strategic Rural Development Plan 2007-2013 and the design of regional rural development plans. The dynamics specific to each area in terms of production, investment capacity, internal disparities, etc. benefit in return from *ad hoc* territorial policies.

Periurban areas consist of the 1,035 municipalities with the highest population density and concentrated agricultural areas. They account for 43% of the population and are characterised by the high level of services and manufacturing industry. Agriculture accounts for only 12% of GNP, grouped around the edge of urban centres in quality local markets, but 31% of employment in the agro-food industry. Marketing infrastructure is often an investment priority for the distribution of production.

Rural areas with intensive and specialised agriculture make up the bulk of rural plains and intensively farmed hillsides of the regions of the North and Centre. With 1,632 municipalities (22% of the population) these areas account for 24% of UAA, 29% of agricultural employment, 30% of employment in agro-industry and 38% of AGDP. They concentrate 25.4% of farmers with more than one job and are relatively dense with a younger population than elsewhere which is growing younger. Despite a high level of specialisation, organisation of local chains is often still at an embryonic stage.

The intermediate rural areas are the highland regions of the North and Centre, where there is a some degree of economic diversification away from agriculture. The 2,676 municipalities in this category account for 24% of the population and 32% of the national territory. Agriculture plays a significant role in terms of employment. Agriculture there has displayed symptoms of serious crisis during the last decade losing 12% of UAA, 14% of its total added value and above all 27% of its employment. High production costs, low productivity of the land (for commercial, not geomorphological reasons), marginalisation and abandonment of entire areas, and the ageing of the active population are the chief causes. 27.8% of farmers with more than one job are found there.

Rural areas with a low level of economic development are those in the highlands and mountains which are predominantly "wild". They are the least populated areas in the country (54 inhabitants per km²) characterised by a low level of local development projects, irrespective of the sector, and a rural exodus, mainly in the South of the country where it affects 6% of the population. The rate of ageing of the population is the highest in the country. These areas nevertheless account for 12% of the population, 43% of the national territory, 42% of GDP (18% of AGDP, 21% in the South), 35% of UAA and 20% of agricultural workers. For this reason they warrant the Government's full attention. Furthermore, the low agricultural potential of these areas explains both why 27% of farmers with more than one job are found there and the extensive character of agriculture. The great variety of natural habitats gives them pride of place for biodiversity.

The same criteria prevailed in Greece in the development of a classification of rural areas, characterised chiefly by the density of the urban mesh, the balance of migration, landlocked areas, the degree of intensification and the capacity of production systems to adapt. The mountain areas, which form the backbone of the country, traditionally characterised by the weakness of the urban mesh and the predominance of extensive

sheep and goat farming, are faced with a phenomenon of desertification and depopulation. A distinction is made between the interior, where economic diversification is still very limited, and the coastal highlands which benefit from the knock-on effects of the development of tourism. Recently, the disadvantage of the highlands in an intensive agricultural system has tended to become a plus thanks to the relative abundance of resources and accessibility facilitated by the density of the road network, in part linked to the weight of organised communities of the diaspora.

The lowland plain areas have been a prime target of development policies. This has led, on the one hand, to strengthening the provision of small towns with infrastructure and facilities and, on the other, by the adoption, since the 1960s, of an intensive agricultural model. The constant updating of the irrigation system by the adoption of innovative state-of-the-art methods reflects a flexibility and capacity to adapt characteristic of these areas. Today, however, they are entering a restructuring phase, made necessary by environmental impacts, reforms of the CAP and market constraints. The diversification of their economy depends on the capacity of this restructuring to deliver a rise in added value and manage the process of marketing local resources.

The last category, semi-mountain areas have become residential areas for a large part of the population of the neighbouring small towns, farming their land from a distance. Typically, they keep up traditional extensive production systems, based on sheep and goat farming, forestry and agriculture of an extensive type (chiefly fodder crops and durum wheat) on land recovered from pastures or felling of woodlands. In the current changing rural context, these areas offer all the conditions necessary to benefit from their links with the highlands and the plains, in the framework of local development projects based on proximity, the quality of traditional products and the value of converting low-yielding land back to undemanding crops.

In France, the combination of a new classification of farms based on length of time spent on farms with the characterisation of rural areas into four categories has proved the way to take account of the close link between agriculture and rural development as well as between agriculture and urban development. In a nutshell, rural France is seen today as dividing into four: a “new countryside” characterised by the development of a tourist and residential economy (Mediterranean regions, Atlantic coast); a “town countryside” which is highly attractive and with a high economic potential (Rhône valley, Île de France); “a countryside in search of balance” (spread throughout the country); and, lastly, “the most fragile countryside” marked by economic and demographic decline (Limousin, Auvergne especially).

The diversity of functions and types of French countryside call for differentiated strategies. The “new countryside” typical of the three French administrative regions bordering the Mediterranean, is consolidating its position by developing basic services and encouraging tourism. The “town countryside” is concerned to advertise the multi-functionality of agriculture and to develop agricultural diversification. It also benefits from its dense economic fabric to encourage the creation of micro-enterprises. The “most fragile countryside” seeks to revive and promote its natural and cultural heritage by providing a good level of services to the population.

Albania is at the stage of changing from a fairly traditional classification based on types of village by geographical level and type of habitat, to one set in a context rapidly evolving into three types of rural area: rural areas with intensive urbanisation around the large towns in the West of the country; rural areas in balance in areas with favourable natural and economic conditions; and rural areas with slowing demographic growth and in economic recession in the North and North-east of the country.

In the last ten years, villages in lowland Albania have seen an explosion of rehabilitation of old housing and residential building which pay little heed to approved local development plans. The new housing is socialist in type, more compact and built according to a precise plan, while the old housing is more scattered, with at its centre the cooperative area or old agricultural enterprises. Hill villages account for almost half the rural habitat, generally grouped together. Access to drinking water and land with installed services are critical factors. For mountain villages, a distinction is made between those which are mainly agricultural and those which are mixed. This is a dispersed habitat which accounts for only 8% of the rural habitat. Rural areas in Albania present several profiles depending on whether they are influenced by a tourist or residential economy, integrated in an urban or periurban fabric or their activities or population are in decline.

In the countries of the South and East, the task of characterising rural areas remains to be done. In the light of the specific features of Egypt (lack of resources and pasture, natural resources mainly in inhabited areas and those worked by man), policies are divided into two categories: inhabited areas and natural areas, the latter generally situated outside areas of activity, in desert areas and the lake zones of the North of the country.

After two decades of interventionist policies based successively on the idea of “community development”, “model villages”, “central villages” or the “urban village model with highly controversial results, Turkey is now relying on a set of regional development plans and projects (*South-eastern Anatolia Project [SAP]*, *Zonguldak-Bartın-Karabuk Regional Development Project [ZBK]*, *Eastern Anatolia Project Master Plan [DAP]*, *Eastern Black Sea Regional Development Plan [DOKAP]*, *Yesilirmak Basin Development Project [YHGP]*) defined according to local needs and characteristics. But the areas outside the project are overlooked.

In Algeria, rural areas are characterised according to the degree of vulnerability of their populations (in terms of infrastructure, landlocked position, access to services, land) and also in terms of performance of the agricultural sector, training of farmers and farm incomes, the level of social exclusion and the weakness of governance (Benbekhti *et al.*, 2006).

In general, classifications of Mediterranean agriculture, when available (cf. chapter 9), are not sufficient to describe the evolution of rural areas in all their components or to understand the local realities involved. More is needed.

Insufficient geographical rebalancing

The urban population in the Mediterranean has supplanted the rural population since the mid-1960s, in other words, very early on, since it was not until 2007 that this reversal

took place globally. In 2005, it stood at 64% of the population and projections for decades ahead do not show any sign of slackening (cf. Charts 1 and 2).

Chart 1 - Rural population in the Mediterranean and the world, 1960-2005

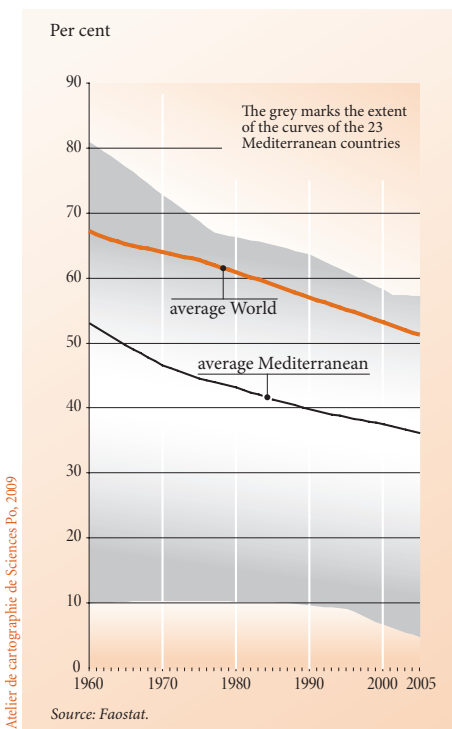
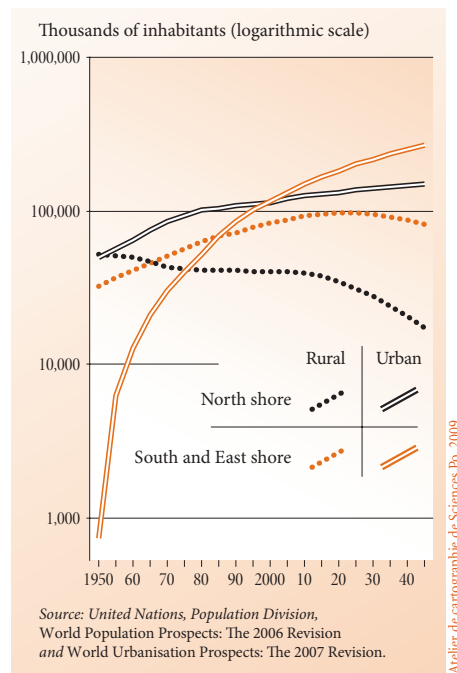


Chart 2 - Urban and rural population of the two shores of the Mediterranean, 1950-2045



This relative decline in the rural population can be seen in all the Mediterranean countries without exception. Yet the rural exodus, although still predominant overall in the North, is not enough to turn the migratory balance negative in the countries of the South and East. The majority of them are seeing their rural populations, already considerable, continuing to grow and assume composite forms. This to some extent presages the adaptations which are already seen in the countries of the North: multiple occupations, mobility, extension of the parental home, scattered families...

With the exception of France, which has seen a renewal of its countryside for some years now, thanks to the multi-functionality of agriculture and the attractiveness of those areas (Hervieu, 2008), elsewhere, in the Northern Mediterranean countries, rural areas are still hovering between decline and demographic revival, while in the South, the majority of rural areas are characterised by the fight against poverty and lagging development.

In the North, a relative renewal of rural areas

For years, rural areas in Spain have been undergoing profound changes which affect its territorial organisation and the socio-demographic and professional composition of the people who live there. This demographic decline of rural regions is now much more selective. In some rural areas (intensive agricultural zones, large villages in the South, regional centres of the interior of Spain), certain processes of demographic recovery, which began in the 1990s, are taking root. However, the acute demographic crisis experienced in the 1960s and 1970s, following the mass rural exodus and the crisis of traditional agriculture, led to a halving of the population over the period 1960-1996, which fell from 57% of the total population to only 23%.

Rural depopulation slowed during the 1980s but, in remote rural areas, the decline continues (- 5.4% between 1995 and 2005). Only areas close to provincial capitals and tourist areas have seen their populations increase by 14% and 0.7% respectively.¹ Between 1991 and 2006, agglomerations of less than 10,000 inhabitants saw their populations fall while those with over 10,000 inhabitants gained. Nevertheless, Spain is still a country where rural density is considerable.

Secondly, the Spanish population has aged rapidly, especially in rural areas (between 8 and 10 points of difference from the national average). The national percentage of elderly persons is of the order of 16% while it is over 25% to 30% in many rural spots. The scale of immigration, however, is putting a brake on this ageing and rural decline, and is contributing to the growing preponderance of men in rural society.

In Greece, demographic growth is almost solely due to the migratory balance. Between 1991 and 2001, the population increased by almost 7% thanks to the settlement of some 780,000 foreigners in the country, while the population of Greek origin rose by only 1.2%. After a long period of rural exodus starting in 1960, which led to severe ageing in rural areas, the process has stopped for the time being and the population has become fairly stable. Without the major influx of foreigners, whose number increased fivefold in the space of ten years, rural areas would have been faced with a net population loss of some 4%, and even more accentuated ageing. In short, the population living in rural areas (85% of the national territory) nowadays represents no more than a quarter of the population.

Albania occupies a very special place. Its transitional situation is a cross between the characteristics of the North and South Mediterranean countries. Country people, whether natives of the lowlands or the highlands, are ready to abandon their villages and properties to settle around the towns or on the coast. Currently, three trends can be identified in this internal migration of the country's population: from mountain areas to the villages of the lowland plains, from the mountain and lowland villages to the towns; from small towns, especially those from remote rural areas, towards the major towns, especially Tirana. Due to the lack of economic development and conditions which make earning a living difficult, the mountainous regions are particularly affected by this rural exodus. This powerful migratory movement has placed Albania at the top

¹ - Over 12 million hectares of UAA, belonging to 2,880 municipalities, are located in areas at risk of depopulation (DGDR-MAPA).

of the list of Central and Eastern European Countries experiencing a phenomenon of uncontrolled urbanisation. The spontaneous migration towards the major towns raises the question of how to adjust the urban investment of the last two decades to the doubling, very marked in the South of Albania, of emigration of a large part of the workforce, especially young people, to Greece and Italy. In these areas, agriculture and livestock farming are already regarded as activities for the elderly or children. Whole villages can be found where there are no young people left between the ages of 16 to 35. At the same time, the population of Albania is rapidly concentrating and drifting to the coast. The most attractive regions, for the mountain or rural populations who leave the agricultural areas of the interior of the country, are precisely those of the coast or the Centre-West, where the density can be as high as 302.5 inhabitants per km² in some districts of Tirana.

In the South and East a positive but narrowing rural balance

In Egypt, in 2005, the rural population accounted for 58% of the total population, a constant percentage, among the highest in the Mediterranean, or 42 million inhabitants. According to UN demographic projections, it is likely to reach some 50 million inhabitants by 2020, while the population of Egypt as a whole will stand at 94 million inhabitants. As in many countries of the South, Egypt's population is young, with 37% aged under 15 years according to the 1996 census, and this youth is even more represented in the countryside where the rate is 40.8% (Aboulata, 2007, p. 62). Just by itself, Egypt is enough to stem and offset the much gentler trends in the other SEMCs. Indeed, the growth of the rural population in Egypt alone accounts for the bulk of the increase in the rural population of all those countries combined.

The rural population in Morocco showed strong growth up to the mid-1990s, after which the average annual rate of growth slowed slightly, from 0.7% between 1982 and 1994 to 0.6% between 1994 and 2004. At 14.3 million in 2008, the rural population of Algeria also slowed during the last decade. It nevertheless posted a growth rate of almost 1% between 1995 and 2008 (ONS) and is characterised by its youth (75% aged under 30 years). Tunisia is no exception in the Maghreb, despite growing urbanisation and a strong rural exodus, especially from the regions of the North-West and Centre-West where agricultural activity is not sufficiently intensive and productive to generate enough jobs and incomes. Two out of three people now live in a municipal environment, where the annual growth rate, despite a net slowdown during the last decade, is still close to 2% per year, compared with a rural rate 10 times lower (0.17% per year between 1994 and 2004). In the South and East, only the rural population of Turkey, the second largest in the Mediterranean, which has been increasing constantly since 1960, has slowed dramatically from 1980 (cf. table 1), added to which is the recent trend to ageing of the agricultural population.

Urban-rural: functional links

Both in the North and South, while the permanent rural population and the farming population has been declining over the years, the effect needs to be put in perspective. Looking beyond this general trend, the installation of populations in small town in rural areas is becoming entrenched, leading to the emergence of new types of habitat and the

Table 1 - Rural population of Turkey, in 1980, 1990 and 2000 (in millions and as percentage)

Census	Rural population	
	(millions)	(%)
1980	25.0	56.1
1990	23.1	41.0
2000	23.8	35.1

Source: SIS.

way households function. This phenomenon can be seen in Algeria, where the heterogeneous nature of the exodus towards rural areas has led to the emergence of numerous small and medium-sized urban agglomerations and the growth of small towns and/or large rural villages in inland and dry areas. This form of urbanisation, sometimes called “rurbanisation”, is described as alleviating the migratory pressure on urban centres (Bessaoud, 2006).

The same goes for Tunisia, where the countryside is becoming urbanised due to its proximity to towns, the development of road networks and rural transport. Given the high cost of housing in the major urban centres, these country-dwellers commute daily between the town and the country. The concentrations of rural habitat are then deprived of the minimum conditions of hygiene and act essentially as a dormitory. They are accompanied by an explosion in the number of communal vehicles, classed as “rural transport” parked at the various exits of the towns. This is a long way from the recreational or leisure functions seen North of the Mediterranean.

In Greece, new spatial and organisational relationships between the family and their various activities are emerging. Space for living and activities tends to expand to the extent that the installation of the household in an urban centre does not mean the ultimate abandonment of the village, since often this movement is not accompanied by the sale of the family home or even, in many cases, giving up farming. Working the farm then depends on the presence of local wage labour, consisting in part of economic immigrants, but also the mobility of the head of the business and a system of mutual help among the immediate neighbours. This form of absentee farming is not evenly spread throughout the country, as it depends in part on the local production system. The more intensive it is, the less this new lifestyle will be possible unless there is a small town nearby which is able to exercise a knock-on effect on its hinterland. This form of more or less pendular mobility is supplemented by a seasonal return of the natives back to their village.

Indeed, increased mobility is a powerful trend throughout the Mediterranean, whether of goods, persons or information. It goes hand in hand with changing lifestyles and takes many forms: daily commuting between work and home, leisure, moving house at different stages of life, as well as international migration. In France, a person travels on average 45 kilometres per day (INSEE-INRETS) and the annual rate of growth of mobility has been 4% for twenty years. In Turkey, a not insignificant number of country-dwellers resort to seasonal work in the major towns in construction, industry or services, in order to earn additional income to support their families.

Mobility, especially among the young, is one of the characteristics of country-dwellers in Spain. This mobility creates social unity in a fragmented space and the new family strategies reflect a profound economic and cultural transformation of Spanish rural families. Analysis of migratory movements between rural and urban areas, the growing phenomenon of foreign immigrants moving to rural areas and the profile of the groups involved are all factors which underline a new spatial configuration of rural society and a dual process of deagrarianisation and tertiarisation.

Against this background, not only must an attempt be made to understand the rural environment in terms of growth or decline of the population, but also in terms of functionalities. The expansion of second homes, the value attached to rural tourism, the promotion of the cultural and natural heritage also make the rural environment a place for leisure and free time for urban residents who can afford it, in the North and in the South and East. In Spain, second homes now account for 50% of all rural housing, compared with 32% in 1992. The countryside is the second tourist area for the French, with 35% to 40% of tourist destinations.² In Tunisia, second homes are the result of rural emigrants who begin by extending their parental home, then build their own houses as soon as the children get a bit bigger.

Rural tourism has a particular physiognomy. Frequenting the countryside is the reflection of a specific expectation of so-called “rich” societies, for which it evokes first and foremost the landscape,³ peace and quiet. While urban living seems more and more restrictive on individuals, the perception of the countryside is now that of a space of freedom and fulfilment. This desire to live in contact with nature is reflected in a form of so-called “diffuse” urbanisation whose disproportionate ecological footprint leads to excessive consumption of non-sustainable natural resources. In developing countries, people are fleeing the countryside. Its agricultural production function remains despite everything a key factor in urban development, for it harbours the resources which the urbanite needs. Moreover, this function is crucial to the functioning and organisation of the socio-economic fabric of rural areas, as it tends progressively to exploit the opportunities offered by the new functions of the countryside and the new environmental needs and challenges, in terms of energy, quality of life and health and biodiversity.

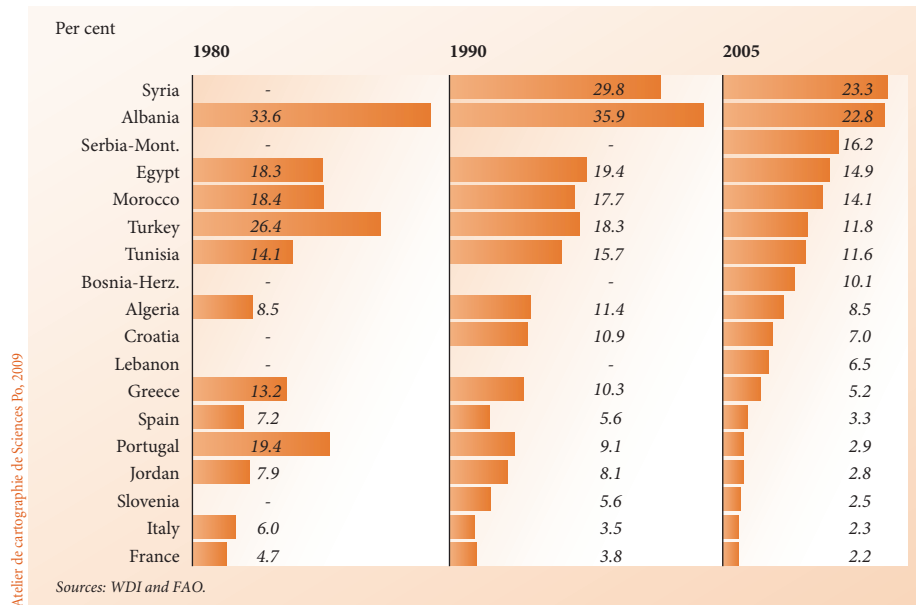
Where does agriculture fit into the rural environment?

Loss of economic share both North and South

Although increasing overall in all the Mediterranean countries since the 1960s, AGDP has seen its share of GDP decline continuously (cf. Chart 3). The disparities from one country to another are considerable: agriculture in 2005 still accounted for almost a quarter of total added value produced in Syria or Albania while it was by then less than 3% in France or Italy.

² - It will be noted that the contribution of farms to tourism provision is still very marginal.

³ - In China, in the 4th century, what had until then been the place where peasants lived, became the subject of aesthetic delectation for the use of those who did not work the land. That required a “taste” beyond the reach of rustics (Berque, 2008).

Chart 3 - AGDP/GDP in the Mediterranean countries, 1980-2005

The granary of Rome in antiquity, Egypt was an “agricultural” country until the early 1970s. Even today, despite the decline in its relative weight in the national economy, agriculture in 2005 accounted for over 14% and, according to 2004 data, on average 47% of exports of raw materials, 20% of exports by value and 12.3% of the value of imports.

Moroccan agriculture has made remarkable progress over half a century. Yet it presents worrying signs of slowing down, a trade balance in deficit and very low productivity. Growth in production fell from an average annual rate of 10.6% between 1985 and 1991 to 0.27% between 1991 and 2004. Its volatility is now eight times higher than the average observed for the North Africa/Middle East region (High Commission for Planning, 2008).

Tunisian agriculture has also made real achievements in terms of production. The share of agriculture and agro-food in exports and imports is some 12% and 9.5% respectively. Exports essentially concern transformed products (olive oil, wines, sea products and dates) and imports mainly non-transformed products (soft wheat, essentially). But there is a paradox: the rural areas of the North with high agricultural potential have virtually no part in these exports and are even the reason for the principal imports, needed to alleviate the low productivity in cereals.

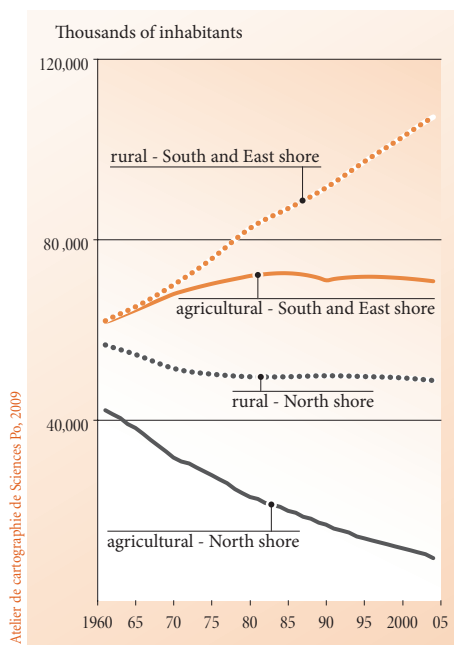
The share of traditional Greek economic activities (agriculture and livestock farming) in GDP has fallen steadily, from 11% in 1995 to some 5% in 2007. Changes in the countryside (cf. above), coupled with the impact of agricultural policies, go some way to explaining this change. In 2007, Albanian agriculture, however, contributed 23.3% of total GDP, compared with 31% in 1981. Despite that, with annual growth of 2.1%,

almost double that of 2001, it is today a key sector of the economy in which the Government should continue to invest to assist its reconstruction. The greatest decline, in proportionate terms, over the last twenty years were in Turkey. Over the period 2001-2005, its share of GDP fell by 18%.

Social weight: the great gulf

The loss of economic importance of agriculture is not just limited to its contribution to GDP. The proportion of the rural population (indicator AGR_P01, cf. chapter 10) and the proportion of the active agricultural population has been declining steadily for over twenty years in almost all Mediterranean countries (substitute indicator AGR_C01).

Chart 4 - Agricultural and rural population of the shores of the Mediterranean (excluding Balkans), 1960-2005



In fact this general trend masks a very different situation from one side of the Mediterranean to the other, since the number of agricultural workers continues to collapse in the countries of the northern shore, while their number is increasing in all the countries of the South and East, chiefly Turkey, Egypt and Morocco. The active agricultural population is characterised in the North by a high rate of ageing, in the South by a high unemployment rate and lack of skills.

The share of agricultural employment in the rural environment (Indicator AGR_C01) gives an idea of the diversification of job-creating activities outside agriculture and, therefore, a certain economic dynamic. As few countries are in a position to distinguish the specifically rural share of agricultural employment, the national figure is provided. The values provided by some countries show that the ratios may vary from 1.5 to over 2. In Turkey, some 68% of employment in rural areas is in agriculture, more than double the national figure in 2005. In France, this rate was 9.43%⁴ at the last census; in Egypt 58% in 2005,⁵ and in Algeria 36.5%⁶ in 2006.

The bulk of Turkish economic activities in rural areas are related to agriculture. Despite a fall in agricultural employment of 21% over the period 2001-2005, the active agricultural population continues to grow. With some 15 million people working in agriculture, or some 30% of the active population, Turkey has the largest agricultural workforce in the Mediterranean.

4 - INSEE, General population census, 1999.

5 - Taken from the report *Alterra 2007*. According to national statistics for 2005, this rate is 48.7% for men and 73.6% for women.

6 - ONS, 2007.

Egyptian agriculture had 3,718,000 farms in 2000 and some 800,00 farmers. In 2001, it employed 5.5 million workers, or 28.5% of the total number of the working population. According to the initial results of the 2006 census, the active population is 19.9 million people of whom 11 million live in rural regions. The agricultural population represents 53% of the rural population.

In Morocco, agriculture is a key sector in the balance of rural society and retains its strategic social importance through the number of jobs involved. The rural population is essentially agricultural (80.5% of workers aged 15 years and over in 2004). "Social" type agriculture, as opposed to agricultural businesses, accounts for 40% of the rural population and in part explains the "over-employment" in agriculture compared with other Mediterranean countries. Latent under-employment is estimated at 42%, reaching 50% in mountain regions and the upland plateaux (High Commission for Planning, 2008).

In Tunisia, agriculture remains by far the dominant economic activity for the rural population and a "fall-back" for the remainder. The distribution of the active population nevertheless indicates a decline of agriculture and fishing, whose share fell from some 22% to 16% between 1994 and 2004, despite a recovery of 18.7% in 2005.

Although commerce and services sectors in rural areas has caught up, agricultural employment (farmers, wage workers, family helpers) is still significant in Algeria. It varies from 4.4 million according to RGA 2001 data, to 1.572 million in 2006 according to the Office of National Statistics (ONS). This difference can perhaps be explained by the fact that in one case only the population engaged in commercial production was counted. According to the Algerian Ministry of Agriculture, the number of viable farms is some 450,000 of the million counted, which gives an idea of the number of "subsistence farms". It should be noted that the ageing of the agricultural population is becoming more pronounced: 43% are aged between 41 and 60 years, over 61 years account for 37% while only 5% of farm owners are now under the age of 30 years (ONS, 2006).

Despite its structural difficulties underlying the ageing of its agricultural workers, higher than the average of the European Union of twenty-five, the Spanish agricultural sector (agriculture, livestock, hunting and forestry) has had a fairly stable average active population of around one million, which is considerable for Europe. On the other hand, while France and Greece, in 2005, had just over 700,000 agricultural workers, and Italy 1 million, those countries had 4.2 million, 1.7 million and 6.1 million respectively in 1960.

Towards an agriculture more integrated in the rural economy

A strong case is often made by international institutions for diversification of rural activities as a factor in rural dynamism and revival. Thus the MSSD encourages national programmes which promote the multi-functionality of agriculture through tourism and other activities, just as the European Committee for Rural Development (composed of representatives of the 27 member States) encourages national rural development programmes to promote diversification of the agricultural sector and create jobs outside agriculture. The World Bank goes further in its 2008 report by inviting workers to leave agriculture.

The development of many non-agricultural enterprises in rural areas (indicator AGR_C02) illustrates these possibilities. Unfortunately, the statistics of the majority of countries do not allow this indicator to be calculated. France gives the figure of 91% of

non agricultural rural enterprises.⁷ In Spain the percentage of agricultural enterprises to total enterprises in rural areas registered in the social security system rose from 0.54% in 1995 to 0.89% in 2006. These figures show the very high level of diversification of the rural economy in Europe, unlike the rest of the Mediterranean.

Industrial employment in the pockets of rural life in France today is on average twice that of agricultural and agro-food employment combined. Today, activities directly related to people (personal services, education and health, retailing) provide over 50% of rural jobs and the majority of new jobs in the countryside. Their location depends primarily on where households are. Their share of the economy of rural areas is constantly growing following the movements of urban populations. The tertiarisation of the rural economy is well under way and is likely to strengthen in the coming years.

In Greece, the modernisation of agriculture has been accompanied by a reduction in employment in the sector and the development of multiple employment, as the time spent on farms has declined. The number of full-time farmers fell by 6% between 1995 and 2005, similar to the decline already seen between 1990 and 1995. The share of agricultural employment in rural areas, however, is still high, despite a fall from 50% to 41% during the 1990s, exclusively through a shift to jobs in services.

In Turkey, employment outside agriculture in rural areas is very much in the minority, even though it has increased during the last decade, from 23.5% in 1990 to 38.70% in 2006. Crafts, weaving and, to a lesser extent, rural tourism, are the main activities, although the lack of data prevents any detailed characterisation.

Table 2 - Agricultural and non-agricultural employment in Turkey 1990-2006 (thousands)

Year %	Turkey			Rural areas*		
	Agriculture	Non-agriculture	Total	Agriculture	Non-agriculture	Total
2003	7 165	13 982	21 147	6 687	3 173	9 860
%	33.88	66.12	100	67.82	32.18	100
2000	7 769	13 811	21 580	7 349	3 128	10 477
%	36.00	64.00	100	70.14	29.86	100
1995	9 080	11 506	20 586	8 635	2 559	11 194
%	44.11	55.89	100	77.14	22.86	100
1990	8 691	9 848	18 539	8 308	2 515	10 823
%	46.88	53.12	100	76.76	23.24	100

* Villages of less than 20,000 inhabitants are considered rural.
Source: SIS, Household and employment survey (2003) and Elci (2008).

7 - Or 390,000. INSEE, General population census, 1999.

In Tunisia, rural diversification is even weaker. The countryside does not attract industrial activities or services, apart from a few units linked to the transformation of agricultural products. The majority of services in small rural agglomerations do not follow any pattern or other regulations, and, moreover, these micro-enterprises are missing from the statistics. The multi-functionality of the rural environment is thus very little developed and there is no significant strategic orientation in this respect.

The situation differs little in Egypt. Jobs outside agriculture are not insignificant, but wage employment is the most common (78%). Self-employment in non-agricultural activities only accounts for 19%. This low level shows the lack of creation of small enterprises in the rural world in Egypt in particular, and in the SEMCs in general.

No end to poverty

The problem of poverty takes on different forms depending on the importance of agriculture in national production over the last fifteen years (1993-2008). For countries where AGDP is less than 5% of GDP, poverty is chiefly urban. In others, it is rural or agricultural (World Bank 2008). Increasing agricultural incomes, developing the non-agricultural rural economy and lessening the disparities between urban and rural are the principal challenges for SEMCs. Solving them is absolutely crucial. While the principal international social indicators attest to global progress, concern has shifted to the growing inequalities between rural and urban areas, and the absence of territorial cohesion. In the majority of the North Mediterranean countries, the needs of rural areas hinge on the attractiveness and competitiveness of different regions.

The Mediterranean poverty map

The percentage of the population living below the poverty line has declined continuously in Tunisia, from 22% in 1975 to 3.8% in 2005.⁸ According to some estimates, however, this poverty affects 8.3% of the rural population against 1.61% of the urban, and a few pockets of extreme poverty exist in landlocked rural areas (World Bank, 2006). In Morocco, poverty today affects 13.7% of the population, 23.1% in rural and 6.3% urban zones.

Similarly, poverty in Algeria is primarily a phenomenon which affects some of the 1.8 million rural households. The poverty map produced by the National Territorial Development Agency in 2001 clearly illustrates the gap between the North and interior of the country. The UNDP report of 2006 shows that the 15.1% of the total population of Algeria, some 5 million people, were living on less than two dollars a day. Taking into account the national poverty line (less than 1 dollar a day), almost one in four Algerians were living below that line in 2005.

Combating poverty is one of the pillars of Egypt's development policy with the stated objective of reducing the poverty level to 6% by 2022. An IFPRI study in 1997 underlines the very marked sectoral difference between urban and rural areas, the latter home to some 63% of the poor population (Datt *et al.*, 1998). It shows that the highest poverty rate is among those employed in agriculture, construction and personal services. In

⁸ - INS, Surveys of household budgets and consumption.

2004, the Human Development Report estimated the poverty rate at 20% of the total population, and the extremely poor at 4.7%. These rates are 2 to 3 times higher in rural areas: 10.7% and 2.1% respectively in urban zones against 27.4% and 6.6% respectively in rural areas.

In the mountainous regions of Albania, the poverty rate has reached the alarming figure of 44.5% (INSTAT, 2004), while at national level it is 23%, and on the coast, 20.6%. Albania is currently classified by the World Bank among countries with “impoverishing” growth with ever-increasing disparities.

The decision to combat poverty in Turkey dates from the mid-1990s. The objectives of the 8th and 9th five-year plans were to reduce income inequalities and eradicate poverty permanently. In 2003, food poverty still affected 1.3% of the total population.⁹ Of the 14.7 million people in 2005 living below the poverty line, 9 million lived in rural areas.¹⁰ A study carried out in the same year suggests that the income gap between the highest and lowest wages was almost 5 times higher than the average of the European Union of twenty-five in 2003.

The indices of social and economic inequality calculated by the Greek National Centre for Social Science Research are somewhat higher in rural areas. The percentage of persons there below the average living standard and incomes of the Greek community is estimated at 39% against 29.5% in urban areas. This is compounded by interregional disparities: mountain or disadvantaged areas continue to show the lowest living standards, with poverty rates close to 50%.

In France, data on monetary poverty confirm a larger geographical concentration in urban areas. Between 1996 and 2002, poor households tended to live in urban units of over 200,000 inhabitants. The number of poor persons in these areas increased by 8% between 1996 and 2002. The fact remains that the risk of being poor is higher in rural areas (25%), with one in four persons still living in a rural municipality. However, there are few studies on the specific question of rural poverty in France. The information that is available is fairly old and specifically concerns poverty in agricultural occupations. A study of the minimum entry income in rural areas shows disparities between farmers. The total of farms in which income per family member working full time is lower than the national minimum wage in 2000 represented 40% of farmers. The authors of the study suggest that the low agricultural incomes can be explained chiefly by the combined effect of insufficient factors of production (land and capital) and farmers’ poor management skills.

Putting food on the table, the prime concern of SEMC households

The gap between the comfortably off and the deprived is reflected in models of expenditure on food. Indicator AGR_C14 on the proportion of family income spent on food shows both regional disparities, household consumption levels and changes in their living standards.

⁹ - SPO-2005.

¹⁰ - SPO-2005.

In the Turkish household budget survey of 2004, food (and non-alcoholic drinks) accounted for 26.4% of expenditure. But the poorest families spend 51% of their total expenditure on food, compared with 24% in the most well off families.¹¹ There is a paucity of national data to evaluate food poverty levels. However, such data as are available show that in 1994 some 3% of the population could not afford its minimum food needs. Moreover, the proportion of consumption of the wealthiest 20% continues to be 4 to 5 times higher than the poorest 20%, not to mention the growing gulf between rural and urban areas since 1994.

In Egypt, the proportion of family income spent on food is 49% for rural households against 40.4% for urban households.¹² In Tunisia, in 2005, it fell from 39% in 1985 to 34.8%, reflecting a decline in poverty, a somewhat relative decrease since non-food expenditure rose from 2,665 Tunisian dinars per household per year in 1985 to over 8,200 in 2005 at current prices, a factor of three, while food spending rose from 1,039 to 2,875 Tunisian dinars per household per year over the same period, or a factor of 2.75. In Algeria, this share fell from 59% in 1995 to 52% in 2005 (CENEAP, 2005). Expenditure was made up as follows: 25.5% on cereals, 13.7% on milk and dairy products, 13.6% on dried vegetables, 6.4% on fruit and 5.1% on fresh vegetables. The urban/rural food ratios are almost the same, with 51% for urban areas and 52% for rural.

In France, this indicator is 10.7%.¹³ In Spain it fell from 16.54% in 1998 to 14.04% in 2006.¹⁴ In rural areas in Spain, food is the main expense or 15.3% (against 13.4% in town). It is in the absolute values that one observes the principal differences between the urban and rural environment. Household expenses are higher in municipalities with over 10,000 inhabitants than in rural municipalities. The most marked differences concern education, leisure and culture, as well as housing where the shares are, respectively, 2.8, 1.6 and 1.4 times higher than in rural areas.

It will be noted that these results were obtained before the rampant food crisis in 2008, which caused food riots in Egypt and other Mediterranean countries. There is no doubt that the rise in the price of basic products and its impact in household budgets contributed to an upward revision of this indicator in the majority of Mediterranean countries.

Poorly-paid agriculture already supplanted

A survey by the Algerian Ministry of Labour on wages paid by economic sector show glaring disparities to the detriment of agriculture. According to this study, which was carried out in 2003, the average gross monthly wage in the agricultural sector was less than 12,000 Algerian dinars (162 dollars), while that paid in industrial enterprises and services was in the region of 24,000 dinars and that paid by companies in the energy sector was some 30,000 dinars (3 times the national guaranteed minimum wage).

In Morocco, agriculture represents 65% of rural incomes, while 35% come mainly from diversification of the rural economy, mobility to the towns and emigration. International

¹¹ - Household Income and Consumption Expenditure Survey of 1994 (SPO-2005).

¹² - CAPMAS, Statistical Yearbook 2005.

¹³ - INSEE, National Accounts, 2005.

¹⁴ - INE (Spanish National Institute of Statistics), Food and non-alcoholic drinks.

comparisons, however, underline the still small proportion of non-agricultural jobs in the country. In Egypt, agriculture is now only the second source of income of rural households,¹⁵ with first place going to non-agricultural incomes which represent, thanks to wage employment, between 41% and 47% of their total income (Croppenstedt, 2006; Ellaithy, 2007).¹⁶ According to estimates, the informal sector employs up to 62% of the workforce, of which two thirds is in rural areas. Transfers represent the third source of income with an average of 16.5%.

In Turkey, the low incomes from agriculture encourage rural dwellers to seek other sources chiefly in construction, agricultural age employment or crafts. In the province of Bayburt, in 43% of households, at least one individual has migrated in the last five years and, on average, two people have left temporarily (mainly men, 69%). The chief characteristic of these migrants is their “contribution to the household income”.

According to data from the last Spanish household budget survey, rural households received incomes 18% lower than urban households. However, the agricultural population has considerably improved its purchasing power over the last ten years and the gaps are narrowing. Moreover, agriculture is no longer the principal source of rural incomes.

Predominance of small farms and family work

The possibilities of integrating agriculture in the rural economy and agricultural incomes depend on the structure of farms and the status of work in the sector. Family workers in small farms, for example, have more opportunities to take up a lucrative non-agricultural activity. This diversification may take place within the farm (multifunctionality of agriculture: hospitality, direct sales, etc) or outside (multiple occupations). These strategies have a positive impact on the exploitation of the existing assets and the viability of farms, especially due to better management risk in the medium term, even if the impact on incomes remains limited.

A high proportion of small farms (indicator AGR_C15) can be interpreted as a factor in stabilising the rural population and trump card in the integration of farming families in the rural economy. However, it also illustrates the fragmentation of small land ownership and the increasing concentration of production in a relatively small number of large farms, traditionally accompanied by growing precariousness of employment in agriculture and wage employment on farms. A distinction should be drawn between the two.

The share of agricultural wage employment (indicator AGR_C16) can also contribute to reflection concerning the criteria for the allocation of agricultural aid with a view, among other things, to limiting job losses in the sector. From this perspective, public authorities could promote a method of distributing aid which is not proportional to production volumes but which enables agriculture to contribute to employment policy, especially in disadvantaged areas.

¹⁵ - Two estimates are given: an average of 29% of total household income (this is estimated at 27.4% in the delta and 31.3% in the valley); an average of 40% which includes incomes of farmers and farm workers.

¹⁶ - The study, published in 2006, is based on 1997 data.

Agricultural employment, however, is not just about wage workers. The employment of wage workers is not common in small farms in the SEMCs, where the workforce generally consists of the farmer alone, perhaps helped by family labour. As a rule, the latter comes way ahead of wage labour in agriculture and artificially inflates the unemployment figures, especially for young people. Moreover, unemployment seems to be a category specific to the countries of the North, as it is marginal to the survival strategies designed by the informal sector characteristic of SEMCs. In these countries, it would be worth asking how to allocate a social status outside wage employment and to make the spreads of wage employment just one solution among many. In Northern Mediterranean farms, the problem is expressed differently. Family labour is in constant decline, and wage employment has a certain future linked to specialisation of production and diversification of farming. The following examples illustrate the situations of different Mediterranean countries in terms of these indicators.

In Tunisia, the proportion of farms of less than 10 hectares rose from 64% in 1980 to 73% in 1975, while their share of the agricultural area rose from 16% to 21% over the same period. The increasing precariousness of much of the agricultural population, especially in pluvial agriculture, can be better appreciated in terms of extreme categories. Farms of less than 5 hectares which represent 53% of the total cover only 9% of the area, compared with 1% and 26% respectively for farms of over 100 hectares. Average areas are 2 hectares and 297 hectares respectively.

The data on agricultural labour in Tunisia are not very precise and no series are available. It represents about a million people. Wage employment is not very developed, the bulk of agricultural work being done by family helpers, especially in small and medium-sized farms. Only a minority of family workers work full time in agriculture, albeit accounting for 275,000 full-time equivalent, while agricultural wage workers are estimated at only 190,000. A recent survey indicated that 96% of female members of agricultural households said that they were unpaid family farm workers (World Bank, 2006). The majority of female agricultural wage workers are seasonal and their number is increasing, primarily in the large fruit-tree plantations (citrus fruits at Cap Bon, olives at Sfax and in the Sahel) and market gardening. Non-farm employment in Tunisia for a majority of small farmers is still agricultural wage employment.

In Algeria, 47.6% of the total irrigated area is shared among farms whose area ranges from 0.1 to 10 hectares (82.3% of all irrigated farms (RGA, 2001). 70% of them occupy 25.4% of total UAA.

In Egypt, the agriculture of small farmers in the Nile Valley and Delta forms a major part of the production system in terms of area and population, or 85% of cultivated and cropped areas, and 94% of farms. 98% of farms are less than 10 hectares.¹⁷ This agriculture continues to provide a large part of the production destined for the domestic market but is in danger of becoming increasingly marginalised. In 2025, the projection which extends current trends (Ellaithy, 2007) predicts that over 80% of farms will be less than 1 hectare, that use of land for building will become more profitable than agricultural production and that 10% of farmers will give up farming, which will lead to a sharp rise

¹⁷ - Based on the agricultural census 1999-2000.

in unemployment. The data on agricultural employment confirm the family character of production units: in 2004, family workers accounted for 68% of agricultural workers against 32% wage workers.¹⁸ The data trend indicates an overall increase of 19% in agricultural work with average annual growth of 2.2% and a rise in wage employment after a period of decline in the 1990s. Farmers (self-employed) represent about half the jobs in agriculture and unpaid work 34% (Ellaithy, 2007, p. 105).

Table 3 - Trends in agricultural family and wage work in Egypt (in thousands)

Year	Wage work		Family work		Total
	Number	% of total	Number	% of total	
1988	1 171	26.3	3 280	73.7	4 451
1990	1 220	24.6	3 744	75.4	4 964
2000	1 604	31.8	3 432	68.1	5 036
2004	1 691	31.9	3 606	68.1	5 297

Source: Egyptian Journal of Agricultural Economics, June 2006.

It is also clear from a study on employment in the Egyptian rural world in 2005 (Ellaithy, 2007, p. 107) that 83% of rural women work in the agricultural sector (43% of men). These women are more involved in unpaid agricultural work (41% compared with 10.6% for men) and less in non-agricultural wage work (40.25% for men against 7.38% of women). Work in agriculture largely involves people who are illiterate (80%) for all categories combined (self-employed 55%, agricultural wage workers 12%, unpaid work 33%), while 92% of non-agricultural jobs, including small-scale entrepreneurs, have primary or secondary education. Half of agricultural wage employment is seasonal, and a third of agricultural work is unpaid. Rural women work in agriculture without pay and, given their low level of education, have very little chance of obtaining non-agricultural work.

In Albania, the structure and functions of the peasant family remained unchanged right up to the middle of the 20th century. Until 1989, individual ownership was prohibited. Land reform, in the context of overall agrarian reform, led to a disintegration of the countryside with the conversion of 700 macro-farms into 460,000 micro-farms divided according to principle of total equality (total UAA divided by the number of families). In lowland agricultural districts, the average size of farms is now 1.2 to 1.7 hectares, and in highland areas, 0.2 to 1 hectare. 89% of farms are less than 2 hectares (MAAPC, 2006).¹⁹ An average of 2 to 3 people work on each farm while 5 to 6 people live on the farm.

In Greece, farms of less than 10 hectares accounted for 90.7% of farms in 1990 and 89.5% in 2005 (covering 45% of UAA). Almost 90% of irrigable farms belonged to this category in the period 1990-2005. To a degree, farms fall within that Greek characteristic which makes family or individual businesses the backbone of the rural economic fabric in Greece. Rare are businesses, in any sector, with more than 10 employees.

¹⁸ - Egyptian Journal of Agricultural Economics, 2006.

¹⁹ - Ministry of Agriculture, Food and Consumer Protection (MAAPC), 2006.

In Spain, the significant reduction in the percentage of farms of less than 10 hectares (indicator AGR_C15) is considered as going hand in hand with greater independence of the agricultural population: over 70% in 1997, their proportion was no more than 47.82% in 2005. Moreover, the increase in the size of farms led to an increase in the relative importance of wage employment in the agriculture sector: while in 1995 it was barely 10% of the total number of jobs in the sector, the percentage had almost doubled (19.7%) by 2005.²⁰ Conversely, data from agricultural censuses and surveys concerning the structure of Spanish farms highlight a constant decline in average family work in annual labour units (ALU) which, for all forms, continues to represent 68% of all work in the field of agriculture. Surveys of the active population also show a fundamental diminution of family workers and a corresponding increase in wage employment, permanent or, above all, temporary, in Spanish agriculture. It can also be seen that women represent a quarter of total employment and the growing importance of immigrants among agricultural workers.

In France, 43% of farms are less than 20 hectares in size, and 20% less than 5 hectares.²¹ The share of agricultural wage workers was 29% in 2005 (including 15% permanent.²² Small professional farms with multiple activities, whose role is essential to rural development, will survive in France, and wage employment will develop due to its major role in diversification. With multi-functionality, support to farmers will have to evolve. The status and conditions of use of wage employment, however, must be monitored if it is desired to avoid this phenomenon running counter to sustainability and the very concept of a trade.

Progress in services, but shadow zones persist

Literacy, education and health: three ways rural women lag behind

Tunisia has always devoted a considerable part of the national budget (7%) to free and compulsory education from age 6 years, significantly rolling back the illiteracy rate of people aged over 10 years. This performance is even more striking among women. In 1994, over 4 women in 10 were still illiterate and still 1 in 3 in 2004, a phenomenon which was more pronounced in rural areas due to early interruption of schooling. The gulf between rural and urban can also be seen in infant mortality which is perceptibly higher in rural areas than in the towns, despite a clear downward trend, with a rate of 2% in 2004 while it was still close to 3.2% in 1994.

In Algeria, education is free and compulsory for ages 6-15 years. The literacy rate for those aged over 15 years has therefore risen, from 65.50% in 1998 to 76.3% in 2005, with a spectacular improvement in rural areas (from 48.5% in 1998 to 68% in 2005). Despite that, the gender gap is still considerable. In 2005, 84.5% of men were literate against 54.3% of women. The infant mortality rate is 30.4 per thousand live births. It is higher for boys (UNDP, 2006).

20 - MAPA, Agro-food Statistical Yearbook.

21 - Agricultural census, 2000.

22 - Ministry of Agriculture and Fisheries, Agreste 2005, Structural Survey 2005.

The Moroccan rural population is lagging behind in social development compared with the urban population, as measured in particular by high rates of illiteracy, poverty and mortality (High Commission for Planning, 2008).

In Turkey, the rate of primary school attendance was 92% for girls and some 95% for boys in 2004. With the extension of compulsory education to the start of the secondary cycle, the gap between the genders has been shrinking somewhat for around ten years. The literacy rate for those aged 15-25 years shows slight gender differences: 98.4% for boys against 94.8% for girls.

Over the last thirty years, the birth rate in Albania has fallen by over half, from 6.85 births per women in 1960 to 2.66 in 1999. This decline was matched by the decline in infant mortality, which fell from 8.3% in 1960 to 2.3% in 2005. In the mountain regions of the North-East, however, birth and mortality rates remain very high and above the national average.

In 2005, Egypt was ranked 111th in the HDI and 112th in 2007, with life expectancy at birth of 70 years (56 years in 1976), infant mortality of 22 per thousand in 2004 against 108 per 1000 in 1961, a literacy rate of 65.7% for men and 56% for women for the country as a whole. The percentage of women with secondary and higher education is 35.6% in urban areas and 13% in rural. The national unemployment rate is 10%, while it is 24% for women.

Table 4 - Literacy rate and level of education in rural and urban areas in Egypt in 2005 (%)

	Literacy rate		Population aged 15 years and over (secondary level and higher)	
	Men	Women	Men	Women
Urban	78.6	63.6	40.2	35.6
Rural	53.2	29.6	20.2	13.5
All Egypt	65.7	56.2	29.3	23.5

Source: World Bank, *Egypt Human Development Report*, 2005.

These data clearly show the persistent gap between rural and urban and between men and women. There are also large inequalities between rural regions themselves: the detailed data (excluding towns and urban centres) show that the literacy rate is highest in the rural regions of Lower Egypt where the rate is 59% for men and 50% for women, while in Upper Egypt, it is 45% for men and 38% for women. Similarly, the infant mortality rate is 15.8 per 1000 in Lower Egypt and 25.8 per 1000 in Upper Egypt.

Critical infrastructure: drinking water and sanitation

Apart from dispersed areas of habitation, which are difficult to cover properly, rural areas and agglomerations in most Mediterranean countries have experienced a significant improvement in infrastructure, especially roads, water, electrification and social services. Sanitation and water quality, however, remain highly problematic.

A very considerable proportion of Turkish rural infrastructure concerns the village road network (285,632 kilometres),²³ both because it can bring social progress to remote communities and because it facilitates access of local products to markets. With this network, practically all villages in Turkey are serviced, even if the quality of the roads often leaves something to be desired, especially due to sometimes harsh climatic conditions. Electricity and telecommunications, despite notable progress, are still limited in rural areas. The rate of Internet access in 2005 was 11.6% in urban areas against 3.5% in rural. Improving access to information, especially for the young, has thus become a priority for the country. More seriously, only 2 million of the rural population of 24 million are covered by social security, and women are virtually excluded. The recent Act No. 2926 on social security of agricultural workers not in multiple employment was a failure. The supply of drinking water reaches 95% of the population but only 87% of villages (KHGM, 2006), while the sanitation system remains one of the most worrying problems. Despite the lack of official data, it is estimated that only 6% of villages have a sanitation system.

Algeria has an equally developed road network with some 104,000 kilometres including 640 km of motorway,²⁴ which is being extended with the planned North-South and East-West motorways and the opening up of the most remote areas. The rate of rural electrification was 96% in 2006, the rate of penetration of drinking water 85% in 2005 (National Economic and Social Council (CNES, 2005) and the rate of gas penetration in rural areas was 36% in 2006 (Ministry of Agriculture and Rural Development (MADR), 2006). Lastly, rural housing still included 5% of precarious buildings in 1998 (General Population and Housing Census (RGPH), 1998).

The rate of provision of drinking water in Tunisia rose from 82% to 92% between 2001 and 2006, in which year almost 45 million Tunisian dinars were spent to reach 65,000 beneficiaries. According to the General Population and Housing Census of 2004, however, the rate of connection of homes to the public drinking water supply is still very low in several rural governorships (from 13% to 37%). The rate of rural electrification in 2006 was 98% in rural areas in Tunisia, with over 12 million Tunisian dinars spent on connecting 17,350 beneficiaries, as well as the electrification of 400 rural homes by the photovoltaic system. Yet some rural areas have connection rates of less than 85%. Lastly, rudimentary housing in rural areas only represented 1% of all Tunisian housing by 2004 (against 44% in 1966 and only 3% in 1994). Only mains sanitation and the natural gas grid have not yet reached the rural environment

In Egypt, an improvement can be observed in the national coverage of electricity and drinking water. In 2004, 99% of the national territory was electrified and 95% was supplied with drinking water. However, rural communities suffer from a lack of access to water of good quality, and increasingly, drinking water. In the Human Development Report - Egypt (2005), it is estimated that 20% of cases of infant mortality (children aged under 5 years) are linked to poor water quality. Sanitation in rural areas is qualified in the same report as a "silent emergency". In 2003, just 13% of rural housing was equipped with modern toilets against 67% in urban areas, and 21% of rural housing was connected to the public sewerage grid compared with 84% in urban areas. The

23 - www.khgm.gov.tr

24 - International Road Federation, 2003.

absence of a system for collection and treatment of waste water or connection to the sewerage grid lie at the root of a great many public health problems.

In Albania, the level of incomes and public services in the mountainous regions is still very low compared with the national average and development goals: poor quality of care, telecommunications, road transport, drinking water and electricity supplies, inadequate and insufficient hospital equipment, closure of classes and postal services, etc.

In France, small and medium-sized towns tend to concentrate service provision, but there is automatic link between the demographic dynamic and the level of service provision. The periurban fringes, whose population is increasing, are often less well equipped than rural population centres. It should, however, be clarified that what is seen is a decline in both private and public services in small isolated rural communities, one of the problems of rural areas induced, in particular, by the “diffused” urban development model, being that of the cost-effectiveness of public services and facilities. The development of the new information and communication technologies (NICT), and especially high or very high speed Internet access now determines the continued presence or installation of many businesses, opportunities of telework, the creation of call centres and a growing number of aspects of daily life in a rural setting. These technologies offer new ways of breaking out of isolation and new activities for remote areas. In 2006, 98.32% of the French population was covered by ADSL, which still left out almost 2% of the population and 10% of the territory.²⁵

Spain has also made use of NICT, especially fast Internet access, a condition of economic development in rural areas. Data for 2006²⁶ show a significant improvement in facilities and use of new information and communications technologies in municipalities of less than 10,000 inhabitants, although the “digital divide” persist between rural and urban areas. The proportion of homes with broadband access rose from 6% in 2004 to 17% in 2006.

In Greece, despite all the efforts made, the disparities between rural and urban and tourist areas are significant. Internet coverage is 20% in the majority of rural areas, but 43% in Attica and 40% in the Aegean region. Current needs are related less to major investments and works than improvement of the existing services and management of improvements: better access to NICT, lifelong learning to improve people’s skill levels, and support for the integration of renewable energy (local production and consumption), support for the reorganisation of education in the most remote areas.

Stimulating development in the hinterland and opening up the landlocked areas of the North

A fair balance between innovation and government regulation

The increasing gap between rural and urban areas is echoed in all Mediterranean countries by similar phenomena within rural areas themselves, to such an extent that Europe has decided to reallocate aid between the first and second pillars of the CAP,

²⁵ - Inter-ministerial delegation for regional development and competition (DIACT) website, www.diact.gouv.fr

²⁶ - INS, 2006, Survey of facilities and use of new information and communications technologies.

respectively support for production and support for rural development. At the same time, the EU set a minimum level of public expenditure on rural development to “force” each State to allocate the resources and in particular to follow the example of the Leader approach. This tool very quickly proved to be the best suited to promotion of rural diversification and improvement of life in the countryside (cf. also chapter 11).

Compared to the previous period, the analysis of the rural development strategies of European countries over the period 2007-2013 (Mantino, 2008) confirms a perceptible redistribution of public spending towards disadvantaged areas²⁷ and rural diversification. The implementation of projects and their adaptation to local conditions depends enormously on the forms of government intervention and the collective intelligence of the local stakeholders, as perfectly illustrated by the following two examples, deliberately contradictory of each other.

The Mouzaki region in Greece (the mountain region of Thessaly) is an example of the revival of a rural area through the emergence of a tourist and residential economy in which the diaspora played a predominant role. This example is representative of rural revival through the promotion of the intangible assets of the territory linked to identity. Mouzaki enjoys a network of construction, timber and agro-food activities. This tiny region suffers from a problem of representation, but the political role attributed due to the diaspora has been able to offset the weight which the government did not give it. At present, there are two co-existent systems: the spatial system centred in Mouzaki (supported by the government’s regionalisation policy) and the relational system between the micro-region as a whole and its diaspora which has allowed it to recover its economic and socio-cultural links with national and international urban markets (in particular the towns of origin of members of the diaspora).

Behind this twenty-year long process is a combination of formal factors (possibilities offered by European programmes) and informal factors (the diaspora, cultural associations, headed by the women’s cooperatives, a movement launched some twenty years ago operating as a network, and the development of niche markets, combining traditional know-how and techniques acquired through international cooperation).²⁸ The latter have enabled a link between different sectors of the economy and, ultimately, played a role of territorial cohesion. However, the lack of flexibility and coordination between administrative levels, an approach which is still too sectoral and the inability to grasp the dynamics which are taking hold pose a threat to continued close relations with local communities and cooperation with actors of the diaspora. The climate of highly personal exchanges, non-market, which accompany the return of migrants to the village in all cases warrants reflection on the local economy and the drift to a client culture which can be the result.

At the opposite end of the scale, the example of Albania shows how the unresolved problem of mountain zones can arise in a country where reflection about rural development has hardly begun. With over 65% of the territory and some 35% of the population living and working there, the mountain regions are still the least developed in Albania,

²⁷ - A region is considered to be disadvantaged when it is situated in an arid or semi-arid zone, or more than five hours from a town of over 5,000 inhabitants. (World Bank, 2008).

²⁸ - The Domeniko Cigar Making Cooperative or the Evros Asparagus Producers Group.

despite their many advantages (natural resources, young and skilled workforce, etc.) and their immense potential for a flourishing tourist industry. Economic activities are in a state of stagnation, not to say regression, and there is a persistent tendency to abandon these regions, chiefly by the poorest groups but also young people and the active population.

No specific priority strategy has yet been devised for the sustainable development of these regions. Worth noting, however, is the successful experiment by the Albanian Agency for the Development of Mountain Regions (MADA) in setting investment priorities, supporting businesses established in these regions, and setting up forums and institutional structures for the inhabitants, not to mention the encouraging results of international cooperation programmes with IFAD, FAO or the World Bank. For all that, these regions are left out of socio-economic or environmental analyses carried out in the context of formulation of medium or long-term economic and social development policies.

Albania has not yet found answers to these strategic questions. What mountain regions do we need? A mountain specific economy along the lines of many European countries? Mountain regions with a tourist vocation, with the status of natural parks and protected areas? Or agricultural regions with fruit trees, forests and pastures, seeking to correct the effects of their natural handicaps by more targeted policies? The population of these regions is aware of the lack of concern and visibility of these problems in national strategic development documents. Albania is in danger, moreover, of finding itself faced with major difficulties in benefiting from the European structural funds for mountain regions in difficulty if it does not revise its procedures and criteria for the classification and definition of mountain regions, and if it does not explicitly draw up a national intersectoral policy for these regions.

Private funds to the aid of the State

The massive transfer and inflow of private funds, with frantic investment in construction, commerce or industry, raise the question of how to use and channel money from migrants, including the diaspora, into public funds. It is worth remembering that in the South Mediterranean countries, the sum of financial transfers from emigrants is greater than public development aid or direct investment in those countries (Ciheam, 2008).

Since 1992, Tunisia has had in place the National Solidarity Fund 2626,²⁹ an original programme for the development of landlocked and disadvantaged rural areas, called "shadow zones" which invites private contributions. Enhanced by State financial support, these contributions are used to finance programmes for the construction of roads, water-retaining dams, electrification, community facilities, health centres, schools, youth centres, libraries, etc. In 2004, the results were already gratifying: the count was over 2,000 shadow zones had been opened up or rehabilitated, 240,000 beneficiary families, representing some one million people had freed themselves from precariousness, over 4,000 kilometres of roads had been built, some 80,000 families had been connected to mains drinking water, almost as many connected to electricity grids, and over 62,000 homes were built. Parallel to this raising of rural living standards, Fund 2626 initiated parallel actions, in

²⁹ - Number of the post office current account opened to received aid and donations from all sources: individuals, companies or institutions.

particular, the creation of the Tunisian Solidarity Bank to grant small loans on favourable conditions (grace period, low interest rates, long repayment periods, etc.).

In 2001, Fund 2121 was set up to combat unemployment and support job-seekers through additional training to enhance their employability. These support measures enabled hundreds of areas to escape isolation and thousands of people to achieve more decent living conditions. Thus experiment in development through solidarity was behind the creation by the United Nations of the International Solidarity Fund on the proposal of Tunisia.

In Egypt, the development of desert land having become an absolute priority for the last twenty years and public investment remaining insufficient, government policies gave the private sector a central role in investing in development works, infrastructure and, of course, production. The attractiveness of the Egyptian economy for the private sector has become a recurrent theme ranging from the modernisation of institutions to the upgrading of standards and nomenclatures to international level.

The new challenges for rural areas

Population trends are undoubtedly one of the major challenges for the Mediterranean. The bulk of demographic growth in the last thirty years has been in the towns, in much higher proportions in the South and East (3.6% per year against 2.5% for the rest of the Mediterranean, especially in Egypt and Turkey). This phenomenon is accompanied by a general concentration on the coast: 80% of the populations of Greece, Italy, Israel, Tunisia, Libya and Lebanon live on the coast (Plan Blue, 2005). By 2050, the populations of the South and East alone could see their numbers increase by 137 million people (Plan Bleu, 2008).

Nevertheless, it would be wrong to ignore rural demographics. The rural populations of SEMCs, characterised by their youth and dynamism, will continue to grow, in absolute terms, until 2020, despite an internal exodus and emigration to the northern shore, to escape the countryside, a synonym of backwardness. Conversely, those of the North Mediterranean countries, which tended to diminish during the second half of the 20th century, are still generally suffering from depopulation and ageing. However, new processes are emerging, in particular attached to diffused urbanisation. Urban dwellers are now moving to the country to get closer to a healthy and natural environment. In some countries, especially Spain and Greece, immigration, foreign or from the diaspora, is coming to the aid of renewal of their rural areas.

When they do not participate in pendular movements towards the agglomerations, rural populations work mainly in agriculture in the South and East Mediterranean. Many are rural dwellers with multiple activities who combine a job in administration or commerce in town with an agriculture activity, or indeed, more than one. In all these countries, without exception, the number of agricultural workers continues to grow strongly. In 2005, Albania and Morocco, Egypt and Turkey has the highest share of agriculture in employment, close to 30% and 50% respectively. Generally, however, wage employment is far outstripped by family labour, the majority of workers have no formal status and little is known still about the share of the informal sector. Despite the pre-

dominance of agriculture, it is gradually giving way to service activities and commerce, mainly in the form of wage employment, as the creation of non-agricultural enterprises in rural areas remains almost nil. However, this phenomenon remains negligible compared with the degree of tertiarisation and deagrarianisation of the countryside in the countries of the North.

The Mediterranean countries are fundamentally differentiated by rural diversification, diversification on farms and evolution of the status of agricultural workers. On the other hand, multiple activities, the predominance of small farms, ageing and the lack of skills of agricultural populations are phenomena observed everywhere, in different forms and to different degrees. What these countries also have in common is that their political concerns are focussed on the increase in social disparities between urban and rural areas, as well as questions of territorial cohesion. Degrees of urgency, it is true, vary. The talk is of food poverty, access to drinking water or road access in the SEMCs, the digital divide and the competitiveness and attractiveness of regions in the North. Yet in all the countries, the gap between the rural and the urban environment in education, literacy, income levels, quality and permanence of services and basic infrastructure in the rural environment is widening, as well as between regions. It requires more appropriate means. In all the countries, equality of opportunities in the rural environment remains a goal to be achieved.

Countries of the North and SEMCs share the persistent difficulties of their political, social and economic institutions to solve the problems discussed here. While the majority talk about or promote principles of participation and decentralisation in development projects, actions in favour of rural areas are still very often aimed at the development of agriculture alone, and not the non-social productive functions of rural areas. The share and amounts of financing specifically destined for rural development are, of course, extremely difficult to identify separately, but the resources allocated in total fall far short of the needs that have been identified.

Bibliography

Aboulata, M. F. (2007). Policy reform, population and demography. In Rural development policy in Egypt towards 2025. Alterra-rapport, 2007

World Bank, *World Development Report: Agriculture for Development*, Washington (D. C.), World Bank, 2008.

World Bank, 2006. Tunisia - Agricultural Policy Review.

Benbekhti O., Saifi A., Benziane B. 2006. Algérie: De la réforme agraire au développement rural, l'évolution des interventions en milieu rural. International Conference on Agrarian Reform and Rural Development (CIRAD). Porto Alegre. Brazil 7 to 10 March 2006. 16p.

Berque (A.), "Les rurbains contre la nature", *Le Monde diplomatique*, 647, 2008.

Bessaoud O. 2006. La stratégie de développement rural en Algérie. In Options Méditerranéens. Sér. A, n° 71. Pp 79-89.

Cannarella (C.) and Piccioni (V.), "Barriers to Innovation in Rural Enterprises: The Strategy of "Doing Nothing"", *New Medit*, 4, 2007, p. 54-61.

Ciheim, *Mediterra. The future of agriculture and food in Mediterranean countries*, Presses de Sciences Po, 2008.

CNES-UNDP, 2006. National Human Development Report, Algeria 2006.

Croppenstedt, A. (2006) Household income structure and determinants in rural Egypt. ESA working paper n° 06-02. Agriculture and economic development analysis division. FAO, January 2006.

Crozier (M.), *La Société bloquée*, Paris, Seuil, 1970.

Datt, G., Jolliffe, D., Sharma, M. (1997). A profile of poverty in Egypt. www.Ifpri.org., 1997.

Ellaithy, H. (2007). Employment, income and marketing. In Rural development policy in Egypt towards 2025. In Alterra-rapport, 2007.

High Commission for Planning, Agricultural Development Council (Morocco), *Agriculture 2030: quels avenir pour le Maroc?*, 2008.

Hervieu (B.), *Les Orphelins de l'exode rural. Essai sur l'agriculture et les campagnes du XXI^e siècle*, La Tour-d'Aigues, Éditions de l'Aube, 2008.

INRA, *Prospective les nouvelles ruralités en France à l'horizon 2030*, report of the working group Nouvelles Ruralités, 2008.

KHGM., 2004. www.khgm.gov.tr/2004

MADR. 2006. La politique du renouveau rural. Algérie

United Nations, Department of Economic and Social Affairs, *Trends in Sustainable Development: Agriculture, Rural Development, Land, Desertification and Drought*, New York (N. Y.), United Nations, 2008.

National Office of Statistics of Algeria. 2006. Principal indicators. ONS.

Ould Aoudia (J.), *Croissance et réformes dans les pays arabes méditerranéens*, Paris, Karthala-AFD, 2008.

Plan Bleu, *Les Perspectives du Plan Bleu sur le développement durable en Méditerranée*, Sophia Antipolis, Plan Bleu, 2005, 428 p.

Plan Bleu, *Les Perspectives du Plan Bleu sur le développement durable en Méditerranée*, 2008, 26 p. (www.planbleu.org).

Portnoff (A. Y.), "Oser l'innovation", *Futuribles*, 344, 2008.

RGPH, 1998. General Population and Housing Survey. Algeria. CD.

SPO., (State Planning Organisation). 2005. Millennium Development Goals Turkey-2005, Ankara

World Bank (2005). Egypt Human Development Report, 2005.

National studies

Abdelhakim (T.), National Study - Egypt, Plan Bleu-Ciheim, May 2008.

Ahouate (L.), National Study - Morocco, Plan Bleu-Ciheim, May 2008.

Ceña (F.) and Gallardo (R.), National Study - Spain, Plan Bleu-Ciheim, May 2008.

Civici (A.), National Study - Albania, Plan Bleu-Ciheim, May 2008.

Elci (A.), National Study - Turkey, Plan Bleu-Ciheam, May 2008.

Goussios (D.) (coord.), National Study - Greece, Plan Bleu-Ciheam, May 2008.

Hassainya (J.), National Study - Tunisia, Plan Bleu-Ciheam, May 2008.

Le Goff (A.) and Seiler (A.), National Study - France, Plan Bleu-Ciheam, May 2008.

Mantino (F.), National Study - Italy, Plan Bleu-Ciheam, May 2008.

Moulai (A.), National Study - Algeria, Plan Bleu-Ciheam, May 2008.



CHAPTER 7

MANAGING COLLECTIVE LAND AND RANGELANDS

Alain Bourbouze (Ciheam-MAI Montpellier), Abdallah Ben Saad (IRA, Medenine, Tunisia), Jeanne Chiche (LAV Hassan-II, Morocco) and Ronald Jaubert (IHEID), Switzerland)

In the southern and eastern Mediterranean countries, public land, commons, tribal or douar collective land, State-owned land, religious trusts, dead land and numerous other legal forms of land tenure still serve to support the economies of many rural communities, particularly in the most difficult regions, where pastoralism is the main activity. The issues at stake in these regions are many and varied and merit closer attention: they are economic in nature, for the supply of meat to towns and cities needs to be regulated and the money transfers from emigrants to their communities of origin, which are fundamental to the economy of these regions, needs to be managed; they are sociological in that the conflicts amongst livestock farmers have to be controlled and action is needed to combat the poverty that prevails amongst the smallest farmers; they are political in that difficult areas, which are often border zones, need to be protected and internal emigration must be curbed; and, lastly, they are ecological in nature, since measures are needed to control erosion, overgrazing and the loss of biodiversity.

Land that is used communally, including collective land strictly speaking, is of course only one element of the pastoral problem, but it concerns vast areas and many different population groups who take part in the local economies. In the Maghreb, it is reckoned that 12 to 15 million people are living in difficult regions, steppeland areas, mountains and arid regions, where agro-pastoral systems using collective rangelands predominate. In Syria, the *badiya* (Syrian steppe), which includes areas where annual rainfall is less than 200 mm, covers 55% of the territory, and population estimates vary from 0.9 to 1.5 million people (cf. Map 1).

This wide variation is due to the fact that this population consists mainly of semi-nomadic families, who often have one fixed base, and sometimes several, situated outside the *badiya*. The main place of residence of many families can thus be defined as either inside or outside the *badiya*.

The exact population figures are uncertain, as are the figures on area, for the statistics on the rangelands that are actually used “communally” are very mixed: State-owned or common forestlands or rangelands that are wooded to a varying extent, farmland that

Map 1 - Locating the badiya

is lying fallow and long-term fallow land. In the case of Morocco, the 1996 census recorded 11.8 million ha of collective land, but this figure only includes delineated land, very little of which is registered. Approximately 1 million ha that are officially cultivated have to be subtracted (in actual fact probably twice that area) as well as wooded land or steppe that has been incorporated by law into the State-owned fixed assets (forests, esparto grasslands, etc., i.e. 6 to 7 million ha), which the pastoralists use communally, plus the arid and desert areas (30 million ha!), such as the Saharan south-west of the country, which is not yet covered by the Land Code. The authorities still seem to be sitting on the sidelines as regards the status to be given to these areas, which are still part of the land “assimilated to collective land” on the basis of the way in which it is used.

In Algeria, there are 39 million ha of State-owned rangelands (the former *arch*), excluding desert land, but there are as yet no precise data on the proportions that are under crop and those that are used for grazing. In Tunisia, 1.4 million hectares have recently been divided up (and most of this land is cultivated), and a further 200,000 hectares still have to be dealt with. There are only 1.4 million ha of common rangelands left, which are either in collective tenure (400,000 ha) or in forest tenure.

Collective rangelands in agrarian history

Although the Maghreb and Mashraq have very different histories, it can be said in general that collective land in the steppe regions and mountains (including forest areas) was farmed extensively in the mid 19th century by communities of nomadic farmers (the Arab Rahala in the Maghreb and the Bedouins in the Mashraq), who lived in tent settlements and moved around the region with their herds of camels and flocks of sheep

and goats. These pastoral areas, whose borders were fairly fluid, were divided into areas of influence or territories with focal points situated around the limited areas of cropland¹ and the water points used in the summer. Nomadism was organised in large armed groups, whose extensive mobility was structured around three imperatives: to defend and watch over the tribal territory, to seek pastureland that could be farmed in accordance with the climate sequences, and to get to markets, for it was not possible for these nomads to be self-sufficient; they traded and bartered goods (sheep and goats for cereals, dates, henna, etc.) using large herds of camels for transport (and mules in the mountain areas), which accompanied them everywhere.

When the Maghreb became part of the French colonial empire,² colonisation in the steppelands and mountain areas took the form of supervision rather than occupation, which was the case in the plains. This episode thus did not involve extensive land spoliation, nor did it disrupt pastoral production methods. But the changes that came about, whether welcome or not, were nonetheless far-reaching: the precarious existence of these population groups was attenuated through the introduction of preventive measures for animal and human health, and through action to open up these enclaved pastoral societies to the national economy; furthermore, lawyers in Algeria, Tunisia and Morocco were called upon to “produce an interpretation of the indigenous land tenure system that would allow the colonists to appropriate land and at the same time preserve the minimum of agricultural area necessary to the survival of the rural communities”. The strategies adopted differed somewhat from one country to another.

Algeria, which first came under the control of the Ottoman Empire and was then colonised by France, and where the pastoral areas were the collective property of the tribes, was a veritable field of legal experimentation. In the early days of colonisation there were advocates of a very state-centred vision of Muslim land law. “The pre-colonial state, and thus its colonial successor, owned the land of the country and tenancy was merely a leniency granted to the tribes by the sovereign; one could thus simply draw on these as yet uncultivated land reserves in order to create official colonial property.” Others, who were supported by the colonists, held, on the contrary, that the land – and in particular the collective tribal land – was owned under private law (*kharaj* land) and was therefore deliverable to the market without any legal constraint. These issues are expressed specifically in the main laws of the colonial period. The Senatus Consulte Law of 1863 makes a distinction in the territory of each group between *beylik* property (belonging to the State), *melks* property (belonging to individuals), common property and collective property, the last two categories being group property. This law, which came into effect at the end of the 19th century, stipulated that the territories of the tribes and *douars* were to be delimited and that private property was to be created. Since it was considered at the time that the steppes could not be colonised, the only delimitation measures that were carried out concerned the tribal territories.

The legislation introduced in 1873 and 1887, on the other hand, aimed to facilitate access for colonists to collective land by returning to the concept of *arch* land in the sense of

1 - The few areas of arable land in the lowlands or flood areas were open to all for individual use, which was organised in various ways (drawing of lots each year for the distribution of the parcels, and so on).

2 - Algeria was colonised in 1845, Tunisia became a protectorate in 1881, followed by Morocco, which, although the colonial power was present from 1906 onwards, was not completely occupied until 1937.

tenancy tolerated by the State. The changes concerning forestland were more radical for the various population groups. Before colonisation, forests, “dead lands”, that is to say, “land which produced nothing and belonged to no one”, were the property of the *beylik* (central power), and the riparian populations were entitled to use it (for grazing, cutting, hunting, and ploughing clearings). The French State took over from the *beylik* and appropriated the forestland. Colonisation subsequently limited rights drastically and grazing was only allowed according to what the colonial power considered to be the forest’s “potential”. It was prohibited to bring animals into the forest that were intended for resale as well as animals that were tended by one person for another person; furthermore, the law of 18 July 1874 prohibited grazing for six years after any forest fire.

After Independence (in 1962), the nationalisation of *arch* land (in 1971) prepared the way for incorporating the steppes into the new Pastoral Code in 1975, bringing them under municipal management. The authorities antagonised big and small farmers; the legislation was a failure and it brought the end of consensus. A law passed in 1983 then allowed access to individual ownership of these areas, provided that the land allocated by the State was developed agriculturally (access to agricultural land ownership). Here again, the legislation was unsuccessful. The 1990 Land Planning Act then endeavoured to give a more effective definition of steppes (land below the 300 mm isohyet) said to be “for pastoral use” and to integrate them into the property owned by the State, thus providing a basis for a new policy for developing land through leasehold (Bessaoud, 2002). The legislator was well aware that crops were grown on rangelands and made provision for a new law (which has yet to materialise) that was to define the ways and means of granting rights to the perpetual use and enjoyment of that cropland. In actual fact, land tenure in the steppes has always been open-access tenure, and herdsmen have been duty-bound by custom to respect the cleared areas under crop.

In Tunisia, the colonial authorities first drew on the *melk* lands in the north of the country and along the coast when looking for land to distribute to the colonists; subsequently, in order to cope with growing demand, they sought legitimacy in Muslim law in order to appropriate part of the collective land of the tribes. The *beylik* decree of 1896 declared that dead lands (*mawat*) belonged to the State, thus denying the tribes the right of ownership which throughout Islamic countries derived from occupation and ancestral enjoyment. The same decree recognised that there were 3 million ha of collective land in the centre and south of the country and called upon the administration to delimit that land without delay. This was done between 1905 and 1912. Some land was thus recovered, becoming State property, and was then distributed to the colonists, but, as was to be the case in Morocco some time later, there was heated debate amongst the colonial lawyers, some of whom, such as Dumas, almost alone against all, defended “the ancestral right of the tribes to the enjoyment and collective ownership of their lands”. The decree promulgated in 1935 officialised the status of the lands enjoyed by the tribes, also making provision for granting legal personality to a tribe by creating a management council, which replaced the traditional council of notables (*myad*). By adopting this measure the colonial administration made this structure more democratic, since the designation of members of the council by the notables themselves was replaced by the election of members by heads of families. The notables, who were worried about control by the administration and the risk of land spoliation, proceeded to divide up flood areas (*felta*) as of 1905 on a strictly egalitarian basis. By 1935, their appetites had been whetted

and the land was allocated according to the “vivification” rule, which, in Muslim law, ratifies clearing operations and, so to speak, rewards the efforts made but creates major inequalities. This was compounded by the land divisions carried out on the basis of the legal costs incurred by each head of family as the result of the numerous lawsuits amongst neighbouring communities over boundaries...

Just before Tunisian independence (1956), there were 3 million ha of collective land, i.e. almost one third of the country’s farmland: 1,550,000 ha for agricultural use and 1,450,000 ha for use as pastureland. Successive land divisions for crop-growing, population pressures and the administration’s constant concern to “settle the nomads” paved the way for the major parcelling operations that were to follow. These began in 1972-1974 and are still continuing today (see below).

In Morocco, colonial legislation, which was experimental in Algeria and already in its stride in Tunisia, opted for a pluralist system that made a distinction between State-owned property, *melk* property, registered private property, *habous* lands and collective land. In the case of the latter, the famous 1919 Dahir stipulated that “the tribes’ right of ownership of the cropland and rangelands which they enjoy collectively can only be exercised under State supervision”. The communities were thus fully authorised to conduct the internal management of their territories. The operations to mark out territories (defining boundaries and rights of use) laid the groundwork for land use, settling tribes definitively on their territories and officialising the collective status of the latter as it is currently laid down by law. The intentions of the colonial authorities were more or less laudable: although they were admittedly aiming to protect the collective lands from the appetite of the colonists, they placed the communities under close political control. Louis Milliot, the eminent lawyer from the Algiers School, whom the Protectorate consulted in 1921, was explicit as to the justification of this option: “Let us guard against uprooting the population and congesting towns and cities with a proletariat that is liable to fall in with troublemakers. Any untimely or premature measure such as distributing large numbers of smallholder parcels to settlers would convince that proletariat that it is going to be the victim of successive spoliations; serious unrest could ensue.”

Despite these relative protections, the land and distribution operations completely disrupted pastoralist movements. An entire population was either driven to marginal areas or attracted by the new incomes procured by work on colonial farms, in mines or esparto grass yards or by emigration. More serious, the conferring of State-owned status on “any land covered with woody vegetation of natural origin” was perceived by these (essentially Berber-speaking) population groups as an infringement of their rights. This concept of State ownership, which was applicable to forest areas where customs were veritable rights, has been an eternal source of conflict ever since, ranging in intensity from one country to another.

Although Turkey is not part of the Mashraq, the country played a major role in this chapter of land history. Turkish legislation governing collective and common land dates back to the zenith of the Ottoman Empire. General census records were introduced under the reign of Suleiman the Magnificent (1520-1566) in order to determine land tenure rights, and these records were subsequently complemented by a large number of *firman* (orders issued by the Sultan in writing) and eventually incorporated into the

Land Code in 1858, which left its mark on all of the territories of the Empire from the Balkans to Algeria. That Code made a distinction between five main categories of land: land in private property (*mullak*); *miri* land, mainly agricultural, where tenancy was granted by the State; this land was gradually assimilated to private property; land belonging to religious institutions (*waqf*); land which one or several villages were entitled to use and which could not be appropriated (*matruka*); and, lastly, “dead” land (*mawat*) or uncultivated land which was reserved for grazing and on which Islamic law awarded *ihya*, which granted the land to whoever developed it. The latter two categories, *matruka* and *mawat*, were for common use. In 1923, Ataturk proclaimed the Republic and modernised the law of the Empire by adopting provisions from the codes of western countries. But the instruments concerning land allocated as collective pastureland were so vague that the former instruments continued to be authoritative and the former provisions of the Land Code and of Ottoman customary law still have to be applied today in judicial decisions. This body of former rules obviously does not adequately meet the needs of present-day pastoralism in Turkey.

In Syria, the Ottoman *qanun* or Syrian Civil Code did not define any categories for designating “tribal territories” (*dirah*). Uncultivated steppes corresponded to dead land (*mawat*), which was open to everyone. At the beginning of the 20th century, “the world of the steppe was divided into three main tribal groups: camel-herding tribes, sheep-raising tribes and semi-nomadic tribes. The Bedouin economy was based on animal husbandry and, in the case of camel-herding tribes, on plunder and ‘safe passage’ or other tolls.”³ The use of these territories, whose boundaries were fluid, was connected with the water points, wells or water tanks, to which access depended on tribal affiliation. The Mandate administration was well aware of the strategic importance of these wells and water tanks, which marked the tribal migration orbits; they were listed and mapped together with the tribal migration areas by the French military in the 1930s (Métral, 2006).

Around the 1940s, nomadic pastoralism seemed doomed as a lifestyle when the tribal raids and ‘safe passage’ tolls came to an end, the caravan trade collapsed and the camel stock was seriously depleted. Crop expansion into the steppelands marked the beginning of considerable changes (Chatty, 1986). Although the fluid boundaries of the tribal territories were compatible with rangeland use, they became a source of conflict when the pastureland was cultivated. Negotiations on the delimitation of the territories continued in the 1940s and 1950s and resulted in the conclusion of territorial agreements. The tribes had two primary objectives: to specify the area where their members could submit an application for land for cultivation and to ensure their access to pastureland (Rae, 2006). These agreements constituted recognition of customary and tribal rites. The vivification principle granted the tribe that was authorised to cultivate the land the right of ownership until the harvest, and once the crop had been harvested the field returned to open-access status.

These years were marked by rapid growth in the cultivated areas in the *badiya*, more specifically in the plains in the east of the country, where almost 1 million ha were cultivated within a space of some 10 years. Together with the increase in cotton-growing in irrigable areas, this expansion contributed to the rapid growth in agriculture in the

3 - Métral (2006).

Managing collective land and rangelands

1950s and was led by farm contractors, most of whom were from Aleppo and who had invested in the purchase of tractors and harvesters. These contractors farmed the land in conjunction with the chiefs of the Bedouin tribes, providing seeds and carrying out all of the work; 80% of the harvest accrued to them and the remaining 20% went to the tribal chiefs, who were also entitled to use the straw and stubble for feeding their animals. The agricultural enterprises farmed several thousand hectares individually, and the crops spread to the detriment of the best pastureland.

After independence (1946), Syrian policy on the steppes and on nomadic pastoralists was called in question. The 1947 programme of the Baath party called expressly for measures to settle the Bedouins, and the project was included in the 1950 and 1953 Constitutions. Furthermore, the 1951 agrarian reform project made provision for expropriating the large demesnes which the Bedouin chiefs had established at the time of the Mandate. It met with opposition from landowners and the chiefs of tribes represented in the parliament and was never applied; the nomad settlement programme has also remained a dead letter.

The establishment of the Arab Republic uniting Syria and Egypt in 1958 marked a decisive turning point. In addition to the implementation of land reforms, the special legal provisions enjoyed by the nomadic tribes were abolished, and the very concept of tribe was eliminated from official discourse. However, contrary to what might have been expected of the Baath party, no settlement programme was introduced, and the extension of agriculture in the steppelands, the development of irrigation, the general introduction of power pumps and the boom in cotton production marked the recovery of a very opportunist and very reactive Bedouin economy.

In the early days of independence,⁴ the traditional pastoral societies of the Maghreb and of the Mashraq were already undergoing transformation: as the result of the population explosion, the population in the steppe regions quadrupled in just under a hundred years;⁵ nomad settlement, which had started at a very early date, was progressing rapidly; new-found security had resulted in the splintering of defensive groups into small units, which were more peaceable; the scope of nomadic movements was much reduced, and markets opened in the middle of the steppelands or on the borders; the most deprived had already left the steppes to seek employment elsewhere. Colonial management, protectorates and other mandates, thus left a deep mark on these pastoral areas.

The historical heritage

The upheavals described above are almost contemporary. Compared to the other Mediterranean countries, particularly those on the northern shores, pastoralism in the countries of the South exhibits several fundamental aspects dating from that history.

- *The persistence of vast territories used collectively.* Public land (collective tribal or *douar* land, dead land, etc.) still serves to support the economies of many communities in difficult regions and plays an important role in maintaining small peasants – the right

⁴ - Morocco and Tunisia in 1956, Algeria in 1962, and Syria in 1946.

⁵ - In the period from the late 19th century to the year 2000, the populations of Tunisia, Algeria and Morocco increased from 1.8 to 10 million, from 5 to 30 million and from 4.5 to 28 million respectively.

to collective land is “the right of the class which owns nothing”. These land reserves are coveted and are an issue where the stakes are still as high as they were in the past.

- *Animal and human mobility.* Tents, huts or the yurts of the Yörük, the essential equipment of mobile herdsmen, still endure today in many regions (in the central and eastern High Atlas, in the Zemmour-Zaer region and in the steppes of eastern Morocco, in the high steppe and desert regions of Algeria, in the arid regions of El Ouara and the Dahar in Tunisia, in the Syrian and Jordan steppelands, and in the Taurus Mountains in Turkey). And even where the tents have been put away, or in regions of long-standing settlement where they were never used, migrations over long distances are nonetheless still undertaken, particularly in the case of large herds or flocks. It should be added that sedentary animal husbandry on rangelands is a practice found throughout these regions, “sedentary” meaning here that the herds and flocks often travel long distances but return to the village each evening. This form of animal husbandry is more common in agro-pastoral than in pastoral systems.
- *The persistence of the “tribal phenomenon” and the resistance of customary law.* As a corollary to the above, this is an aspect that administrations frequently dismiss or underestimate. Although it is not always the case, the modern administrative apportionment of a country (rural community, delegation, etc.) often aims to parcel out pastoral territories, in line with the general idea that “the *arouch* must be broken”.⁶ But the rule that is applied – a rule that has been taken from customary law and incorporated into modern law – states that it is affiliation to a group (tribe, faction, lineage, etc.) that gives rise to the right to collective grazing. The use of collective resources and the conditions of use are based on these crossed rights and are thus controlled to a greater or lesser extent by the communities concerned. But this type of intention must be placed carefully in context, since situations differ widely from one country to another.

In Syria, the Baath revolution in 1963 tried to break the power of the tribal chiefs. In the Al-Jazira region, the implementation of a huge Euphrates project which would intensify agricultural production and bring a “new socialist society” was to be based on new frameworks. But in the 1970s the tribes asserted themselves as the inescapable vectors of the advantages granted by the regime, and their chiefs infiltrated the agricultural cooperatives. The successive Syrian regimes actually adopted a pragmatic attitude to the dominant tribal society, allowing the structures for controlling the population to be diverted to the advantage of a minority of sheiks from the semi-nomadic *châwaya* tribes, provided that they were active Baath Party executives. Do they still control the pastoral areas? Surveys conducted in Aleppo Province reveal clearly that customary law exists which is based on the concept of tribal territories (Rae *et al.*, 2002), but many farmers consider that the role played by the tribal authorities in pastoral management is weak (Wachholtz, 1996). Officially, the Syrian projects concerning the rangelands are very vague, mentioning the “Bedouin community” or pastoral communities, and they carefully avoid specifying any structures.

In Algeria, on the other hand, the power of the tribes was systematically eroded throughout the colonial period, and the pressures which the authorities brought to bear in order

⁶ - That is to say, the tribal system must be broken, to quote the expression attributed to Bourguiba.

to break the tribal chiefs (in particular during some ten peasant revolts which took place in the course of the century and which were severely repressed) were much more forceful than in the countries under mandate or protectorate. The ensuing War of Independence and its notorious strategy of regrouping the population followed by the incorporation of the *arch* lands into State property in the new Algerian State considerably reduced the influence of the old structures, which, although they were not completely eliminated, were greatly weakened (Bessaoud, 2002). However, in the context of the measures to provide access to agricultural land ownership where the land was granted for development to outsiders, it was preferable for the latter to pay the *arch* (tribe) “peace money” (*hak* or *affia*).

There have been no such practices in Morocco, where affiliation to an ethnic group gives rise to the right to collective grazing. The tribal framework and the custom-based organisation that often goes with it mean that pastureland can be managed at the local level despite numerous conflicts and malpractices concerning access to resources. The same applies to Tunisia, but less explicitly; there, the sharing of collective land depends on the management council, which is composed of six full members who are elected by the community. In actual fact these elections draw on custom, allowing each lineage to be represented by one or several members, depending on the significance of the lineage. In the “Deep South”, the old tribal organisation still exists in attenuated form (see Prodesud project below).

The region’s historical heritage thus prevails in the steppelands and marginal areas. But these societies are subject to numerous forces which together have been contributing to the upheaval and transformation of lifestyles and production methods, particularly since the 1960s, accentuating a movement that had begun to a large extent in the previous phases.

Pastoral management in the dock

Rangeland overgrazing?

All are agreed in denouncing the inefficient use of collective land. The vegetation on these lands is dominated by steppe in the arid desert plains (overwintering plants, wood species or grasses are predominant, covering 10% to 80% of the ground surface) and a little more diversified in the mountains. But clearing operations have developed to such an extent that rain-fed agriculture and tree farming have become permanently established both in the Maghreb and in the Mashraq, transforming agrarian systems and creating new landscapes that are less homogeneous and more “patchworked”, and the collective lands are part of this mosaic.

The specialists’ assessment seems conclusive: overgrazing, plant depletion, loss of plant stamina, and degradation of the ecosystem are the most evident signs of what is considered to be a worrying state of collective land, particularly in the steppe regions. Output potential is estimated to have dropped by 75% in Algeria, where esparto grass cover has decreased from 40% to 13% in fifteen years. Depletion is particularly marked in the case of palatable perennials. Cover crops remain for ecologists the worst enemy of collective areas, since they establish an irreversible situation, destroying plants and pulverizing the topsoil, which is thus made highly sensitive to wind erosion.

It is difficult to quantify the scale of the problem. It is estimated that a total of 5 of the country's 20 million ha have been seriously degraded. In Tunisia, the experts reckoned back in 1976 that 12% of the total area of the country was already "seriously affected" and 40% was "moderately affected". The problem seems to be more serious in forest areas (which for herders are simply areas that are grazed collectively), for disagreement between peasant farmers and the forestry departments is leading to the overtapping of forest resources; this is happening, for example, in the evergreen oak forests of the mountain regions of the Maghreb and Turkey.

In Syria, the question of the degradation of the *badiya* has been a matter of debate since the late 1960s. Given the present state of the vegetation, it is widely accepted that the Syrian steppes are today subject to rapid degradation, which is attributed to three major causes: bushes are being uprooted to provide firewood, pastures are overgrazed, and the area of cultivated land is expanding – the latter being unquestionably the most powerful factor in the transformation of the environment.

On the rangelands, even in rainy years, the plant cover is composed essentially of annual species and geophytes and is more dense during the wet season; there are very few, or no, perennial bushes. Crops have been banned, but regeneration of the vegetation is very slow or is not taking place at all. The hypothesis of overgrazing, which is coherent with the increase in the number of animals since the 1970s, has not in fact been verified. In the western region of the *badiya*, analysis of the vegetation trend since 1975 shows that the stable zones account for an average of 82% of the area studied and that vegetation has decreased on 6% of that area and has become more dense on 12% (Debaine *et al.*, 2006). The fact that the increase in the number of sheep does not seem to have caused overgrazing can be explained by the considerable extension of exploitable area compared to what it was in the 1950s and the shorter time spent in the steppes.

Collecting firewood remains common practice, as is testified by the heaps of bushes near encampment areas or houses, but it is mainly the older bushes that are taken, since they provide more woody matter. The collection of bushes would not cause the perennial vegetation in a given area to die out, at least, not immediately.

Certain points must thus be qualified. Ecologists, who are concerned at the cultivation of pastureland and the disappearance of pastoral ecosystems, do not always review their opinions on the status of the natural vegetation, even where the agrarian system has changed completely to an agro-pastoral or agricultural system. Few arguments have been put forward to substantiate the fact that the cultivation of collective land is systematically harmful to the environment, as specialists keep hammering out. Furthermore, the claim that the states of degradation are irreversible does not always hold, for the resilience of the steppe systems (their ability to return to a state of balance) is greater than expected and is surprising even the most pessimistic. Similarly, the fact that resources are being overtapped does not mean that there are no areas that are underexploited or left fallow in certain situations (conflicts, joint tenancy, very active emigration, etc.), as is the case in low mountain regions (the Rif area, Kabylia, Khrumiria) or in the semi-desert regions in southern Morocco, Algeria or Tunisia (El Ouara, the Dahar).

The management of pasture resources on collective land thus must not be called in question in the same way everywhere. In addition to systems that have been completely

disrupted, having been undermined by conflict and having overtapped resources, the social management in many areas is peaceable and more concerned with the well-being of the community than is suggested by the hackneyed expression of “the tragedy of the commons”, which has been constructed in theory and suggests that since these collective lands are doomed to disaster the only possible form of progress would be to divide them up. This is obviously a fundamental issue of debate.

Pastoral organisation and disorganisation, conflicts

Forms of pastoral organisation on collective rangelands

The importance of customary forms of rangeland organisation has often been neglected for lack of knowledge. Although they have practically disappeared, barring an inventory, from countries such as Algeria, Syria or Jordan, there are many examples in the Moroccan mountains, for example. They operate on the following principles:

1) *The dividing of pastoral territories.* The herdsmen use a specific pastoral area, which can be called, and which they themselves consider to be, their “territory”, and which is composed of rangelands that have collective and State-owned status. These lands are grazed and allocated to specific assignees, and it is affiliation to an ethnic group which gives rise to the right to use them. Pastoral territories are not always used exclusively by a particular group: there are intertribal pastures, tribal territories, faction territories and village collective lands. The latter develop in a number of outlying sectors that are too far away to be used by all of the villages in a faction. Only the closest villages eventually establish the right to use the land exclusively, which is then consolidated by the construction of sheepfolds and the cultivation of the land. The boundaries are not impassable barriers, except in specific cases, and the herders cross them frequently while grazing their animals on the neighbours’ land, provided that they do not sleep there, and perhaps in some cases that the animals are not watered there – they thus have a right of way. On the rangelands they will carefully avoid the “areas of respect” (*itissaa*) in the immediate surroundings of a tent, sheepfold, cereal plot or water point. Everyone knows the boundaries of these temporarily private areas and abides by the rules of propriety.

2) *Customary rules and resource management.* Customary institutions do not merely guarantee territories and identify rightful claimants; they also establish numerous rules and specific practices. Custom grants the right to cut grass or forbids the cutting of grass, the right to graze cows or sheep, the right to allow a permanent shelter, or *azib*, to be built or to forbid any such construction, the right to grow crops, to install a tent while grazing animals or to graze animals without installing a tent. Seasonal prohibition of grazing (*agdal*) is also a widespread practice.

The institution of *agdal*

This institution is still very much alive in the High Atlas mountains of Morocco. It involves prohibiting grazing on a clearly delimited area of the most productive part of the rangelands in the spring or in early summer. This ban on grazing in the most sensitive period for plants, since it is when they draw on their reserves and then flower, is extremely judicious, since it is a means of strengthening vegetation stamina and ensuring a reserve of standing biomass that will be available at the end of the season.

The system always follows the traditional pattern: the pastureland is closed and opened on agreed dates, which are laid down by custom but can also be changed at the request of a party, depending on the status of resources, and the pastures are watched by guards, who are paid by the community of herdsmen or, as the case may be, by the tribal faction located in the remotest area which fears infringements most. Their role is simply to report any offenders to the *jmaa*⁷ during the two or three months of their mandate; if the offenders are from the tribe they will be punished according to custom (they were formerly required to sacrifice a sheep, but nowadays they are fined). As is the case with the pastoral territories, a distinction is made between several types of *agdal*: intertribal, tribal, applied by a faction, or applied by only a few villages. In the case of the most modest village systems, pastoral management seems to be peaceable and consensual, but at more ambitious levels (100,000 head of livestock, 1000 herdsmen), the *agdal* owe their success to the very active control by leadership (the *zaouia* in former times, nowadays the local administration as a political authority).

3) *The institutions.* The collective resources are used individually, irrespective of the conditions of access. It is in principle the *jmaa* that manages the collective, although it is not defined by law. Since the term denotes a group of persons who are bound by common interests, this assembly is not always the same in a given area. There is a tribe, faction, village, district or lineage *jmaa* depending on the type of problem to be dealt with. When it is declared that “the tribe has decided on the *agdal* opening dates”, this simply means that the herdsmen most concerned have held a meeting, generally at the mosque after Friday prayers. The same applies to the drawing of lots to distribute the *azib* (shelters) or the consent to allow an outside flock into the pastureland, which only concerns a very restricted group of users who are directly concerned.

The *jmaa* can designate a delegate, *amghar n'tuga* (a ‘grass chief’), or simply a *moqqadem* (loosely equivalent to a rural policeman), who is in charge of supervising transhumance activities (pitching of tents and of a “tent-cum-mosque-cum-meeting-place”, use of the collective *azib*, mutual aid and searches for animals that have strayed). It also designates the *agdal* guards, who are paid by the community and who watch over the pastures during the bans and ensure that offenders are punished. More officially, the *jmaa* of each of the lineages or factions of the tribe can in certain circumstances designate a “collective land delegate”, who is approved by the chief; it is this *naïb* who represents the interests of the group within the “collective land *jmaa*”, which states its opinion in particular on how the land is to be divided up and on the establishment of shelters.

Regression of forms of customary organisation and pastoral conflicts

These organisational models are fragile. It is frequently declared that rangeland rights are the same for all. These virtuous professions of faith do not stand up to analysis, however, for, over and above the formal principle, vigorous strategies are developed by individuals but also by lineages or villages, which introduce major inequalities. As far as the individual is concerned, the only real stratagem for establishing one's control of a portion of collective rangeland is to take possession of a shelter (*azib*); this serves as a prelude to definitive control, which is obtained by clearing land, sowing a crop or

⁷ - *Jmaa*: village assembly of heads of families.

digging a well. It is thus important for a herdsman to strengthen his position on a territory by putting up *azib* in various complementary environments.

In Morocco, for example, the approval for putting up a new shelter should normally be granted at tribal level (the collective land *jmaa*) and covered by the chief. In actual practice, more limited spheres of influence are recognised where groups of various sizes have a say – the lineage, the village, the faction and, more rarely, the tribe. The area is thus much more segmented than declarations suggest, for the theoretical freedom of a flock and the permits for building shelters are constantly hampered by strict control of the rangeland at these various levels. What is more, not everyone who wants a shelter actually obtains one. When the persons concerned say, “The tribe has decided”, in reality the decision has no doubt involved a complex and subtle process in which the political weight of the applicant, the consent of several influential neighbours, or even the intervention of the collective land *jmaa* or the chief himself has played a role. The final decision is often celebrated with a meal, to which a number of heads of family from the tribe or village are invited.

The fundamental principles of custom-based forms of organisation are thus constantly flouted. These pastoral societies are rarely peaceable, and the conflicts which stir them can involve killings. They occupy vast expanses that are often difficult to monitor, and they come up against problems of rights of use and limits where customary law and modern law are intermingled. Many current conflicts seem to be of little consequence (conflicts over boundaries, right of way and trespassing on transhumance trails, conflicts over reciprocity, sheepfold ownership, the right to grow crops, livestock theft, and so on) and are often masked or dormant, for in the field amicable arrangements amongst herdsman are more often the norm. On the other hand, any intervention aiming to improve the rangelands is liable to reactivate a latent problem and raise the stakes. The local authorities then freeze all action, but do not resolve the conflict.

The dispute between forestry departments and herdsman is one of these eternal unresolved problems. Dealing with the relations between forestry and animal husbandry involves reflecting on the combination of two radically different systems of organisation which have ignored or fought each other for many years. They are indeed diametrically opposed in every aspect: their aims (to produce wood or meat), producer organisations and representative bodies (forestry officer or agricultural adviser), action plans implemented in time frames of a century or a year, and so on. Yet the concept of agro-sylvo-pastoralism is a reality and a key element of survival in mountain regions. It has been created specifically to illustrate systems that work (argan forests, forest *agdal*, etc.). The incorporation of land into State property is a recent phenomenon in the Maghreb, and since the herdsman feel they have been deprived of their meagre heritage there is latent or violent conflict with the forestry departments, which leads to serious problems: the typical damage caused by firewood cutting is compounded by widespread land clearing for cultivation, overgrazing and excessive foliage cutting.

When one analyses this traditional form of management and the institutions which control it one has the double impression of coherence and equilibrium, on the one hand, in a system serving mutually supportive management that is flexible and adapted closely to a complex environment, and on the other hand a more turbulent picture reflecting

the conflicts and individualistic practices developed by herdsmen in order to appropriate space. To what extent can these various forms of organisation manage resources efficiently? What are the lessons to be drawn from studying them, and what principles are to be adopted for better management of mobility?

Major changes in production systems

There are many factors which are contributing to the far-reaching transformation of animal husbandry systems on these collective lands. Some are exogenous, such as a strong top-down agricultural policy that is applied without prevarication (as is the case in Tunisia or Syria). Other factors are endogenous and are closely connected with the changes taking place within pastoral society as it opens up to the national economy. Amongst all of these various factors, key issues for the future of these regions are emerging in the course of the debate on social change – upheavals in land tenancy, a new form of mobility and innovative agro-food systems, and the reorganisation of marketing chains and of the sheep market.

The transformation of pastoral societies

This is a subject that merits special treatment exceeding the limits of the present report. The topic of “new territories” is discussed elsewhere. We shall confine ourselves here to highlighting two essential factors concerning the way in which resources are used.

The influence of the notables (kbir) and their control of collective lands

Pastoral societies in the southern Mediterranean countries have long been founded on notability. The notables, by reason of their economic power, their knowledge of networks of influence and their respectability, have always been skilled at defending the interests of their own ethnic group through their own private interests – a lesser evil. Even today, in difficult regions the political authorities rely to a large extent on this mode of governance, and the notables, all of whom are big farmers, hold sway, motivated as much by political conviction as by the aspiration to move up the social ladder. Multiplying their sources of income (emigration of relatives, acquisition of businesses, official duties) and residing temporarily in cities where their children study, they extend their control over their homeland by breaking customary rules, swell their flocks by recruiting shepherds, sow cereals where they are banned while the authorities turn a blind eye, come to agreements amongst themselves from one community to another by breaking access rules, and surround themselves with opaque networks of numerous “clients”.

Yet the notables are indubitably the vectors of modernity in pastoral environments, particularly since agricultural policies (and the aids, incentives and emoluments that accompany them) are implemented through these very networks of notability and spheres of influence and recognition. They promote innovation: trucks, feed supplementation, cultivation, sinking of wells, fattening of lambs, separation of rams, prohibition of milking ewes raised for meat production, etc. But their territorial, economic and political power can be exorbitant, and pastoralism is suffering from these phenomena of influence and alliance with the administration, perhaps more than any other field of activity. It is to be feared that a class of very big farmers (600 to 3000 sheep

or more) will eventually occupy the greater part of these steppe regions: very well equipped, very well adapted to the context, growing vast fields of cereals with unpredictable yields, living in town with their entire families and leaving the flocks in the care of paid shepherds, who live with their families in tents.

Spatial reorganisation of families

The populations of difficult environments were obviously the first to be concerned by emigration as a means of survival and of diversifying their incomes. It can be a very ancient tradition, as in the case in the Matmata Hills in southern Tunisia, or a more recent phenomenon (since the 1960s) in most steppe and mountain regions throughout the countries of the zone. Except for several regions where the networks failed to get established, there is not one family in these pastoral societies, whether rich or poor, that has not seen at least one of its members leave for the city or go abroad. The activities of the various members of the family are thus organised in concentric circles moving outwards from the core of members who remain and practice animal husbandry; these circles move farther and farther afield, from 20 or 30 km (living and working in small towns in the steppe or foothills and returning every week) to several hundred or several thousand kilometres (returning two or three times a year in the holidays for religious festivals). Financial solidarity plays a major role: money must be sent regularly, since the women and children often stay back home. This spatial fragmentation and these extra incomes are accompanied by the complete reorganisation of lifestyles and systems of husbandry. It is impossible to explain the buoyancy of the pastoral economy in these regions without referring to these migratory flows.

Thus, in the rangeland regions, pastoral territories that are used by users and rightful claimants who identify socially with the region and claim it as theirs can almost always be described as the “territory to which the group belongs” and which is operational in terms of rural area management and rural development and equivalent to the “local area” in agricultural regions. But for the last ten or twenty years developments such as family fragmentation, the close connection between the steppeland areas and the small towns which develop there, the extensive mobility of flocks and the opening of distant markets, etc., have meant that a more extensive area fairly close to the concept of “country” is involved.

From collective rangelands to individual cultivation (the *melk*)

The essential issue of debate is whether or not the collective rangelands should be parcelled out. Does dividing the land into individual plots offer better prospects of investment and development? Does it not exclude the weakest through the play of land market forces? Are there, on the other hand, efficient institutional mechanisms for managing pastoral resources collectively?

“Rampant” privatisation that is more or less tolerated

The number of people anxious to obtain a piece of rangeland in order to sow cereals or to co-plant it has been growing considerably over the past thirty or forty years. In Algeria, free access to the steppes has become virtually obsolete in the least unfavourable zones, since “owner-users” have been carving out large areas of pastureland for themselves: the strategy consists of clearing small areas (*gdel*) or simply drawing a line with a plough,

which delimits an impassable pastoral enclave, since the customary rule of respecting crops applies. The operation stops at the boundaries of the territory of the immediate neighbour, who does likewise.

In Morocco, where the State refuses to accept any dividing of collective pasturelands, the status quo seems to be continuing, but this is only on the surface, since illegal cultivation is to be found dotted over the landscape; in some cases it is just slowly eating away the pastureland, but in other cases it is more offensive (involving urban capital for large-scale development operations, to which the authorities turn a blind eye), and the “*azib*” (shelter) strategy is pursued. In the steppelands in the east of the country, *zniga*, long narrow strips of cleared rangeland that is roughly sown with cereals, complemented with a few tents and water tanks cleverly arranged in arc formation are used to reserve entire stretches of territory. Appropriation can also be the collective wish of a group, as is the case with the cactus plantations in the south of the Guelmim region, for example, which are run illegally on thousands of hectares of open collective tribal land (the Tekna tribe in this particular case).

But is it really illegal? In Muslim land law, “land belongs to God and thus to His representative, the Sultan.” The tribes thus have much more than simply the right to use their area, and it is the power structures that decide who conquers new territory. Muslim law applies two principles, which can be contradictory: the principle of the free use of natural resources (which in fact prohibits appropriation by individuals), and the principle of vivification (*ihyaa*), according to which the land belongs to whoever has developed it and “revives” it. From this point of view, pastureland does not engender development and thus does not permit appropriation, but in actual practice the person who takes the initiative to develop it is granted the exclusive right to dispose of it.

Syrian hesitation between steppe and crops

In Syria, the objectives of conserving and restoring vegetation emerged in the 1960s and became predominant, if not exclusive, in the second half of the 1990s. The agricultural cooperatives established in the semi-arid zones held a marginal place in agricultural policy; they did not enjoy the same advantages as those enjoyed in more favourable regions and had little success. And the failure was even more marked in the case of the animal husbandry cooperatives operating in the *badiya*, which tried to establish a traditional form of pastoral organisation (see below). The permits for cultivating steppeland were thus the subject of endless procrastination reflecting the conflict between the aims of production and those of restoring vegetation: the 1970 decree authorising the cultivation of a maximum acreage of 45 ha per family, prohibition of cultivation in 1982, abolition of the ban in 1983 combined with the obligation to plant fodder shrubs on 30% of that acreage; this was then reduced to 20% following intervention by the farmers’ union. But this approach was no more successful than that of the cooperatives: 95% of the plantations created within the framework of these regulations had disappeared by 1992 (Leybourne *et al.*, 1993).

The ban on crops below the 200 mm isohyet promulgated in 1995 marked a clean break with former policy to the advantage of the objectives of conserving and restoring vegetation. It is still effective today and is complied with fairly generally, to the great

annoyance of the villages established in the steppes. This “200 mm” limit that was laid down in the 1970s separating the agricultural areas from the *badiya* corresponds in the west of the country with the 1942 “desert” line, i.e. the boundary of the area occupied by non-migrant or semi-nomadic villages. In order to better protect these population groups a demarcation line was drawn between the cultivated area under the authority of the civilian authorities and the *badiya*, the Bedouin sphere of influence, which is controlled by the army. This delimitation dividing the country into two legally separate fields ought logically to have disappeared as soon as independence was gained and certainly after the Baath Party came to power. The elimination of the special provisions and privileges which the nomadic tribes had enjoyed under the Mandate was in fact one of the Baath Party’s main objectives, as has already been mentioned. The fact that the administrative division under the Mandate corresponded with the presumed position of the 200 mm isohyet obscured its political origin by giving it climatic justification. The concept of rainfall boundary has no real basis, however, and does not reflect heterogeneity in terms of soil aridity, which is largely conditioned by soil variety, topography (lowlands, etc.) and drainage system.

Activist policy in Tunisia

In more official terms, the process has progressed furthest in Tunisia. The State has been endeavouring to settle the nomadic peoples in the south of the country since the early 1970s, in particular by creating numerous village centres that are equipped with all of the services necessary to modern life (electricity, schools, and dispensaries). This settlement process has been accompanied with the extension of cultivated areas (tree farming, in particular with aid from special funds). With the laws passed in 1971 and 1973, the Tunisian State embarked on a policy to “break the lethargy of these lands by involving them in the dynamics of economic channels” by parcelling out the collective lands into individual properties... It was a veritable agrarian revolution.

The right to use and enjoy the land was transformed into the right of ownership on co-planted land or on arable land where it could be proved that crops had been grown and people had been residing for more than five years. And as for the rangelands, the arable part could be divided amongst the members of the community and the non-arable area was delimited and brought under the forest tenure system. Of course, this division, which was carried out under the authority of the management council (six members elected amongst the lineages) left only the worst sectors to the forestry administration (5% to 20% of the rangelands), which was ill-prepared for managing such barren land.

Two allocation methods were used, the normal procedure and the so-called “accelerated” procedure. The normal procedure, for which provision is made in the 1971 law, is precise, costly and slow. So slow that since 1973 the procedure has been simply to carry out possession surveys in conjunction with the management councils and with the assistance of a “topographer” (trained on the spot), a secretary for taking the minutes and two workers (for holding the surveyor’s chains). Once the procedure has been completed, the owner is issued with a provisional title (the “green title”), which entitles him to bank loans and to the benefits granted by the State. By 2006, 1,350,000 ha, i.e. 87% of the rangelands “for agricultural use”, had been allocated to almost 100,000 assignees.

The divisions were in actual fact rarely egalitarian (there were a few cases in small communities), for, since the right of *ihyaa* was applied, the most enterprising and the best informed carved out the lion's share for themselves introducing major inequalities in the rural areas of southern Tunisia. It is a subject of great controversy, which we shall only mention briefly. This privatisation had a dual effect: the number of small farms soared and land was concentrated in the hands of the few. To the north of Gafsa, on the rangelands after the land division, 26% of the owners of less than 10 ha occupy 6% of the land, and 13% of the owners of over 50 ha occupy 45% of the land. Many peasant farmers in this region (46% in the Bled Amra plain) opted to abandon their farms and move to the city (34% of them selling all or part of their land). The future is less gloomy for those who remain. As soon as the allotment operations had been completed, the farmers, equipped with their land certificates, generally sold three-quarters of their flocks in order to finance wells, pumps, basic agricultural implements and fruit saplings. They then reorganised their farms around a small irrigated area (1 or 2 ha) with semi-irrigated tree crops (pistachio trees and olive trees), rain-fed crops, etc. and gradually built up their sheep-rearing activity again based on the thin-tailed Algerian breed, which is more demanding (i.e. more agricultural) than the fat-tailed Barbarine breed. The return on investment has been excellent for the well-off farmers (20% to 30% of the assignees) and the land development through irrigation, which was made possible by the land division, has been spectacular and is held up as an example. The problem is that all of these wells that were sunk in 15 years have caused a drawdown in the water table and many of them have been abandoned as a result (1900 of the total of 4500 wells listed in Gafsa and Tataouine in 2006 have been abandoned), so that the administration is forced to control this development more efficiently. Entire stretches of the former collective pastoral territories are thus cut up by a form of agriculture of uncertain sustainability, which fragments the land, closes transhumance passages and severs the rangelands from the most productive areas.

Reorganisation of mobility: the era of the truck

Motorisation is the most spectacular change and one which has attracted the least comment and has neither been promoted or explicitly integrated into any pastoral policy; beginning in 1955-1960 it spread throughout the steppes (to a lesser extent in mountainous regions) from the 1970s onwards. Throughout the Maghreb and the Mashraq, wherever the trails can take vehicles, trucks, pick-ups or animal-drawn carts have made far-reaching changes in farming methods: water and cattle feed are now taken out to the animals every day rather than the reverse, sales are organised more efficiently, decisions to make a journey are taken more rapidly and the farmers travel farther as the case may be. The flocks belonging to the big farmers are transported by truck and take over the area to the detriment of smaller flocks. But almost everyone now has either bought (or borrows or rents) some sort of motor vehicle making the pasturelands more accessible. In the Algerian steppes in particular, trucks cut back and forth and it would seem that the traditional summer transhumance to the croplands in the north (*achaba*) is gradually dwindling – although studies have still to be conducted on the subject – and is being replaced by a growing flow of steppe-bound traffic transporting feed and fodder that are produced in the north of the country.

It is a fact that in the steppelands family settlement is accelerating in Morocco and Syria and has been virtually completed in Algeria and Tunisia, but at the same time the flocks, which are now increasingly being led by professional shepherds, are still very mobile. Family lifestyle and flock husbandry are thus organised at two different levels and are gradually becoming disconnected. Only the poor continue to live in the steppes as they did in the past (with very few exceptions, as in Syria, where they no doubt mingle with the semi-nomads who have settled in the villages of the *badiya* and where certain rich families are “real” nomads with flocks of up to several thousand head of sheep). However, the big sheep farmers are gradually settling in the towns as a general rule (a bipolar system with “one foot in the steppes and the other in town”), for they have to maintain their social rank and defend their interests. In the Moroccan and Algerian steppelands, where bigamy is still common practice, the natural setup with this bipolar system is that the first (older) wife stays in the steppes and the second wife lives in town, where she mainly looks after the children who are at school.

New flock husbandry methods and anti-risk strategies

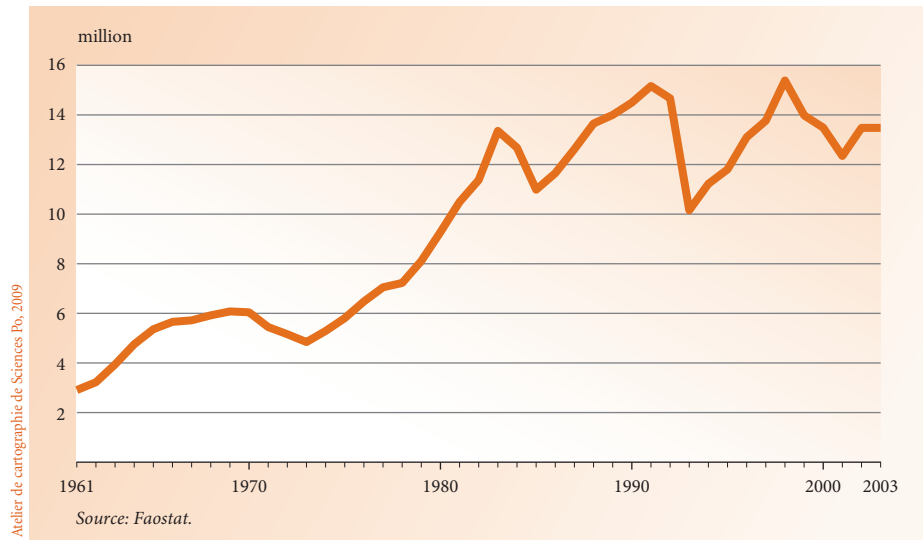
The decisive role of supplementary feed inputs

Small ruminant meat production (which, in this context, is the main rangeland product rather than beef) is now managed on a radically different basis, which is dictated by the powerful imperative of adapting to risk and managing risk based on an extensive combination of factors.

First and foremost, supplementary feedingstuffs – barley in particular, which comes from the cleared land that has been expanding steadily as the land has been privatised. The crops are sown every two, three or four years depending on rainfall, and the grain and straw are stocked and redistributed in poor years. This very random extension of crops, which compromises flock mobility, restricts pastoral areas and depletes biodiversity, cannot continue indefinitely and must obviously be limited strictly to the areas where it is justified. The whole problem lies in defining that limit or point of balance – a classical question of comparative economic advantages but one which is particularly difficult to resolve, for in many places crops and pastures form a veritable patchwork which changes in pattern depending on harvests.

In regions where rainfall varies widely and is less than 200-250 mm per year, the output of this rain-fed crop husbandry is in general very inadequate for the flocks, and the new trend is to rely systematically on supplementation with purchased products. This practice, which was started in the Maghreb by big farmers and encouraged by a succession of dry years (1981-1984 and then 1991 and 1998), has spread to all animal farmers. In Algeria, where the capacity of the steppe rangelands has decreased by half in fifteen years, the steppes, which should now be supporting no more than 2 million sheep, actually support five times as many and supplementation covers 60% to 80% of needs. In southern Tunisia, the rangelands now only cover 40% of animal needs in dry years and 80% in wet years.

The situation in the Syrian steppes is even more incredible; flocks have grown spectacularly as the result of a very active export market (cf. Chart 1).

Chart 1 - Sheep population trend in Syria, 1961-2003

This has only been possible thanks to a substantial increase in available feedingstuffs. Several factors have combined in this context. Irrigated crop acreage, where the residue is grazed by flocks, increased from almost 450,000 ha in 1969 to over 780,000 ha in 1991. The development of the agro-food industry has brought an increase in the available by-products that can be used as feed, such as sugarbeet pulp or cottonseed cake. Furthermore, barley production in the steppelands gradually expanded in the 1970s and 1980s, and flock husbandry changed completely from then on. The use of trucks now means that animal feedingstuffs can be transported to the areas where flocks are grazing in the steppes or in cultivated areas, or the flocks themselves can be transported. Thus, for the last thirty years, migratory animal husbandry has been based on dual mobility: flock mobility on the one hand and feed and water mobility on the other.

The rangelands are grazed in the spring, but the flocks stay in the steppes at all times of year for varying lengths of time. The steppes are a grazing and stabling area, which some call a “parking” area. At the beginning of the 1960s, it was estimated that the rangelands in the steppes covered 70% of flock feed needs. They now only supply 5% to 20% of annual feed, depending on the variations in forage production connected with rainfall and feeding strategies (Bahhady, 1981; Leybourne, 1997). Annual intake is composed of over 80% of distributed feedingstuffs (barley, cereal straw, agro-industrial by-products) and residue from irrigated crops. At the beginning of the 1990s, it was estimated that almost 1.5 million tonnes of feedingstuffs were transported to the steppelands each year (Treacher, 1993).

Cash flow and “controlled” flock reduction

In dry years (two or three out of five years), the quantities purchased are so large (approximately € 30 to € 40 per ewe per year in southern Tunisia) that the farmers’ cash

flow is inadequate. The system survives – except in the case of the poorest farmers – through the sale of ewes, which amounts to a more or less “controlled” reduction of the flock (the animals are not thin even after two years of drought and they fetch a better price than they did in the past). Clearly the best safeguard is thus to have a flock that is large enough (200-300 head) in order to be sure to guard against the risks of prolonged drought. Not all farmers manage to do so – far from it – and during the last major drought in eastern Morocco in 1998-1999 several hundred small farmers had to sell their entire flocks and find work elsewhere.

This strategy of adaptation to risk, which we consider efficient, is strongly criticised. Most pastoral projects promote a more authentic return to pastoralism; their planners advocate measures to restore the rangelands, which is legitimate, but they regard the use of supplementary feed as the worst evil. They inveigh against farmers who swell their flocks by buying feed and overcrowd the rangelands with flocks out of all proportion with the grazing capacity. But by what right should the rangelands be the exclusive resource for feeding flocks? Why fear an increase in flocks if the deficit can be covered by means of external supplementary inputs? What is more, it is an approach which disregards several factors: a farmer cannot increase his flock beyond a certain point without impunity; there are certain thresholds (regarding shepherding, for example, or the size of trucks or water tanks and watering). And lastly, it underestimates the flexibility of the flock reduction/replenishment system described above, which is only viable when supplementary feedingstuffs are used.

Strategies for adapting to risk

Supplementing feed and reducing stock are not the only means of guarding against risks. Strategies have become diversified. In the short term, the problems posed by drought can be overcome for the time being through flexible management (adjustment of transhumance departure dates, combining of flocks) of the mobility that farmers/flock owners acquire through motorisation (pickup trucks for backup supplies of feed, etc.) and of shepherd mobility (encampments, tents, etc.). In the long term, the aim would be to guard the system against climate hazards well before drought sets in. Extending irrigation could be viewed as the “absolute weapon” for protecting oneself, but of course this depends on groundwater resources. In most cases, water input is much too limited to ensure the security of the pastoral system at affordable cost, for the prospects of costly irrigation for producing forage are very limited. The strategy that farmers tend to adopt is to extend the rain-fed crop acreage and to risk sowing cereals, which, in one in every four or five years, can produce whole-grain barley and straw; the advantage of these feedingstuffs is that they can be stocked and their use can thus be postponed (for at least two or three years). Non-agricultural incomes from emigration, business or other trades remain the only real long-term answer. They are the most efficient form of protection. The sums mobilised for the occasion are large, and the best-endowed can thus slow down the reduction of their ewe flocks. With external support the system can resist as long as the drought lasts, without losing its ability to bounce back as soon as the rain returns.

Economy of the system and dynamics of the marketing chains of pastoral areas

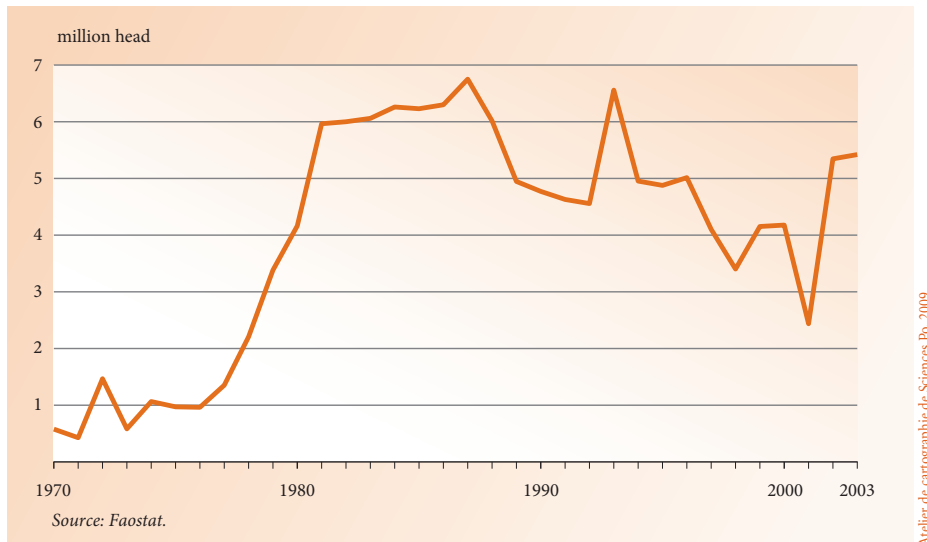
Little attention has been devoted to the economic aspect of the problem in the pastoral environment. This system of reducing/replenishing flocks, which farmers are obliged to use in order to adjust to climate hazards, is only viable if the terms of trade do not swing too far to the disadvantage of producers and if producers can afford to use it. The strategy thus can only work and be economically viable if the “live kg mutton/kg barley” ratio⁸ is well above 10 at all times, since it takes just under 10 kg of barley to produce 1 kg of meat in flock fattening terms. There are thus two conditions which must be met:

1) Feed prices must not rise too high in periods of drought when everyone is buying; the supply chain (cereals, by-products, etc.) must thus be reliable, diversified and monitored. This is more or less the case in Tunisia and Algeria, where the feedingstuffs market has become very diversified (production of hay and straw in the north of the country, which is then transported to the steppes by special dealers, olive cakes, etc.). What is more, the State has been intervening regularly since the 1980s by means of recovery plans facilitating transport through grants and placing subsidised feeds on the market (criticism focuses here on the procedures for granting subsidised products, but there does indeed seem to be a regulatory effect on prices on the open market) or by importing cereals where necessary. Feedingstuffs are also very diversified in Syria, where the State intervened in the 1970s and 1980s, supplying feed at subsidised prices which could cover up to 20% of needs.

2) Meat prices must not collapse as the result of the operations of livestock dealers, who are quick to take advantage of critical situations. The State does not control their activities in any way, nor indeed does it control livestock markets. However, since the sheep market chains are now more closely connected with distant markets in the plains and cities than they were in the past (livestock is transported by truck, mobile phones are now in general use), and since urban demand for red meat is high, price speculation is not as significant as it used to be.

The system has in fact been completely reorganised: more animals are put on the market in dry years (male and female lambs and reduction of ewe stock) than in wet years (only male lambs), since the stocks are to be replenished. In Syria, sheep-raising stagnated until 1974, after which stocks increased by almost 10% per year for over fifteen years. This increase was directly related to the increase in oil prices and the ensuing rise in incomes and increase in meat consumption. Syria did not produce oil but benefited from the oil revenue of the producer countries through emigrants' transfers and from the direct financial support of the Gulf countries as a contribution to the military expenditure incurred by the front-line countries. In addition to the national market, Syrian farmers benefited from the boom in the oil-producing countries. In Saudi Arabia, the main foreign market for Syrian products, the growth in live sheep imports was virtually exponential in the period from 1975 to 1980 (cf. Chart 2).

⁸ - or, more generally, the price of the feed unit provided as a trough feeding supplement.

Chart 2 - Saudi live sheep imports

This market is relatively protected in that, according to regional standards, Australian or New Zealand products are not substitutes of comparable quality for the products obtained from local breeds.

The Syrian administration has made several attempts to limit exports in order to contain price increases in the country, particularly during religious festivals. Although Syria is the leading sheep exporter in the Middle East, the authorities have had to import sheep from Romania and Bulgaria on several occasions in order to contain prices and supply the national market. The period of rapid growth came to an end at the beginning of the 1990s, since which date the volume of livestock has oscillated between 10 and 15 million head of sheep depending on market conditions and variations in rainfall.

Although we must stress in conclusion that most farmers now adopt explicitly economic attitudes and that the rather outmoded image of the pastoralist who keeps large unproductive flocks “for reasons of prestige” is a thing of the past, many strategies are nevertheless difficult to decode and economic factors do not explain everything – far from it. Many of the decisions that are taken by farmers are governed by compromise, and other factors have to be taken into account (labour, cash flow and whether the farmer has a bank account, relations with neighbours, production for own consumption, etc.). Furthermore, the notables are all big farmers and their large flocks contribute to their prestige, enabling them to move rapidly up the social ladder by means of active patronage.

Pastoral policies

Land policies

Land policies are an absolutely essential component of pastoral policies, particularly for the future of these regions, where decisive choices are being made. As we have seen in both the Maghreb and the Mashraq, with the advent of independence new land policies aiming to integrate marginal zones more effectively were implemented at different paces depending on the legislation in effect in each country.

The main technical achievements of research and development

The various development plans have constantly laid emphasis on improving animal husbandry on the rangelands rather than on crop growing or tree farming. These plans have two components: improving feed by attaching special importance to pastoral resources (i.e. improving rangelands and organising farmers), and improving flock husbandry and animal production. A number of technical achievements brought by the research and development work carried out in various institutions have been mobilised in the context of numerous development projects.

In pastoral areas, particularly collective pastures, a choice has to be made between heavy techniques (directly affecting vegetation management: these include controlled fires, clearing by chemical or mechanical means or by biological means – i.e. by the animals themselves, through sowing, fertilisation, etc.) and light techniques (affecting how the rangelands are used by the animals: these include controlling stocking rate, choosing grazing periods, organising those periods, and managing fencing and water points).

Although the technique of short-term grazing bans has proved its worth in a number of pastoral projects, controlling stocking rate is a challenge on collective rangelands, where the rightful users do not accept the limitation of stock as a matter of principle. The methods used are thus confined to limiting grazing time rather than stock, which is an indirect way of limiting the stocking rate. Attempts to reduce the number of animals by authoritarian methods or to charge for the grass are generally unsuccessful.

Creating water points is another means of acting on how animals are distributed over rangelands and is an operation that can easily be implemented in most programmes. It can lead to errors, however, since the water available must be in proportion to the available vegetation. The discharge can often be reasonably limited with a simple manual or mechanical water lift, while allowing a specific group to take care of the social management of the water.

Where so-called heavy techniques are used, the rule should be to restore the most degraded pastureland first of all and then to enrich areas where vegetation can still grow again easily. But given the vast areas involved, the task must be approached with due modesty. One of the methods that should be adopted is to plant forage shrubs, since this is the main way to restore degraded rangelands.

Major rangeland development projects

A 1990, a publication on rangeland development projects in the Maghreb (Alaoui, 1990) was entitled “thirty years of failure”. How do things stand at present in the Maghreb and the Mashraq? In the 1960s and 1970s, animal husbandry cooperatives in Syria tried to establish a traditional form of pastoral organisation (*hema*).⁹ These cooperatives were to be assisted by other cooperatives which fattened lambs for sale with a view to keeping only the ewes and lambs necessary for renewing the flocks in the steppes. Each cooperative had the task of controlling a stretch of rangeland whose use was to be restricted to its members. The plan was a failure. No rangeland protection measures of any significance were implemented. The programme focused in actual practice exclusively on supplying livestock feed. The ban on cultivation under the 200 mm line that was promulgated in 1995 was a contributing factor to the obtaining of international funding in 1998 for conducting a “steppe rangeland development project” covering an area of 3 million ha. The project received funding from the Arab Fund for Economic and Social Development amounting to 60 million dollars as well as a 20 million dollar loan from the IFAD. The main objective of the project was to ensure rapid regeneration of ecosystems by planting or reseeding forage shrubs and by extending grazing bans, but the results obtained fall very short of expectations. One of the principal achievements was the planting of forage shrubs, particularly on the areas cultivated by the villages in the *badiya* near the boundary of the agricultural zone. Since the end of the 1960s, *Atriplex* has been the species selected for regenerating steppe vegetation, since it is widely considered to be the most suitable restoration species. *Atriplex* grazing by sheep poses several problems, however. The salinity of the forage considerably increases the animals’ water needs, and the most favourable grazing period is at the end of the summer when a large proportion of the flocks are no longer in the steppes. Only 3000 of the 35,000 hectares of *Atriplex* that were planted have survived.

In Algeria, it is recognised that measures need to be taken to involve agro-pastoralists more closely in several projects (Centre for Research in Applied Economics for Development – CREAD), which are endeavouring to innovate in this field. The administration in charge of development is hesitating to delegate its decision-making authority to the grassroots communities.

There has been a succession of projects in Morocco with limited success, although the excellent work carried out has considerably expanded the range of knowledge on the subject. All evaluation reports agree that they have had little impact, having failed to take account of social developments and to convey the imperative of incorporating technical rationalities into social reality. The techniques themselves are tainted with serious contradictions and are in actual fact very difficult to apply (sophisticated rotations, reseeding and excessive fertilisation unconnected with the economic efficiency of the system, limitation of stock, with no details as to how such a revolution is to be brought about, etc.). Many technicians continue to be overoptimistic as to the success of some of these projects, which should really be classed as misguided ideas, such as the *Atriplex* plantations in Syria, which are undeniably valuable as forage but whose spread rate is mediocre, the acacia projects, dry farming etc. Similarly, all the pasture reseeding, tillage

⁹ - Very similar to our description of *agdal*.

and fertilisation work would seem to be questionable on the whole and only to have favourable effects in experimental situations which can rarely be reproduced in the field. When one tries to evaluate the economic and financial profitability of these extensive efforts it is rarely proven.

The only really successful example is that of the (IFAD-financed) project in the east of the country, where a new type of “ethno-lineage” cooperatives have been set up, in which an attempt is made to reconcile the advantages of a modern structure and those of traditional organisation managing collective rights of rangeland use. The basic hypothesis is simple: the traditional ethnic group is an asset from the outset because it functions collectively. It will thus provide a favourable basic structure for the cooperative, which is another form of collective organisation. This hypothesis has not always been confirmed, however, for in many cases a compromise has been necessary in order to avoid completely distorting the cooperative institution. The measures to ban grazing on almost 300,000 ha are the most conspicuous and have been the most decisive in involving farmers in the project, even if the sustainability of the system is compromised by severe droughts or by the monopolisation of aids by the big farmers. There are two very concrete results, however, which mark progress:

- At least 10 of the 36 cooperatives operate properly, have capital at their disposal, and administer the rangelands in good years. Although the pastoral territory of each cooperative (mapped out on the basis of speculation and surveys in which the various parties were not always all consulted) is fictitious, because the users continue to abide by *orf* (custom), applying rights to reciprocity and practising “mixed” grazing in the winter when the flocks move south, the territory that has been “invented” in this manner by the project is gradually taking shape and is becoming a new “area of habit”. Furthermore, mixed communities are regrouping around the forage areas. The territories are evolving.
- As a result of the grazing bans, for which a high price is paid in terms of compensation in the form of barley, the concept of paying for grass on collective lands has at last been accepted. This is a considerable success.

Work on spineless cactus in Tunisia has highlighted its numerous advantages: high drought resistance, building-up of standing reserves for pre-harvest gaps, good productivity, easy planting, facilitation of compliance with grazing bans, and so on. Whether spineless or prickly, this cactus now plays a major role in central Tunisia in both State-owned and privately-owned steppelands. Its recent development in the newly parcelled lands has been spectacular. It has admittedly taken some time (twenty years) to become established, but as soon as the private initiative that was stimulated by privatisation outpaced the State straitjacket, attitudes changed radically.¹⁰ After several failures in the field of large-scale projects (in the Oglet Merteba region), the Prodesud project was launched in 2002. It is based on socio-territorial units (a euphemism which avoids the term of ‘ethnic community’ or ‘tribal faction’) that are “organised around pastoral areas, the purpose being to discuss ways and means of managing the agro-pastoral area with the population groups concerned within an openly participatory framework”. After five

¹⁰ - The multifunctionality of this plant, which produces fruit that is exported, protects the soil from erosion, closes off territory as a protection from one’s neighbours and feeds livestock when times are hard, had a lot to do with it.

years of effort, the project can definitely be qualified a success in several communities (Ouled Chehida, Guermessa, Jlidet, etc.), which have taken steps to manage their area. Here again, the principle of paying for the grass when the grazing bans come into effect seems to have been accepted. But in several sectors the boundaries between the above-mentioned socio-territorial units are a subject of such contention that the project managers avoid referring to them. Of course, the concept of socio-territorial unit presupposes a different type of territorial demarcation which inevitably generates conflict over boundaries and arbitration. So it will take time. Another project (Dieppo), which is financed by the World Bank, focuses on managing the natural resources of the El Ouara region (600,000 ha) but as yet only a few agricultural trails have been opened and the Sidi Toui nature reserve (6000 ha) has been created.

Plans for stock conservation in periods of drought

As regards risk management and the strategies that farmers adopt, the “stock conservation plans” which the State implements in periods of drought, must of course be mentioned. Since the beginning of the 1980s, the competent departments of the various ministries have been taking emergency measures in the form of “drought plans”, particularly in the Maghreb: subsidised feed inputs, water transport, alfalfa nut imports, conclusion of contracts with cattle feed firms for the manufacturing of emergency feed. The plans are not as reactive as one might wish, of course, and the administration is slow to respond... and to act. State intervention varies in degree from one country to another, depending on State power and organisation. During the serious drought in France in the summer of 2003 the producer organisations protested and did not delay in approaching ministry departments, which by August 2003 had implemented a very comprehensive set of aids including a disaster fund, transport aids, financial aids, deferment of taxes, advances on premiums, etc. The producer organisations in the Maghreb are too close to the authorities and are not well represented; they are thus much less reactive, and “drought plans” take a long time to get off the ground. Yet these aids in periods of crisis help to curb runaway feed and animal prices. This realisation that drought is a structural factor in these ecosystems has thus marked an important turning point in mentalities, in discourse and in policies over the last few years.

Agro-environmental policies and collective land management

Pastoral policies can be regarded as agro-environmental policies, and rightly so, since they are applied in regions where the ecological issues at stake are particularly important. More specifically, some countries are also beginning to effectively integrate environmentally sound practices into their planning with the support of international institutions and non-governmental organisations. Lebanon drew up an environment code in 1997. And in 1998, Syria established its National Environmental Action Plan (NEAP), thus swelling the ranks of the countries in the MENA (Middle East and North Africa) region with environmental action plans or strategies (Egypt, Jordan, Lebanon, Syria and Tunisia). Algeria and Morocco followed suit in 1999.

In difficult, pastoral or forest regions, the most significant actions concern measures to protect the forest heritage, to restore and regenerate rangelands and to delimit nature reserves. Environment policy in Algeria has resulted in the creation of some twenty

nature reserves (including the El-Kala reserve, which receives funds from the World Environment Fund). A reforestation programme aiming to reforest 14% of the area of the country and scheduled to run for the next fifteen years, and a programme for converting production systems in arid zones, which will involve 700,000 ha in the medium term, have been selected as the priority objectives of the most recent agricultural development plan (September 2000). Tunisia is endeavouring to implement measures focusing on reforestation (aiming to reach a rate of 15%), soil conservation in order to protect farmland and towns from floods, action to combat desertification, and the installation of water and sewage treatment plants.

There are currently four national parks in Morocco, two of which (Toubkal and Tazekha) were created during the Protectorate. Thirty years went by before the administration again realised the need to protect certain ecosystems considered to be of particular interest from irreversible degradation and vested itself with the means of establishing three other parks in the Sous-Massa, Al Hoceima and Ifrane regions. An extensive programme for evaluating ecosystems and natural assets throughout the country was launched recently complete with a “masterplan of protected areas”. Responsibilities in the field of the environment and nature conservation are split up amongst several ministries in Morocco, including the Ministry of the Environment. The Department of Water Resources and Forestry has until now been the administration which has played a decisive role in implementing this national park policy in the context of protecting forests and wild flora and fauna.

It must be stated, however, that until the past few years most of the parks that are situated in forest regions and are under strong pressure from riparian populations have not been treated any differently to the areas subject to forestry legislation. The boundaries have not actually been marked out, and the few forest rangers in charge of monitoring them merely apply the rules a little more stringently to the best of their ability given the limited means at their disposal. Excessive felling, countless offences, difficulty in ascertaining the real names of offenders, frequent inefficiency of the courts adjudicating the cases – such are the problems they encounter in their daily work.

Establishing a nature reserve on collective or State-owned land in these countries with a view to preserving the ecosystem and protecting wildlife in a region where living standards are very low and the local people expect the government to devote attention to them would be socially unacceptable and would meet with such hostility that the remedy would eventually prove worse than the disease. It is absolutely essential that the management of these parks include, support and consolidate local development. The Wadi Rum National Park in Jordan, where the Bedouin people have arranged their lives to take advantage of tourism on the site while preserving their traditional activities,¹¹ is an interesting example.

What is to become of collective lands?

In the collective rangelands in the difficult regions of the Maghreb and Mashraq, the communities with collective land rights have long lost any ability to manage their own

¹¹ - Including trade with Saudi Arabia, for the border is very porous for these Bedouins, who often have double passports.

affairs independently. This decline in their ability to take the initiative, which has been virtually continuing for over a century, has been brought about by various factors: the appropriation of land by the colonial powers, the spread of the melk (individual cultivation) system for the benefit of the assignees and in particular of private purchasers, long-term leases, etc. In view of the gradual diminishment of the communities' authority to manage their resources, the local authorities and regional communities have more or less superseded the former customary institutions. This loss of authority seems to be irreversible, except in the case of a few pastoral collectives in southern Tunisia or in the mountains in Morocco. The tribal societies, or what remains of them, have embarked upon a process of individualisation from which there is no return, and any illusion of rebuilding "traditional" collective entities that are capable of stimulating modern change must be clearly dispelled.

What should be retained from these traditional modes of management for future development? Should they be drawn on for new projects? Is it not utopian to try to draw lessons from them that can be applied to other contexts? After the succession of failures registered in the rangeland development programmes of the past 30 years, many project managers now recognise that it is more advisable to promote flexible and participatory management of natural resources on the lines of the traditional forms of organisation. But from the examples that have been cited it will have been realised that behind these concepts of "flexibility" and "participation" are modes of management and organisation which can bring success or disaster, depending on how they are applied. One must thus beware of euphoria when drawing on traditional models and select only the best of their assets.

Although in Tunisia the problem of collective lands is no longer on the agenda, it is still a controversial issue in other countries. In Morocco, the communication difficulties between management and research departments are illustrated by two major brainstorming events on these questions, which were organised and sponsored by two ministries: the national colloquium on collective lands organised in December 1995 by the Ministry of the Interior (Directorate for Rural Affairs) and the large-scale workshop on land policy held in June 2000 by the Ministry of Agriculture. Collective land realities were only examined at these events with a view to pinpointing the obstacles to economic and social development constituted by the status of these lands and their *modus operandi*. The question of the economy of ethnic communities, which is related to that of the significance of (Ministry of the Interior) supervision, was not raised.

In these times of liberalism, would these collectives be a form of small farmer autonomy that can be regarded as a relay of the State which is disinvesting? (Bouderbala, 1992). It is clearly quite inaccurate to state that rights to collective land are the same for all. No stock reductions are applied, flocks are combined, and there is speculative purchasing of animals that have been fattened rapidly; these practices are carried on to the sole of advantage of big farmers without any real control. The system is thus very inegalitarian, since each individual grazes as many animals as he can and uses every possible means (transported water tanks, encampments at higher altitudes, annexing of rangelands) to try to obtain a maximum of resources. There is no cooperative spirit in the modern sense of the term, since each rightful user claims a right which he shares with others

whether he likes it or not. This being so, “the principle of management is not the fact of developing resources collectively but of controlling competition for the individual use of those resources” (Chiche, 1992).

Many preconceived ideas about rangeland exploitation and the management of collective lands die hard. For a start, ideas that have to do with overgrazing are not always particularly objective. Many projects display a stringently "pastoral" philosophy (measures to restore and improve pastureland, plantations, etc.) and regard feed supplementation as a management error. Soil and vegetation degradation, which are generally the principal factors justifying the action programmes, are certainly the first element to be specified. In the case of Syria, for example, the report on vegetation status provides no information whatever on the environmental transformation processes that are underway or have already taken place, environmental resilience or the validity of a hypothesis of rapid degradation justifying urgent and heavy-handed intervention (prohibition of cultivation under the 200 mm level). This objective of restoring rangelands seems to go hand in hand with a mythical perception of outdated pastoralism. The steppes are pastoral lands, but they are exploited by a form of sheep farming that can no longer be described as pastoral.

If any progress is to be made in this debate on the future of collective lands, care must obviously be taken to place the issue in context. Those who criticise collective status generally put forward two types of argument:

- *Criticism by the advocates of intensive production.* They consider that the collective status of land is an obstacle to investment. This position essentially concerns cultivated and arable collective lands with all the ambiguity attaching to the latter term, which determines whether the land is for agricultural or pastoral use (experience in Tunisia has shown that with social pressure all rangelands become arable land!). But it is a fact that collective status precludes the economic guarantee required for access to credit. It is an obstacle to security of access since it only grants the right of usufruct and thus hampers or discourages land development and the intensification of land use;
- *Critics who are anxious to protect the natural environment and/or resources.* These critics consider that with collective status there is an inherent risk of destruction of resources and degradation of the environment. Since each rightful user – and there are countless numbers – is entitled to use the land, there is an abnormally large number of farmers, which leads to the overtapping of resources. Furthermore, the communal use of land involves competition amongst users which induces them to overgraze it.

In both cases the claims are excessive, and there are many examples to disprove them. We consider it more reasonable in the light of the facts to hold that simplistic arguments are not enough to justify the sharing of collective land. The exploitation of resources is not necessarily conditioned by their status: the examples of good and bad management of *melk* and collective lands are many and varied. The experience gained in Tunisia is a wonderful source of information, and it is surprising that so little research work has focused on it. It teaches us that the parcelling of land is not a panacea, that it is far from egalitarian, that it can lead to ecological disaster and the overtapping of resources (water in particular), and that it triggers the rapid eviction of those farming unviable units

and the purchase of their land by the biggest farmers. Measures to divide up collective land and to allocate individual parcels thus can only be justified when there are prospects of effective and sustainable development. Sharing involves a certain degree of equity, if not equality, and requires follow-up: support and control of the investments effected (the wells that have been sunk, the methods adopted for developing the land). It is difficult for the authorities to escape this powerful trend, which calls in question the bases of the collective pastoral system in order to promote an entrepreneurial form of individual farming wherever possible.

Bibliography

Abaab (A.), Bedrani (S.), Bourbouze (A.) & Chiche (J.), "Les politiques agricoles et la dynamique des systèmes agro-pastoraux au Maghreb", in M. Allaya M. (ed.), *Les Agricultures maghrébines à l'aube de l'an 2000* CIHEAM-IAMM, Montpellier, 1995. 376 p. (Options Méditerranéennes: Série B. Etudes et Recherches; n. 14) "Les agricultures maghrébines à l'aube de l'an 2000", *Options méditerranéennes*, 14, 1995, pp. 139-165.

Ababsa (M.), *Privatization in Syria: State Farm and the Case of the Euphrates Project*, EUI Working Paper RSCAS, 2005/02, European University Institute, Florence, 2005.

Bahhdady (F.), "Recent Changes in Bedouin Systems of Livestock Production in the Syrian Steppe", in J. Galaty, D. Aronson & Ph. Salzman (eds.), *The Future of Pastoral Peoples, Proceedings of a Conference Held in Nairobi, Kenya*, International Development Research Centre, Ottawa, 1981.

Bedrani (S.), *Les Aspects socio-économiques et juridiques de la gestion des terres arides dans les pays méditerranéens*, Cahiers du Cread, pp. 31-32, Algiers, 1992.

Ben Saad (A.), Bourbouze (A.) & Abaab (A.), "Partage des terres et dynamique des systèmes agraires dans le Sud tunisien", in A. Bourbouze, B. Msika, N. Nasr & M. Sghaier Zaafour (eds.), *Pastoralisme et foncier: impact du régime foncier sur la gestion de l'espace pastoral et la conduite des troupeaux en régions arides et semi-arides*, "Options méditerranéennes", série A, 32, Ciheam-IAMM, Montpellier, 1997.

Ben Saad (A.), *Politiques foncières et dynamiques sociospatiales: la privatisation des terres collectives dans la plaine de Bled Amra, Gafsa (hautes steppes tunisiennes)*, thesis, Urbama research papers, François-Rabelais University, Tours, 2002.

Bensouda Korachi (T.), *Towards private landownership: the State's role in the modernization of land tenure in Morocco*, FAO, Agrarian reform, 1998, pp. 55-68.

Bessaoud (O.), "L'agriculture algérienne: des révolutions agraires aux réformes libérales (1963-2002)", in O. Bessaoud (ed.), *Les Agricultures du Sud et de l'Est de la Méditerranée*, l'Harmattan, Paris, September 2002.

Bouderbala (N.), Chiche (J.) & El Aich (A.), "La terre collective au Maroc", dans A. Bourbouze & R. Rubino (ed.), *Terres collectives en Méditerranée*, Ciheam-FAO, Ars Grafica, Paris, 1992.

Bouderbala (N.), *Projet de recherche sur l'autonomisation des ruraux pauvres et la volatilité des politiques, étude de cas: les terres collectives et l'autonomisation au Maroc*, Institut national de la recherche agronomique-International Food Policy Research Institute-International Fund for Agricultural Development, 2005.

Bourbouze (A.): "Gestion de la mobilité et résistance des organisations pastorales des éleveurs du Haut-Atlas marocain face aux transformations du contexte pastoral maghrébin", in M. Niamir-Fuller (ed.), *Managing Mobility in African Rangeland: The Legitimization of Transhumant Pastoralism*, IT Publications, London, 1999.

Bourbouze (A.), "Pastoralisme au Maghreb: la révolution silencieuse", *Revue Fourrages*, 161, 2000, pp. 3-21.

Chatty (D.), *From Camel to Trucks: The Bedouin in the Modern World*, Vantage Press, New York, 1986.

Chiche (J.), "À la recherche d'une définition des statuts fonciers au Maroc", in A. Bourbouze, B. Msika, N. Nasr & M. Sghaier Zaafouri (eds.), *Pastoralisme et foncier: impact du régime foncier sur la gestion de l'espace pastoral et la conduite des troupeaux en régions arides et semi-arides*, "Options méditerranéennes", série A, 32, Ciheam-IAMM, Montpellier, 1997.

Chiche (J.), *Utilisation des ressources et statuts fonciers*, actes du Symposium du réseau Ciheam-FAO "étude sur les systèmes d'élevage des ovins et des caprins en Méditerranée", Options Méditerranéennes, Bella, 1997.

Debaine (F.) & Jaubert (R.), "Dégradation des steppes, perception et réalités", in R. Jaubert & B. Geyer (dir.), *Les Marges arides du Croissant fertile, milieu, peuplements et contrôle des ressources en Syrie du Nord*, Maison de l'Orient et de la Méditerranée, CNRS, Lyon, 2006.

Dutilly-Diane (C.), Acherchouk (M.), Bechchari (A.), Bouayad (A.), El koudrim (M) & Maatougui (A.), "Dominance communautaire dans l'exploitation des espaces pastoraux: impacts sur les modes de vie et implications pour la gestion des parcours du Maroc oriental", *Cahiers agricultures*, 16 (4), July-August 2007.

El Euf (F.), "Les parcours en Tunisie", in *Atelier régional sur le pastoralisme en Tunisie*, CRDA Gafsa, April 2003.

Jaubert (R.) & Geyer (B.), *Les Marges arides du Croissant fertile, peuplements, exploitation et contrôle des ressources en Syrie du Nord*, Maison de l'Orient et de la Méditerranée, CNRS, Lyon, 2006.

Kingdom of Morocco, Colloque national sur les terres collectives, Directorate for Rural Affairs, Ministry of the Interior, 1995.

Leybourne (M.), *La steppe syrienne, dégradation et adaptations*, doctoral thesis in geography, Lyon University, Lyon II, Lyon, 1997.

Leybourne (M.), Ghassali (F.), Osman (A.), Nordblom (T.) & Gintzburger (G.), The utilization of fodder shrubs (*atriplex soo*; *Salsola vermicula*) by agropastoralists in the northern Syrian steppe, in *Pasture and forage livestock program annual report 1993*, ICARDA, Aleppo, 1993.

Métral (F.), "Transformations de l'élevage nomade et économie bédouine dans la première moitié du vingtième siècle", in R. Jaubert & B. Geyer (eds.), *Les Marges arides du Croissant fertile, milieu, peuplements et contrôle des ressources en Syrie du Nord*, Maison de l'Orient et de la Méditerranée, CNRS, Lyon, 2006.

Nasr (N.), *Systèmes agraires et organisations spatiales en milieu aride: cas d'El Ferch et du Dahar de Chenini. Guermessa (Sud-Est tunisien)*, doctoral thesis, Paul Valéry University, Montpellier-III, Montpellier, 1993.

Rachik (H.), *Comment rester nomade*, Afrique Orient, Casablanca, 2000.

Rae (J.), Arab (G.), Nordblom (T.), Jani (K.) & Gintzburger (G.), *Tribes, State and Technology Adoption in Arid Land Management, Syria*, Capri Working Paper 15, Washington (D. C.), IFPRI, 2001.

Managing collective land and rangelands

265

Rae (J.), “Les politiques foncières dans la steppe d’Alep: l’interface entre les tribus et l’État”, in (Jaubert, R., Geyer, B., Eds), *Les marges arides du Croissant fertile, milieu, peuplements et contrôle des ressources en Syrie du nord*, Maison de l’Orient et de la Méditerranée, CNRS, 2006.

Treacher (T.), “Gestion des systèmes d’élevage en Syrie: complémentarités entre la steppe et les zones cultivées”, in R. Bocco, R. Jaubert & F. Métral (eds.), *Steppes d’Arabie, États, pasteurs, agriculteurs et commerçants: le devenir des zones sèches*, Cahiers de l’IUED, Geneva, PUF, Paris, 1993.

Wachholtz (R.), “Socio-Economics of Bedouin Farming Systems in Dry Areas of Northern Syria”, in W. Doppler, *Farming Systems and Resource Economics in the Tropics*, Wissenschaftsverlag Vauk Kiel, 24, Kiel, 1996.



CHAPTER 8

IMPROVING RURAL GOVERNANCE

Omar Bessaoud (Ciheam-MAI Montpellier), Annarita Antonelli (Ciheam-MAI Bari), Patrizia Pugliese (Ciheam-MAI Bari)

The general matrix of agricultural and rural policies in the Mediterranean countries defined in the 1990s bears the mark of the promises of liberalisation sealed by the Marrakesh Accords (1994) and untouched by the global food crisis of 1995. Over twenty years after the adoption of the Green Paper by the European Union in 1988, the launch of the McSharry reforms and the agro-environmental reforms which proclaimed the second Pillar of the CAP (2002), the European Community, faced with the challenges of globalisation and the demands of sustainable development, embarked on a revitalisation of its rural areas by developing a multi-functional agriculture. The sustainability of development processes reflected both a new rurality and society's growing environmental concerns. It flagged up its will to see the emergence of a local society run by stakeholders and/or private and public partners and associations as the chief actors tasked with managing the resources and activities of the rural area in a renewed living context.

During the same decade, the announcement of sustainable rural development strategies by the Southern and Eastern Mediterranean countries was an endeavour to respond to the poverty, the wilting of the economic fabric and the degradation of natural resources, a result in particular of the implementation of structural adjustment programmes. These programmes plunged rural societies into situations of extreme material vulnerability and, without solving the problem of feeding the inhabitants of the poorest rural areas, exposed the most modern part of their agricultural economies to global trade. The new strategies of foreign donors often advocated the principle of decentralisation of powers to rural communities which were asked to assume greater responsibility for the management of the land on which they depended for a living. A flurry of reforms faced with the challenges of globalisation.

A flurry of reforms faced with the challenges of globalisation

The new challenges of sustainable rural development and globalisation of rural societies and economies led public authorities to adopt far-reaching reforms of public policies and the institutions of rural governance. For their part, the rural development strategies drawn up by the European Union were centred around three major axes:

- competitiveness of the agriculture and forestry sector through measures aimed at the structures and factors of agricultural production;

- improvement of quality of life by strengthening services in the rural environment and diversification of economic activities;
- protection of natural resources (water, soils, forests, biodiversity) and promotion of environmental amenities and the countryside.

The Leader approach,¹ which was first piloted in 1990, was what came to be known as a cross-cutting axis. The rural world was to promote modes of governance involving the mobilisation and organisation of local actors exercising their responsibilities in decentralised structures and providing coordination at local, regional and/or national level.

In the SEMCs, rural development strategies accompanied and/or extended existing agricultural policies. The new strategies were organised around productive actions aimed at agriculture, basic infrastructure programmes to improve people's standards of living and national action plans to combat desertification and the degradation of natural resources. Strengthening of institutions and representative organisations of rural communities and local actors was another priority of rural development policies.

Alongside its major objectives, there were also unifying themes which were region-specific. For example, Egypt emphasised settlement and development of desert land to improve its productive potential and ease demographic pressure on resources located in the "old lands" of the Nile Valley. Turkey embarked on a policy of major works to mobilise the waters of the major basins (Tigris and Euphrates), regional development and strengthening of its rural infrastructure. The GAP programme or the South-East Anatolia Project are emblematic of the new rural development outlook in Turkey.

After nigh on two decades of local development programmes in the North and South of the basin, it is time to take stock. How should the objectives be regarded today? What has been achieved and what lessons can be learned from the first evaluations? The objectives of rural policies must be interpreted, if they are to be validly evaluated, in terms of the specific characteristics of each rural society and its history, stage of development, the functions assigned to rural areas by society as a whole and, finally, the nature of the political and administrative institutions which provide a framework through which local actors can express themselves. It is essential to take into account the time-frame specific to each society and rural economy, since beyond the similarities observed in the formulation of rural development policies, the orientations and strategic axes do not have the same content and/or the same meaning on the different sides of the Mediterranean.² To be convinced of this, it is enough to recall in outline the reversals and major transformations that have occurred in the rural societies and economies of the Mediterranean.

The emergence of new forms of rurality in the North of the Mediterranean

The demographic and economic upheavals which marked rural areas in the North Mediterranean countries in the latter half of the 20th century explain the differences in

1 - *Liaisons entre les activités du développement rural* (Links between rural development activities).

2 - Organised around the same paradigms: enhanced competitiveness of agriculture, sustainable management of natural resources, quality of life and diversification of activities, better rural governance.

functions assigned today to these areas and also form the basis of rural development strategies. Even if in countries like France, Greece, Italy or Spain, there is a new trend towards re-population, from 1950 up to the late 1980s the North Mediterranean countries experienced an accelerating rural and agricultural exodus which left deep marks on the countryside. The “rural renaissance” which marked the disappearance and/or demise of country people was fed solely by immigration of people originating from conurbations, towns or abroad. It occurs primarily against a background of an agricultural exodus of young people and women which accentuates the ageing of rural populations.

In Greece, the population living in rural areas (85% of the national territory) now represents only one quarter of the total population. Without a massive influx of foreigners, whose number has increased five-fold in ten years, rural areas would have faced a net population loss of some 4%, and even more accentuated ageing.³ Agriculture and livestock farming represented only about 5% of gross domestic product (GDP) in 2007, and it is residential functions and flourishing leisure activities which play a crucial role in the socio-economic fabric of these areas.⁴

In Spain, rural areas celebrated in his time by Ibn Khaldûn⁵ as the home and workplace of a powerful farming society, have turned a historic corner in the last thirty years. The modernisation of agriculture has accelerated their depopulation. The rural population fell by almost half (47%) between 1960 and 1996, declining from 57% of the total population to just 23%. The “rural renaissance” only involves areas close to the provincial capitals and tourist areas.⁶ In remote rural areas, the decline continued at a rate of 5.4% between 1995 and 2005.⁷ This population has also aged considerably. Old people represent over one quarter of the population in many rural communities (higher than the European average). There, as elsewhere in Europe, rising migrant flows of foreign populations are contributing to this latest reconfiguration of Spanish rural society. During the last five years, the foreign population increased fourfold, an increase of some three million new inhabitants.⁸ According to the 2006 census, some 9% of Spanish residents were of foreign nationality, and it was estimated that a quarter of the immigrants arriving in Spain were settling in rural areas.⁹ Foreign labour is now almost essential in agriculture and livestock farming: 15% of the labour employed in the agricultural sector is of foreign origin compared with an average of 11% in other sectors of the economy. The rural population employed

3 - The new populations are settling in small towns in rural areas, bringing about new types of housing and new ways in which households function. These demographic changes introduce new spatial and organisational relationships between families of farmers who have stayed in the villages and the diaspora. Forms of absentee management of farms are evolving, supported by the presence of local wage labour, in part made up of economic immigrants and drawing on a system of family mutual aid.

4 - New actors are involved in these new dynamics of rural areas (local private or foreign entrepreneurs, municipalities, government development agencies, associations, cooperatives) implementing integrated development programmes, introducing innovation (organisational and economic methods) and encouraging the development of new activities.

5 - In his “*Al-Muquaddima*. Discourse on the Universal History”, Ibn Khaldûn emphasises the considerable heritage handed down by the Iberian peninsula to the farmers of the Maghreb. The Spanish were described by Ibn Khaldûn as “the best farmers of all the civilised countries”.

6 - These areas saw their populations increase (by 14% and 0.7% respectively) between 1991 and 2006. Agglomerations of less than 10,000 have lost population and the so-called “urban” agglomerations (over 10,000 inhabitants) have gained.

7 - Over 12 million hectares of UAA, belonging to 2,880 communes, are in areas affected by depopulation (DGDR-MAPA). The rural heritage has not disappeared, as of the 61,197 population units in Spain, 59,041 (or 96.6% of the total) consist of villages or hamlets which have a clearly rural morphology and functionality.

8 - Since 2000, Spain has been the second highest country of immigration behind the United States.

9 - These populations initially settle in regional capitals but also in small villages where they can find work and housing.

in the primary sector has been declining since 1995, falling from 8.84% of total employment in 1995 to only 4.78% in 2006. The loss of the economic importance of agriculture is not confined to employment alone, but can also be seen in national wealth creation where the agricultural sector accounted for only 3.32% of GDP in 2007. Finally, the new residential strategies of families are clearly an important component of social change. Second homes now account for 50% of all rural homes, compared with 32% in 1992.

Rural areas in Italy have also been affected by profound economic and social change. Even in rural areas with intensive and specialised agriculture (which concentrates some 24% of UAA, 38% of agricultural added value and 29% of farm workers), the active population in agriculture is now only 6% of the total active population. In other rural areas, the ageing of the population is ever more pronounced, and the crisis indicators in agriculture in some regions are mounting up (rate of loss of land, for example).

Although they offer a great variety of configurations (a highly attractive “town countryside” with great economic potential, a “new countryside”, “a countryside in search of balance” and “the most fragile countrysides”, marked by economic and demographic decline), rural areas in France are not, in the main, exodus lands. Since 1975, rural France has gained two million people thanks to new residential patterns made possible by the transport revolution, the development of second homes, shorter working hours and increased life expectancy. Rural demographics in France are still marked by two phenomena: on the one hand, the accentuated trend to peri-urban living (between 1990 and 1999, the population living in peri-urban areas rose from 8.8 to 12.25 million people); on the other, the rising residential function of rural areas (in 1999, 18% of the population of metropolitan France lived in mainly rural areas). While the choice of an alternative lifestyle has some weight, the settlement mostly involves retired people, self-employed, often old, some of whom come from northern Europe. These phenomena explain the ageing of populations in predominantly rural areas. France is also recording a decline in agriculture in its rural areas. Between 1970 and 2000, the number of agricultural workers halved and rural areas became more industrial. Industrial employment in basins of rural life today is twice as great as agricultural and agro-food employment combined. Labour is essentially family labour, although there is a growing share of permanent wage workers in agriculture (rising from 10% to 16% of permanent labour between 1988 and 2000) as well as an increase in seasonal workers. A powerful trend to tertiary employment is another feature of the rural economy which is likely to be confirmed in the years ahead. Jobs and activities directly related to populations (services to individuals, education and health services, retail trade) already provide over 50% of all rural jobs and most of the new jobs in those areas. The rural area plays an essential role in the recreational and tourist economy. Even though the contribution of farmers to tourist provision (farm camping sites, *gîtes* and B & B) is still very marginal, the countryside is the second biggest tourist area for the French (35% to 40% of tourist destinations). This enjoyment of the countryside reflects a specific social demand for the scenery, nature, the quest for identity and authenticity.

In a nutshell, the North Mediterranean countrysides have been profoundly transformed by the mass exodus of country people and their extinction as a majority social group, the disconnection between home and workplace, and the demand of urban-dwellers for nature and rural traditions and culture. All are turning points which “mark the end of

traditional rural societies [...] and raise the problem of the place of agriculture in these [rural] areas” (Hervieu, 2008).

Agriculture, smallholdings and the importance of the rural population in the South and East

For their part, the SEMCs have recorded a rural and agricultural exodus during the last decades which radically upset the distribution of the population between urban and rural, as all the countries, with the exception of Egypt and Albania, have an urbanisation rate of over 50%. Nevertheless, the population in rural areas is rising with natural growth rates sometimes approaching 1%. This population is still mainly young (unlike the populations of the North) and it is natural growth (not the migratory balance seen in Europe) which feeds this sustained demographic growth.

The traditional peasant societies which dominated rural areas in Turkey are being transformed by profound changes, a mark of an ongoing transition. Highly modern socio-economic relationships are developing, with the emergence of commercial enterprises, transforming industries and new production methods promoted in large farms producing for local and international markets and managed by an educated and ambitious class of agricultural entrepreneurs. The crisis experienced by rural smallholdings during the last three decades was the consequence of this historic change. The rural population which, at 25 million people, was still in the majority (over 56% of the population) in 1980, represented only 41% of the total population by 1990. The trend towards urbanisation was clearly confirmed at the turn of the millennium with a rural population of less than one third of the total and an age structure which showed significant ageing following a rapid pace of migration of young country people to the town looking for a better life.¹⁰ The process of modernising society and the Turkish economy was reflected, as in the developed countries, by a decline in the relative share of agriculture. Its share of GDP halved (from 26.1% to 13.3%) in the period 1980-2000. Moreover, this modernisation also created big regional disparities, and eliminating these is today seen as one of the priorities of rural development and integrated in the objectives of various projects currently in progress.

The situation in the Maghreb countries is still specific with regard to the natural handicap affecting rural areas and regions (aridity of the climate, mountainous relief, growing human pressure on water and soil resources) and in terms of their history, since urbanisation on the scale we are familiar with today has only emerged there in the last three decades.

The various censuses in Algeria confirm a downward trend in the rural population: 68.6% in 1966, 60% in 1977, 50.3% in 1987 and 39% in 2005. It is a young population, but one whose prospects of employment and earnings remain poor.¹¹ Accessibility to basic services for so-called sparse populations and the uncertain functioning of the infrastructure in recent years have compounded the poverty and exclusion of populations

¹⁰ - The poverty level in rural areas was significantly higher than in urban areas. According to one study (SPO-2005), 14.7 million people were living below the poverty line in 2005, of whom 9 million were country dwellers.

¹¹ - The average rate of unemployment in rural areas, estimated at 25.1%, mainly affects the young, especially the 20-29 age group which alone accounts for over half (51.4%) of all job-seekers.

from the factors of progress.¹² The rural population, which in the past was predominantly agricultural, is now shared equally between the primary and tertiary sectors (39.5% and 39% respectively). With some 25% of the active rural population, the secondary sector also takes a growing share.¹³ The trend to multiple activities of rural households is also on the rise.¹⁴

In Tunisia, urbanisation is well advanced, with two persons in three today living in an urban environment. The demographic trend shows a strong rural exodus, especially from the North-West and Centre-West. As in all the Maghreb countries, these migratory flows are indicators of a crisis of traditional agriculture which is powerless to procure sufficient employment and income for farming households. The relationship between the country and the town is still subject to employment needs, and the daily travel of village populations to urban centres is far from a freely chosen residential strategy. It is not the return of townspeople to the country, but the impossibility of finding somewhere to live in the towns, due to high property prices or rents which forces this pendular movement of populations whose lifestyle (housing and daily consumption) is still essentially rural. Agriculture no longer exerts its hegemony over the other sectors of activity. The decline in its relative weight has been to the benefit of commercial activities and services. In Tunisia, the active population employed in agriculture fell from almost 22% in 1994 to 16% in 2004. Its contribution to GDP also fell to some 13% in 1994-1995, compared with 22% in 1960.

It is in the decade from 2000 that Morocco began a historic swing in the distribution of the population. The urban population was only in a majority at the last census in 2004 with a rate of over 55% compared with less than 30% in 1960.¹⁵ The rural population, however continues to increase under the effect of a natural positive growth rate (0.6% between 1994 and 2004). Despite all the efforts and social projects, the rural world at the start of the decade of 2000 remains characterised by poverty and precarity: over two thirds of the poor continued to live in rural areas with agriculture as the main source of income. The human development indicators lag alarmingly: an illiteracy rate of 45%, access to electricity for 44% of households, drinking water for only 18% and isolation affecting some 50% of rural households. Agriculture continues to have an important place in the rural economy, with agricultural households representing almost two thirds of rural households. At national level, the agricultural sector employs over 40% of the active population,¹⁶ and represents on average 15% of total GDP.¹⁷

12 - According to the study on "Human development and poverty in the rural environment", poor communes are generally situated in rural steppe areas, mountain areas or mountain forelands. They are small, have very little income of their own, have low levels of child education and the highest rates of adult illiteracy. Cf. *La Revue du Ceneap*, "Développement humain et pauvreté en milieu rural", 34, 2004

13 - The rural populations employed in industry still accounts for 8.8% and 12.6% in buildings and public works (National Office of Statistics, 2006).

14 - Multiple activities occurs in agricultural families which in 15.9% of cases can obtain income from outside the farm through work in other sectors. This figure does not include work in the informal sector which is sometimes a more important source of income.

15 - According to the last UNDP Human Development Report (2007-2008), this process is bound to continue. The rural population would then represent no more than 35% of the total population by 2015.

16 - However, employment in the agriculture sector fell 13 points in 18 years (1987-2005). The highest level was recorded in 1987 with 54% of total employment

17 - In 2002, of an active rural population of 5 million, agricultural activities, forestry and fishing remained the chief providers of employment in rural areas in Morocco. They alone provided employment for 79.1% of the active population in these areas.

In 2000, the rural population of Egypt, at 42 million, was still the largest in the Mediterranean.¹⁸ In 2004, it represented 57.8% of the population. As in many countries of the South, this population is young, with 40.8% under the age of 15 years (1996 population census). The poverty ratio is estimated at 26.5% of the total population, or 15.7 million people in 1997 (Datt and Jolliffe, 1999). A very clear difference can be seen, too, between urban and rural areas, with the latter home to some 63% of the poor population (Datt *et al.*, 1998). Egyptian agriculture is an important activity in rural areas, and the agricultural population represents over half (53%) of the rural population. The most significant change was that initiated in the early 1980s by the programmes to settle uninhabited areas. The demands of regional development through mobilisation of the waters of the Nile was at the root of a new rurality based intensively on a competitive agriculture driven by a new class of rural entrepreneurs which has little to do with the traditional peasant system of the Nile Valley.

Albania, together with Egypt, is a country where the rural population is still in the majority (55% of the population). The predominance of small and very small farms¹⁹ resulting from the 1991 Land Act, their lack of market access, economic underdevelopment and the conditions in the mountain regions, all of which make subsistence of the population difficult, gave rise to powerful emigration flows (to Greece and Italy) or, within the country, to the regions of the Centre-West, the coasts or the major cities, especially Tirana. These migratory movements which essentially concern the youngest groups²⁰ can be seen in particular in the growth of fallow land.²¹ They also contribute to a social reconfiguration of rural areas.²² Albania has retained from its communist past the priority attached to education. Almost all the rural population is literate (over half have attended school for eight years). The mountain regions are the least developed. Poverty is more in evidence there and more serious than elsewhere (2 in the coastal areas). Agriculture occupies an essential place in the rural economy in terms of wealth creation or employment. It still contributes almost one quarter of national GDP, concerns 90% of rural households and employs over half of the active population.

One cannot understand the nature of rurality in the SEMCs without taking into account the economic and social importance of agriculture. Rural societies are societies structured around agricultural workers and households. The importance of the rural population is measured essentially against the yardstick of the smallholding. The demographic vitality of rural areas is directly related to the importance of the smallholding. Turkey has 3 million farms of which three quarters are less than 5 hectares. In 1991, Albania counted over 450,000 private production units with an average area of 1.3 hectares. Morocco in 1996 had some 2 million farmers of whom 70% owned less than 5 hectares. In Tunisia, in 2004-2005, there were 516,000 farms of which smallholdings of less than

18 - In Egypt, areas and agglomerations are classified into "rural" and "urban" by administrative decision. As this classification has important implications in terms of infrastructure and collective structures, in practice decisions in this area are based, not surprisingly, on different criteria (the relative strength, power of local elected representatives, etc.).

19 - Of the order of 1.2-1.7 hectares in the plains and hills and 0.2 - 1 hectare on average in the mountain areas.

20 - Almost half (48.6%) of heads of farms are now over 55 years of age.

21 - Fallow land affects 42.9% of farms in Albania and 14% of total UAA.

22 - Currently, three types of rural areas with their own characteristics are emerging: a rural area with intensive urbanisation (around the major cities in the western part of the country), a rural area in balance (in the areas with favourable natural and economic conditions such as Myzeqe, Fusha and Korçes, etc.) and, lastly, a rural area in demographic decline and economic recession (chiefly in the North and North-East of the country).

5 hectares accounted for 53%. In 2001, Algeria recorded over 1.2 million private farms with an average area of some 4.7 hectares. Egypt, for its part, had 3.7 million farms in 2000, plus some 800,000 “landless” farmers and employed 5.5 million workers. Any transformation of rural areas, rural economies and forms of expression of rurality will be observable in changes in small farming. Its vitality will express rural vitality. Conversely, a crisis in farming will be a crisis of the rural world as a whole.

European policies tested by rural realities

Rural policies in the North Mediterranean countries assign the hosting new populations, involving residential, leisure and environmental functions to rural areas. The economic functions are essentially devoted to non-agricultural activities, services to communities and support for agricultural structures. The strategic objectives of rural development in the EU Mediterranean countries clearly incorporate the dimension of sustainability. Three fundamental axes are identified:

- the first concerns modernisation and the pursuit of competitiveness of agricultural production to strengthen their anchorage in the area, occupation and use of rural areas being a recurrent theme;
- the second concerns protection and promotion of the environment and natural resources of rural areas;
- the third concerns improvement of the quality of life of communities and diversification of activities.

Added to these three axes is a cross-cutting axis based on experience acquired through Leader initiatives, which offers the possibility of implementing local (bottom-up) approaches to rural development. The modalities for the implementation of this rural development policy involved the participation of local actors in the conception and elaboration of local development actions, which would be included in the priorities discussed at national and EU level.

Assessment of the policies in the North

To achieve the objectives defined above, rural development policies in the North Mediterranean countries combine three types of instrument: the traditional instruments of classical agricultural structural policies (investment in farms, training, setting up young farmers, farm income support in disadvantaged areas, etc.) introduced in the early 1970s by the European Community; instruments stemming from the McSharry reform (1992), notably agro-environmental measures; the most recent instruments adopted by the EU devoted to support for rural areas and diversification (support for investment in irrigation, services to farmers and the rural population, craft industries, tourism in rural areas, etc.). These latter measures reflect a new vision of rural development in the European Union which includes, for example, the multiple functions performed by agriculture. The principal measures which accompany these axes can be broken down into the following categories:

- modernisation of agricultural structures (axis 1);

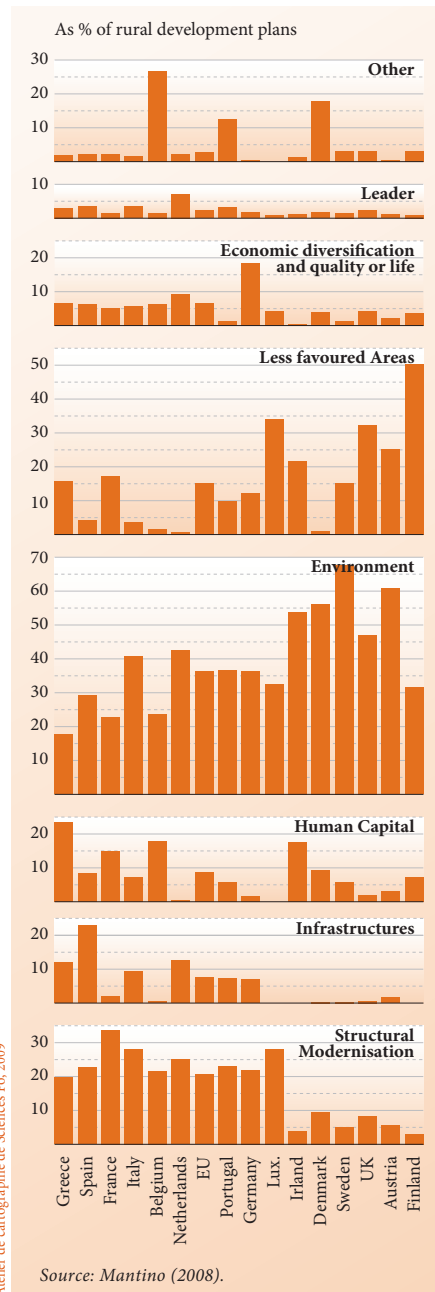
- strengthening of agricultural infrastructure (axis 1);
- development of human capital (axis 1);
- improvement of the environment (axis 2);
- income support in the least developed regions (axis 2);
- economic diversification and quality of life of the rural population (axis 3);
- development of the Leader approach (axis 4);
- other measures (axis 4).

Chart 1 shows the distribution of public resources (EU co-financing, national and regional) by category for the period 2000-2006.

An examination of public expenditure shows that support measures and the implementation of good environmental practices took up over one third of the total public resources. If these are added to compensatory aid allocated to the least developed regions, this means that over 50% of public resources are allocated to axis 2. Meanwhile, modernisation of structures (aid to farms and agro-industrial enterprises, investment in equipment and infrastructure) represents just over one fifth of public resources. Strengthening local infrastructure and services in rural areas and improving human capital within the structure of farms absorbed 7.5% and 8.6% respectively of public expenditure. Analysis of the allocation of public resources to axis 1 shows that EU strategies are still primarily focused on the physical capital of farming to the detriment of human capital on the one hand and rural infrastructure and public services in rural areas, on the other. Lastly, the axis relating to economic diversification and quality of life of the rural population, which is essentially an axis linked to rural development, absorbed only 6.8% of public resources, although the resources allocated to the Leader programme (2.3%) should be added to this. Thus, with just over 9% of the total resources, real efforts at rural development were highly marginal in the EU-15 over the period 2000-2006.

A simplified classification based on the pattern of expenditure shows that rural development in the North Mediterranean countries is still linked to the modernisation of agricultural structures. Expenditure varies from country to country and the structure by axis of rural development programmes in 2000-2006 (CNASEA, 2003; Dwyer *et al.*, 2004) indicates several strategies. While environmental approaches are dominant in approaches to rural development in the countries of northern Europe (Luxembourg, Finland, Denmark, Sweden, Netherlands, Ireland, United Kingdom, Austria) the Mediterranean countries (southern Italy, Greece, Spain and France, too), due to the existence in their territories of regions whose development is lagging behind, pursue an objective of modernisation of the agricultural and forestry sector. Public resources devoted to this modernisation strategy are a response to the imperative need to restructure farms, bearing in mind the weight that small family farms still have, as shown in the following chart (cf. Chart 2). Expenditure on irrigation equipment and infrastructure essential to countries like Spain or Greece should be included in this.

Chart 1 - Percentage of public expenditure by category in EU-15, 2000-2006



Trends in new rural development policies

During the new planning period (2007-2013), the EU's rural development policy is contained in three documents: 1) the Community strategic guidelines governed by Regulation 1698/2005 (EC) which defines the legal framework of the second pillar of the CAP and details the actions eligible for the European Agricultural Fund for Rural Development (Feader); 2) national strategic rural development plans; 3) operational strategic development plans.²³

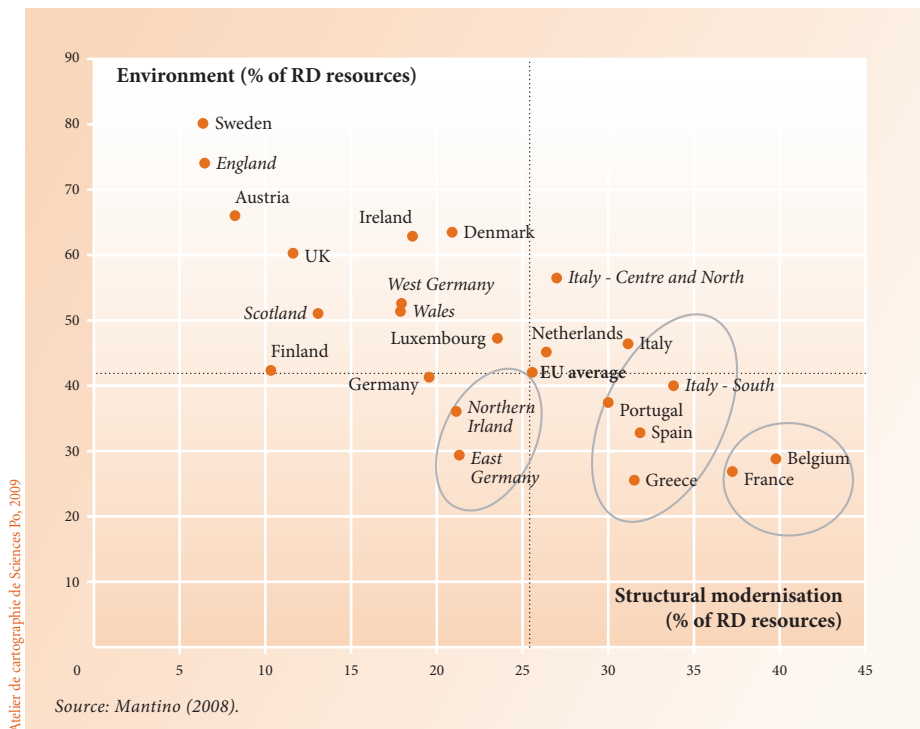
The system put in place in the framework of the programming period 2002-2013 creates a single fund, Feader, with national and regional co-financing and invites development of European Union regulations through appropriate national strategies and regional rural development programmes:

- axis 1: Improving the competitiveness of the agricultural and forestry sector (25% minimum envelope);
- axis 2: Improving the environment and the countryside (25% minimum envelope);
- axis 3: Improving the quality of life in rural areas and encouraging diversification of the rural economy (10% minimum envelope);
- axis 4: Leader, methodological axis for the application of the measures of the other three axes (5% minimum envelope).

What are the new rural development strategies in the European Union and especially the Mediterranean countries on the northern shore? A comparison based on the chief expenditure on intervention in the period 2007-2013 shows changes in the

²³ - Council Decision of 20 February 2006 on Community strategic guidelines for rural development (programming period 2007 to 2013) (2006/144/EC).

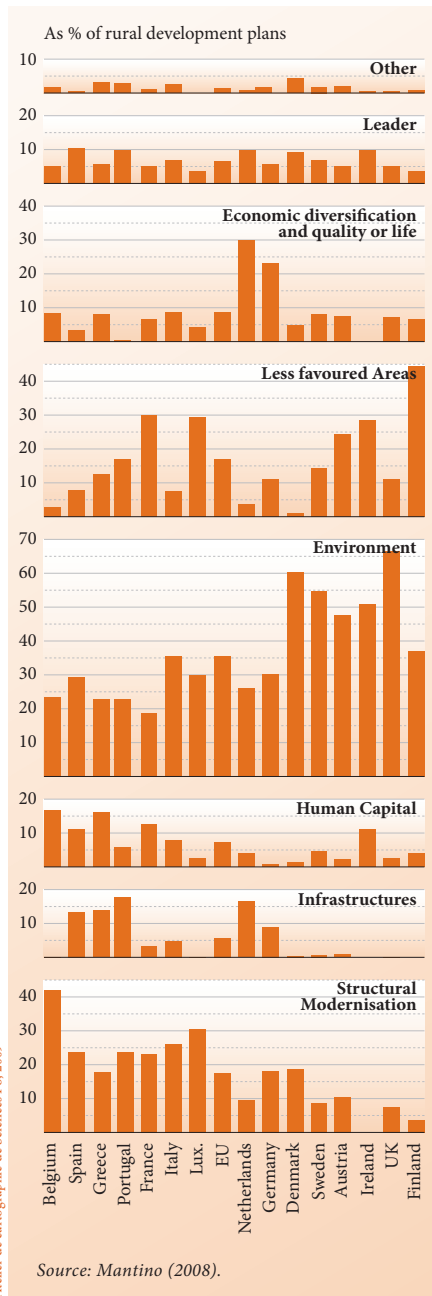
Chart 2 - Modernisation of structures versus environment in the rural development strategies of the EU-15, 2000-2006



priorities of rural development. For the EU-15, chart 3 shows that while axis 2, “environment and least developed regions” continues to figure among the chief priorities in the majority of European countries (these two objectives concentrate 53% of public resources), there has been a redistribution of public resources towards other axes. Public resources devoted to “modernisation of agricultural structures” (18%), infrastructure (6%) and human capital (7%) decline while those allocated to the “Leader programme” (7%) show an increase. The instruments used in the framework of EU regulations, especially the identification, in many countries, of the Leader approach to promote economic diversification and improve the quality of life in rural areas and the fixing of the minimum threshold for the Leader approach at 5%, have exerted a powerful influence on this redistribution of resources.

While during the period 2000-2006, the priorities in the Mediterranean countries (Spain, Greece and Italy) were polarised on improvement of the competitiveness of agriculture, due to the weight represented by rural development programmes for disadvantaged regions, the strategy which prevails in the period 2007-2013 now combines the two axes of “environment” and “agricultural competitiveness” in a more balanced way in the programmes. In Greece, the implementation of the national strategic rural development plan integrated the concept of sustainability as a cross-cutting theme in the competitiveness

Chart 3 - Share of public expenditure by type of investment in EU-15, 2007-2013



axis (for example, through actions to promote quality products or rationalisation of the production of small enterprises). In Spain, the national strategic rural development plan, 2007-2013, increased the number of environmental measures. The presence of an environmental strategic axis in the majority of Leader + programmes, particular attention to protection of biodiversity in regional programmes and the new Sustainable Development Act (December 2007) bear witness to the interest attached to the environmental question. While attaching special importance to increasing the competitiveness of agriculture, livestock farming and forestry, regarded as the economic and social base of rural areas, the strategic plan supports measures to maintain the population of rural areas and improve their quality of life as a key element in the Spanish rural development strategy.

France, for its part, has radically changed its policies compared with the previous programming period (2000-2006). Environment and the least developed areas now represent 50% of public resources. This change of priorities was essentially influenced by two factors: firstly, reduction in agricultural subsidies following the reform of the CAP which provides for transfers of resources from the first to the second pillar by compulsory modulation and, secondly, the EU's budgetary constraints, where arbitrages are made more in favour of agro-environmental measures or compensatory aid to the least developed regions than structural investment in farms. The Hexagonal Rural Development Programme (PDRH) covers the whole of metropolitan France apart from Corsica which has its own rural development programme, the Corsican PDR. Half the new commitments will be managed locally in the period 2007-2013 through the

regional components of the PDRH and regional programmes. The envelope allocated to Feader for France over 7 years is 6.37 billion euros of which 5.27 billion are for the PDRH. Some 1.8 billion euros from this sum was allocated to regional components. The distribution of the Feader credits between axes differs significantly from region to region.²⁴

The case of Italy is more emblematic of the changing strategies. Priority in rural development at national level was clearly given in 2007-2013 to improving the environment and the countryside. Economic diversification and improvement of the quality of life of rural areas saw their budgets doubled. An examination of Italy's rural development strategies shows marked differences between regions. At region level, three types of rural development strategy emerged in the programming phase 2007-2013:

a strategy resolutely directed towards the environment and the countryside which is dominant in the North and the mountain regions – Piedmont, Lombardy, Aosta Valley, Trento and Bolzano – and two regions in the South, Basilicata and Sardinia;

a strategy which strikes a balance between competitiveness of the agricultural sector and the environmental axis, represented by 8 regions, distributed geographically half in the North and half in the South (Emilia, Tuscany, Umbria, Marches, Campania, Calabria, Sicily and Apulia);

a strategy resolutely turned towards competitiveness of agriculture and forestry in all the geographical regions: in the North (Veneto, Friuli-Venezia Giulia, Liguria), in the Centre (Lazio) and in the South (Abruzzi and Molise).

In Turkey, rural development policies stem from the Strategy 2001-2023 which fixes the objective of modernisation of the economy and society in the framework of joining the EU. By increasing income levels and the quality of life in the rural sector, they seek to reduce regional disparities and to protect and promote the environment and the cultural heritage. For rural communes under an urban influence, the measures involve the processing and marketing of agricultural products, diversification of economic activities and strengthening the capacity of local development. The Kemalist legacy of agricultural modernisation appears to set the framework for approaches to rural development. The development of infrastructure and basic services (education, health, transport, electricity, drinking water) in "focal villages", introduction of industry and organisation of rural producers (cooperatives, associations) which began in the 1930s, all of which still inspire the policies implemented in 2000. In this country, rural development programmes have a particular regional dimension. Among the regional plans, mention should be made of the South-East Anatolia development project ("Guneydoglu Anadolu Projesi" or GAP), the Zonguldak-Bartın-Karabuk regional development project (ZBK), the East Anatolia project (DAP), the Eastern Black Sea regional development project (DOKAP) and the Yesilirmak basin development project (YHGP). However, the disparities in development between the regions are still considerable, and Turkey's objective remains reduction of rural poverty.²⁵

24 - The regions allocated on average 42% of their Feader envelope to axis 1. Six regions allocated more than half their envelope to this axis. The major part allocated to axis one by some regions reflects a highly significant action in favour of modernisation of farms and/or development of IAA.

25 - The objective is to reduce by half, between 1990 and 2015, the proportion of the population whose income is less than one dollar a day. In Turkey, the poverty level in rural zones is significantly higher than in urban areas. According to one study, of 14.7 million people living in 2005 below the poverty line, 9 million were living in rural areas (SPO-2005).

In Albania, the principle of restoring freedom of movement of populations and the application of the Land Act were fundamental measures which influenced the rural world. The collapse of the rural economy after the withdrawal of the State and the reform of agrarian structures destabilised rural society. Rural development projects were then financed by international funds (World Bank, EBRD, Albanian Development Fund, etc.) during those ten years. The priority objectives of the 2006-2009 Programme concern several aspects of development: strengthening the productive potential of the agriculture sector, improvement of farm structures and rehabilitation of irrigation systems, development of basic infrastructure to provide an adequate standard of living for rural populations and combating the degradation of natural resources. In short, Albania is seeking an agricultural development model (agro-export model or agriculture producing for local needs) but has not yet found an answer to the issues of the strategic development of the mountain regions which cover a large part of its territory. The economic and social shocks resulting from the structural adjustment programme and the post-communist transition undermined the old standards, values and forms of cooperation and solidarity between the actors of rural development. The “destructuring” of the actors, economic instability and the uncertainty related to it are a barrier to forms of self-organisation and coordination of the local actors.

Rural development strategies in the countries of the South: the central place of agriculture and poverty reduction

The SEMCs are endeavouring to stem the rural and agricultural exodus by encouraging country areas to contain their population growth for lack of controlled urbanisation policies. They assign productive functions which generate jobs and incomes to their rural areas. Agriculture being the chief sector of activity, many projects seek to improve its productivity and economic competitiveness. However, rural development programmes all grant poverty reduction and basic social infrastructure a prime place. The projects and plans implemented also aspire to conserving scarce and fragile natural resources seriously endangered by human pressure and the perceptible climate change which affects these regions.

Rural development strategies in the SEMCs today seek to resolve the great challenges of poverty reduction and under-employment, social and geographical inequalities and the degradation of scarce resources weakened by demographic pressure and inappropriate systems of production. Apart from these strategic axes, they have set themselves a cross-cutting objective of strengthening agricultural and rural institutions and organisations. The rural development strategy 2020 in Morocco, the new integrated rural development programmes in Tunisia (2004) and the rural renewal policy in Algeria (2005) illustrate these new directions. Since the 1980s, Egypt has been pursuing development of agricultural potential and consolidating the settlement of new areas in the framework of reconstruction of its agricultural lands through expansion into uninhabited areas.

In Tunisia, the year 2004 saw the effective launch of improved integrated rural development projects which seek to conserve natural resources and make better use of them,

increase agricultural production of small and medium-sized farms, improve living conditions and incomes of rural populations and promote rural women.²⁶ Interventions in the fields of mobilisation and exploitation of water resources, forests and grazing land, water and soil conservation and promotion of difficult zones is part of the national programme to combat desertification. A national adult education programme which mobilises many teachers (employing “unemployed” graduates) was decreed to combat the illiteracy which afflicted 1 adult in 3 in 2004, especially rural women.

Meanwhile, the integrated rural development programmes combined two main types of action: productive actions and others aimed at improving living conditions and basic infrastructure in the most disadvantaged rural areas. The actions were focussed on improving infrastructure: building roads and highways, provision of drinking water (which rose from 82% to 92% between 2001 and 2006), general electrification in rural areas (98% in 2006), reduction in precarious housing and increased number of health centres. The general improvement in living conditions and access to the various services in rural areas was accompanied by a decline in poverty. The poverty rate was estimated to have halved between 1990 and 2005, despite a few pockets of extreme poverty which still exist in remote rural areas.²⁷ The programmes to improve general living standards in rural areas were financed by both state and national solidarity funds (National Solidarity Fund 26-26, the National Employment Fund 21-21 and the Tunisian Solidarity Bank) as well as international solidarity funds. Simultaneously, a regional development programme was implemented in the rural areas of the North-West, coordinated by the Sylvo-Pastoral Office of the North-West (Odesypano). This shows that efforts are being made to include the new generations of integrated rural development programmes in regional development programmes, allocating more resources to the protection of natural resources (conservation of water and soils, combating sand encroachment and managing common grazing land...).

In Algeria, the agricultural and rural policy reforms could not be implemented in the decade 1990-2000 because of the particularly difficult political climate. Rural areas had been especially exposed to the effects of a terrorist movement that was devastating in human and material terms. It was only in July 2000 that a national agricultural development programme was adopted, endowed with considerable budgetary resources in the framework of the establishment of the National Fund for the Regulation and Development of Agriculture (FNRDA).²⁸ The findings after a few years of operation of the national agricultural development plan, in 2003, showed that the actions taken, individual agricultural investment projects, had excluded households in small rural agglomerations who were the socially and economically most vulnerable groups, and scattered or isolated farms (a rural population of some 10 million people). These findings led to the adoption of a national agricultural and rural development plan chiefly based on improving the living standards of communities. Local rural development projects, regarded as key tools of rural development, thus came to reinforce local development actions (rural

26 - The projects should achieve a global supply of rural drinking water of 80% in all the governorships and improve the rate of connection of households to some 95.5% by the end of 2004. As regards the development of difficult regions of the interior, the 10th Plan (2002-2006) envisaged the implementation of 11 integrated agricultural development projects, with investment estimated at 216 million dinars).

27 - World Bank (2006).

28 - Of the order of 40 billion Algerian dinars in 2000, over 500 million dollars, representing unprecedented growth (tenfold) of public agricultural budgets allocated in the 1990s.

electrification, opening and modernisation of the road network, drinking water systems, health, schools...). Collective projects financed by various funds were combined with projects to strengthen the local economy (mobilisation of water resources, development of land and farm improvement, planting of plantations, safeguarding and developing grazing land, creation of livestock farm units and smallholdings...).²⁹

The rural renewal policy adopted in 2006, which targets rural households in landlocked or remote areas, in particular, is structured around four main programmes. The first concerns improvement of rural living standards. The second, diversification of economic activities, is designed to encourage development of alternative sources of income by rural populations. The third concerns protection and promotion of natural resources and the rural heritage, both tangible and intangible. These three programmes will be implemented in the framework of a participatory and local rural development process, formalised by the tool called the integrated local rural development project. This axis benefits from a programme of human capacity building and technical assistance for those involved in rural development. Various evaluations and studies show that the integrated local rural development projects adopted are essentially collective projects defined by local communities with the objective of strengthening social facilities and collective infrastructure of rural communes. They reflect the real aspirations of rural communities to improve their standards of living.

In the 1990s, approaches to rural development in Morocco involved the implementation of sectoral programmes with the objective of eliminating the deficit in infrastructure and basic social services (drinking water, electrification, rural roads, etc.). The productive actions are carried out in the framework of agricultural development projects in *Bour* areas.³⁰ The spread of poverty in the rural world, the growing social disparities between the urban and rural milieu, low labour productivity on small farms and the degradation of natural resources are core objectives of Morocco's Rural Development Strategy 2020 adopted at the end of the 1990s. This strategy involves projects of a social, economic and environmental character and both national resources and those of international cooperation and public development aid. It was strengthened in May 2005 by the National Human Development Initiative which again sets itself the objectives of alleviating infrastructure deficits in the poorest rural communes and promoting income and employment generating economic activities. In Morocco, rural policy has an undoubtedly social dimension. It is a policy of compensating for the social and economic inequalities which mark areas, regions and the agriculture sector as a whole. The question is whether the "Green Plan" adopted in the Spring of 2008 which charges the modern private sector of Moroccan agriculture (Pillar 1) with training and "accrediting" the small rural economy sector (Pillar 2) will succeed in bringing about more social change in the Moroccan countryside than Strategy 2020 sought to achieve.

Egypt is a model of a rural development policy which gives a central role to private sector investors. Public rural policies are backed up by hydro-agricultural improvement policies and intensification of the agricultural sector entrusted to the private sector.

²⁹ - The Fund for rural development fund and development of land by concession (FDRMVTTC), the Fund for combating desertification, development of grazing land and steppe (FLDPSS), the National Fund for Aid to Housing (Fonal), etc.

³⁰ - *Bour* agriculture corresponds to the notion of pluvial agriculture.

Private investment in the development, equipment and production represents on average between two thirds and over 80% of agricultural investment (84% in 2006). They led to the emergence on the new lands of large capitalist estates, a far cry from the family model of the “old lands”.³¹ These irrigated and mechanised farms (20 to 25% of the total agricultural area) target their crop systems towards export products and concentrate social infrastructure, services and economic activities.

The objective set by Strategy 2017 is to increase the area of land under cultivation by 3 million *feddans*, or 1.2 million hectares compared with today. Six major projects concentrate the bulk of public and international financing, the most important of them being the Toshka and Elsalam canal projects.³² While in the land reclamation zones, a class of agricultural entrepreneurs, technicians and local managers dominate the local economy, the rural population in Upper Egypt (Nile Valley), made up of small farmers, wage workers and landless peasants, is very largely poor and state controlled. Studies show that there is a close correlation between access to land and poverty in the rural world (Croppenstedt, 2006; Ellaithy, 2007). The amount of public investment in rural development (Shorouk national programme) is too small to fill the gap between rural and urban areas. Thus, in the period 1982-2002, per capita investment in urban areas was 9 times higher than in rural areas. It was still 7 times higher in the period 2002-2005 (*Egypt Human Development Report*, 2005). Collective infrastructure is cruelly lacking. More than half the population of Upper Egypt is still illiterate, 59% of men and 50% of women, and rural populations suffer seriously from lack of access to drinking water.³³ For decades, public policies have disadvantaged the rural areas of Upper Egypt (80%-85% of the total agricultural area with 90% of the rural population). Current agricultural and rural development policy benefits the agriculture of the new lands. Bearing in mind that this agriculture occupies only 20% of the agricultural area, is home to only 8% of the population and accounts for only 2% of farms, it is legitimate to question the sustainability of a development strategy marked by such an imbalance.

From “constructed” areas in the North to “lived areas” in the South

The spatial dimension is now regarded as a productive force in the strategies of economic actors. Faced with globalisation and the need to promote economic competitiveness, many rural areas have embarked on a process of developing their local resources. They mobilise their historic heritage or know-how, respond to a demand for typical products with a strong identity, maintain their countryside and their culture and revive their culinary traditions. As a complex space comprising multiple functions involving numerous actors, the area becomes the organiser which captures external forces, a place of

31 - The term “old lands” is used to designate the agricultural lands of the valley and the Delta, as opposed to the “new lands” reclaimed from the desert.

32 - The Toshka project seeks to create a new “Nile Delta” in the South of the Western desert. It involves cultivating 540,00 feddans (226,890 hectares) using the water from Lake Nasser by means of a canal 150 kilometres long. The Elsalam canal project is intended to reclaim 620,000 feddans (260,504 hectares).

33 - During the summer of 2007, Egypt experienced what the national press called “the revolt of the thirsty”, i.e. the demonstrations by people in several rural regions following the lack of drinking water for several days, despite a Nile flood regarded as particularly strong.

intermediation, the centre of economic activities and trade. The modes of organisation and coordination of the actors call for many kinds of innovation. Actors organise themselves into networks. They absorb all the modalities inherent in geographical, relational, institutional and economic proximity. They develop partnerships and cooperation and rely on institutions to channel projects and the funds to implement them. The area is permanently constructed on a given historical territorial base. Constructed areas are the product of organised actors who seek to resolve identified problems. The foundation on which they build is formed by an economic and social base and a value system shared by members of the local community.

The construction of new rural areas in the North

In the North Mediterranean, the adaptation of agriculture to European integration and global trade brought the theme of the new functions of the rural space and rural areas to the fore. The area is seen as a foundation of social relations providing a strong bond between the socio-cultural heritage and the economic sphere. Farmers and their organisations are no longer the only actors in the development of rural areas. The central State transfers powers and resources to a society of private stakeholders, involving representatives of civil society, local elected representatives, enterprises and administrations. Agricultural production is redirected towards quality. Quality marks and labels of origin, in this context, are the essential tools of public policies in favour of local areas and the environment. The burgeoning institutional and organisational structure driven in the North Mediterranean by the EU rural development policies is at the very core of multiple and varied local area structures, even, in some eyes, to the point of excess. Apart from actions related to national regional development policies, the EU's so-called social cohesion regional policy, the reform of the structural funds (1988), provided for the financing of project areas through the Leader programmes in France, Italy, Spain and Greece. Other geographical configurations have been superimposed since the 1990s.

In France, the national highland policy, "pays" contracts, the implementation of agro-environmental measures, the creation of natural parks, the Leader project, the Agricultural Orientation Act (area contracts) and the Chevènement and Voynet Acts (1999) defining "pays" projects, were all methods of construction of local areas. The Leader programmes were deployed in 2000-2006 in 140 areas of France and involved development strategies aimed at experimenting with new ways of exploiting local resources and potential (heritage, culture, agriculture, environment...), strengthening the economic environment and enhancing the organisational capacity of the actors (dialogue, local networks, monitoring and management of projects, decision making...). Feader axis 4 (strategic orientations of rural development 2007-2013) takes up many of the characteristics of the Leader + programme which is a localised programme. Only selected rural project areas (some 200 in France for 140 areas at present) are eligible for European co-financing. The beneficiaries must be formed of local action groups (LAG) composed of public and private partners (the latter at least 50%) responsible for monitoring projects included in an integrated local development strategy.

Parallel to these area projects, another 379 projects were labelled poles of rural excellence in 2006, following a call for projects issued by the Government in December 2005. Based on a public-private partnership, these innovative projects in rural areas were intended

to create or maintain some 40,000 jobs in the long term. The breakdown of projects in the poles of excellence is as follows: 41% of projects for the promotion of the natural, cultural and tourist attractions, 21% concern the development and management of bio resources, 16% are aimed at agricultural production, craft industries and local services, 14% target the provision of services and reception of new populations and the remainder, some 8%, cover a variety of subjects.

In addition, “*pays*” projects are now the cornerstone of construction of rural areas. The measure involves advice on the development of “*pays*” (involving all the local development actors) which provide the framework for negotiations and multiple partnerships to establish joint projects to meet the expectations of the people living in these areas. The project promoters are bound by a charter which formalises the partnerships of actors (social, cultural and environmental). Serving as a complement to structures already existing in the framework of intercommunality (natural parks, basins of employment, tourism and rural development offices, etc.) the “*pays*”, whether embryonic or already institutionalised, are a focus of local power which gives birth to a new area map, often overlapping previous administrative divisions (departments, regions, communities of communes). Lastly, the “*pays*” are more broadly involved in the realignment of urban and rural areas, as shown by “agglomeration contracts”, which are similar to “*pays*” contracts, also intended to spark debate. They encourage a learning process among the actors in the management of collective actions and planning the future of their areas taking into account sustainability.

In Italy, political history and the organisation of the State which allowed considerable autonomy to the regions have influenced local structures. Apart from the Leader projects (132 local action groups in 2000-2006) which were widely used, the “*contratti d’area*”, which promoted the establishment of area employment pacts, integrated area projects and rural districts, were all ways of implementing local rural development. The third generation Leader projects (Leader +) benefited from the lessons of the previous Leader programmes. Area employment pacts are specific to Italy, both in terms of financial resources and methodology. Integrated area projects were put in place during the programming phase 2000-2006 in the least developed regions and those targeted for restructuring. Lastly, rural districts are a very recent creation of Italian policy. Implemented as a pilot in Tuscany, their scale is still modest in terms of resources. These various methods of area construction have common characteristics which can be summarised as follows:

- the projects focus on innovation;
- the geographical limits are generally neither too large nor too small to ensure satisfactory public funding of communal needs;
- they include various sectors but are based on agriculture and concentrate on rural areas rather than agricultural households;
- they involve local actors on a formal basis but also call on informal partnerships. Decisions are taken by local partnerships rather than central (national or regional) administrations.

It is the degree to which these characteristics are actually enshrined in policies which explain the differences between Leader, area employment pacts, integrated area pacts and rural districts. While Central and Northern Italy are marked by a rural-urban continuum where labelled local products, IAA and industrial SME are structured on a local area basis, these geographical dynamics are weaker in the South where the organisational fabric is less dense and economically less robust. In these regions of the South, the quality of the countryside and environmental assets are the principal local resources.

In Spain, 17 autonomous regions and 50 provinces form the basis of the country's administrative organisation. Up to the 1980s, rural areas were essentially regarded as agricultural areas where the rural was subsumed into the agricultural. After joining the European Union in 1986, with a State already decentralised into autonomous communities, Spain began to introduce the CAP, followed in 1991 by the Leader I initiative aimed at rural development which would contribute to the emergence of areas. Between the municipal and provincial level, "comarcas" were formed. These were neither political constituencies nor administrative divisions, but a geographical base for rural development projects and a place of negotiation and coordinated action by local actors. It was only in the mid-1990s, with the development of the "bottom-up" approach, that the area would be considered as a key element in rural development strategies. The favourable reception given to Leader by the central Government and regional and local government is linked largely to the considerable decentralisation of the Spanish State and the obligations arising from the country's accession to the EU.³⁴

The execution of these rural development programmes required new community and Spanish institutions and new "ground rules". These new institutions, in turn, created new forms of participation, collaboration, supervision, etc., and new actors and areas appeared. The decentralisation of the State and the application of the European Union rural development policy also implemented the principles of "subsidiarity and co-management", encouraging rural areas to take on decision making and management powers which hitherto had belonged exclusively to the National Administration. This helped to reinforce the structuring and creation of the socio-economic fabric in areas which had previously been somewhat fragmented. Other factors contributed to this "upsurge", notably the revaluation of the "local" and the new opportunities of a globalised market which offered opportunities for certain rural activities (ecological products, local products, quality products, tourist services, environmental services, etc.). Ultimately, the process of construction of areas enabled the rural actors to forge a common culture, exercise new responsibilities authorising the appropriation of institutional measures and master the essentials of local development.

For its part, Greece experienced a major upheaval in its administrative system. In 1997, it embarked on a reform of decentralisation with the creation of 1,000 *demes* (the basic administrative unit), 52 *nomes* (departments) and 13 regions in order to create a viable and competitive system of areas.³⁵ The national improvement and sustainable development

³⁴ - The Ministry of Agriculture, which surrendered its powers to the EU and the autonomous communities, regarded the new rural development policy as an opportunity to regain some purpose. Certain governments of the autonomous communities saw rural development policy as an opportunity to consolidate their legitimacy in relation to rural areas, stem the rural exodus and stimulate local economies.

³⁵ - The Decentralisation Act organised the transfer of powers from central level to a reduced number of enlarged

plan proposes in the next four years to introduce a new administrative reform reducing the number of administrative divisions by two thirds. This means reducing the number of departments from 52 to 17 and regions from 13 to 5. Although still without all the necessary financial, institutional and technical means to assume its role, the rural area has become a partner of the State in planning at all levels. Greece has used the Leader scheme and development agencies were the preferred instrument for promoting area projects. At the core of these projects leading to some degree of localisation, the process of qualification of agricultural products, tourism and protection of the natural, cultural, architectural and historic heritage have played a major role. Greece has tried new and original forms of constructing areas. In particular, network areas have been founded on the basis of common values and representation shared by actors from the diaspora. Drawing on their relational proximity, these actors of the diaspora have constructed a network of relationships which mobilise physical, social and financial capital and the new information and communication technologies for the benefit of the area of origin. These areas have taken shape with the development of multiple projects which generate economic activities, redeployment of services to the public and rapid demographic expansion.

Excessive localisation and institutional overheating in the North

The new modes of governance coincide with environmental, national and regional development policies which are directed towards greater openness to opportunities of initiatives and actions of rural areas (regional parks, national development act, environment...). The proliferation of area projects and regional strategies on the subject of rural development sometimes makes them difficult to coordinate.

In France, while we can see a convergence of the LAG (project areas) which are invited in the framework of the programme for 2007-2013 towards cohesion with existing local entities (natural parks, *pays*, basins of employment), some *pays* are proving difficult to establish because of political tensions or conflicts of interest which stand in the way of the participatory approach.³⁶ The question of project financing and competition for control of resources is crucial. It raises the subsidiary question of the legislative constraints which govern relations between local authorities and the State addressed in the Lambert report of December 2007.³⁷

In Greece, the organisational weakness of the demes, added to the weakness of the intermediate local and regional bodies, means that rural society and its actors are unable to participate effectively in the organisation and functioning of the new institutions which are supposed to govern the new areas (catchment areas, Natura 2000 zones, natural parks, etc.). Nor are they able to participate in the elaboration and implementation of diagnostics and local development actions. Although development agencies have

communes, 1,000 demes instead of 6,000 communes. These reforms are quite recent and have so far not led to an organisation or improvement in the functioning of these authorities sufficient to make them fully effective in practical terms.

³⁶ - This is especially the case in Aveyron, where some people refuse to see the proposed *pays* overstep the borders of the department for political reasons. The partnership of future *pays* is rather on the basis of competition.

³⁷ - *Révision générale des politiques publiques. Les relations entre l'État et les collectivités locales*, report of the committee chaired by D. Lambert, December 2007.

a key role in the economic development of rural areas, they tend rather to aid and support projects of collective interest rather than fulfilling the function of a personalised information service and support for individual initiatives. In short, the organisational weakness of local institutions accentuates the difficulty of linking the two levels of intervention (rural area and new management areas), and it does not allow the introduction of the support and information mechanisms necessary for sustainable development of rural areas by local society.

In Spain, it cannot be said that the process of construction of areas has been successful in all rural areas, given the diversity of situations and the existence of certain negative aspects of the emergence of democracy in rural areas.³⁸ To combat these disparities between areas, monitor cross-cutting measures and ensure that rural development programmes of the autonomous communities are consistent with the national strategic plan and the national framework, new administrative structures were created (National Monitoring Committee, Interministerial Committee for the Rural Environment, Council for the Rural Environment, Office of Rural Development Associations). In addition, the persistent disparities between areas led to the adoption of the Local Sustainable Development Act, 2007.

Los Alcornocales park: the key to mastering decentralised development

The park is a natural park in Andalusia measuring 170,000 hectares and with 95,000 inhabitants. Natural parks are protected and they are managed at national level (not autonomously). While this example is not representative of Spain, it has been chosen for its special characteristics: the priority given to clean energy, combating desertification, biodiversity and governance.

The Spanish regions have powers relating to agriculture not possessed by the State, and sustainable development has been a means of legitimisation for the region of Andalusia. Until then, there had been a proliferation of institutions in the park area with 4 associations of communes, the natural park and management agency (AMA), 4 Leader projects, 1 Proder project, 5 OCAS, etc. It was the Rural development committee of the Leader II project in the park area which was tasked by national declaration to draw up the sustainable development plan (SDP). The SDP organised the coordination of programmes and actors. It created the conditions for dialogue and institutional cooperation in the management of resources, control, monitoring of socio-economic aspects, and dynamics of functioning which, following discussions and negotiations between the various actors, promoted a fair distribution of missions. A collective learning process, taking heed of the needs of the population, listening to the private sector and coordinating with administrative structures is the basis which allows the park to function properly. Other similar processes have been followed in the natural park, such as the "European charter for sustainable tourism" (ECST) or the New Rural Strategy for Andalusia (NERA).

In Italy, the deficit of the local dimension of projects is considered as one of the principal gaps in rural development plans adopted up to 2006. A localised approach would have avoided the extreme fragmentation of measures. This shortcoming was particularly

38 - F. Ceña, R. Gallardo and D. Ortiz, *Rapport final portant sur l'étude institutions et organisations du développement rural en Espagne*, projet PAR-PAA, champ III: Développement rural et politiques agricoles dans le contexte de la mondialisation, Montpellier, IAMM, 2005.

marked in the case of agro-environmental measures. To be effective, the concentration and proximity of farms receiving environmental aid required localised actions.

Do local policies settle the question of geographical inequalities (Auvergne, South of France, Northern Italy, Southern Italy, Spanish regions)? How can distance be overcome by reducing access to public services, efficient transport, reliable energy supplies and high-speed Internet which is still distributed unequally between remote areas where 40% or more of the population lives on average more than half-an-hour by car from a hospital and 43% more than an hour away from a university. In 2007, the percentage of homes with high-speed Internet access was less than 15%, on average, of that in the towns. The management of environmental problems in a context of climate change and increased risks of flooding, loss of biodiversity or movement demands an organisation of actors based on a cooperation which does not stop at the borders of an area or region. While the policy of cohesion encourages forms of cooperation through the Interreg programmes, the Green Paper on territorial cohesion emphasises that much remains to be done.³⁹

From “lived areas” to “illusions of participation” in the countries of the South

The obstacles placed in the path of local structures in the South of the Mediterranean derive from delays in the process of regional development and inequalities in human development. They are related to non-recognition of areas of traditional rural communities (lived areas) and, lastly, they emanate from the fragmentation of localised actions and approaches to rural development largely due to the weaknesses of modes of coordination and governance.

In the first place, the material conditions and basic infrastructure in many rural regions do not form a sufficient critical mass to give visibility to the area. Furthermore, illiteracy and poverty hold back local development and many rural regions are landlocked and isolated. In addition, areas lack real borders, necessary for social intermediation to organise them. It is within borders that a community recognises its territory and identifies itself as a community. Yet the actions taken in the Maghreb often ignore the territories of rural communities and traditional rural organisations are maintained, in legal terms, on an informal basis. The process of formation of national states in the Maghreb (administrative boundaries of territories) and modernisation of society (communal assemblies, provinces, governorships, cooperative organisations and rural associations cemented in the Act of 1901) sought to extinguish traditional forms of organisation of rural societies (tribes or *arch* and *djamâa* or assemblies of douars and villages). The setbacks to local development have often been attributed to this “strategy” of the modern State.

The geo-administrative structure introduced on the back of state regional development projects is thus in competition with forms of “lived areas” experienced by village and/or rural communities whose traditional bonds have not been undone. Thus, the territories of the South are in search of an identity and a mode of governance which takes account of the wishes and specific characteristics of rural communities. It should be noted that

³⁹ - Communication from the Commission to the Council, the European Parliament, the Committee of the Regions and the European Economic and Social Committee, *Green paper on territorial cohesion: Turning territorial diversity into strength*, SEC (2008) 2550, 6 October 2008.

timid attempts to taken these communities into account were made through a number of projects concerning rural regions of the Maghreb. One can point here to the Douar Development Plan (PDD) implemented at local level by Odesypano to involve populations more in various choices and thereby to take ownership of them. One can also mention the experiment involving ethno-lineage cooperation in the pastoral areas of Eastern Morocco (financed by IFAD) or, in the grazing lands of Southern Tunisia, the creation of socio-territorial units (UST)⁴⁰ which are identified with rural communities tied by quasi tribal relations. This question arises against the background of the problem of the relationship between State and civil society and, consequently, the degree of relevance of governance of rural areas.

Douar development plan in North-West Tunisia

The experience of the Office of Sylvo-Pastoral Development of the North-West (Odesypano) which benefited from the support and expertise of the GTZ is an example of good practice. It was decided to the *douar* as a socio-territorial unit. The *Douar* Development Plan sought to take a participatory approach by closely associating the population with the conception of its own development. A research-action-training operation was conducted with Odesypano staff and technicians, agricultural researchers and experts and representatives of each socio-spatial entity or *douar*. This operation was conducted in four phases: 1) ad hoc promotion and training, identification of needs of the population and concrete participation; 2) contribution of technicians; 3) planning; 4) feedback to populations and negotiation with the administration. These *Douar* Development Plans took the decision to involve rural women. The latter participated directly in the analysis of the situation in the *douar* and planning of development actions. This approach was not replicated in other projects.

The difficulties of territorial structures also stems from the fragmentation of rural development actions due to the existence of multiple institutions involved in operations (NGOs, international organisations, State). Not only are the actions implemented segmented, but each of the institutions or organisations stamps its own ideas, approaches and methods. These interventions raise the question of sustainability of projects when the financial aid dries up.

Lastly, the failure of territorial construction stems from a problem of coordination and governance. The principles of participation in the management of projects and decentralisation of powers are set out in all the texts which define the doctrine governing modes of territorial governance. All the rural development strategies in the countries of the South have proclaimed their desire to adopt integrated and localised approaches and laid stress on the plurality of actors and their role in rural development. It is true that there has been a development of the associative movement, creation of cooperatives or rural development groups and involvement of new elites which support each other and/or revived traditional forms of organisation of rural societies (village assemblies, family networks, emigrants, professional relations...). It is equally true that it was the external impetus (from government or foreign donors) which encouraged the blossoming of rural organisations and that the role of these organisations remains largely consultative. At the same time,

⁴⁰ - The Prodesud project started in 2002 was based on socio-territorial units (UST, a euphemism to avoid using the term ethnic community or tribal group) organised around pastoral areas to discuss with the populations concerned how to manage the agro-pastoral space in an openly participatory framework.

the decentralising movement is still unfinished if not non-existent in the SEMCs. In Egypt and Tunisia, for example, the organisation of local authorities is under state control. In Egypt, each territorial level has a “people’s council”. However, the governors and other key posts, including the mayors, are appointed by central government. In Tunisia, the heads of rural communes are also appointed by the central authority. When they are elected, as in Morocco or Algeria, they are duplicated by a representative of the Makhzen (the royal authority in Morocco) or under the umbrella of the public authority (*wali* in Algeria).

The “alibi” of sustainable development and talking about “participation” have often masked issues of unfinished or, indeed, absence of decentralisation in the modalities of rural governance. Moreover, in not one of the countries of the South do farmers or country people have trade unions or professional organisations independent from the local authorities which can share in management of the agricultural sector or share responsibility for management of local affairs. The liberal policies have very clearly favoured monopoly of representation in associations of rural entrepreneurs and farmers or agrarian capitalist groups well established in local and/or international markets. In short, local governance in the countries of the South of the Mediterranean today is characterised by a concentration of powers and/or an asymmetry of powers in favour of the public administration or organisations which are “institutionalised” or “dependent” on state structures. These situations, which are political in nature, firstly explain the lack of participation by country people in local associations and, secondly, their failure to make their mark on the local landscape. They express the weaknesses in the process of accumulation of social capital and the degree of mastery of collective action by rural actors.

Table 1 - Summary table of territorial constructions in the North and South of the Mediterranean

North	South
<i>Functions of rural spaces</i>	
Productive, residential, leisure, landscape functions Extinction of farmers, reception of residents, mobility by choice 4 strategic axes: 1) competitiveness of agriculture and sylviculture, 2) protection of the environment, 3) quality of life and diversification of activities, and 4) promotion of the Leader approach.	Productive functions Important role of agriculture and farmers, rural exodus and natural population increase, enforced mobility. 4 objectives: 1) development of agricultural potential, 2) improvement of living standards, 3) combating degradation of resources, and 4) participatory and integrated approach.
<i>Institutions and organisation of actors</i>	
Dense, diversified and centralised institutional fabric, partnership, charter and contractual relationship. Collective action, integration in the local fabric.	Thinly meshed, lagging process of localisation, unfinished decentralisation, weight of informal organisations without recognised legal status. Territorial approach through development projects.

Table 1 - (contd.)

North	South
<i>Rural economy</i>	
<ul style="list-style-type: none"> - Economy of services, tourism, industrial SME, agro-food industry. Vertical diversification <ul style="list-style-type: none"> - Competitors, customers, market, diffused area of industrialisation, local investment and public project financing, diversification of activities. 	<ul style="list-style-type: none"> - Dominant primary sector, declining crafts, weak industrial fabric, limited tourism. Horizontal diversification (emigration) <ul style="list-style-type: none"> - Restricted market with little competition, foreign investment by foreign institutions and emigrants.
<i>Basic infrastructure and human capital</i>	
<ul style="list-style-type: none"> - Visibility of the territory with a better provision of basic services. - Existence of a charter of public services (France 2005), improved living environment, services to enterprises in progress. - Existence of human skills, innovation, support for project promotion and engineering, society of stakeholders, actors better and better organised who introduce an economic dimension. 	<ul style="list-style-type: none"> - National development schemes and regional schemes in progress to improve infrastructure. The critical infrastructure threshold has not been reached in many rural communes. No visibility of the rural area. - Limited rural elites or elites in formation with contributions of young people and rural women, widespread adult illiteracy and weak technical staffing of projects.
<i>Forms of areas</i>	
“Excessive localisation” <i>France:</i> Leader areas, natural parks, communities of communes, basins of life, intercommuned unions. <i>Italy:</i> <i>contratti d’area</i> and area employment pacts (PT), integrated area projects (ITPS), rural districts (RDS) Leader projects. <i>Spain:</i> <i>comarcas</i> , Leader, Proder, Natura 2000 parks, etc. <i>Greece:</i> Leader, Pider, “network territories”, Natura 2000 zones, natural parks, catchment areas, etc.	“Lived areas” Administrative territories in competition with the lived territories of rural communities. The territories of the South are in search of an identity and a mode of governance which takes account of the wishes and specifics of rural communities Territorial dynamics today are the result more of investment and/or development projects initiated by development aid institutions or the State.

The future of Mediterranean rurality

Agriculture will continue to influence the structure of rural areas for a long time. Family agricultural structures in Italy and Greece which diverge from the systems based on a purely productivist logic are an advantage in promoting locally based quality products. They allow the maintenance of populations and the development of a social and economic fabric favourable to the rural area. Other forms, dominated by specialised professional farms can be a barrier to a re-defining of the town-country relationship and local development. The scenarios for France (Datar 2020 and Agriculture 2030 of

the Commissariat for Planning) envisage a scenario of urban dominance and the advent of a post-family era of organisation of agricultural production affecting a delicate social fabric.⁴¹ The projections prepared by the Ministry of Agriculture show a trend towards professional farms dominated by agricultural activity and specialisation. Certain areas are likely to see a concentration of the largest farms while others will suffer the effects of rural desertification.⁴² Among these professional farms, it is the corporate farms relying increasingly on wage workers (which will account for 25% of agricultural workers) which will increase.

This trend is in contradiction with a process of local development generally characterised by self-regulation of labour with a focus on trades. The local area bases its development on quality products and products of local origin. It is a place for the renaissance of a “new breed of country folk” establishing an empathy with nature, defining agricultural activity and food by the product of local origin. The question then arises whether production of quality products can be sustainable in the face of the threatened disappearance of 150,000 micro-farms or the social disqualification related to ageing of the agricultural population (17.3% of farm owners will be over 60 years of age in 2013.)

Furthermore, how can this trend towards specialisation be reconciled with the objectives of an “ecologically sustainable agriculture” or the preservation of biodiversity urged by the National Strategy for Sustainable Development (June 2003) or the European Strategy for Sustainable Development (2006). These are legitimate questions if one recalls that quality marks and appellations of origin are the essential tools of public policies in favour of local areas and the environment.

Moreover, faced with the ageing of rural populations and the difficulties of generation renewal, it is surely vital to have more effective policies for attracting and settling young people and women in “local areas” promoted by intercommunalities, Leader groups and regional natural parks. The obstacles currently encountered by promoters of settlement projects, mostly related to financing, acquisition of land, the absence of a structure suited to their project or their vocational skills, must be removed. Given the risks of disconnection of the second pillar of the CAP, these problems call for a debate on the promotion of a European local agricultural model. Indeed, there will be no agricultural development without local dynamism just as there will be no local vitality without the development of an agriculture diversified in all its social forms.

How can rural populations of the South be made to participate genuinely and effectively in the management of their territory when a majority of them, especially women, are still illiterate, trapped in poverty and sometimes live in conditions of isolation and material discomfort unfit for humans? Many rural regions are also characterised by precarity of employment, inequalities of income, poor conditions of work, a lack of regulation of

⁴¹ - In France there are three types of farm: professional operations with a dominant agricultural activity which concentrate 52% of workers (284,817 farms), 75% of UAA and 74% of the standard gross margin, residential farms, (respectively 34%, 9.8% and 8.7%) made up of retired people who pursue an agricultural activity (188,411 farms) and multiple-activity professional farms (13.2%, 16%, 17%).

⁴² - The trends towards concentration observed in professional farms are the result of a variety of situations. On the one hand, farmers who retire without heirs (either in the family or outside) must sell their land. On the other, as young people are becoming fewer and fewer, farms are mainly bought by local farmers who constantly increase the size of their farms. There is a danger that this pattern of agricultural structures could increase economic, human and regional imbalances.

labour relations, a lack of a system of social security, training and professional representation. Whether in Egypt, the Maghreb, Albania or Turkey, improving the economic and social conditions of rural populations and areas is more than ever the key to changing the current situation and heading towards sustainable development.⁴³ It inevitably requires stronger public policies in the field of infrastructure, services, especially health and education, and institutional reform policies and support for actors in mastering collective action.

In the context of the current food crisis, agriculture plays a vital role in terms of employment, living standards and food security of rural households, and its productive base must be strengthened. To be sustainable, agricultural development must also include agricultural reforms which rehabilitate family farms and reduce inequalities in the material and budgetary allocations in relation to the modern agricultural sector. Today's reference model must be revised and reconstructed since, in the face of current demographic trends, in which populations will continue to increase, the current dual model will not be able to meet the challenges of climate change, protection of widely degraded natural resources, food security and combating rural poverty. The process of globalisation will ultimately marginalise or even exclude rural areas from the development process. This prospect, which is unacceptable, therefore demands a revision of rural policies, a social and political mobilisation of all the societies concerned to define horizons that match their aspirations and expectations.

⁴³ - Rural women are particularly affected by poverty and exclusion, and the level of "capacities" of populations, in terms of the national education system, is very low. In these circumstances, how can this agriculture be sustainable?

Bibliography

World Bank, *Agriculture for development, World Development Report*, Washington (D. C.), World Bank, 2007.

Communication of the Commission to the Council and the European Parliament, *European Strategy for Sustainable Development (SEDD)*, 2007.

CNASEA, "L'application du règlement du développement rural en Europe (comparative study)", *Les Cahiers du CNASEA*, 3, April 2003.

Croppenstedt (A.), "Household Income Structure and Determinants in Rural Egypt", *ESA Working Paper*, 06-02, Rome, FAO, FAO Agricultural and Development Economics Division, January 2006.

Crozet (Y.) and Musso (P.) (dir.), *Réseaux, services et territoires: horizon 2020*, Paris, Datar, La Tour-d'Aigues, Éditions de l'Aube, 2003.

Datt (G.) and Jolliffe (D.), "Determinants of Poverty in Egypt : 1997", *FCND Discussion Paper*, 75, Washington (D. C.), IFPRI, October 1999.

Datt (G.), Jolliffe (D.) and Sharma (M.), "A Profile of Poverty in Egypt : 1997", *FCND Discussion Paper*, 49, Washington (D. C.), IFPRI, August 1998.

Dwyer (J.), Slee (R. W.), Buller (H.), Baldock (D.) et Swales (V.), "Helping Farmers Adapt. Comparative Report", *National Audit Office Study*, 2004 (<http://www.nao.gov.uk>).

Ellaihy (H.), "Employment, Income and Marketing", *Alterra-rapport. Rural Development Policy in Egypt towards 2025*, Wageningen, Alterra, 2007.

Gumuchian (H.) and Pecqueur (B.) (dir.), *La Ressource territoriale*, Anthropos, 2007.

Hervieu (Bertrand), *Les Orphelins de l'exode rural. Essai sur l'agriculture et les campagnes du XXI^e siècle*, La Tour-d'Aigues, Éditions de l'Aube, 2008.

INRA (France), *Les Nouvelles Ruralités en France à l'horizon 2030*, Report of the working group "Nouvelles ruralités", July 2008.

UNDP, *Human development report*, 2007.

Prime Minister (Tunisia), 10th Plan (2001-2006), Tunis, 2000.

Ministry of Agriculture, Rural Development and Maritime Fisheries, *Stratégie 2020 de développement rural*, Rabat, 1999.

Ministry of Agriculture and Rural Development (Algeria), *La politique de renouveau rural*, 2006.

National studies

Abdelhakim (T.), National Study - Egypt, Plan Bleu-Ciheam, May 2008.

Ahouate (L.), National Study - Morocco, Plan Bleu-Ciheam, May 2008.

Ceña (E.) and Gallardo (R.), National Study - Spain, Plan Bleu-Ciheam, May 2008.

Civici (A.), National Study - Albania, Plan Bleu-Ciheam, May 2008.

Eryilmaz (A.), National Study - Turkey, Plan Bleu-Ciheam, May 2008.

Goussios (D.) (coord.), National Study - Greece, Plan Bleu-Ciheam, May 2008.

Hassainya (J.), National Study - Tunisia, Plan Bleu-Ciheam, May 2008.

Le Goff (A.) and Seiler (A.), National Study - France, Plan Bleu-Ciheam, May 2008.

Mantino (E.), National Study - Italy, Plan Bleu-Ciheam, May 2008.

Moulai (A.), National Study - Algeria, Plan Bleu-Ciheam, May 2008.



CHAPTER 9

DIVERSIFYING RURAL ACTIVITY

*Annarita Antonelli (Ciheam-MAI Bari), Patrizia Pugliese (Ciheam-MAI Bari),
Omar Bessaoud (Ciheam-MAI Montpellier)*

Agriculture still has an undeniable place in the rural areas of the Mediterranean, playing a plethora of complex and changing roles. The future of the rural Mediterranean is still closely bound to the future of agriculture, not only as a sector in itself, but also through its capacity to integrate with the other sectors of the local and national economies and, more broadly, its capacity to contribute to the development process.

Since the debate surrounding the “Health Check” of the Common Agricultural Policy, the challenge in Mediterranean countries in the European Union is to ensure that production and the multifunctional role of agriculture co-evolve in line with the demands and growing expectations of consumers. In Southern and Eastern Mediterranean Countries (SEMCs), agriculture is both a major source of employment and a social safety net for the most vulnerable rural populations (World Bank, 2007). The challenge for agriculture and rural development is therefore the same: to lift out of poverty entire sections of the population that have until now been forced to diversify as a means to survive or, worse, to migrate in desperation to the cities where the future is not necessarily any brighter.

The situations, practices and considerations presented in this chapter are based on a review of recent literature and on the first-hand observations of the authors. They provide food for thought in a debate that, despite having failed to produce, so far, any miraculous recipes for success, remains open to discussion and to sharing experiences.

Rural areas in the Northern Mediterranean: multifunctionality and diversification

The rural areas of Europe (European Union of 27) are extremely diverse in terms of population, culture, demographics, socio-economic structures and natural resources. Characterised by diversity and instability, they are also undergoing profound changes progressing in different directions and at varying speeds. In the Mediterranean countries of the European Union, which have a shared tradition, rural areas have, despite some specificities, followed comparable paths of evolution in the face of the pressures, risks and opportunities they have encountered. This leads to competition but also encourages the sharing of experiences and best practices.

Obviously, it is critical that the politicians who will decide the future of these areas and their communities should fully understand and appreciate the diversity of “the countryside”. Prompted by the inadequacy of the OECD criteria and the lack of an alternative shared model for the definition of rural areas, Italy has revised the OECD methodology and adapted it to its national context. An ad hoc classification was developed that would better take into account the differences between the Italian farming and agro-food systems and the various ways in which rural areas are integrated with urban and industrial areas and, in general, the relationship of the countryside with socio-economic development in the country (Mantino, 2008). The classification, developed in a national strategic plan to implement the European Rural Development Policy, inspired decision-makers at the regional level to elaborate regional rural development plans. Four types of rural area were identified:

- *Rural areas in commuter belts*: characterised by their high population density and the relatively low importance of agriculture in the local economy, which is based on the service and manufacturing sectors. Agricultural and agro-food activities, although spatially restricted and under threat from urban agglomerations and pollution, provide employment opportunities to a sizeable proportion of the population and benefit from the proximity of urban markets.
- *Rural areas with specialised and intensive agriculture*: these areas may be characterised as rural, significantly rural or urbanised rural, and are densely populated with positive demographic trends (a growing population that is generally younger than in the other types of rural area). The heart of the agro-food and agro-industrial system is concentrated in the fields and valleys of these areas, organised in specialised branches or districts. Alongside the dominant agro-food sector there is well-structured tourism and a high concentration of artisan SMEs. However, these areas must contend with some problems in terms of infrastructure and services as well as pollution related to and exacerbated by intense pressure on resources.
- *Intermediate rural areas*: mountainous or hilly areas characterised by an ageing population. Agriculture has a significant role in the local economy, more so in terms of land coverage and jobs than in terms of productivity, resources or contribution to added value on account of high production costs and commercial difficulties. In these areas, a non-agricultural local economy, complementary to and integrated with agriculture, has developed based on the economic development of the countryside and of local natural, cultural and gastronomic resources through tourism and artisan activities. However, infrastructure and services are still inadequate for the needs of local people and economic actors.
- *Rural areas with significant development problems*: in these marginal mountainous or hilly areas, characterised by considerable infrastructure and service deficits verging on neglect, the local economy is essentially dependent on extensive agriculture that is generally un-modernised and unproductive, and which is often still in the hands of the older population.

In France, rural areas are tremendously heterogeneous. The demographic trend in most rural areas is positive, essentially on account of the acuity of the commuter belt phenomenon

and the increase in the residential function of rural areas. However, whereas commuter belt areas are seeing their populations swell, elsewhere the trend is for people to leave rural areas, resulting in an ageing population. At the catchment area level there is no association between demographic trends and the level of services available. In fact, rural areas within commuter belts often have worse provision than the very remote rural areas, which enjoy good inherited levels of provision. At the same time, services are being neglected in particular in small villages in isolated rural areas. Although one French person in four lives in a rural area, only one in five works in one. Rural areas still do not provide employment commensurate with their demographic significance.

In the productive parts of the countryside, agriculture continues to be modernised: work productivity is growing, the number of agricultural labourers is falling and the employment of permanent staff is on the rise. In recent years, only farms that are “professional in the dominant agricultural activity” have grown, whilst farms that are “residential” or “multi-activity professional” have decreased. Although the agricultural and agro-food sectors are no longer dominant in terms of employment and added value, they remain an essential element of the rural landscape, and farmers are an important part of the structure of society. Agriculture makes an even more marginal contribution to the diversification of the rural economy which on the one hand is associated with services to the local populations and basically accompanies the migration of urban populations who live in rural areas and, on the other, is evolving towards the leisure and tourism sectors of the economy.

Today three faces of rural France are emerging, which obviously require tailored development strategies.

- *The countryside of the city*: highly attractive and with great economic potential, where the dense economic fabric encourages the creation of micro-enterprises.
- *The new countryside*: striving for a balance between adequate provision of basic services to the resident population and the development of alternative economic activities such as tourism;
- *The more vulnerable countryside*: characterised by economic and demographic decline, but has a rich natural and cultural heritage to be turned to economic advantage.

In Spain too, where more than 90% of land is rural, there is significant regional variation in rural areas (Ceña and Gallardo, 2008). Agricultural added value still makes a sizeable contribution to GDP, at least bigger than in most countries of the European Union (European Union of 25), thanks to modernisation efforts over the past few decades, the contribution made by certain irrigated production systems and the high value of out-of-season produce in some areas. However, agriculture is not the main source of income in rural areas, and there has been gradual diversification of the rural economy in line with de-agrarisation and tertiarisation. A quarter of foreign immigrants arriving in Spain move to small rural villages where they are able to find work (a source of labour that has become indispensable for the agricultural sector) and somewhere to live.

In Greece, many households have left the countryside over the past few decades, to set up home in the small urban centres that have developed in rural areas as a result of specific

public policies since the 1970s, in search of work opportunities that have often led to the creation of family micro-businesses. For these households, migration to urban areas has not meant deserting the land or above all agricultural activity, which is managed from a distance using local immigrant labour and the support of neighbours. Greeks who have emigrated abroad or to big cities harbour strong attachments to their villages and areas of origin. These sociocultural links, along with strong family ties and solidarity networks, have been crucial catalysts in many local development processes and initiatives, and are therefore important factors in the tertiarisation and diversification of the rural economy affected by de-agrarisation. In some areas more than others, agriculture is modernising yet losing its economic importance, whilst still retaining its essential place in the socio-economic fabric of the Greek countryside. For example, family ties and relationships of mutual support explain how small shops and restaurants in rural areas remain economically viable despite aggressive competition from big supermarkets and shopping centres.

The rural area of Mouzaki in Greece

Some small territories in Greece that were once marginalised have managed to improve their situation and their cohesion within the region by transforming their sociocultural relationships into economic solidarity networks. The micro-region of Mouzaki, despite the loss of its historical role and the small size (4000 inhabitants) of the town that is its rural centre, has today become a territory with a real identity. Through traditional activities (wood, construction, commerce), almost 500 companies over the past twenty years have enabled the development of second homes in this mountainous backwater, supported by its diaspora. The innovation here lies in extracting value from non-material factors (family ties, social networks) linked to local identity.

This can be characterised as a neo-ruralisation movement, because this marginalised rural area has managed to turn its particular resources to advantage by integrating its diaspora. Following a period of a decline in the region, including falling population numbers, Mouzaki – like most small rural Greek towns – has seen its population grow substantially since 1980. It is becoming a centre that provides services and somewhere for some of the population of the mountain villages to live during the winter, and also a multi-activity centre for the residents of neighbouring villages. Although official census figures put the population of Mouzaki at 4000, its winter population exceeds 7000.

The development process in Mouzaki was essentially set in motion by the transformation of the mountains into a place of consumption by its diaspora (second homes). The general interest in the region created a favourable climate for micro-investment. Local businesses have invested significant capital into the region. The main beneficiaries have been construction and public works. Other sectors (weekend tourism, local agro-food products) have also benefited, by finding new outlets.

Using second homes as a means of strengthening the ties between the home territory and the diaspora has enabled socio-cultural relationships to be turned into strong economic networks which have allowed local businesses to control the emerging market and create competitive advantages over neighbouring urban centres. The organization, functioning and cohesion of this territory are heavily dependent on the coexistence of two “informal” systems: the spatial system with the economic centre of Mouzaki at its centre and the system of relationships between the whole micro-region and its diaspora. The first functions within the spatial boundaries of more than 12000 inhabitants and 450 businesses and provides various forms of cooperation within a local economy that is relatively diverse and benefits from the high level of mobility of its population of agricultural multiple job-holders, who provide a relatively flexible and qualified potential workforce. The second

is based on the sociocultural and economic relationships between the diaspora, physically present only intermittently, and the district.

After a quarter of a century of implementing European policies and 15 years of interventions by the Greek Development Agency (ANKA), the production capacity of the Mouzaki region rests on three pillars:

- 2 500 family farms, specialised in extensive livestock farming in the mountain and foothill areas, and in large crops (cotton, maize) on the plains. A large proportion of the produce is sold via external trade networks on non-local markets;
- 480 traditional artisan local trading companies and family businesses that target the local market under their control, including the diaspora (construction of second homes, purchase of meat by visitors, wealthy regular clientele in the tavernas at weekends);
- 23 businesses, for the most part integrated into funding programmes under the aegis of ANKA. Two sub-groups can be identified. Those in the first group belong to the forest sector (furniture, joinery, cuisine). These businesses include the conception, manufacture and distribution of products and have the opportunity to recruit locally a flexible and qualified workforce. The presence of Greek emigrés in Germany has enabled skills and technology exchanges to be developed between local and German businesses. The current strategy focus is on market expansion through cooperation with construction businesses and companies that can commercialise their products. The second sub-group comprises agro-food companies (meat products, drinks, cheeses, tomato puree) whose markets are local, regional and national. Their raw materials come in part from local production.

The number of local businesses has grown by 52% since 1995. This increase has affected Mouzaki in particular and even more so the neighbouring village of Mavromati (117%), and the rest of the region to a far lesser extent. These businesses cover the entire gamut of social, commercial and consumer services. Some small outfits have seen a significant boom (relative increase in their size and modernisation). Today, the number of artisan, commercial and service businesses in Mouzaki is disproportionate to its population and its sphere of influence.

Source: Goussios (2008).

Adapting to emerging challenges

The changes that are shaping the landscapes and socio-economic fabric of the rural areas of the Northern Mediterranean can only be understood through analysis of national and local specificities and with profound knowledge of the “Mediterranean rural tradition”. Local factors interact with the major forces of change that are affecting more generally, albeit to varying degrees, agricultural and rural areas and their communities.

One of these forces is globalisation, which opens up new emerging markets, but also brings with it exposure to the pressures of competition. This is stimulating the agricultural and agro-food sectors to modernise their production methods and work organization in order to meet the market requirement for quality products with high added value. Producers in the sectors most affected by globalisation fail to get satisfactory prices for their products, which tend to be less competitive than imported products. For consumers, globalisation that on the face of it increases competition is in fact no guarantee of lower prices, whilst standardisation will mean that they will see some erosion of the diversity and identity of the products on sale in the supermarkets.

The production of material goods (food and non-food, processed or not) in a sufficient quantity and of satisfactory quality is not the only recognised function of agriculture, which is no longer thought of as a purely sectoral activity. This primary sector can also produce non-material private and marketable goods, such as tourism services, and help to revitalise the local economy and maintain a vibrant social fabric in rural areas. Through agricultural activity, producers contribute to the production of non-tradable public goods such as landscape, environment and culture (Hervieu, 2002). There is also a link between the production of certain goods and certain types of agriculture and/or farmer profiles.

Recognition of agriculture's multiple economic, social and environmental functions, and therefore of its multifunctionality, has since the 1990s legitimised demand and growing public expectations in this regard that cannot be ignored and which are another major force in the transformation of rural areas. Many of these expectations come from new residents who have arrived from the cities, and whose relationship with the countryside is complex. They bring with them new lifestyles that require new services: immigrants, after a short stay in the capital, are moving to the countryside in search of work and accommodation; entrepreneurs are in search of new business opportunities; tourists require leisure services. Since the 1996 Cork Conference, the growing expectations of consumers and citizens have gradually been taken into account by the Common Agricultural Policy, as is evidenced by the various changes that it has undergone, notably its rural development pillar – even if budgets and mechanisms have not always lived up to the ambitions.

In future, implementation of regional rural policy will increasingly be based on the multifunctionality of agriculture which, in leaving behind the dualist interpretation of the European model (specialised and competitive agriculture in areas with the greatest potential versus multifunctional, diversified, niche agriculture in more marginalised and disadvantaged areas), provides the unifying paradigm of an agriculture plunged deeply in the diversity of rural areas and that is sensitive to the needs of the various rural actors. The concept of the multifunctionality of agriculture reveals very clearly the extent of agriculture's integration into the fabric of the countryside and assumes that it will be anchored in modern society in new ways (Dufour, 2007).

In the framework of a competitive and multifunctional agriculture, considerable importance is attached to diversification, both of farming and, applying a broader notion of the concept, of the local economy. In ensuring additional incomes, diversification becomes a strategy for the survival of farms and of farming professions as well as a means of revitalising the rural economy. At the same time, it is a tool that can help meet the challenges facing rural areas: thus, it can meet some of the needs of society and convey the multifunctional potential of agriculture.

Agricultural diversification means developing profitable activities using the human, cultural and material resources of the farm. A distinction can also be made between strictly agricultural diversification, which involves non-conventional crops and livestock (bio-fuels), and structural or entrepreneurial diversification, which involves the development of non-agricultural activities based on the farm itself and largely carried out by the farmer and his or her family. This type of diversification includes traditional sectors,

such as contract processing, the preparation and production of agricultural products, direct sales, farm tourism and new domains less closely linked with agriculture, such as craft activities, gainful leisure activities (educational farms, sport and leisure or health activities) and eco or bio-fuel production (Nihous, 2008; Salvioni, 2008).

The main reasons for the diversification of rural areas are increasing farms' incomes and reducing their dependency on the CAP and their vulnerability to changes to the CAP or price fluctuations, expanding trade, increasing the customer portfolio or developing new markets (Nihous, 2008). Some farms and some regions have stronger reasons and a greater potential for doing so, and the spread of certain production methods – organic farming for example – can create the necessary preconditions for diversification to develop. For example, a territory characterised by an already competitive agro-industrial sector might adopt a strategy of ecological or environmental diversification, as with the district of Parmagiano Reggiano in Italy, where some production is becoming diversified and turning to organic methods.

In the Northern Mediterranean countries, the diversification of rural areas is still underdeveloped, despite the opportunities offered by the European Rural Development Policy. The competitiveness of agro-food systems remains the main planning priority for 2007-2013. Analysis of budgetary resources shows that these countries are among those that determine the highest amount under axis 1 (competitiveness) (Spain 47%, Greece 45%, Italy 42% and France 38%), and modest amounts under axis 3 (quality of life and diversification), i.e. less than 20% (Greece, Italy, Spain), 11% France.

Some analysts emphasise the disharmony between the concepts of multifunctionality and diversification proclaimed in European rural development policies, and the inertia of farmers in implementing this. Some of them believe that the transition of the vocation of peasant towards a new vocation that requires the coming together of skills and knowledge (Hervieu, 2002), characteristic of a diversified farm, seems difficult and poses a real problem of legitimization. Thus, in France the Ministry of Agriculture and Fishing has recently decided to put in place an operational and territorialized provision to encourage diversification in the rural setting, on the basis of the following reports: from 1988 to 2000, the number of diversified farms has fallen due to the tendency to abandon product lines considered to be marginal, or that are not integrated into the farm's plans; diversification is more widespread among farmers over the age of 50 than among young people, who prefer to focus on their primary, strictly agricultural activity.

Using agricultural and food identities to create value

Local speciality products can play a critical role in rural diversification, as they are the main way of creating value from the resources of a territory. Regulation CEE 2081/92 on the Register of Geographical Indications and Appellations of Origin of agricultural products and foodstuffs provides that “whereas, as part of the adjustment of the Common Agricultural Policy the diversification of agricultural production should be encouraged so as to achieve a better balance between supply and demand on the markets; whereas the promotion of products having certain characteristics could be of considerable benefit to the rural economy, in particular to less-favoured or remote areas, by improving the incomes of farmers and by retaining the rural population in these areas.”

Local speciality products are created by a marriage of natural environmental factors with traditional production methods, and can only be reproduced over time if local “organisational structures” enable them to become recognised and to distinguish themselves. Only then can such products become a driver for development, through their ability to reach markets, involve other sectors of the local economy with which they have direct or indirect links, and in so doing stimulate a transformation of the local production structure, building relationships with markets and developing other economic activities such as tourism, food services or commerce.

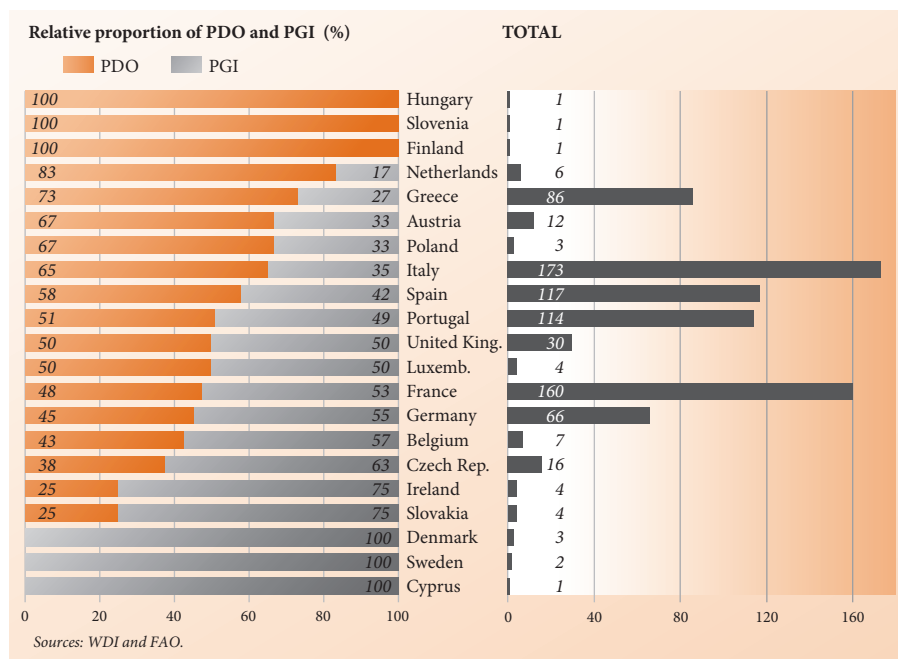
In recent years the market seems to have been characterised by strong growth in demand for quality products. The success of the policy of creating value from a product’s quality and origin must be considered within the general context of increasing interest by all economic actors, who wish to facilitate consumer choice and respond to consumer expectations with regard to food safety, taste, pleasure and the preservation of gastronomic and cultural values. In 1992 the European Union passed a series of regulations relating to systems to protect and create value for agro-food products (PDO, PGI, TSG) which equate to a consumer “guarantee”, providing a commercial boost for economic operators and contributing to the development of the areas concerned. Interestingly, some 80% of the products that have received European Union certification, under the three categories, come from Mediterranean countries.

In France, there are today approximately 200 000 farmers and more than 13 000 agro-food businesses (cottage industry, small and medium-sized enterprises or industrial) and suppliers (hatcheries, food companies...) affected by the policy of creating value for agricultural and food products. Symbols for designations of quality and origin encourage variety as well as the diversification of production. They allow producers to market diverse products with specific, clearly identifiable characteristics, and encourage access to markets, especially for smaller companies. The products concerned, which are guaranteed to meet the specifications, enjoy easier access to mass-market distribution and the export market. Symbols are also tools for market segmentation with a genuine economic purpose: they meet an identified consumer need, enabling them to spot the products sporting their national or community logo. Determining the specifications for a product requires a collective organisation of producers and their downstream partners, the efficiency of which is a crucial factor for success in an approach to differentiation based on origin or the quality of agro-food products. It also gives producers more weight in negotiations with supermarket buyers, which means that they can then hope to receive some of the value generated from consumers. Here are some figures showing the benefits for producers of designations of quality and origin: the retail price of a cheese with a designation of origin is 30% higher on average than that of competing cheeses; for wines, the price differential is 230%, which trickles down to producers of the raw material; the price paid to producers for milk destined for the manufacture of cheeses with designations of origin is 20% higher on average than for milk for other purposes (Le Goff, 2008).

Behind France and Italy, Spain is in third place for PDO and PGI (cf. Chart 1). According to data from the Spanish Ministry for the Environment, Rural Areas and the Sea (MARM), sales revenues from quality foods rose from 386 million Euros to 650 million

Euros in 2004, an increase of 68%. However, despite the increase in the number of designations and the economic value of production protected by designations of quality, these still only represent 2% of ordinary food production (Ceña and Gallardo, 2008).

Chart 1 - Distribution of PDO/PGI in Europe, 2008



In Greece, as in other Mediterranean countries, there is another form of quality product with a strong presence in rural territories: traditional, “authentic” products, such as wild herbs and medicinal or aromatic plants. These are products where the quality-assessment certification process is based on traditional skills and knowledge, on a conveyed image of a “natural” product and/or on faith in the producer. These products are not yet integrated into the official process of recognition and certification, not in local development projects, and tend to rely on individual initiative to meet demand that is related both to the Greek people’s attachment to their home territories and to the development of rural tourism.

A large proportion of quality products contributing to the image of a territory is destined to be consumed in situ in the context of the tourist trade (commerce, restaurants, cake shops...). They are also sold through networks of families and friends and on local markets. These forms of marketing in circuits that are small, and of varying degrees of formality, are controlled by the producers directly, by integrating the spheres of influence of family and relations. The sale of products on distant and more structured markets relies more on cooperative unions or companies and businesses, and the lack of collective forms of organisation prevents producers from negotiating directly with supermarket buyers. However, we should not underestimate the importance of the role played by natives to a region, who, since the 1980s, have been instigators in the creation of

specialised shops in big cities, selling products from their territory of origin. This phenomenon of opening up rural territories to urban and foreign markets via networks of diaspora has grown in recent years and is contributing to the emergence of distant markets that can be directly controlled by producers (Goussios, 2008).

Designations of quality and origin affect a territory on several levels: the effects may be economic (essentially direct or indirect employment), social (directly related to the economic effects), such as those relating to the safeguarding of a culture or a heritage, or social cohesion, and environmental, such as the protection of landscapes and of natural resources (animal and plant biodiversity, farming practices that are particularly environmentally friendly). The economic impact is essentially to be found in the value generated by the designations of quality and origin, which help to slow the deterioration in the value of agriculture and keep small farms afloat. Their contribution to the protection of landscapes also allows some regions to develop and retain a strong potential for tourism. Agricultural and agro-food economic activity, directly or indirectly, and tourism contribute to a region's economic dynamism regardless of natural disadvantages. In this respect, the contribution made by protected designations of origin (PDO) to protecting the landscape is a consequence of certain agricultural practices required by the specifications, such as the proportion of grass in animal feed, which helps to maintain pastures and grasslands in general, or the requirement to put animals out to pasture. In mountain areas, the production of cheese with a protected designation of origin helps to keep landscapes accessible by maintaining prairies, whereas land in areas without a designation of origin is gradually being closed off.

Beyond these regulations, quality production is a major component of Europe's agricultural modernisation policy. Funding is therefore planned within the framework of the Common Agricultural Policy to ensure strategic positioning by raising quality and creating value for agricultural or food products. The new European Agricultural Fund for Rural Development (EAFRD) now offers support for improving the quality of agricultural production methods and products, improving the environment and countryside, encouraging tourism in the context of the diversification of the rural economy, conducting studies and making investments to maintain, restore and give value to cultural heritage.

Harnessing added value while protecting the environment

Organic farming is another extremely common diversification strategy. The emergence of organic farming in some Northern Mediterranean countries in the 1960s and 70s was due to the efforts of a few pioneers. The sector then experienced varying levels of growth depending on the relative importance of factors that in Europe have generally depended on the growth of the organic sector, such as the introduction of financial support measures, the gradual structuring of the national organic movement or demand on the domestic market. In some countries, such as France or some regions of Italy, standards for the sector were adopted prior to the European Economic Community regulation No. 2092/1991. This demonstrates particular sensitivity towards the organic sector and a desire to see the development of an organised community and the local market. It is also no coincidence that France and Italy now have some of the most expanding markets in Europe, after Germany and the United Kingdom.

In production terms, Italy has been the European leader for several years, with more than a million hectares being organically farmed and more than 50 000 organic operators (Sinab, 2007). The Italian market for organic products is valued at more than 2.5 billion Euros and represents 1.8% of the total national agro-food consumption. It does not seem to have been greatly affected by the credit crunch. Further developing the domestic market and establishing the presence of Italian organic products on international markets are among the objectives of a national action plan for the organic sector, established in 2005, which also aims to provide a structure for the organic sector and promote the sector through awareness-raising and improvements to the institutional information system. The remarkable expansion of organic agriculture in Italy in recent years is attributable to a number of factors: financial support from the European Union, the hard work of a few pioneers, the effect of food scares and the search by many farmers for economic alternatives and methods of protecting the viability of their farms. In some regions, a favourable institutional environment has facilitated the emergence of individual and collective initiatives that link organic farming with rural development practices, such as agrotourism or other ways of creating value from the local heritage (see “Organic theme routes” in the Apulia region”). In several protected areas in Italy these initiatives are encouraged at the territory level using an integrated and multi-sectoral approach (Pugliese, 2007). Emerging synergies between the organic sector and the *SlowFood* and fair trade movements could lead to interesting developments.

“Organic theme routes” in the Apulia region, Italy

The Pro. Bio. Sis project, which received funding within the framework of Interreg IIIA Greece-Italy 2000-2006, in three provinces of the Apulia region in Italy, aimed to facilitate the promotion of sustainable rural development compatible with tourism in the territories concerned by developing and promoting organic production systems.

The relationship between organic farming and rural development, a synergy with tremendous potential and that has many facets (economic, social and environmental) is a specific component of the project. A review was conducted of “best practices” in the region, which is to say a review of individual and collective initiatives able to demonstrate that adopting the principles and methods of organic farming can make a useful contribution to the process of local development.

On the one hand, the review showed that there were a significant number of diversified organic farms that were individually extremely active in increasing the value of local resources through tourism and leisure, educational and gastronomic activities, etc. On the other, it emphasised the lack of collective initiatives. This prompted the idea of redrafting the guidelines for the development and management of theme routes, with the aim of integrating organic farming systems with other agricultural and non-agricultural activities based on the multi-functionality of rural areas, by involving other kinds of operator and local economic actors.

An organic theme route is defined as:

- *a journey in the world of organic farming* to discover its delights and the countryside that is associated with it;
- *an opportunity to create a network* around the organic sector, by involving all the operators in making people aware that the organic “culture” is about something more than the strict “health and nutrition” reference point of organic products;

- *a chance for tourists to make a sustainable and responsible choice* and get to know a territory in a different way.

To live up to these ambitions, an organic theme route must be:

- *aesthetically pleasing*, which means it must be developed in a “typically” rural environment with an attractive landscape;
- *rich in attractions*, which means it must enable visitors to find out about the history and the most important natural resources of the local area, as well as including initiatives that generate value from the cultural heritage and local products that are the basis of its uniqueness and its identity;
- *varied*, which means it must include an appropriate array of visits, tastings, accommodation, dining, and shopping in order to continue to stimulate visitors’ curiosity and meet their expectations;
- *complete*, which means it must touch on all of the unique characteristics of the local area, even “minor” aspects that are normally less visible but that often provide unforgettable experiences; they must also try to involve all categories of operator and attract a wide range of visitors with different interests.

Planning and executing the setting up of an organic theme route can prove to be a complex but extremely effective exercise so long as, from the outset, there is a procedure to ensure the involvement of all actors and collective learning. The guidelines redrafted in the framework of this project are targeted at a range of public and private actors all affected, one way or another, by the future of rural spaces and their communities: local authorities, local development agencies, associations, farms and other private operators, scientists and technologists.

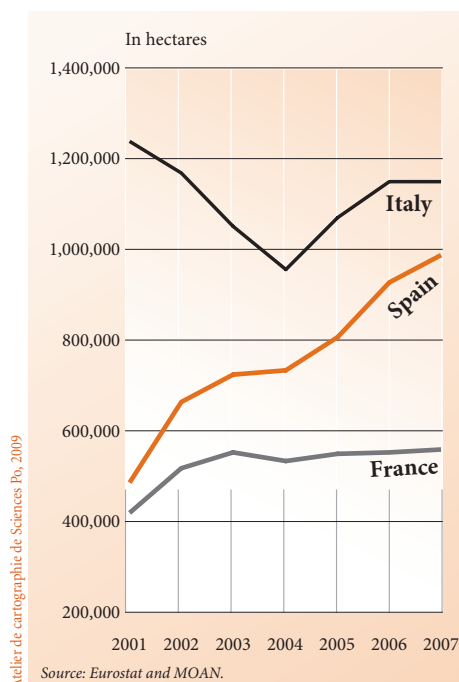
Source: Cataldi et al. (2008).

Spain has caught up considerably with Italy in terms of coverage in recent years, but not in terms of the number of operators. Organic farming is a major objective of the Spanish Rural Development Programme’s agro-environmental measures. The strong dynamism of the sector translates into an increase in the number of organic farms, from 1233 (1995) to 19 211 (2006). The proportion of land being farmed organically grew from 0.13% (1995) to 5.19% (2006). In 2004, organic production had an estimated value of 250 million Euros and involved more than 1700 processing plants. However, the consumption of organic products remains low: it equates to less than 1% of what the Spanish spend on food. Almost 80% of production is exported, mostly within Europe, especially Germany, Holland, France or the United Kingdom, so far as fresh products in particular are concerned. The reasons for the low levels of organic consumption include high prices but also a lack of promotion and the lack of distribution methods; consumers do not recognise the products, have difficulty associating quality products with a logo or stamp, are not informed about their beneficial properties, and do not find them in the places where they usually shop. To overcome these shortcomings, the Ministry of Agriculture, Fishing and Food (MAPA) has adopted a complete plan of interventions to encourage organic farming, in order to promote the development, awareness and commercialisation of organic products (Ceña and Gallardo, 2008).

In France, organic agriculture has been through a period of stagnation; the revival is recent and there is once again a strong determination, through a national plan of action,

to meet the demand of the ever-growing domestic market. At the end of 2006, 11 640 farms were using organic methods, farming 560 838 hectares, or 2% of the national agricultural land that was in use. According to recent estimates, the market for organic products has grown to 1.6 billion Euros, or 1.1% of the food market, including drinks. On average, since 1999, the market has grown by 9.5% per year when all sectors are taken together.

Chart 2 - Organic land area in France, Italy and Spain, 2001-2007



France has put in place various policies for the development of organic farming: the Agricultural Orientation Act of 5 January 2006, which provides for a specific tax break for organic farmers (a tax credit for three years, for the years 2005, 2006 and 2007); specific support in the framework of the National Strategic Plan 2007-2013, which provides for European Agricultural Fund for Rural Development (EAFRD) assistance in the form of “territorialized” agro-environmental measures; support within the framework of the “quality” measures of the French national Rural Development Programme (PDRH), which encourage the adoption of food quality regimes, including organic farming, by contributing to fixed costs (certification costs for example) and support awareness-raising and product promotion activities. The development of organic farming also includes funding for activities designed to enable organisation of the sector by facilitating relationships between its various actors. Thus, 2.7 million Euros of funding is earmarked for activities to support the creation of a structure for the organic

sector, especially downstream. Lastly, the French Agency for the Development and Promotion of Organic Farming (Agence BIO), which takes the form of a Public Interest Group, is charged with promoting interprofessional dialogue and working to ensure the balanced development of this sector, through communication particularly. This entire gamut of instruments will be strengthened within the framework of the Organic Farming Action Plan 2012 announced by the Minister of Agriculture. Organic farming is much less developed than in other Mediterranean countries in the European Union.

Diversifying to revitalise communities and heritage

For two decades, rural areas on the Northern shores of the Mediterranean have seen a new lease of life that may be called into question by the scarcity of fossil fuels. For the moment, this rural dynamism still has great resonance, thanks, in particular, to growing tourism demand and new expectations in terms of land management. Changing tourist trends (a hankering for the “authenticity” that is associated with local culture, local

products, meeting local people, immersion with nature etc.) has encouraged many rural territories to turn to tourism in an effort to reinvigorate their economy locally.

Rural tourism is not a new phenomenon in Europe, but the market has become more sophisticated. There has also been a resurgence in interest in rural tourism, which has come to be seen as an effective way of achieving vital diversification of the rural economy. Although rural spaces are no longer interchangeable with the agricultural world, agriculture does play an important part in the image game, and its contribution to heritage and tourism is not insignificant. This is encouraging to farmers who want to invest in tourism as a means of diversifying, thus changing its place in society.

There is a lot of evidence to show that rural tourism, as a cross-sectoral activity, has become a driver of sustainable economic development of local areas, by opening up new market places for typical and traditional agricultural production, by publicising the produce of local artisans and playing a marketing role for the local area. Today, there are a range of tourist products offering various leisure activities as well as a plethora of accommodation types and dining experiences that are giving a new lease of life to some parts of the countryside and redefining the territorial organisation of some rural areas (Dubois, 2004).

In France, rural tourism occupies a special place in economic tourism. In 2005, tourism-related spending rose to 108.11 billion Euros, of which approximately 59 billion was on overnight stays; 19.3%, or approximately 20 billion Euros of this was in rural areas. Rural tourism thus represents almost a third of French tourist visits (28% of overnight stays). However, rural tourism is largely non-commercial (in 2005, 78% of overnight stays in the countryside were in second homes or with family or friends) and generates little income (Ministry of Tourism, 2007).

Types of tourist accommodation that are specific to rural settings (B&Bs and rural holiday cottages) are increasingly popular with foreign and French customers. Farmers have an important contribution to make to the development of tourism in rural areas. They offer services that complement the conventional services offered by hotels, cafés, restaurants and open-air catering, and therefore, with good reason, can receive aid from the Ministry of Agriculture.

Table 1 - Rural Tourism in France

	Rural areas	Other areas
French territory	80 %	20 %
Tourist visits	28 %	72 %
Tourism spending	19.30 %	80.70 %

Source: French national Tourism Directorate (2005).

Rural tourism emerged in Spain in the 1980s. Today it is booming, thanks in particular to women joining the labour market. In 2003 Spain had 50 000 beds in approximately 7 000 establishments (5% of the country's tourism beds). The development of rural tourism has been helped in particular by support from the European programmes Leader I, Leader II and Leader +, as well as the Spanish plan Futures II. Although it has become a factor in renewed value being placed on the environment and the development

of rural areas, it has not developed evenly across all the regions of Spain. The lack of a Federal body of rural Spanish tourism has resulted in forms of development being extremely diverse from region to region. Development models have been influenced by the context and structure of local tourism (Ceña and Gallardo, 2008).

In Greece, accommodation provision in rural areas continues to increase, for two reasons: on the one hand, because tourism is considered to be the only thing capable of reversing the trends of job losses in an agriculture that is in decline, and of depopulation. On the other hand, it is because it is seen as something that gives women an opportunity to find paid employment in rural areas where agriculture, animal husbandry and construction have remained largely masculine activities, unlike in the cities where the industrialisation and then tertiarisation of the economy have given women the opportunity to work.

Rural tourism and the value that it creates for local and traditional products have thus encouraged work for women and new innovative practices such as the creation of women's cooperatives producing and ensuring the commercialisation of local and traditional products (Goussios, 2008). Over and above this tourist activity, the whole of Greece is now affected by the new residential and leisure functions of rural areas, stimulated in particular by the diaspora and the role of cultural organisations. This phenomenon contributes a great deal to the cohesion of territories and to a better connection between the various sectors of activity – unlike tourism investment projects that have failed to integrate other sectors.

Rural areas in the Southern and Eastern Mediterranean: boom and new adaptations

The weak economic growth of SEMCs in recent decades seems to be attributable to political instability and to an institutional and economic climate that is unattractive to investment. High levels of unemployment have also been exacerbated by strong population growth. The structure of GDP shows that services and industry have a dominant role in these countries' transitional economies. Agriculture, which retains considerable importance, represents 10 to 20% of GDP, but there is a downward trend, a universal phenomenon in countries with a growing GDP.

Significant geographical redistribution of the population has led to strong metropolitanisation. In urban areas, families must work several jobs in order to be able to afford a decent standard of living, thus encouraging smaller households and families living separately, as well as the desocialisation that comes with the increase in single person households (Padilla, 2008). The transformation and rapid industrialisation of modes of food consumption, which co-exists with the preservation and renaissance of traditional food, are manifestations of recent societal changes. Although the Mediterranean is becoming more urbanised, a considerable proportion of Southern and Eastern Mediterraneans still live in rural areas, and these are still poorly developed. The rapid increase in the acuity of disparities between rural and urban incomes, as well as extreme poverty, which is ubiquitous in rural areas, are an important source of social and political tension. Emigration to now overpopulated cities or abroad is no guarantee of finding new opportunities.

Despite emigration, the rural population in most SEMCs continues to grow. For example, it exceeds 40% of the total population in Algeria, Morocco and Egypt, and is reaching 30% in Tunisia and Turkey (IFAD, 2007). Inhabitants of rural areas are small farmers, women, business owners, herdsmen who are becoming less and less nomadic, fishermen and artisans, seasonal workers on big farms, the “land-less”, young rural inhabitants without jobs and with poor qualifications, and refugee populations who are obviously the most vulnerable groups. Given the high cost of accommodation in towns and the weight of sociocultural constraints, many of them continue to live in the country even when they work in the city, commuting daily. Moreover, although they do not always appear in the official statistics, migrants are in increasing numbers deserting rural areas completely and moving to commuter belt areas in search of other work opportunities; these are another “frontier category” in the make up of the rural Mediterranean population. Many of them take advantage of the proximity of urban markets and grow on micro-farms in order to sell the surplus and so earn a little money.

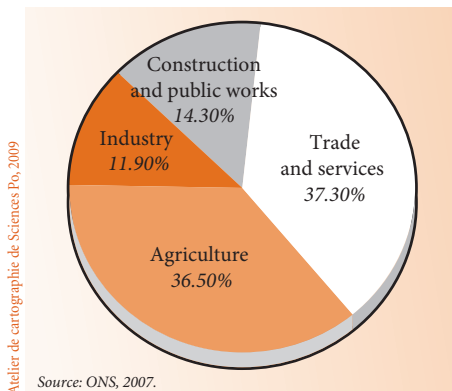
In Algeria, there is a trend towards the urbanisation of the rural environment that surrounds cities and key rural towns, which translates into the emergence of “buffer zones” around urban areas. This type of urbanisation serves above all to attenuate the migratory pressure on urban centres. However, the living conditions in these rural environments often remains poor. In Morocco, for example, they are without basic sanitation (piped drinking water in homes and sewage networks).

In the cities, which are gradually becoming overcrowded, there are fewer job opportunities. At the same time, rural areas still do not provide adequate non-agricultural sources of income. Lack of employment is one of the major causes of poverty in rural areas, as the diversification of economic activity remains very poor almost everywhere in the Southern and Eastern Mediterranean. Agriculture alone cannot absorb the available rural labour force, which keeps on growing. The mismatch between the number of new rural workers and the number of agricultural jobs being created is growing (World Bank, 2007), and only those who manage to cling on to their farms, often by supplementing their income with other activities, are saved from the rural exodus. For those who stay, the alternatives offered in the formal sector in industry, construction and the public sector are limited.

Most must adapt to precarious and badly remunerated employment in the informal sector: in small retail shops, repair workshops and various informal services. In Tunisia, there are a growing number of yellow vehicles of all shapes and sizes (although rarely luxurious), classed as “rural transport” and parked at the various exits to the city to provide transport to the thousands of rural residents who spend the day in town, in particular on building sites. This new line of work, along with the small grocers scattered throughout cities and rural villages that are already facing strong competition from urban commerce, is one of the few alternatives to agriculture in the Tunisian countryside (Hassainya, 2008).

One major obstacle to diversification is the agricultural economy’s strong dependence on the climate, as climatic conditions determine the level of demand for goods and services on the local market. In Morocco, for example, a dry year will cause a significant fall in the number of jobs created by agriculture. For 2000-2001, jobs lost in cereal crops

Chart 3 - Distribution by sector of rural employment in Algeria



alone were estimated to be in the order of 14 million work days, which equates to a loss of earnings of approximately 70 million dirhams (6.3 million Euro) (Ahouate and Tamehmachet, 2008). Local agricultural conditions determine the viability of non-agricultural businesses, which are highly dependent on local markets because considerable communication and information shortcomings mean that they lack the connections to larger markets.

Another constraint on the development of entrepreneurial activities in rural areas other than agriculture is the “weakness” of human resources: the vast majority of agricultural workers are illiterate (in Egypt, 80% of

illiterate people work in agriculture when all categories are taken together: self-employed 55%, employed agricultural worker 12%, non-paid work 33%. Only 12% of workers educated to degree level are employed in the agricultural sector); half of employed agricultural workers are in seasonal jobs (in Egypt, 50% of all agricultural job holders are seasonal farm workers but only 11% of non-agricultural job holders are in seasonal jobs) and a third of agricultural work is unpaid. Rural women undertake unpaid agricultural work and given their low levels of education have very little chance of getting a paid non-agricultural job. In Egypt, 83% of women in rural areas work in the agricultural sector, often being paid little or not at all; only a small number of women do paid non-agricultural work. In Algeria, there are still many disparities in the rural environment. The number of rural women in employment remains low: in 2006 they made up only 5.5% of the total active population. One unemployed woman in four is rural, a quarter of whom are aged between 20 and 29 years old. Of the paid work that is done by rural women, 39% is in industry, followed by 33% in agriculture (Benghabrit-Remaoun and Rahou, 2006).

This means that the agricultural sector has at its disposal plentiful but poorly qualified and unproductive human resources, which is hindering the emergence, spread and adoption of innovation. In this context, the current state of the agricultural labour force is clearly a real handicap preventing the evolution of agriculture. Assessments of investment in the rural environment have revealed other significant limitations on the diversification of economic activities, notably, apart from the poor quality of roads and infrastructure (electricity and drinking water supply, refuse collection services), poor access to credit and financial services, insecurity of property rights, weak government structures and legal institutions and a lack of coordination between private and public actors.

In Egypt, poor access to formal credit is a huge limitation. The Principal Bank for Development and Agricultural Credit is the main service provider. The obtention of credit is conditional on ownership of agricultural land, or in other words excludes farmers who do not own land. Owning farmland is likewise a condition for the purchase of “inputs” in agricultural credit cooperatives. Small farmers are thus forced to make

deals with the big land-owning farmers who buy them the inputs in exchange for half their value. Informal credit generally dominates in the rural world, particularly among small or landless farmers. Clearly, this unfavourable scenario helps discourage outside investment, which explains the presence of businesses close to urban areas, which are better served. Even agro-food industries have historically been set up on the outskirts of towns in order to benefit from the basic infrastructure (roads, electricity, water, ports) – well away from the biggest cereal-growing farms.

These shortcomings combine with a lack of vision on the part of institutional actors, who identify the rural environment with agriculture, or with a pool of cheap labour without social or trade union coverage, which is not conducive to the emergence of a framework that stimulates diversification. This makes it an imperative to save rural society from the position of weakness in which it finds itself. Despite the loss of economic importance and the considerable fluctuations of the agricultural sector, agriculture is not only a valuable economic alternative, but remains undeniably a driver of development for rural areas in the countries of the Southern and Eastern Mediterranean. Moreover, exploring various routes to diversification of the local economy is becoming a necessity.

Linking agricultural development with carefully targeted social safety nets

The vast majority of poor people live in disadvantaged regions, left behind by technological progress. In these areas, improving agricultural production whilst providing social safety nets to populations is a key orientation for political action. In some contexts, it is necessary to reduce the vulnerability of the weakest categories of farm by consolidating agricultural employment and stabilising agricultural incomes in order to allow a rural economy that is still highly dependent on agriculture to retain a minimum level of vitality.

In Tunisia, the Government classifies farms into one of three categories, on the basis of size and turnover: 1) large farms (cereals and irrigated); 2) small and medium-sized farms of an economic nature (PMEACE); 3) small-scale family or social farming (PACFS). The Ministry of Development and International Cooperation (MDCI) puts 24% of farms in the “social” or “family” category that is the most at risk of poverty and vulnerability. These farms have a net income from farming of less than 3 500 Tunisian dinars (approximately 2 000 Euros), the farming viability threshold. Farming is their main occupation. They rely on family labour and occasionally recruit seasonal workers. Women are more likely to be involved, in raising cattle and poultry, carrying out craft work, processing food, or doing specific tasks in the fields, such as hoeing. These family farms, in particular the poorest of them, make practically no call on formal credit, access to which is limited by distance and bureaucracy. However, 87% of them say that they would make use of credit if it were more accessible and adapted to their needs. Informal loans between family members, neighbours etc. are relatively common, in particular between those family farms that are better off. Some studies point to other limitations that also apply to the agricultural sector as a whole: poor capacity for investment, insufficient access to credit, weak organisation among farmers, poor access to information

on popularisation, training, research and the market, an ageing population, fragmentation of land.

It has become vital to reduce the vulnerability of these farms in order to stimulate the non-agricultural economy that is dependent on them. On the one hand, this means enabling dialogue between farmers and institutions, and meeting the need of all farmers to overcome the inadequacies of agricultural systems; on the other hand, it would be desirable to have well thought-out social programmes carefully targeted at the needs of communities and rural areas, in order to attenuate the impact of reforms relating to the liberalisation process (World Bank, 2006).

Diversifying by promoting agricultural and agro-industrial activities with high added value

Insofar as urban incomes are rising, eating habits are becoming more varied and opportunities on international markets remain attractive, rural economies could be developed by promoting activities with high added value in order to diversify agriculture and, in some contexts, steer it away from cash crops. Following the green revolution, the high added value revolution is now generating a second wave of growth in employment. The dynamic sector of crops and livestock products with high added value, which are labour-intensive, has strong potential for increasing employment and raising rural incomes (World Bank, 2007).

Moreover, a private agro-industrial sector establishing a link between agricultural producers and consumers can be an important engine for growth in the agricultural and rural sectors. In order to ensure the success of this approach, it is important to promote the involvement of small farmers through targeted public-private partnerships and initiatives promoting a more favourable investment climate for small and medium-sized enterprises. Eliminating the strangling bottlenecks that prevent the participation of SMEs could increase the effectiveness and impact of the development of the agro-industrial sector in poverty reduction (World Bank, 2007).

In some SEMCs, despite good agricultural performance in recent decades, many examples demonstrate that agriculture is not making the contribution that it could to the national economy. Fully realising agriculture's potential means increasing the value of the most competitive well-known products. There are clearly opportunities here: the demand for raw and processed products with high added value is growing rapidly on domestic and world markets, stimulated by higher incomes, rapid urbanisation, changes in eating habits in favour of more processed and high-quality products, the liberalisation of trade, foreign investment and technological advances. The countries of the Mediterranean therefore have great potential in agro-food on account of their soil and climate, their culinary and cultural traditions, and the existence of an artisan and industrial base that is already significant.

Among activities for export, we might draw attention to: out of season crops; products with a strong Mediterranean or country association; cooked and frozen meals on the basis of local recipes and products; organic farming; the harvesting of aromatic and medicinal herbs (see box entitled "the role of aromatic and medicinal plants in the development of the rural economy").

At the same time, local markets comprising millions of consumers are growing rapidly and becoming increasingly demanding, opening the way for the development of activities to strengthen local capacity to meet the domestic market in order to limit the effects of dependency on foreign goods and avoid the too rapid introduction of imported modes of consumption: products with short shelf life (dairy product lines), modernisation and reliability of the cold chain, aquaculture and fish farming, mineral waters, bio-fuels, industrial baking, food distribution, slaughtering, the processing of red meats (Anima, 2005).

The role of aromatic and medicinal plants in the development of the rural economy

Aromatic and medicinal plants offer a promising alternative for the economic development of rural areas in the Mediterranean owing to their more rational use of water, the lower cost of farming and harvesting them, and the fact that they offer higher incomes per farming unit than conventional crops, as well as significant potential for creating added value and employment through processing and marketing them. Moreover, aromatic and medicinal plants provide a niche market for women in rural areas, who are closely involved in the various phases of processing (drying and distillation) and marketing. This means that the development of this sector would have a considerable effect on the contribution made by women to rural household incomes. For other vulnerable categories of the rural population, such as young people, landless farmers and marginalised small producers, harvesting such plants is an additional means of subsistence and a way of diversifying family incomes in the interests of better risk management vis-à-vis various climatic and economic hazards.

In rural areas in Morocco, aromatic and medicinal plants offer a genuine economic alternative. The country has rich and varied biodiversity comprising more than 4200 species, with very marked endemism. There are between 500 and 600 aromatic and/or medicinal species, the exploitation of which allows the export of 1000 tons of essential oils and extracts and almost 400 tons of dried herbs with a value of 300 million dirhams, creating approximately 500 000 days' work. Since the 1980s, Morocco's biggest customer has been France. Demand is now growing in the United States, Japan, Spain, Switzerland and Germany for products exported in the form of dried plants for use by herbalists and for flavouring food. There is a lot of potential for the development of processing systems for wild and endemic plants. Their use for medicinal purposes, as well as for the preservation and flavouring of food is deeply rooted in society. Plant resources are found in regions where they are an important source of income for the local population and thus a springboard for local development. Other regions are starting to promote the techniques for this kind of cultivation.

However, a number of technical, organisational or resource management-related limitations reduce the added value of this activity. On the technical level, the poor quality of products results from a lack of technical and technological knowledge and poor commercialisation skills. In order to regain its competitiveness, the sector must improve the quality of its products and ensure the protection of its label. Efforts must also be made at the marketing level. So far as the organisational limitations are concerned, remember that professionals in the sector receive no supervision. Those who harvest wild plants generally work piece-rate and are rarely unionised. Meanwhile, resource management suffers the pressures of the local population and cattle, and the lack of awareness of local people about the protection of the environment and the importance of aromatic and medicinal plants. In some contexts, we are increasingly seeing the negative environmental and social effects of unregulated over-exploitation of these resources.

Source: *Ahouate and Tamehmachet (2008)*.

In Morocco, the agro-food industries are, with a turnover of more than 60 billion dirhams (more than 40% of the industrial sector's share of GDP and 8% of national GDP in 2005), by far the main manufacturing sector, ahead of textiles or chemicals and thus a pillar of the Moroccan economy. According to the most recent statistics (2005), the Moroccan agro-food industries employ 71 000 people in more than 2000 companies. Most of the industry comprises small and medium-sized enterprises (SMEs). However, although SMEs make up 95% of the agro-food industries, they are responsible for only 45% of agro-food production, whilst the fifty biggest companies (big national groups such as ONA or Holmarcom or foreign companies such as Nestlé, Unilever, Proctor and Gamble) carry out close to 55%. The products supply both the local market (essentially staple goods such as sugar or oil) and the export market (fresh and processed products, such as canned vegetables or fish).

These numbers aside, the sector does have a number of vulnerabilities. In particular, supply is a major problem for the agro-food industry. The links between farmers and processors have never been conducted appropriately, with relations between them so confrontational that they make it impossible for the sector to grow. Other handicaps include a lack of qualified labour, a weak packaging industry that does not meet the needs of the sector etc. Packaging costs are high due to the need to import raw materials, the cost of energy and the monopolies or quasi-monopolies of manufacturers. For all these reasons, the local packaging industry does not seem to be a source of competitive advantage for the sector.

There is also an absence of the marketing approach that might offer employment opportunities to small agricultural enterprises wanting to transform their production. Indeed, the proportion of business by companies in the sector that is conducted loose remains sizeable: 50% for olives, 90% for capers, 100% for apricots, and 100% for juices. This is worrying when viewed in comparison to competing countries, such as Turkey, where most companies export in separate packaging and sub-mark a priority. Although Morocco is the world's biggest exporter of capers, "nobody was able to meet a foreign customer's request for capers in vinegar", says Fenagri, the National Agro-Food Federation. A marketing vision would also enable new niches to be identified, by diversifying what is on offer (argan oil, poultry processing, organic products...) (Vallée and Flandrin, 2005). However, the Moroccan agro-food industry has been successful on international markets – exports of processed cheeses, for example, are growing. This industry, one of the few that has been able to be built on the back of a local market, produces 32 000 tons of cheese per year and exports close to 15 000 tons to Arab countries (Libya, United Arab Emirates, Saudi Arabia).

In the context of the promotion of agricultural and agro-industrial activities with high added value, organic farming and typical and traditional products represent innovative approaches that marry the modernisation of agriculture with the link with territory and tradition. On the regional scale, the first Conference of Ministers of Agriculture held in Venice in 2003 in the framework of the Euro-Mediterranean Partnership made specific mention of sustainable rural development, organic farming and geographical designations. These issues were then included as non-commercial elements in the Euro-Mediterranean roadmap for agriculture intended to guide the process of trade liberalisation. Organic

Agro-food processing as a driver of development in Karaman Province, Turkey

Karaman Province is considered to be a model for the agro-food industry in Turkey: agricultural products are processed there into products with high added value (flour, biscuits, fruit juice, cheese etc.). Karaman is situated in the region of Central Anatolia, and comprises 6 zones, 10 towns and 160 villages. According to census figures from 2000, the province has 243 210 residents, of whom 58% live in urban and 42% in rural areas. The economy of the province is above all reliant on farming activities. Of 940 743 hectares, 25.79% is arable land, 6.85% is lying fallow, 34.15% is grassland, 22.27% forests and 6.8% non-agricultural land. Karaman Province has 13 826 dairy cows, 11 591 head of cattle, 374 141 sheep, 59 093 goats and 11 696 angora goats.

Since the early 1990s there has been a remarkable improvement in employment levels, thanks to the stepping up of investment in the agro-food industry, which has turned to production for export. Thus, the agro-food sector has made a great contribution to reducing unemployment. Employment participation rates in Karaman province are 69% for men and 44% for women, as compared to 48.4% and 24.4% respectively for Turkey as a whole. Karaman first began to attract attention in the mid 1980s, when its biscuit-making industry grew to the point that almost half of all biscuits made in Turkey were made there. There are 37 businesses in the province (biscuits, bulgar wheat and bakery goods). One third of biscuits and one fifth of bulgar wheat produced in Turkey comes from Karaman Province. Karaman's centre has become a magnet for immigrants from neighbouring provinces seeking work. Around 450 000 tons of biscuits and derivatives (waffles, cake, crisps, confectionary, chewing gum etc) are produced in the region each year. In 2006, the value of exports reached 56 million dollars (compared to 32 million in 2000); the main partner countries are in the Middle East. The GDP of the region increased by a factor of 20 between 1995 and 2001. Statistics for 2001 show that the agricultural sector in the Province accounts for 50.8% of the region's wealth; the food industry makes up 30% of manufacturing in the region.

The effects have been remarkable:

- Products with high added value, obtained through on-site processing of agricultural products, have made a strong contribution to the region's economy;
- Industry in the region has improved, due to the processing of agricultural products;
- The presence of this web of agro-food SMEs has created jobs, especially for young people, reducing emigration towards the cities;
- The concept of quality production has been developed in the province;
- The province has seen accelerated economic and social development;
- Innovative approaches to agro-industrial processing and marketing have been adopted.

There have been some negative effects, which must also be mentioned, such as the increase in environmental pollution and the use of agricultural land for non-agricultural purposes.

Source: Elci (2008).

farming and geographical designations are also referred to together in the chapter on sustainable agriculture and rural development of the Mediterranean Strategy for Sustainable Development (MSSD) adopted in 2005 by the United Nations Environment Programme's Mediterranean Commission on Sustainable Development (MCSD). The potential and multiple synergies between organic farming and geographical designations

are increasingly being taken into account by investors, national governments, private operators and non-governmental organisations (NGOs).

According to a review by the Mediterranean Organic Agriculture Network,¹ in 2006, in the countries of the Southern and Eastern Mediterranean and the Balkans, 344 000 hectares of cultivated land and 20 669 farms were engaged in organic farming. If harvesting of wild aromatic and medicinal plants is included, the total surface area is more than 2 million hectares. Turkey, Tunisia, Egypt and Morocco are the most important countries in terms of production. The European Union, the United States, Japan and the countries of the Gulf are the biggest export markets for organic products from the Southern and Eastern Mediterranean and the Balkans.

Table 2 - Organic Farming in Southern and Eastern Mediterranean Countries and the Balkans, 2006

Country		Organic land area without wild plants (ha)	Organic land area with wild plants (ha)	Operators (number)	
Potential Candidate Countries to the EU	Balkan countries	Albania	171	1 201	93
		BH*	714	488 804	60
		Croatia	6 012	23 670	342
		Macedonia (FYR)	509	2 101	104
		Montenegro	25 051**	158 851	15
		Serbia	906	1 102 906	48
	Turkey	100 275	192 789	14 737	
		Sub-total	133 638	1 970 322	15 399
Mediterranean European Neighbourhood Policy Partner Countries	Mashrek	Egypt	14 165	14 165	460
		Jordan	1 024	1 024	25
		Lebanon	3 470	3 470	213
		Palestinian Territories	641	641	303
		Syria	30 493	30 493	3 256
		Sub-total	49 793	49 793	4 257
	Maghreb	Algeria***	1 550	2 400	61
		Libya	-	-	-
		Morocco	4 216	104 216	n. d.
		Tunisia	154 793	220 476	952
		Sub-total	160 559	327 092	1 013
TOTAL		343 990	2 347 207	20 669	

Notes: *The Federation of Bosnia and Herzegovina and the Republic of Serbia are the two entities that make up Bosnia-Herzegovina, according to the Dayton Peace Agreement; the Ministry of Agriculture is at the entity level; ** Including grasslands; *** The figures for Algeria under-estimate wild plants and pastures.

Source: Adapted and updated from Al-Bitar L. (2008).

1 - <http://moan.iamb.it/>

Over the past two decades organic farming in the Mediterranean has, thanks to the ideas and determination of its pioneers, investment by private operators, the financial and technical support of financial donors and, more recently, the action of governments, become a very dynamic and promising sector. Although the level, pace and potential of its development obviously varies between countries in the region, it is not difficult to identify a number of problems and opportunities that are common to all organic operators in the Southern and Eastern Mediterranean.

There are three routes to the development of organic farming that appear to have developed in sometimes parallel, sometimes diverging, fashions, but that are increasingly being forced to converge on account of the pressing need for a permanent and constructive dialogue between the various public and private actors (Pugliese and Al-Bitar, 2008). The first of these three routes is essentially through the activities of the pioneers of organic farming and of many associations, often supported by local authorities and financial donors, and sometimes partnered by foreign NGOs; these actors ensured that the principles and methods of organic farming were disseminated among small farmers and women farmers, and enabled the creation of an awareness of and a national movement for organic farming. In conjunction with initiatives for responsible and solidarity-based shopping, they became ardently involved in promoting organic farming in the local market, which generally still tends to be under-developed in most of these countries.

A community supported agriculture initiative in Morocco

Local Solidarity Partnerships between Producers and Consumers (LSPCC), known variously as Associations pour le Maintien d'une Agriculture Paysanne (AMAP) in France and Community Supported Agriculture (CSA) in Anglo-Saxon countries, are close partnerships between a farm and a group of consumers. The consumers buy a share in the season's harvest in advance, in the form of "baskets" of the farm's produce, at a price agreed with the farmer. This commits consumers and producers to the same motivation: promoting healthy and socially just agriculture. The first LSPCCs were set up in the 1970s, first in Japan and then Germany and Switzerland. France did not begin its AMAP experiment until 2001. The advantages of the system are many: it gives farmers a guaranteed income that allows them to maintain their farming activity; consumers have access to fresh and seasonal produce; and lastly both partners are guaranteed a fair price.

Morocco has also been won over by this model, which combines social development with environmentally-friendly production methods. In Shoul, near Rabat, a number of associations have set up an organic market gardening project, since 2007, in one of the poorest rural communities in Morocco. An entirely new idea in Morocco, this programme for market gardeners brings together consumers and producers, the countryside and the city, in the same way as other LSPCCs: subscription to a basket scheme (monthly or quarterly depending on families' financial circumstances) finances the production of organic vegetables and cereals. The advantages are the same, namely fair remuneration for the producer and access to quality produce for consumers. This has not only enabled the diversification of production in the region (dominated by stock farming and harvesting) but also improved the economic integration of local producers. The success of this project will allow the creation of the first LSPCC in Morocco very soon.

Source: Ciheam, 2008.

Organic farming and rural development in Turkey: the case of Project Wheat

In 2005, the municipality of Istanbul and its public enterprise Public Bread Company (IHE) set up the project *IHE Contractual Organic Agriculture and Organic Bread Project* (Project Wheat). In ten provinces of Eastern Anatolia and the Black Sea region, where there is considerable poverty, the project aims to support the production of organic wheat, which is then processed in the IHE establishment. In 2006, small shops and supermarkets in Istanbul sold 10 000 loaves of bread (each weighing 400g) produced by the IHE, using 8 000 tons of organic wheat (and wheat in conversion), bought at a price 40% higher (20% for wheat in conversion) than the price of conventional wheat from 1 400 producers under contract involved in the project. The number of producers is planned to be increased to 12 500 over a period of five years. IHE provided the farmers with advance payments and subsidised inputs (organic fertilisers and seed), covered the costs of certification and financially supported migrants who wished to leave the capital and return to their villages to work on the project.

Adhering to the project's objectives produced several multidimensional benefits:

- an increase in producers' incomes (not only through a guaranteed premium price but also through the improved returns that resulted from the use of better inputs);
- support for local development by reducing migration towards the cities and promoting back-migration;
- increased attractiveness of organic farming for producers and consumers by developing the local market;
- the creation of an environment favourable to development for the institutions involved;
- the promotion of organic farming in Turkey and, consequently, the protection of the environment and human health.

The collaboration with the Ministry of Agriculture, local institutions, research centres, universities, farmer organisations and NGOs was fundamental to the success of the initiative. The regional departments of the Ministry of Agriculture even changed their training and popularisation programmes to include organic farming. An evaluation of the initiative undertaken in 2007 concluded that the project has been a real success and can serve as a model to be used in other regions of the country.

Source: Engiz (2008).

The same associations may also be involved in the export (sometimes sporadic) of small quantities of traditional and organic products sold in Europe, for example, in small specialised shops, which is enabled essentially by specific collaborative relationships between these local associations and the foreign operators involved (NGOs, certifiers, exporters). Often these are little success stories that would not be sustainable without the support of financial donors.

Without any doubt, the main outlet of organic produce from Southern and Eastern Mediterranean countries remains the export of larger quantities to European markets, and this is the second route to the development of the sector, initiated independently of the first by private foreign and local operators who undertake almost all stages in the line, from production to putting goods on to the market. They provide the producers

under contract with all the inputs and the necessary services, including technical assistance and certification. Most of the added value created by the organic market and a significant part of the land area and organic farmers in these countries are to be found in this approach.

The third route, which might be described as “institutional”, is linked to the recent commitment by several governments attracted by the potential of the organic sector and its positive contribution to the commercial agro-food balance. In this instance, public intervention is characterised by the creation of a legislative context and the introduction of various forms of financial support to the sector, of varying degrees of effectiveness but that for the time being are continually evolving. As in the first approach, international cooperation has often played a vital role and allowed institutional capacities to be strengthened and networks to be created to allow the exchange of information and best practices.

Products of quality (organic and conventional) give value to local skills and the cultural heritage of particular districts. Evidence shows that differentiation and typicality can be elements of a response to the problems of marginalisation. Since 1995, giving value to produce typical of the mountain regions of Mediterranean countries has been an objective of the FAO-Ciheim “Mountain products” project. In the current context of liberalisation, the value created can allow producers in mountain regions – faced with high transport costs, a lack of infrastructure, inadequate technology and the difficulties of access to market – to stand up to the growing competition from systems and areas of production that enjoy more favourable conditions. Indeed, the emergence of networks of public and private actors (product distribution channels and local and national administrations) show that those able to distinguish their produce, their services, even their regions of production, gain in productivity. The Mountain Products project has made it possible to take inventory of more than 50 typical mountain products in the Mediterranean. The project also provided a dynamic information system to collect knowledge likely to encourage the development of these products.²

According to the final report of the Femise programme on products of the Mediterranean (Ilbert, 2005) in Algeria, studies have shown the existence of a quality and “local speciality” approach, especially for Deglet Nour dates and the olive oil of Kabylie. This kind of approach is a recent phenomenon and stems from local dynamics that are changing and made vulnerable by the difficulty of access to the external agro-food market. The low level of involvement by public authorities and big economic operators in supporting quality-based approaches leaves the way open to such local dynamics and rural development initiatives. Some producers, researchers and operators have become aware of the importance of local speciality produce and are trying to turn them to economic advantage. In Morocco, with the exception of some national initiatives (argan oil), the development of logos indicating quality runs up against weak organisation in the distribution chain and a regulatory framework that is partially non-existent. However, the diversity of agro-ecological spaces and the skills and consumer expectation for these quality products do exist.

In Tunisia, some products, such as wines and spirits, have benefited from logos indicating protected designations of origin for decades.

² - See www.cybermontagne.org/

The establishment of quality sectors of agricultural and agro-food produce in Tunisia

As a Mediterranean country with a very long tradition of arable and livestock farming, Tunisia has always had unique products connected to nature and to the land, in the broadest sense of the term. In 1999, the Tunisian Government promulgated Act No. 99-57 of 28 June 1999 on protected designations of origin and designations of origin of agricultural products and their application. The act targets the protection of the specificities and peculiarities of natural and processed agricultural and food products, vegetable or animal, and giving them value by granting them a PDO and a geographical indication.

In the framework of the Project to strengthen agricultural support services, a project implemented by the Ministry of Agriculture and Hydraulic Resources (MARH), with a loan from the World Bank (loan No. 7 306), the component entitled "Improvement and enhancement of the capacity of interprofessional groups" (2003), also referred to as the "quality component" is coordinated by the Agency for the Promotion of Agricultural Investment (APIA) and benefits several Interprofessional Groups (IG): IG vegetables, IGV; IG fruits (including dates), IGF; IG Fishing products, IGFP, IG bird and rabbit products, IGBRP; IG meat and milk, IGMM. Some of these designations are more recent, often where Interprofessional Groups have been amalgamated in the framework of restructuring carried out since 2003. The quality component has six objectives:

- to identify and publicise the brand image of the quality of Tunisian agricultural and agro-food produce;
- to define the level of quality (standardisation, protected designation of origin, geographical indication, organic farming etc.) within Tunisian agricultural production;
- to improve the provision of services to various operators within the distribution channels so that they grow and market products that will be recognised, remunerated and identified from the producer to the consumer;
- to ensure the rapid dissemination of information between producers, service providers, processors and the market;
- to promote Tunisian agricultural products with particular characteristics by providing detailed and complete information about these products in various modes of communication in relation to a clearly identified target group of potential consumers;
- to train Tunisian operators in promotion, marketing, packaging, distribution, etc., in order to facilitate better access to national and export markets.

Technical support was entrusted to a group of three French experts from the French Agricultural Research Centre for International Development (CIRAD), the French National Institute for Agricultural Research (INRA) and the French National Institute of Designations of Origin (INAO). The group undertook several missions to the field with the Agency for the Promotion of Agricultural Investment (APIA), the Interprofessional Groups, the Tunisian Union of Agriculture and Fishing (UTAP), the Tunisian Union of Industry, Trade and artisan activities (UTICA), the National Office of Oil (ONH), central and regional administrations of the Ministry of Agriculture and other affected Ministries, and private operators. Many other national and foreign experts were also involved.

The creation of a "quality network" was one of the activities of the project. Quality "cells" were set up at the level of the IGs and the National Office of Oil and cover several sectors, such as fruit, vegetables, farm produce, red meat and milk, products of the sea, olive oil. These cells comprise management staff and experienced technicians specialising in

technical and commercial fields. The teams worked with professionals from the sector to make Tunisian and foreign consumers aware of the quality of Tunisian agricultural products. The network is run by APIA.

Two types of study were carried out with the key objective of promoting the quality of Tunisian agricultural products (assigning logos, PDO, PI, AB etc) with a view to improving access to export markets. The project also included training activities in Tunisia and abroad that affected first of all the staff of the quality network (training courses relating to quality, food safety and export), and then the professional producers and exporters, on themes relating to quality, packaging, the preparation of the product for export, international commerce techniques (quality of red meat, export of fruit and vegetables, quality of poultry products, Eurepgap, processing and export of fishing products, marketing of fishing products, ISO 22 000).

The research activities are intended to improve the quality of products, develop products for specific niche markets and perfect new biological control, packaging or processing techniques. Fourteen themes were developed by teaching and/or research establishments of the Institute of Research and Agronomic Higher Education (IRESA).

Lastly, an agriculture portal is planned, with a promotional purpose, aimed at the commercialisation and export of agricultural products. Based at the National Observatory of Agriculture (ONAGRI), the portal will have links with the various sites of national and private institutions and bodies operating in the sector. It will be an electronic trading hub for Tunisian food products.

At present, the quality component's most significant result is the approval by the Technical Consultative Commission of Designations of Origin of several Tunisian agricultural products, such as the Gabès pomegranate, the Sbiba apple, the Deglet Nour date from Nefzaoua (Kebili) and the Deglet Nour from Jérid. Steps have been taken towards acquiring recognition of collective brands for the following products: king prawn; Mediterranean sardine; Cap Bon harissa; Sidi Bouzid lamb; black Thibar (sheep) and an application is being considered to grant a PDO to an olive oil from Sahel (Monastir regions). The planned budget of the component was 5.02 million Tunisian dinars, and it will probably come in, on completion, at 4.2 millions.

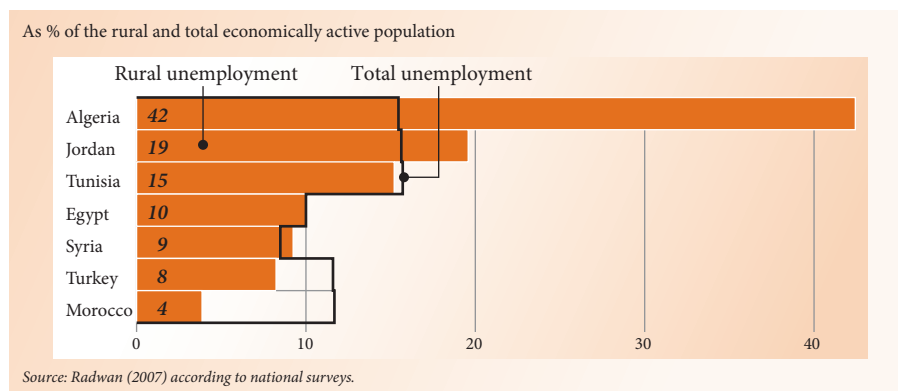
Source: Hassainya (2008).

In Turkey, the certification of produce of quality origins is a tradition that has been the subject of laws and regulations since 1502 under the Ottoman Empire. Today, the country defends a strong protectionist policy by geographical designations because it is one of the countries, like India or China, that would like to see an extension of geographical protection in the WTO. A regulation on the protection of geographical designations (Act No. 555 of 27 June 1995) was adopted, and this was strengthened in 2003 by a law governing geographical designations within the Institute of Patents. In 2008, there were 95 products enjoying protection under the regulations on geographical indications, 53 of which were agro-food products (Tekelioglu and Demirer, 2008). The economic importance of these products and their advantages in terms of income are clear: four products with geographical designations – Giresun hazelnuts, Malatya apricots, Aegean sultanas and Antep pistachio nuts – make up 60% of the total of Turkish agro-food exports.

Developing non-agricultural rural economies

Thousands of unemployed young people in SEMCs leave the countryside in search of work in the cities. This migration cannot be a solution for everyone, and unemployment is sometimes higher in the cities than in the countryside (see Chart 4). As agriculture's progress will not be sufficient to meet the challenge of employment in the rural environment, the non-agricultural rural economy must also become a source of new jobs. Alternatives to agriculture should be explored, in particular in the manufacturing sector, which remains very tied to the urban environment given the even more significant limitations in the rural environment.

Chart 4 - Rural and total unemployment rates in the Mediterranean



In the service sector, alongside the small activities of commerce and transport, rural tourism is emerging as a route to the diversification of household incomes. Although the benefits of tourism, such as employment creation, income production, infrastructure improvements, need no longer be demonstrated, its negative effects are also apparent in the countries of the South. Even assuming that eco-tourism and fair-trade tourism have less impact than mass tourism, it should not be forgotten that, for example, there is fierce competition in these countries for access to basic goods such as water, and the effect on land-owners can be considerable. Moreover, although tourism is a great creator of jobs, these are often low skilled and poorly paid, often cash in hand and particularly precarious. Lastly, tourism development can also lead to the desertion of food-producing agriculture in favour of activities, such as the sale of souvenirs or begging, which do not provide any benefit from a social and cultural point of view (Collombon, Barlet and Ribier, 2004).

Of the countries along the Southern shores of the Mediterranean, Morocco is one that has decided to invest in tourism as a means of improving the development of its rural territories. In the framework of the Moroccan tourism initiative "Vision 2010", a programme entitled "Tourism: a vision, a challenge, a desire" was launched for the period 2001-2010. Signed by the General Confederation of Moroccan Enterprises (CGEM) and integrating the objectives and orientations of the Economic and Social Development Plan 2001-2004, this programme is based on three main axes:

- to construct a realistic yet ambitious vision of the development of the sector by 2010;
- to identify trump cards to be exploited and the challenges that will need to be overcome to achieve this;
- to put forward a voluntary comprehensive strategy capable of releasing the powerful dynamic of tourism development in order to allow the country to feature among the most attractive destinations in the world.

Alongside traditional tourism, Morocco has begun to focus on rural tourism in order to stimulate economic recovery in remote areas and encourage expatriate Moroccans to visit and invest in their country and region of origin. Every year, Morocco welcomes between 150 000 and 200 000 tourists who visit the Atlas Mountains, the desert and the countryside. As long ago as 2003, the country launched a rural tourism initiative that encompassed all the factors affecting the development of the sector: from construction to training, from regulation to awareness raising and promotion. In this context, the Ministry of Tourism adopted a strategy for the development and consolidation of tourism in the rural environment, based on the French concept of Tourist Host Country (PAT). A Tourist Host Country covers a well-defined territory, possessing its own identity and enjoying a maximum of attractions. They sometimes span several regions and develop a structured range of tourism provision. The PAT project aims to lead tourists to discover the rural areas of Morocco by means of theme routes that enable them to meet local people and see their way of life outside the usual tourist circuits. This experiment initially involved the territories of Chefchaouen around the park of Talasemtane, the PAT of Ifrane/Mid-Atlas around the park of Ifrane and the PAT of Immouzer Ida Outanane.

Another cooperation project with France, supported in particular by the French Development Agency, aims to improve tourists' access to rural villages. This project aims to stimulate the local economy in order to dissuade people from leaving for the cities or abroad and encourage expatriate Moroccans to come back and invest in their country. It intends to develop "tourist host arteries" in the remote areas such as Chefchaouen, Ifrane, Imouzzet, Ida Outanane, as well as places that already had strong tourism but that are in need of renovation and support, such as the Grand Atlas, the Rachidia desert, Ouarzazate and Zagora. It even intends to invest in the remote douars, where there are plans to install twenty new rural inns. Nine of these rural inns, at Taroudant, Tiznit, Ouarzazate, Haouz, Tata, Chtouka ait Baha, Rachidia and Zagora, have already begun to receive visitors. This project's strategy for promoting rural tourism consists of providing villages with roads leading to the inns, electricity, drinking water and sewer networks. The Moroccan Social Development Network (ADS) provided the training, but the day-to-day operation of the inns is up to their owners, locals who have returned home to the area and retirees. The idea is also to instil in Moroccans an awareness of the superb resources they have and a sense that they can take advantage of them. This means turning to financial advantage the character and numerous advantages of Moroccan villages that until now have only benefited foreigners, great fans of this type of tourism. The communities involved are also beginning to understand that good and welcoming conditions for tourists increase the importance of their heritage and their natural treasures. The project also helps to improve the social conditions of the inhabitants of the douars in which the inns are situated, whilst strengthening the State's

policy for combating rural emigration. It has rehabilitated remote mountain regions and improved the standard of living of the people there, by providing new jobs (manufacture of traditional local products, guides for camel treks or for visits to historic sites of which there are many in the region).

The experience of the Migration and Development Association for the development of rural areas in Morocco

The Migration and Development Association (M&D) was set up in 1986 by around 50 immigrants who were obliged, following the closure of an industrial plant in France, to return to their countries of origin, in particular Algeria, Morocco and Tunisia. In Southern Morocco, in collaboration with immigrants living in Provence, French nationals working for EDF and Moroccan villages, the Association undertook the electrical hook-up of eight villages in the province of Taroudant, a mountain province with a semi-arid climate whose population continued to live in extremely marginalised conditions, without electricity, drinking water or sewer system, often without a pharmacy and sometimes without a school. The region was known as a great source of non-skilled labour for big Moroccan cities and for Southern Europe.

In each of the villages, M&D set up a village association by introducing the principles of village management that subsequently made it possible for other development projects concerning infrastructure, social or environmental development to be implemented. These village associations, in conjunction with the migrants in France, became real vectors of local development in mountain areas thanks to a particularly participative approach (all projects are self-funded by the village associations and the migrants at the level of 40%), a partnership approach (the local institutions are involved in the process) and a dynamic of constant trade between Morocco and Europe.

The action of creating local jobs and injecting value into local agricultural resources is translated into the establishment of pilot workshops around olives, argan, saffron, dates, and henna. These workshops processed the raw agricultural material in order to keep the added value and jobs in situ. There was also a project to support one thousand women weavers, who make Berber rugs, by making them aware of their rights, providing technical training and equipment, and creating sales cooperatives. In this way, the project affects rural tourism. 18 rural inns were set up as well as guesthouses. Each partner village adopted a "Solidarity Tourism Charter" and they established a network organisation: the Network of Village Associations of Solidarity Tourism. A Berber cooperative of tourist services is being set up to take on the function of a regional reception agency. It will monitor respect for the specifications and the quality of the services provided to the inns and the families who host customers in guesthouses. In the context of this approach, the promoters of the rural tourism project are also thinking about setting up a museum that would exhibit local heritage and building a centre to offer tourists leisure, cultural and commercial activities: an organisation of local festivals, the sale of local produce, henna rituals etc.

Source: Collombon, Barlet and Ribier (2004).

In order to emphasise the Government's commitment to the development of its land in this way, the Moroccan Ministry of Tourism and the Craft Industry, in partnership with the National Federation of the Hotel Industry (FNIH), organised a national day of tourism and the environment with the theme "For sustainable and ecologically responsible tourism", which addressed good environmental management at the hotel level. Held in Casablanca in July 2008, this is to be the first of an annual event bringing toge-

ther all the parties involved to take stock of environmental problems in the tourism sector, focusing in on specific topical themes.

Since the 1990s, Turkey too has decided to diversify into alternative forms of tourism in order to become more competitive with other European countries. Some regions in particular, such as Central Anatolia and Northern Turkey, have been very committed to the promotion of rural holidays (walking holidays, trekking, rafting etc). Very recently, local authorities have started working with NGOs to develop rural tourism through specific projects designed to turn local traditions and natural, architectural and cultural resources to economic advantage. There are also a number of private companies that have sprung up specialising in rural tourism, who hope to offer visitors alternative holidays close to nature. This new trend is improving the standard of living of local communities, through the restoration of old houses, improved access to villages, new work opportunities, and opportunities to escape isolation (Akca, 2006).

Lastly, the Turkish Ministry of Culture and Tourism has established a Tourism Strategy with a horizon of 2023, which aims to promote alternative forms of tourism such as agricultural tourism, ecotourism and “plateau tourism” (tourism connected with Turkey’s high plateau regions). A number of measures are planned in order to create the basis for the development of these kinds of tourism: to improve road infrastructure, to provide training to local communities to help them to manage their tourism activities (business administration, quality, sale of produce), to encourage the opening of house museums presenting the ecological and ethnological characteristics of the region.

Agriculture first and foremost

The persistence of considerable disparities between different areas is one of the major challenges for sustainable development in European rural areas. If policies fail to adequately take into account the heterogeneity of rural areas, there is a risk that the already apparent trend of rural areas becoming either over-populated or deserted will be exacerbated, with unacceptable implications with regard to the recommendations of the Lisbon and Gothenburg strategies.

We know that economics play an important role in the construction of a balanced relationship between urban and rural areas. The competitiveness of the agricultural and agro-food sectors will remain pivotal to the economy of many rural areas. However, we cannot ignore the vast range of economic alternatives that are being developed in rural areas near cities or those that are emerging in the more isolated and marginalised environments, thanks to a range of local and non-local actors and interests.

A favourable socio-economic and institutional framework will allow Northern Mediterranean countries to diversify farms and rural economies, who can also generally depend on the advantages afforded by infrastructure and modern technology (including ICT). This is not the case for many rural communities in the Southern and Eastern Mediterranean Countries, which are certainly driven by dynamic and enthusiastic thinking, are aware of their potential, but that are situated in isolated areas with very poor infrastructure, physically and culturally separate from the urban centres and the opportunities they can offer. Consequently, such communities continue to be little visible and their regions remain unattractive.

In this context, the range of diversification options remains narrow, and is even more closely tied to the agricultural sector, and to developing profitable niches, in particular the processing of agricultural produce or growing organic or local speciality agro-food products. This sector can also be combined with crafts and cottage industry and more recently with rural tourism, which are autonomous from agriculture; the development of these activities, as with other economic alternatives to agriculture, is often a result of external influences (foreign NGOs, cooperation projects, the remittances of migrants). It goes without saying that the sustainability of these activities and their becoming part of the structure the local economy remains contingent on rural communities adopting them, which is achieved in particular by strengthening the capacities of local actors and providing training, especially to young people. It is also important to put in place strong policies to minimise infrastructure problems.

Bibliography

Akca (H.), "Assessment of Rural Tourism in Turkey using SWOT Analysis", *Journal of Applied Sciences*, 2006.

Al-Bitar (L.), "Organic Farming in the Mediterranean: Towards Further Development", in H. Willer, M. Yusefi-Menzler and N. Sorensen (eds), *The World of Organic Agriculture. Statistics and Emerging Trends 2008*, Frick (Switzerland), IFOAM and FiBL, 2008.

ANIMA, "Le secteur agro-alimentaire dans la région euro-méditerranéenne", *Notes et documents Anima*, 16 November 2005.

Benghabrit-Remaoun (N.) and Rahou (Y.), "Itinéraire de femmes entrepreneurs en Algérie: cas d'Oran", international symposium *Création d'entreprises et territoires*, Tamanrasset, 3-4 December 2006.

Cataldi (G.), Ciola (G.), Pugliese (P.), Altamura (A.) and Maggi (M.), "Le linee guida per la costruzione di un bio-itinerario", Project *Sviluppo e Promozione per i Sistemi di Produzione Biologica* (Pro.Bio.Sis) Interreg III A Grèce-Italie 2000-2006, Ciheam-IAMB, 2008.

Ciheam, *Mediterra 2008. The Future of Agriculture and Food in Mediterranean Countries*, Paris, Presses de Sciences Po, 2008.

Collombon (J.-M.), Barlet (S.) and Ribier (D.) (dir.), *Tourisme solidaire et développement durable*, Paris, Les Éditions du Gret, 2004.

Dubois (C.), *Du tourisme rural au tourisme durable*, DESS Aménagement rural et développement local, Montpellier, Université Paul-Valéry Montpellier III, 2004.

Dufour (M.), *État des lieux de la diversification des exploitations agricoles du Limousin. Enjeux, poids et acteurs*, conseil régional du Limousin, service Animation agricole et Forêt, 2007.

Engiz (M.), "The IHE Organic Farming or Wheat Project. Organic Agriculture as a Social Responsibility Project within the Context of Poverty Alleviation and Rural Development", dans P. Pugliese and L. Al-Bitar (eds.), *Organic Farming Policy in South-East Mediterranean and Western Balkans. Approaches and Measures in Government Support*, Bari, MOAN, Ciheam-IAMB, 2008.

European Union, *Rural Development in the European Union: Statistical and Economic Information*, Brussels, 2007.

Hervieu (B.), "La Multifonctionnalité de l'agriculture: genèse et fondements d'une nouvelle approche conceptuelle de l'activité agricole", *Cahier d'études et de recherches francophones*, 11 (6), November-December 2002.

IFAD, *Impact of Trade Liberalization on Agriculture in the Middle East and North Africa*, Rome, IFAD, 2007.

IFAD, *The Role of High Value Crops in Rural Poverty Reduction in the Near East and North Africa*, Rome, IFAD, 2008.

IFAD, *The Status of Rural Poverty in the Near East and North Africa*, Rome, IFAD, 2007.

Ilbert (H.) (dir.), *Produits du terroir méditerranéen: conditions d'émergence, d'efficacité et modes de gouvernance*, Rapport final du Programme Femise, Montpellier, Ciheam-IAMM, June 2005.

Ministry of Tourism, "Tourisme rural", *Le Tourisme de A à Z*, Paris, Tourism Directorate, 2007 (www.tourisme.gouv.fr/fr/)

Ministry of Culture and Tourism, *Tourism Strategy of Turkey 2023*, Ankara, 2007 (www.kulturturizm.gov.tr/).

Nihous (F.), *Rapport sur la diversification et la valorisation des activités agricoles au travers des services participant au développement rural*, Paris, Ministry of Agriculture and Fishing, 2008.

Padilla (M.), "Dietary patterns and trends in consumption", in Ciheam, *Mediterra 2008. The Future of Agriculture and Food in Mediterranean Countries*, Paris, Presses de Sciences-Po, 2008.

Pugliese (P.), "The Role of Organic Agriculture in Rural Development: Experiences in Italy and Mediterranean countries", contribution, FAO Regional Workshop *New Horizons in Organic Agriculture*, Istanbul, 19-20 March 2007.

Pugliese (P.) and Al-Bitar (L.), (eds.) *Organic Farming Policy in South-East Mediterranean and Western Balkans. Approaches and Measures in Government Support*, Bari, MOAN, Ciheam-IAMB, 2008.

Radwan (S.), *Rural Youth Unemployment and Coping Strategies in the Near East and North Africa region*, Rome, IFAD, 2007.

Salvioni (C.), "Diversification, Multifunctionality and Pluriactivity in Italian FADN", contribution, meeting of Wye City Group, York, 8-9 April 2008.

SINAB, "Bio in cifre 2007", 2007 (www.sinab.it/programmi/).

Tarik (R.), "Des jardins maraîchers pour combattre la pauvreté", *Le Matin*, 28 September 2008.

Tekelioglu (Y.) et Demirer (R.), *Küreselleşme sürecinde, yöresel ürünler ve coğrafi işaretlerin geleceği*, 2008.

Vallée (S.) and Flandrin (A.), "L'agro-alimentaire: une opportunité de croissance à saisir", *Conjoncture*, 860, May 2005.

Van Huylenbroeck (G.), Vandermeulen (V.), Mettepenningen (E.) and Verspecht (A.), "Multifunctionality of Agriculture: A Review of Definitions, Evidence and Instruments", *Living Review in Landscape Research*, 1 (3), 2007.

World Bank, *World Development Report 2008: Agriculture for Development*, Washington (D. C.), World Bank, 2007.

World Bank, *Tunisia: Agricultural Policy Review*, Washington (D. C.), World Bank, 2006.

National studies

Abdelhakim (T.), National Study - Egypt, Plan Bleu-Ciheam, May 2008.

Ahouate (L.) and Tamehmachet (Z.), National Study - Morocco, Plan Bleu-Ciheam, May 2008.

Ceña (F.) and Gallardo (R.), National Study - Spain, Plan Bleu-Ciheam, May 2008.

Civici (A.), National Study - Albania, Plan Bleu-Ciheam, May 2008.

Elci (A.), National Study - Turkey, Plan Bleu-Ciheam, May 2008.

Goussios (D.) (coord.), National Study - Greece, Plan Bleu-Ciheam, May 2008.

Hassainya (J.), National Study - Tunisia, Plan Bleu-Ciheam, May 2008.

Le Goff (A.) and Seiler (A.), National Study - France, Plan Bleu-Ciheam, May 2008.

Mantino (F.), National Study - Italy, Plan Bleu-Ciheam, May 2008.

Moulai (A.), National Study - Algeria, Plan Bleu-Ciheam, May 2008.



CHAPTER 10

MEASURING AGRICULTURAL AND RURAL DEVELOPMENT

Florence Pintus (Blue Plan) and Jean-Pierre Giraud (Blue Plan)

Reflection on sustainable development indicators in the Mediterranean region is evolving in line with the world trend, and efforts to define and select indicators for monitoring national policies and strategies are now the order of the day. The Mediterranean Strategy for Sustainable Development was devised and adopted by the Contracting Parties to the Barcelona Convention at their 14th session in Portoroz in 2005. Thirty-four priority indicators for Strategy follow-up were appended to the Strategy; the international definitions established or proposed must be taken into account in their documentation. Four of those indicators refer to agriculture and rural development.

Additional indicators, particularly those proposed in the present chapter, have been devised as a basis for monitoring the trends in progress towards the Mediterranean Strategy objectives more closely. They have been based on work carried out at the international level on sustainable rural development indicators, in particular that of the FAO, the United Nations Environment Programme, the OECD, the European Environment Agency and Eurostat, and they draw on a large number of variables that are sometimes available from other international or national institutions subject to adaptation in certain cases. The national level is used primarily in these indicators in order to allow cross-country analysis.

Only the indicators documented within the framework of the present publication are defined in this chapter. Time series are presented in this chapter, and sparser data are spread over other chapters. For the full list of indicators and for further methodological details on calculations, precautions for use, the sources of international data or justification of the choice of indicators readers should consult the indicator fact sheets at: www.planbleu.org/themes/rural_progr_travail2006_08.html for rural indicators and www.planbleu.org/methodologie/indicateursSmdd.html for all indicators.

This chapter begins by relating each of these indicators to the objectives of the Mediterranean Strategy and then gives definitions of the indicators so that readers can understand the time series that follow. It ends with a critical reflection on the methods used for calculating and interpreting these indicators.

Table 1 - List of rural indicators of the Mediterranean Strategy for Sustainable Development

Strategic objectives	Indicators	
To diversify the rural economy by developing non-agricultural activities	AGR_P01	Ratio of the farm population to the rural population
	AGR_C01	Share of agricultural employment in rural areas
	AGR_C02	Number of non-farming enterprises in rural areas
To combat desertification and the loss of productive land	AGR_P02	Loss of arable land
	AGR_C03	Rangeland stocking rate
	AGR_C04	Foliar index for wooded lands
To promote agricultural development schemes and sustainable rural development programmes in marginalised rural areas; to strengthen social and regional cohesion	AGR_P03	Share of the public budget allocated to sustainable rural development programmes
To promote Mediterranean diversity and quality and increase the value added through development, recognition and marketing	AGR_P04	Proportion of quality agricultural products
		Share of farmland used for organic farming
	AGR_C05	Number of labelled/certified products
	AGR_C06	Existence of a legal framework for quality products
	AGR_C07	Share of processed products in agricultural exports
	AGR_C08	Number of organic producers
	AGR_C09	Number of applications submitted for the recognition of quality products
To promote productive and rational farming	AGR_C10	Ratio of fertiliser quantity to GAP
	AGR_C11	Ratio of pesticide quantity to GAP
	AGR_C12	Ratio of mechanical power to GAP
	AGR_C13	Ratio of the volume of water consumed to GAP
To reduce rural poverty and the social gap between the rural and the urban population	AGR_C14	Share of family income allocated to food consumption
	AGR_C15	Percentage of farms with an acreage of less than 10 ha
	AGR_C16	Share of paid agricultural labour

Table 1 - (contd.)

Strategic objectives		Indicators
To protect biodiversity and landscapes	AGR_C17	Percentage of protected areas
	AGR_C18	Existence of an inventory of indigenous genetic plant and animal resources
	AGR_C19	Afforestation rate (wooded lands)
To strengthen the governance of local communities and the role played by women	AGR_C20	Number of women's groups (associations, cooperatives, etc.)
	AGR_C21	Local levies and transfers not allocated from the State budget to local communities
	AGR_C22	Local government elections

Note: The priority indicators are marked in boldface.

Definitions

Ratio of the farm population to the rural population (AGR_P01)

This indicator measures the share of the farm population in the rural population. It is expressed in percentage (%). The objective is to diversify the rural economy by creating non-agricultural jobs and thus to bring about a decrease in the indicator.

The farm population is defined as all of the persons who depend on agriculture, hunting, fishing and forestry. Since this estimate covers everyone who is actively employed in these fields as well as their dependants, part of the farm population can be urban.

Urban areas, and thus the populations living there, are generally defined, and the remaining areas are considered to be rural. In concrete terms, the criteria for distinguishing between urban and rural areas vary from one country to another, but they can be classed in three main groups: localities of a certain size are classed as urban, the administrative centres of minor civil divisions are classed as urban, and minor civil divisions are classed according to a given criterion, which can comprise the type of local administration, the number of inhabitants or the share of the working population in agriculture.

Share of agricultural employment in rural areas (AGR_C01)

This indicator measures the entire working farm population in rural areas as part of the economically active population in rural areas. It is expressed in percentage (%).

There is no international definition of rural areas. The differences concern the characterisation of rurality (cultural, economic and geographical dimensions, etc.), the definitions adapted to national policies, and the levels at which the relevant data are collected. The OECD methodology for defining rural areas is the one most commonly used and the only one that is internationally accepted. It is based on population density. Municipalities are considered rural if their population density is lower than 150 inhabitants per km². Urban areas, and thus the populations living there, are generally defined, and the remaining areas are considered to be rural.

The working farm population (agricultural labour force) comprises all persons who have an economic activity or who are seeking employment in agriculture, hunting, fisheries or forestry. Seasonal labour and part-time labour are included in this definition as wage earners who work on diversification activities on the farm (multifunctionality): rural tourism, on-farm processing and direct sales, and various other activities. A farm worker can also appear in statistics as a non-farm worker in another or in several other sectors due to the widespread practice in certain countries of engaging in several different activities.

Number of non-farming enterprises in rural areas (AGR_C02)

This indicator measures the number of enterprises, companies and declared craftspeople whose registered offices are situated in rural areas and whose branch of activity does not belong either to agriculture or to forestry or fisheries, expressed in relation to the total number of enterprises in rural areas. It is expressed in absolute figures and as a percentage (%). The Mediterranean Strategy for Sustainable Development recommends that special attention be devoted to diversifying economic activities in rural areas by promoting rural tourism, clean industry, the agro-food industry and the services.

Farmers who engage in several different activities come under the definition of this indicator whenever their activity or activities are off-farm activities. The European statistics on the income of agricultural households are sufficiently detailed to measure the impact of this form of diversification on farm viability.

Loss of arable land (AGR_P02)

This indicator measures the trend in the area of arable land according to the types of pressure prevailing or land use: desertification, erosion, salinisation, artificialisation, deforestation, cessation, etc. It is expressed in hectares. The objective is to reduce the area of farmland lost to erosion, salinisation, desertification, urbanisation or other forms of cessation by at least one-third by 2015.

“Arable land” is land under temporary crops (acreages harvested twice being counted only once), temporary grassland for cutting or grazing, market gardens or vegetable gardens (including greenhouse crops), and temporary fallow land (less than five years). Land that has been abandoned following shifting cultivation is not counted (FAO).

Rangeland stocking rate (AGR_C03)

This indicator measures the number of animal units per unit of acreage of summer and winter pastures per year. It is expressed in animal units per hectare of farmland. Although,

for the reasons explained in Chapter 7, this indicator is not necessarily suited to contemporary issues in the arid and semi-arid Mediterranean regions, it is generally considered that there is an optimal stocking rate for pastureland,¹ which is determined according to pasture management objectives; it provides a basis for preserving rangelands while achieving maximum profits. It is applied to all types of animal husbandry from purely commercial systems to systems focusing exclusively on subsistence (FAO). Rangelands are composed of all uncultivated land, including forestland which produces sufficient forage for livestock grazing (FAO). The definition of rangelands comprises permanent and temporary pastureland. Since these parameters vary considerably from one country to another (ranging from semi-arid zones to land devoted to herbaceous fodder crops), the definition used in a given country will have to be specified.

Proportion of quality agricultural products and the share of farmland used for organic farming (AGR_P04)

This indicator measures: 1) the share of quality agricultural products (identification, labels and designation of origin, local products, organic farming) produced in each Mediterranean country; 2) the share of farmland used for organic farming. It is expressed in percentage (%).

Products that are certified as organically produced are products that are stocked, processed, managed and marketed in accordance with specific technical specifications (standards) and guaranteed to be “organic” by approved control bodies.

Organic farming is a system of holistic management of production, which promotes the health of the agro-system, including biodiversity, biological cycles and biological soil activity. It lays emphasis on management practices rather than on external production methods and takes account of the fact that local systems must adapt to regional conditions.

Number of labelled/certified products (AGR_C05)

This indicator measures the number of agriculturally produced products on the national scale (including forestry products and agro-foodstuffs) which are labelled or certified, which have been awarded a quality mark by a competent control body, or for which an application for labelling or certification has been submitted.

The Mediterranean Strategy for Sustainable Development encourages the development of high-quality Mediterranean products in conjunction with the liberalisation of trade, in particular typical agricultural products such as wine, olive oil, vegetables, fruit, flowers, durum wheat and animal products. It recommends that a regional and national environment be created that is conducive to labelling, quality marks, the certification of foodstuffs and the promotion of the Mediterranean diet.

Apart from the ‘organic farming’ label and the European marks – PDO (Protected Designation of Origin), PGI (Protected Geographical Indication) and TSG (Traditional Specialties Guaranteed), which have official national or Community logos – the international identification marks, not to speak of the Mediterranean identification marks, do not have common specifications or any common mark on which there is agreement.

¹ - With the exception of non-equilibrium areas, where this is a controversial issue.

Labelled/certified products must contain a reference to specifications and/or a legislative framework. The body with which statements of commitment to a quality mark are registered, the approved certifying body issuing the quality mark, and the designated control structures must be identifiable.

These European quality systems are open to third countries and, since 31 March 2006, PDO and PGI registration applications submitted by producers in those countries can be filed with the European Commission direct. It will be possible for products that have been labelled in another framework to be classified, depending on whether they have quality and origin identification marks (PDO, etc.), status-enhancing acknowledgements (i.e. specific words such as “mountain”, “farm-produced”, etc.), or conformity certification.

The farm price statistics system can be used to make a distinction between organic products and traditional products.

Existence of a legal framework for quality products (AGR_C06)

This indicator measures whether legislation has been introduced to promote the quality of agricultural commodities and agro-foodstuffs; this legislation can apply at very different levels depending on the nature of the issues that arise and their order of priority. It is a boolean indicator (Yes/No). The objective is to encourage the Mediterranean countries to establish a national and even sub-regional policy on agricultural product quality as well as a legislative framework for protecting and developing agro-foodstuffs. Where Mediterranean products have been awarded a European quality mark (PDO, PGI, TSG) this refers to Community legislation (cf. definition under AGR_C05).

Number of organic producers (AGR_C08)

This indicator measures the number of farmers in the country as a whole who run farms according to a certified organic farming system or who are about to convert their farms to such a system (OECD). This number is divided by the total number of farms in the country to give the percentage.

A producer is an individual or corporate body who or which operates a farm. Any farm (or enterprise) which has been registered with an approved control body as an organic farm is deemed to be an “organic operator”. There is no minimum acreage requirement for a farmer. Organic products are produced, packaged and labelled on the farm. Since there is as yet no strict international definition of organic farming – although this is currently changing within the International Federation of Organic Agriculture Movements (IFOAM) – definitions and standards can vary from one country to another. The IFOAM has, however, issued guidelines on trade in organically farmed products for certification bodies throughout the world so that they can define their own standards and take account of local conditions. It even set up a regional group in 1997 known as the AgriBioMediterraneo, which federates Mediterranean countries and provides a platform for addressing the issues specific to Mediterranean crops.

Ratio of fertiliser quantity to GAP (AGR_C10)

This indicator is calculated as the total quantity of nitrogenous, phosphatic and potassic fertilisers sold in the country divided by the gross agricultural product (GAP) in one year. It is expressed in tonnes per unit of dollars.

The estimates of the total use of fertilisers are obtained by totalling the quantities of nitrogenous, phosphatic and potassic fertilisers, expressed as plant nutrients (N, P₂O₅ and K₂O respectively). The use of fertilisers is calculated on the basis of the farm year (July to June) (FAOSTAT). The data on mineral fertiliser sales are available from the main manufacturers and from several member countries (TAPAS programme).

The gross domestic product (GDP) measures the total output of final goods and services produced throughout the country, irrespective of the distribution of domestic and foreign demand. GDP at cost price is equal to the sum of the gross values added by all resident and non-resident producers plus taxes and minus subsidies, which are not included in the value of the products. No deduction is made in its calculation for the depreciation of the goods manufactured or of the degradation or depletion of natural resources. The gross agricultural product (GAP) is equivalent to the net sectoral output (animal husbandry, forestry, hunting and fisheries) after adding all intermediate outputs and subtracting intermediate inputs. No deduction is made in its calculation for the depreciation of the goods manufactured or of the degradation or depletion of natural resources. The origin of the value added is determined according to the International Standard Industrial Classification of All Economic Activities – ISIC (3rd revised edition). The data are expressed in current dollars (FAOSTAT).

Ratio of pesticide quantity to GAP (AGR_C11)

This indicator is calculated as the total quantity of pesticides (classed according to their intrinsic characteristics such as toxicity to non-target organisms, long-term effects, etc.), if possible sold (or, failing this, consumed) in the country, divided by GAP over one year. It is expressed in tonnes per unit of dollars.

The data on the use of the various pesticides are available from the main manufacturers and from several member countries (TAPAS programme). This indicator comes close to an indicator of the cost-effectiveness of using pesticides. It must be interpreted with caution since its value can be the result of a rational choice of practices, changes in market rates or the low purchasing power of population groups. Cross-country comparison of trends should be limited, since climatic conditions (particularly humidity rates) determine to a certain extent the composition of pesticides and the degree to which they are used.

Ratio of mechanical power to GAP (AGR_C12)

This indicator is calculated as the total horsepower of agricultural tractors operating in the country divided by GAP over one year. The unit is the total power (Hp) per unit of dollars (1 Hp = 0.746 kW). The term “agricultural tractors” is generally understood to mean tyred or tracked tractors (with the exclusion of walking tractors) used in agriculture (FAOSTAT) (cf. definition AGR_C10).

Ratio of the volume of water consumed to GAP/AGR_C13)

This indicator is calculated as the total quantities of water used in agriculture for irrigation purposes divided by GAP over one year (if possible the GAP of irrigated crops). It is expressed in m³ per unit of dollars.

Water used for irrigation purposes is water used artificially in the soil in order to facilitate crop and pasture growth (OECD/Eurostat Joint Questionnaire). Where there is no irrigation water, the figures for water for agriculture should be used, and this should be stated (irrigation accounts for over 80% of the total volume of water used by agriculture in the case of most Mediterranean countries – OECD). The water used for irrigating public and private gardens and parks is not included. Water losses due to leakage (by evaporation or seepage) in the course of transport between the abstraction point and the place where it is used are not included in the calculation either (cf. definition AGR_C10).

Percentage of farms with an acreage of less than 10 ha (AGR_C15)

This indicator measures total farm acreage, which comprises the agricultural area in use (arable land, domestic gardens, permanent grassland and pastures, permanent crops), used by the farm plus the other areas.

The agricultural area in use on a farm comprises the acreage under the main crop to be harvested in the year of the survey (Eurostat).

An increase in the proportion of small farms in the total number of farms can also be an indication of the growing concentration of production on a relatively small number of large farms and partially reflects the expansion of employment in sectors other than agriculture. It would be of interest to determine the acreage threshold below which a farm is no longer viable.

Share of paid agricultural labour (AGR_C16)

This indicator is calculated as the total number of agricultural wage earners divided by the total number of farmers on farms located in rural areas. It is expressed as a percentage (%).

The term “paid agricultural labour” is understood to mean persons who work under contract for a resident unit engaging in typical activities of the agricultural sector (agricultural activities and non-separable non-agricultural secondary activities) and who in return receive remuneration in cash or in kind. In this context, part of the undeclared labour force can be considered to be paid labour. This classification differs from the classification based on family bonds with the farmer (family labour force and non-family labour force). Persons who are still under the school leaving age are not included (Eurostat). A farm manager is the individual responsible for the day-to-day management of a farm. In the case of a corporate farm, where several persons can perform that function, the person assuming the largest share of responsibility is selected and the others are defined as assistant managers (INSEE - French National Institute of Statistics and Economic Studies). The volume of agricultural work must be expressed in full-time equivalent.

There is no list of the types of farm in the Mediterranean region that are corporate farms. The commonest form is single proprietorship and the other forms can be assimilated to a classical or specific corporate body (collective farming grouping, limited liability agricultural holding, etc.). For this indicator no distinction is made between owner-occupier, farmer, share-cropper, etc. (Eurostat).

This indicator does not specify any acreage or output threshold for the farm and thus does not reflect in any way the heterogeneity of income levels or of the rate of employment of paid workers (full-time, part-time, seasonal, etc.) depending on whether the farms are large or small. Nor does it provide any information on the level of insecurity of agricultural workers. It would be of interest to make a distinction between the permanent wage earners and the others.

Percentage of protected areas (AGR_C17)

This indicator measures the percentage of the total (terrestrial and territorial sea) area of a country dedicated specifically to the protection or conservation of the biodiversity and the natural and cultural resources associated with it and to their management, irrespective of the means of action or legal or other instrument employed. The level of protection varies from total to partial (according to the World Conservation Union – IUCN).

According to the Mediterranean Strategy for Sustainable Development, 10% of the Mediterranean terrestrial ecosystems should be given protected area status by 2010. Action to create biosphere reserves and regional and national parks is particularly encouraged in disadvantaged rural areas. More generally, the Strategy recommends that the Convention on Biological Diversity be implemented. The European Strategy for Sustainable Development sets 2010 as the deadline for ending the loss of biodiversity in the EU Member States and for substantially reducing it in the other Mediterranean countries. Special attention is devoted to the fragmentation of habitats.

These areas can be classed by the IUCN, the Natura 2000 network, the Habitat Directorate or any system of national classification which, preferably, corresponds with the principal classification systems used at the international level. The areas included are forestry and agricultural areas that are subject to regulations or restrictions of use and of practices for environmental reasons. Areas that are protected under local or provincial legislation are not included. The degree of protection and the efficiency of management as well as the relevant trends are more difficult to assess, since protected zones evolve over time.

Existence of an inventory of indigenous genetic plant and animal resources (AGR_C18)

This indicator measures the existence of a form of inventory (list, catalogue, compendium, directory, etc.) of the total number of plant varieties cultivated and animal species bred. It is a boolean indicator (Yes/No). The purpose is to reduce the risks of genetic erosion, since any loss is generally irreversible. The Mediterranean Strategy encourages the use of local agricultural varieties and of know-how that is adapted to specific environments, ecosystems and production systems.

Not all of the plant varieties cultivated and livestock species bred are registered and certified for production. This indicator can be accompanied by information on the share cultivated for non-commercial purposes, the share that is certified for marketing, the share that is endangered, and the risk of irreparable loss of part of the existing reserve of genetic resources. The type of inventory will be stated as well as how frequently it is updated, the date on which it was last updated and whether it is considered to be exhaustive or incomplete. In the countries of the European Union, specific information will have to be collected in addition to the information available in the common catalogue of varieties of agricultural plant species.

This indicator must be interpreted with caution, since the number of varieties is not necessarily representative of genetic diversity. Productivity levels should not serve exclusively to characterise a breed; aspects such as resistance to cold or drought, nutritive values, and taste should also be considered. In the case of livestock, it is important to describe the genetic diversity amongst livestock breeds and within breeds.

Afforestation rate (wooded lands) (AGR_C19)

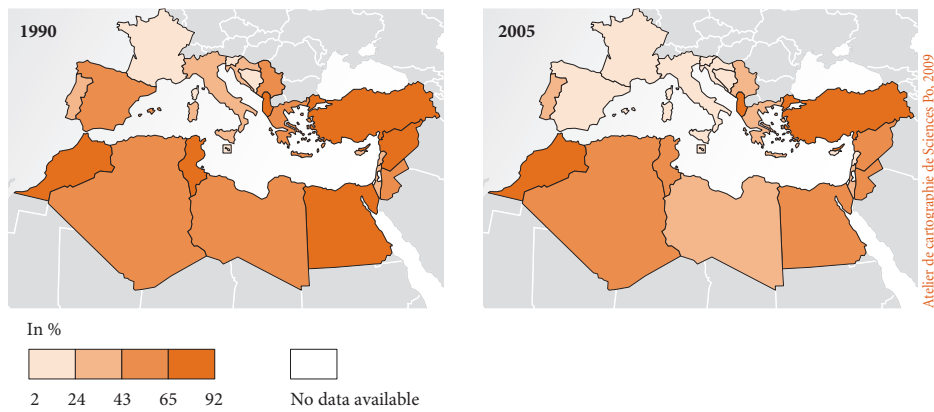
This indicator measures the areas of forest and other woodlands as a percentage of the total land area of the country (with the exception of areas covered by internal waters).

Wooded lands are composed of forests and other woodland. The term “forest” comprises natural forests and forest plantations, mainly those planted for production, conservation or protection purposes, windbreaks and hedges. It excludes forest stock intended for agricultural production. It designates land with over 10% of tree crown cover and occupying an area of more than 0.5 ha. The trees must be able to grow to a height of at least 5 metres. Temporarily unstocked areas are included. Forests are determined both by the presence of trees and the absence of other uses of the land. Woodland is defined as land with a cover of 5% to 10% of trees that are capable of growing to a height of at least 5 m at maturity, or with a cover of over 10% of trees that cannot grow to a height of 5 m at maturity, or with a cover of more than 10% of shrubs or bushes. The full definitions given by the FAO should be consulted.

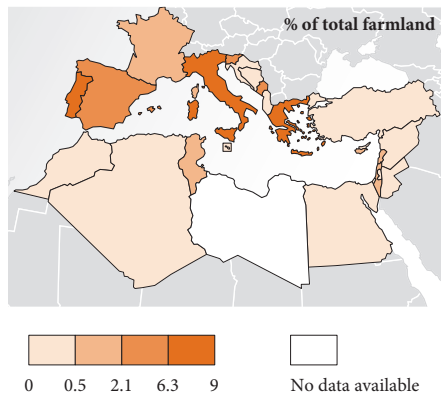
The interpretation of time series is still tricky in that the definitions, methods and data deriving from them differ widely from one country to another. The variations in forest areas over time should thus be documented. In order to adopt a more dynamic approach a distinction will have to be made between the proportion of forest area concerned in re-afforestation measures each year, the area concerned in natural forest extension, and the proportion lost to anthropic or natural deforestation.

Some results

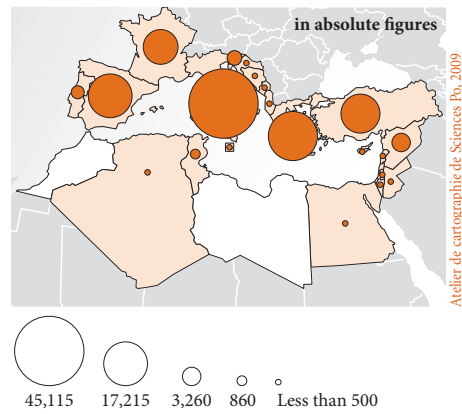
Map 1 - Ratio of the agricultural population to the rural population, 1990 and 2005



Map 2 - Farmland used for organic farming, 2006

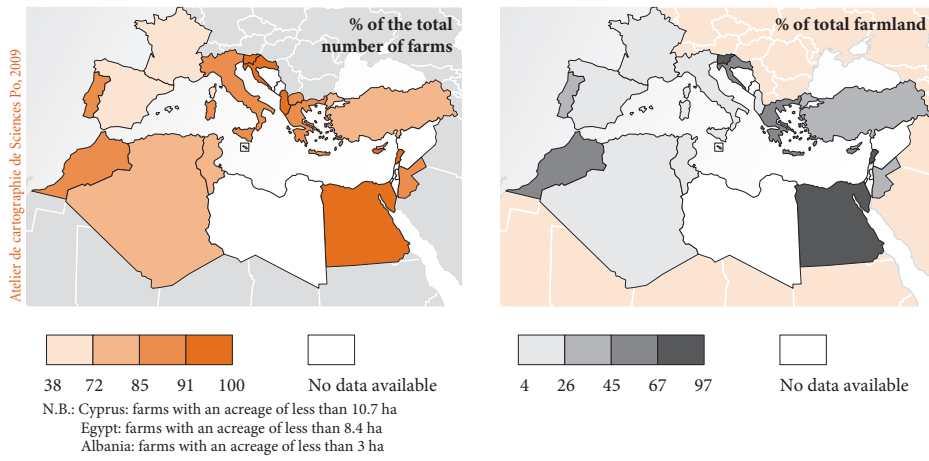


Map 3 - Organic producers, 2006



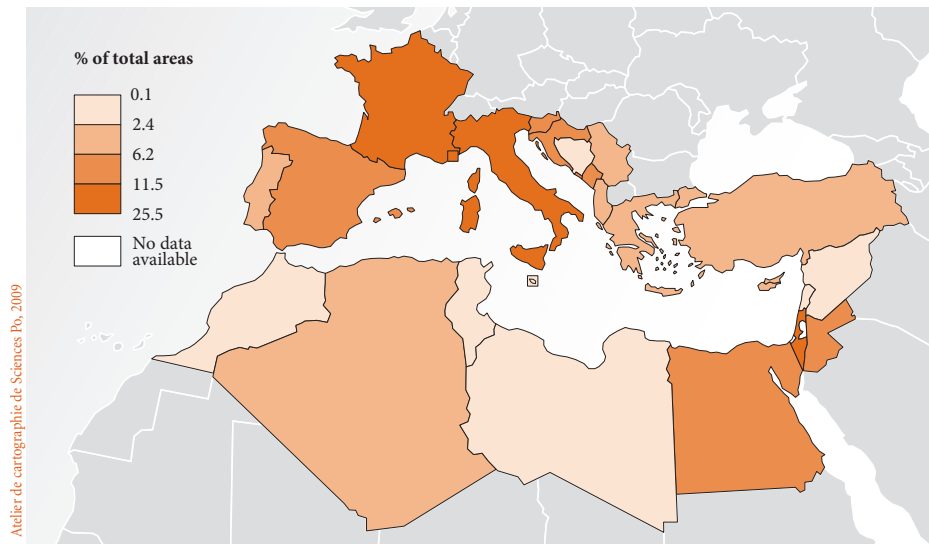
Sources: Helga Willer and Minou Yussefi (eds), *The World of Organic Agriculture. Statistics and Emerging Trends*, Bonn, Ifoam, 2006 (www.ifoam.org).

Map 4 - Percentage of farms with an acreage of less than 10 ha



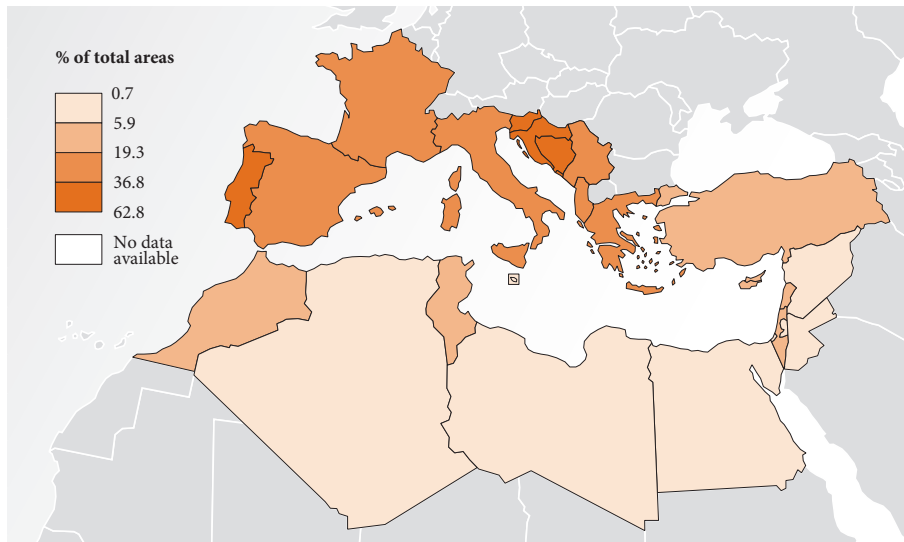
Sources: Faostat, FAO Statistics Division, 2008.

Map 5 - Protected areas



Sources: UNEP-World Conservation Monitoring Centre (UNEP-WCMC) and the IUCN World Commission on Protected Areas (IUCN WCPA).

Map 6 - Afforestation rate, 2005



Source: Faostat.

Chart 1 - Net loss of arable land, 1980-2005

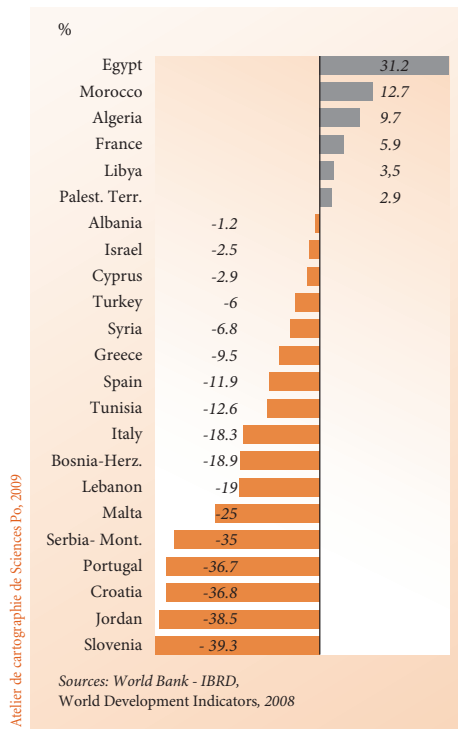


Chart 2 - Fertiliser quantities, 1980-2005

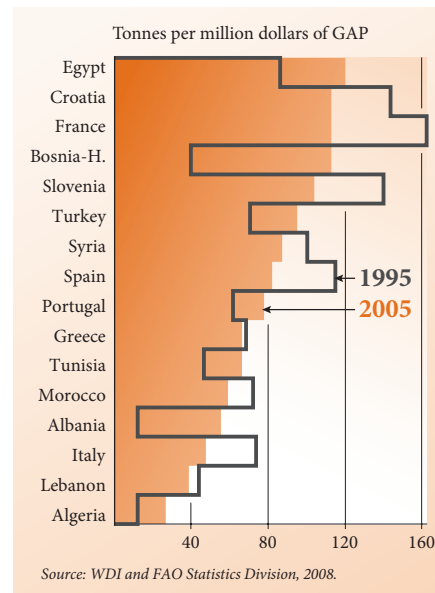


Chart 3 - Pesticide quantities, 1990-2001

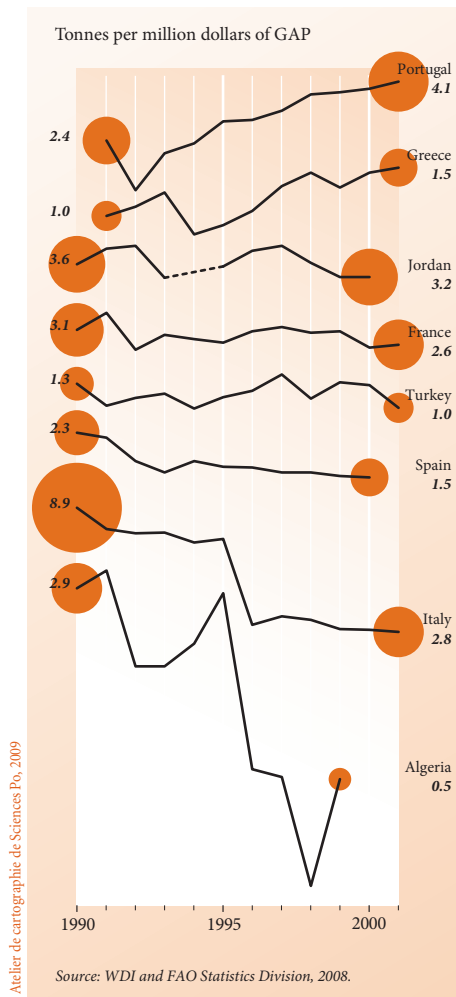


Chart 4 - Number of tractors per arable acreage, 1994-2003

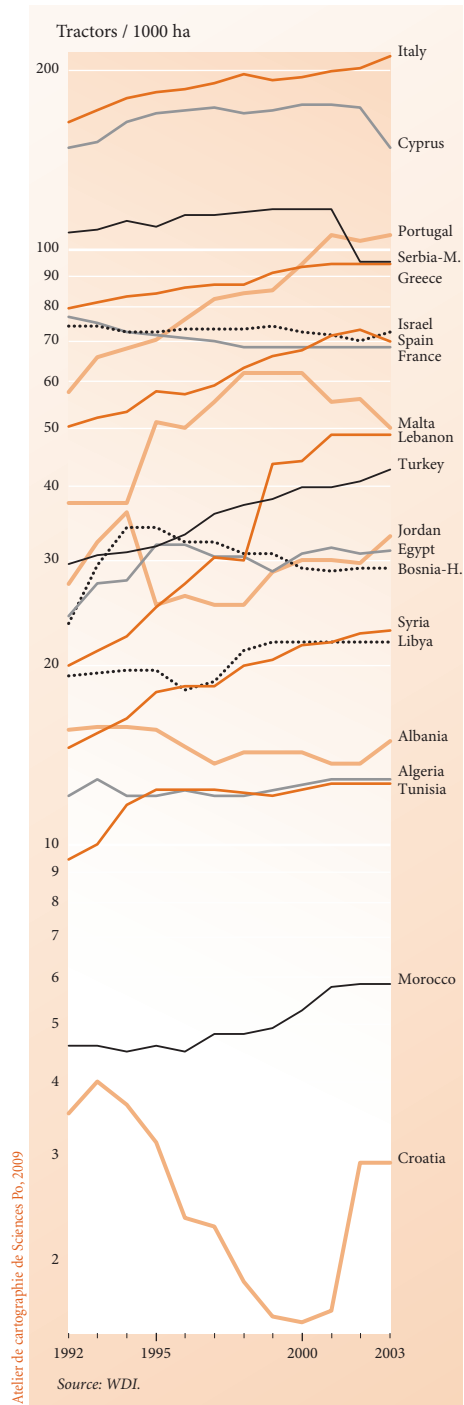
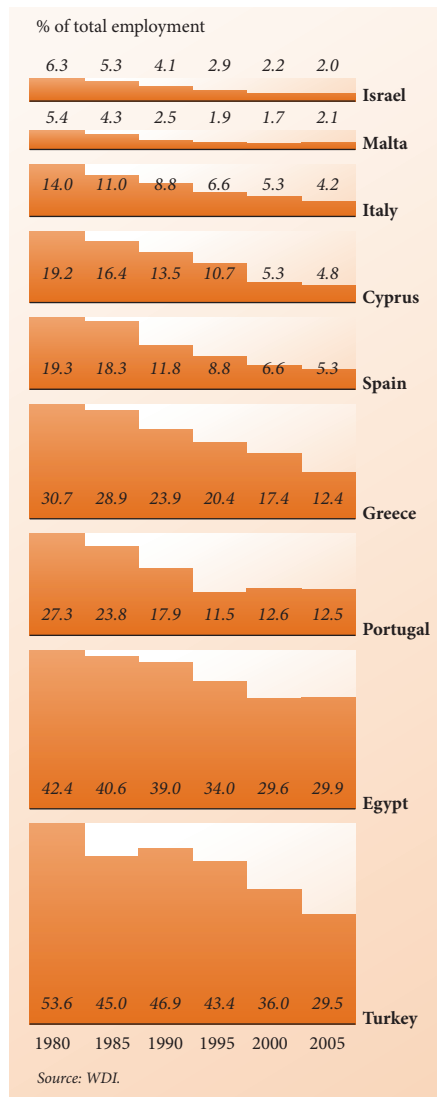


Chart 5 - Share of paid agricultural labour, 1980-2005



Reservations regarding calculation and interpretation

On the basis of the country studies conducted within the framework of the Ciheam/Blue Plan partnership for the follow-up to the Mediterranean Strategy, the indicators proposed for agricultural and rural development can be classed in three categories according to data availability:

- an indicator that is easy to calculate (the data are absolutely available but sometimes rather out of date);
- an indicator which can be calculated but which requires that the data be centralised and/or which refers only to partial information (geographic coverage and/or time coverage);
- an indicator involving major calculation and reliability difficulties (data not available or extremely scattered).

Many different problems arise in the calculation of indicators:

- compatibility of the definitions of variables included in the calculation of indicators. This problem arises in particular when it comes to defining rural areas, depending on whether the FAO or OECD definition or the definition of a national statistical institute is used, but it also occurs with the definition of forests or protected areas. When definitions differ, the series of data do not allow cross-country comparison of the trends observed.
- data obsolescence. This can be due to the date of the survey from which the variable has been extracted. Agricultural censuses are generally conducted every 10 years. And this is also often the case with biodiversity surveys due to the ponderous apparatus required.
- reliability of data – even official data. The reasons for unreliability can be strategic (water resource in the Middle East) or they may be due to a change in nomenclature, calculation or reporting errors, errors in the units used, etc.;
- dispersion of data and absence of centralised data for certain variables that are essential for calculating the indicators. This is the case with the loss of arable land to desertification, since the indicator generally can only allow evaluation of the decrease in arable acreage, irrespective of the causes;
- incoherence of data depending on the sources used. The poverty rate in Egypt varies, for example, in the same year from 16% according to the national sources to 24% in the Human Development Report. The latter two comments are particularly true in the case of environmental data, the production of these statistics being relatively recent.

Selecting the indicators to be reported in the context of national surveys for monitoring the implementation of the Mediterranean Strategy is the first stage in the construction of a common set of essential indicators at the Mediterranean level. But the exercise reaches its limits when it comes to intercomparing the results obtained from contexts as heterogeneous as those in the northern, southern and eastern Mediterranean countries or the EU Member States and non-Member States.

Some indicators designed for developed countries prove unsuitable for developing countries either because the statistical information on the rural environment, the economic data or data on poverty are still lacking, or because the time it takes for concepts

and values to be adopted differs from one country to another – this is particularly the case with the concept of governance. There is thus little point in making comparisons.

Although global statistics have the merit of providing material for regional analyses and projections, they are nevertheless as a whole inadequate for describing the dynamics of specific regions, which often diverge widely. If the relevance of the indicators on which national policies have to be based is to be improved, one of the pitfalls to be avoided is that of only taking account of indicators that are aggregated at the national level, since this masks imbalances that are developing between regions where quality of life has meaning and regions which are stagnating or regressing and where the expectations of the people who live there concern basic infrastructures and decent living conditions. The Tunisian Environment and Sustainable Development Observatory, for instance, uses its own set of regional indicators on the improvement of living conditions.

In order to reflect differential trends in the various types of farms towards productive and rational farming, for example, and, even more so, any contribution they may be making to sustainable development, there must be reliable reporting on how production inputs are being used, how farming activities are being organised, and how products are being used, as well as on the real capacities of farms for developing and adapting; that is to say, the analysis framework must be complemented and refined. This shift from one level to another is an accompaniment to the re-orientation of rural policies towards the more extensive regionalisation discussed in Chapter 5. Given the emphasis on the fact that policies and activities are integrated, relevant new indicators must be selected in order to support national policy on sustainable development and provide a more appropriate basis for follow-up.

The relevance issue is crucial, for it is also a question of dynamics. The system for producing the information on which policies for governing are based is sometimes so static that the result or the very choice of indicator is invalidated by structural or economic trends. Sustainable development must be continuously validated and confirmed. Complacency, which can stem from a certain “culture of excellence”, must be avoided in the assessments that are made, for outlooks are based on hypotheses and trend scenarios – hypotheses, not certainties.

It transpires in conclusion that the current monitoring setup does not allow the Mediterranean and national strategies for sustainable development to be adapted to the evolving needs of rural environments. Several proposals have been put forward or suggested in the country reports to illustrate the above factors from the angle of the prevailing national issues or from the analytical point of view. The creation of a “commitment arena” could support the implementation of the Mediterranean Strategy for Sustainable Development, and a set of indicators could provide a basis for estimating the means used by the various States to promote environmental sustainability, such as measures to integrate the principles of sustainable development into sectoral policies, the inclusion of socio-economic considerations in decision-making processes, the existence of cooperation and technical support, means developed with a view to supporting the Mediterranean Strategy, etc. A further possibility would be to construct two sets of indicators: one set based on State indicators characterising rural areas in the Mediterranean region (definitions, quantification, etc.), income levels, employment, and so on, and the

other set connected with the categories of instruments for implementing policies such as indicators for the structural modernisation of agriculture and the agro-food industry and indicators for improving environmental management. This category should place emphasis on the trends in the specific components of rural areas.

Several country studies have proposed indicators as a compliment to the above list or for replacing it with a view to continuing reflexion on how indicators can be used as tools for steering national and regional policies. The full list can be found in the studies themselves.

The list is as follows in the case of the national strategy in Spain:

- trends in land use (agricultural land, forestland and other land);
- the results of water saving policies and policies to combat erosion;
- trends in the consumption of organically produced and quality products;
- trends in the agricultural area allocated to energy uses;
- the sectoral distribution of the working population in rural areas;
- access for the rural population to new technologies;
- reduction of the gap between urban and rural incomes;
- the budget which the various government authorities allocate on a coordinated basis to measures to encourage sustainability;
- the involvement of the local population in sustainable development measures.

In the case of Tunisia:

- economic evaluation of the cost of the degradation of natural resources and the environment, construction of relevant indicators per country according to the data and statistics available (survey currently being launched in Tunisia);
- the strategy for promoting organic farming, including processing;
- eco-tourism in the Mediterranean countries (Mediterranean tours) with a view to diversifying the supply of tourism products and developing the specific features of natural and human landscapes.

In the case of Egypt:

- water quality;
- existence of networks of waste reception facilities;
- existence of recycling plants;
- occupational status of the various groups constituting the working farm population;

Measuring agricultural and rural development

351

- training for the working farm population (training projects and sessions).

In the case of Algeria:

- organisation and structuring of the agricultural commodity markets which are currently adversely affecting capital regeneration processes;
- organisation of marketing channels and integration of farms into international markets;
- concerted action amongst institutions at the region level.

In the case of Greece, a selection of integrated indicators from a regional project:

- the ratio of bottom-up projects to top-down projects;
- the share of investments coming from bottom-up projects in total investments;
- the trend in the number of projects run in geographical units comprising a small town;
- the number of rural “demes” which have drawn up an action plan;
- the number of bottom-up projects per action plan;
- the involvement or non-involvement of local associations and NGOs in integrated projects;
- the involvement or non-involvement of people from the local communities (diaspora associations, for example) in the running of the project;
- the share of local employment created by activities integrated into projects.



CHAPTER 11

EVALUATING THE EFFECT OF THE MSSD

Blue Plan

Plan Bleu, the regional activities centre of the Mediterranean Action Plan (MAP) was commissioned by the Contracting Parties to the Barcelona Convention to monitor the Mediterranean Strategy for Sustainable Development, adopted in November 2005, within which sustainable agricultural and rural development are a priority field of action. Against this background, in partnership with Ciheam, ten national studies were commissioned from national experts for academic circles, government and the private sector.¹ The experts were required to follow terms of reference concerning primarily the extent to which national rural and agricultural development policies paid heed to sustainability. The studies sought in particular:

- to present national agricultural and rural development policies, with emphasis on their sustainability;
- to evaluate wherever possible the cost of these policies;
- to highlight the economic and social benefits of incorporating environment in these policies;
- to prepare a case study of particular interest for the country;
- to list and refer as far as possible to examples of good practice or alternative practices;
- to include a reflection on future risks related to the trends and to make recommendations for consideration by decision-makers.

They were also asked to obtain and comment on the MSSD performance indicators in so far as they were available.

Reminder of the MSSD

Why a Mediterranean strategy?

At the twelfth meeting of the Contracting Parties to the Barcelona Convention (Monaco, November 2001), the twenty-one countries of the Mediterranean and the European

¹ - Reminder of the countries studied: Albania, Algeria, Egypt, Greece, France, Italy, Morocco, Spain, Tunisia, Turkey.

Community decided to prepare a “Mediterranean Sustainable Development Strategy” (MSSD) to coincide with the Earth Summit process.² The second Euro-Mediterranean Meeting of Environment Ministers (Athens, July 2002) approved this initiative. At the same time, the World Summit on Sustainable Development called for regional and national strategies, recognising that sustainable development could not be achieved in isolation and that international resolutions must be adapted to local circumstances and the conditions of the ecoregion.

The Mediterranean strategy is a framework strategy. It aims to adapt international undertakings to regional conditions, guide national sustainable development strategies and initiate a dynamic partnership between countries at different stages of development. It takes into account recent developments in regional cooperation, in particular the Mediterranean Action Plan, the Euro-Mediterranean Partnership (EMP), the Arab Initiative for Sustainable Development and the EU Sustainable Development Strategy (EU SSD). The latter directly concerns the Mediterranean member countries and those that are in line to become members. It also has an indirect impact on the EU’s Mediterranean neighbours, to the extent that it requires sustainable development to be a priority of all Community policies. The implementation of the Strategy, through the Euro-Mediterranean Partnership and the EU’s new neighbourhood policy, both centred on sustainable development, will help Mediterranean countries to fulfil their aspirations in perfect synergy.

Lastly, the areas of cooperation set out in the Final Declaration of the Union for the Mediterranean and the priority projects selected at the Paris Conference, among them the Horizon 2020 programme, whose objective is to de-pollute the Mediterranean, and the Mediterranean solar plan involving the development of alternative energy sources, should allow the countries bordering the Mediterranean to advance in step in implementing the MSSD.

Four major objectives and thematic actions

The Strategy identifies four key objectives which seek to promote progress in terms of sustainability in the economic, social and environmental fields and governance: to contribute to economic development by enhancing Mediterranean assets; to reduce social disparities by implementing the millennium development goals and strengthen cultural identities; to change unsustainable production and consumption patterns and ensure the sustainable management of natural resources; and to improve governance at local, national and regional level.

Seven independent priority fields of action were chosen because of the non-sustainable nature of the trends characteristic of them, their importance in the economic and social fields and their shortcomings in terms of governance and integration. They involve integrated management of water resources, energy, transport, tourism, agriculture and rural development, urban development and coasts and marine resources. In the field of agricultural and rural development, the priority fields of action are divided into four major categories which each set out a series of actions:

- liberalisation of trade and promotion of high quality Mediterranean products;

² - Plan Bleu, Mediterranean Sustainable Development Strategy, Athens, UNEP-MAP, June 2005.

- promotion of productive and rational agriculture;
- rural development and local governance;
- sustainable management of rural areas and the Mediterranean natural habitat.

Recommendations for the implementation of the MSSD by States

Implementation of the Strategy requires regional solidarity and commitment, the involvement of States through national strategies, local authorities, socio-economic stakeholders, associations and communities. It also requires new methods of governance which are essential to any progress towards sustainable development and joint monitoring at Mediterranean level.

Overall monitoring of progress towards sustainable development in the Mediterranean should highlight the major regional trends in terms of socio-economic disparities between the two shores, the economic weight of the Mediterranean in the world, poverty and unemployment, the region's contribution to global pollution, the impact of climate change, the cost of degradation of the environment and the capacity of States to take account of the needs of future generations. For this purpose, a set of 34 priority indicators has been prepared. As these indicators do not cover all the sub-themes of the MSSD, additional indicators have been adopted for each of the themes (cf. chapter 10).

Although regional and subregional approaches assume the pursuit of consistency, as defined in the common Strategy, national objectives will obviously need to be clarified or adapted to each national framework. The same goes for the choice of national sustainable development indicators, for although a common set of indicators is necessary, any comparison on this basis between the North, South and East Mediterranean countries, as between EU and non-EU, bearing in mind the variety of situations, would be a bold one.

Preliminary feedback of experience in agriculture and rural development

A facilitating framework in the North, but failure to exploit opportunities for regional cooperation

The MSSD on paper

It will be clear from the outset that the concept of rural development, as used in practice in the EU countries, does not correspond exactly to that used in the MSSD. The most recent European definition, on which projects financed by the EU are based, comprises four fundamental objectives: the competitiveness of the agriculture and forestry sectors, the rural environment and countryside, quality of rural life and diversification of the rural economy, governance and the mobilisation of the endogenous development potential of rural areas.

According to this definition, rural development does not necessarily mean development of the agricultural sector, but is based rather on relations between sectors taking into account the needs and resources of local populations. This is a philosophy that is in tune with the changes in the Common Agricultural Policy since the 1990s. This broader concept, moreover, converges with the various components of the MSSD, especially questions of promoting competitive and rational agriculture, governance and sustainable management of rural areas and natural resources.

Yet the chief problem encountered when writing national reports lies in the lack of any reference to the MSSD in national policies and strategies, especially the absence of systems for monitoring implementation of the MSSD. If its principles are put into effect, it is through the European sustainable development strategy and the international context,³ where more attention has been paid to the inclusion of sustainable development. This is especially true of Spain and Italy. In Greece, efforts to locate and collect information in the various ministries and institutions and NGOs involved have overcome the delays and limited resources allocated to the study. France and Albania, however, make no reference to taking a Mediterranean strategy into account.

Principal results

When the authors of the studies attempted to cross-check national progress against the MSSD guidelines, it emerged that the objective of quality agriculture with high added value is an absolute priority for the North Mediterranean countries. Not only does it involve restructuring production systems but also appropriate support for the organisation of producers, including access to markets and a legal framework favourable to small businesses. While real progress can be seen in the identification and promotion of products, all too often their access to national and international markets remains problematic.

Spain's concerns relating to the three international conventions are very specific among the North Mediterranean countries. Its national action programmes on desertification, irrigation and renewable energy are specific expressions of national policies, on top of a cross-cutting biodiversity approach in sustainable rural development programmes. Greece has had a national committee to combat desertification since 2000, and its land planning policy consists of protecting the most fertile agricultural land and discouraging the concentration of land, despite European trends. It is distinguished above all, however, by its efforts in subregional cooperation (the Plan for the Economic Reconstruction of the Balkans – ESOAB) and regional cooperation (presidency of the Euro-Mediterranean Assembly on the theme of climate change, the Barcelona Process), and its desire to establish itself as the regional leader.

In all the countries, European instruments (Leader, Pider, Proder, regional covenants, Interreg...)⁴ have recorded the best results in terms of governance, rural diversification and businesses, especially in rural tourism and craft industries, training and support

³ - Chiefly, the Rio Conference in 1992 and the signing of the three international conventions on climate, biodiversity and desertification, as well as the Lisbon Strategy 2000 on employment and competitiveness, the Gothenburg Declaration in 2001, etc.

⁴ - Interreg and Leader + are two of the programmes of European initiatives implemented in the framework of the structural funds. Pider, Integrated rural development programme, Proder and rural development programmes, PDR, are national names for rural development programmes.

for micro-enterprises in Italy, participation of women in local action groups (LAGs) and agricultural organisations in Spain and Greece and in rural entrepreneurship in Italy, or in industry proper and agro-industry in Greece. Most of all, these instruments are the sources of considerable creation of agricultural and non-agricultural employment and long-term stimulation of private investment in rural areas, in Italy, for example.

On the other hand, throughout Italy – except Tuscany – and in Greece, they fail to maintain services to rural communities beyond the period of subsidisation, and fail to have a significant impact on income levels. In Spain, they failed to bridge the rural/urban gap or increase participation of rural communities. Furthermore, projects are still implemented on a modest scale and go nowhere near covering the whole country. In the Mediterranean context, the chief reproach levelled at them is failure to encourage the integration of the South and Eastern countries, either because they are ineligible to participate or because those countries cannot receive European funding, even when they belong to partnerships. In Greece, as the majority of these initiatives stem from development agencies, the countries of the South are at a disadvantage when it comes to cooperation because they do not have such agencies. For example, the transnational pillar of the Leader programme was unable to involve the South Mediterranean countries because they do not have LAGs.

One of the major obstacles to the creation of such cooperation networks for the Mediterranean as a whole stems from the lack of associations and forums for participation representing and directly involving the local community in the South and Eastern countries. In the North, it is the lack of integration of development programmes which prevents any multiplier effects of investment at local level.

On Greece, the difficulties linked to the lack of synchronisation of regional and sectoral policies, i.e. between ministries and regions, is compounded by the inflexibility of political and institutional systems, which do not take into account the way in which family farming has responded to the inadequacies of agrarian institutions by informal cooperation and multiple activities. In such a context, the integration of family strategies must be a key objective.

In Spain, the Sustainable Rural Development Act of December 2007 is regionally oriented, its aim being precisely to achieve better integration of rural areas. In this context, integrated agricultural production is the result of extending the concept of integration to all aspects of agricultural business.⁵ The Spanish experience in this field, and the development or renewable energy (wind, solar) may be of interest to other Mediterranean countries.

The main conclusion which emerges from the analysis of Italy's twenty-one regional rural development plans is that public aid to agriculture is more cost-effective when it is targeted, in contrast to open invitations to tender or monolithic measures. While the integrated planning process certainly involves greater administrative costs, it allows aid to be allocated to reflect the actual situation. This makes the most of the synergies offered

5 - The Spanish renewable energy plan 2005-2010 aspires to satisfy at least 12% of total energy consumption by 2010, and 5.75% of consumption of biofuels for transport. Integrated production in 2005 concerned a total of 14,505 operators, of which 131 were integrated production groups covering 13,190 producers. The cultivated area under integrated production reached 299,472 hectares, and the system involved 69 recognised certification bodies.

by the different instruments, thanks to coordination with the local level and prior reflection on the most appropriate way of promoting innovation and achieving the best results.

As a rule, in the field of sustainable management of natural resources, the evaluation of agro-environmental measures and compensatory aid in disadvantaged areas shows, firstly, that they cease to be effective when they are calculated in the basis of averages and, secondly, that in both cases they give rise to over-payments and under-payments.⁶

In the South and East, the models of governance are the first obstacle to implementation

“Circumventing” strategies

If the term “sustainable development” is well integrated in political speeches, it is another matter at institutional level. Algeria and Morocco have national sustainable development strategies (NSSD). Morocco embarked on the process of drawing up an NSSD early in 2008 and has fifteen months to implement it.⁷ Turkey mentions a long-term development strategy (2001-2037) supplemented by short, medium and long-term sustainable development strategies (horizon 2015) for agriculture. Egypt’s policy, meanwhile, relies on sectoral policies. It is difficult to measure the real degree of influence of the MSSD on the directions of these various policies. Algeria, Morocco and Tunisia make explicit reference to it and also to Agenda 21. Conversely, Turkey by its choice of terminology, periods and target dates seems to wish to demonstrate its ability to decide its own critical indicators.

In their studies, the authors show that all the countries are engaged in the process of liberalisation, with the signing of tariff and free trade agreements in Morocco, the signing of association agreements with the EU in Turkey, the creation of a free trade zone with the EU in Tunisia, the progressive abolition of state control of agricultural production in Egypt. Under agreements with the EU, Turkey has made clear progress, especially in the implementation of good agricultural practices, and food health and security. However, the overall picture in rural areas is mixed. The emergence of large capitalist operations far removed from the family farming which largely dominates farming in all these countries, gives cause to fear “selective” regional policies and a rise in food dependency.

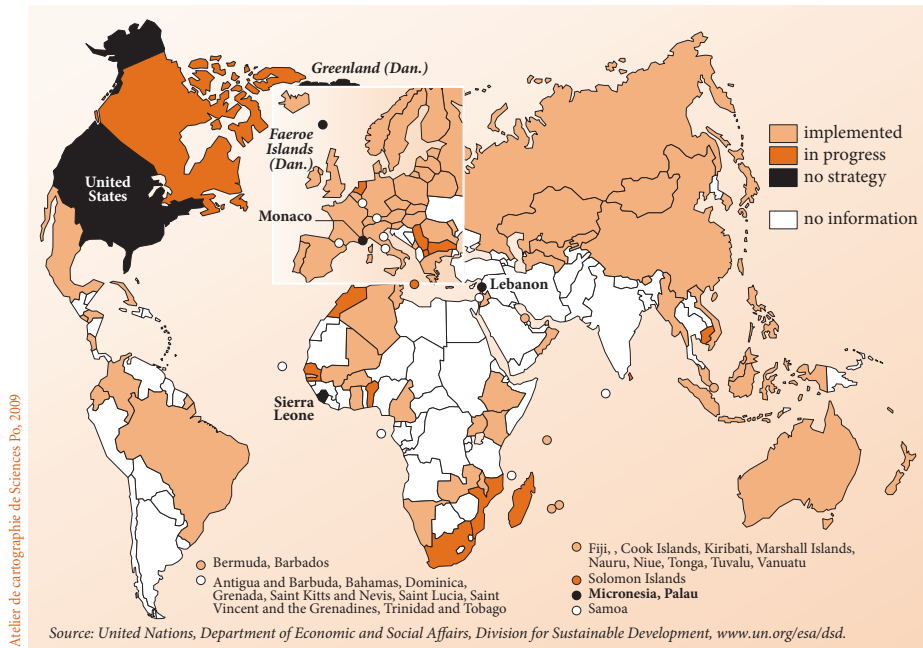
The obstacles to productive and rational agriculture are still many: deficit of active trade organisations which are genuinely representative of all agricultural producers, conditions of access to credit and lack of recognition of the professional status of small family farmers (Egypt, Turkey), fragmented supply (Tunisia), difficulties of marketing and market access (Tunisia, Algeria), breaking up of wholesale markets (Algeria), land legislation (Algeria, Morocco), general level of education in rural areas.

The Maghreb attaches great importance to the promotion and certification of products. Morocco and Tunisia have made significant progress in legislative terms (distinctive marks of origin in Morocco, biological agriculture and efforts in favour of the agro-food

6 - F. Mantino, *Agricultural and Rural Development: National Study of Italy*, 2008.

7 - Commission of the European Communities, *Implementation of the European Neighbourhood Policy, 2007. Progress Report, Morocco*, Commission working paper accompanying the Communication of the Commission to the Council and European Parliament, 3 April 2008, p. 9.

Map 1 - National sustainable development strategies



sector in Tunisia). It is only recently that international standards have introduced this subject into Egypt. Its link with the structure of production and public aid makes its implementation in practice long and complex. These four countries share the difficulties, indeed absence, of diversification, both on farms and in the rural environment, with the exception of a few specific experiences, despite repeated emphasis on the great potential for green tourism, especially as a source of employment. The absence of financial commitment by the State, weak institutions, the lack of autonomy granted to local authorities and the lack of involvement of communities are issues raised again and again.

Because the regional disparities in Turkey are closely linked to the agricultural nature of the economic structure of under-developed rural areas, Turkey very early on considered diversification of the rural environment as a priority. The five-year plans of the 1960s accelerated the provision of public services and infrastructure in rural areas with the aim of convergence with urban areas. This objective was not achieved. On the other hand, small and medium-sized agro-food enterprises in rural areas succeeded both in integrating with the industrial sector and meeting the challenges of employment and maintaining incomes in agriculture. Agro-industry and local agriculture are both maintaining their growth. The redistribution of wealth that this dynamic creates underlies the diversification of activities and sources of income in rural areas. Here, economic and social concerns have very clearly stolen a march on the environment.

Paradoxically, it is in taking account of the environmental objectives of the MSSD that the South and Eastern countries have fared comparatively better. Egypt is in the vanguard

of inventories of biodiversity, the pace of classification of protected areas is relatively high in all the countries, and all are parties to the international conventions on desertification, climate change and biodiversity.

Social and economic sustainability, a precondition of environmental sustainability

All the studies stress the need to work for human development: health, poverty, education and training. Sustainable development must not be reduced to production methods and patterns of consumption which preserve the environment since they are inextricably linked to living conditions. Sustainable development necessarily involves strong public policies on infrastructure, public services as well as institutional reform and helping stakeholders in learning how to act collectively.

While aid with structural improvement of farms and agricultural production remains essential in the Mediterranean countries, the institutional specifics are even more so. The success or failure of a rural development policy depends on the capacity of its institutions to implement a sustainable development strategy. Integrated and participatory regional approaches in Europe have clearly demonstrated their many benefits in terms of employment, the effects on private investment, local governance, etc. At the same time, however, the results are highly dependent on local and regional governance, as the Italian experience clearly shows. The road to decentralisation, therefore, requires investment which is not only well targeted but also uninterrupted and suited to capacity-building of local communities. That is why it is necessary to devote more effort in these countries, more than elsewhere, to human capital and expertise.

The way to convergent development policies

The objectives of sustainable development in the Mediterranean will be achieved all the more effectively if the MSSD is the subject of appropriate evaluations, based on detailed monitoring of progress in implementing it in the Mediterranean countries and sharing of experience. Regular reports are required to show the will of States in the region not only to integrate the principles of sustainability in their public policies, but above all to implement them and adapt them to their own problems.

The studies discuss the conditions in which indicators of sustainable rural development are produced, how they are integrated into official statistics and, more broadly, the information systems on which policies are based in order to govern. In the Southern and Eastern Mediterranean countries, where regional disparities between urban and rural, as well as within rural regions, are even greater than in the countries of the North, the disaggregation of indicators is a necessity in order to be able to appreciate the differences in local development.

An ad hoc national mechanism to monitor the MSSD would not only make it possible to produce interim reports, but also facilitate adaptation of national sustainable development strategies to the changing needs of the rural environment in practice. For this reason it is absolutely vital.

The national examples based on a significant regional dimension (Spain, Greece, Italy) suggest that this type of experience should be linked to an operational framework

Evaluating the effect of the MSSD

361

programme at regional level. The studies emphasise the need to make the two regional strategies not only consistent, but to ensure that the Mediterranean strategy reinforces the European. They therefore implicitly recommend taking as a starting point aspects where the initial situations in countries or regions are fairly similar (“focused strategies”).

The similarities between the Mediterranean and European sustainable development strategies as defined for the period 2007-2013 in the various Member States are manifold. For this reason, more attention should be paid to the legal framework and the instruments of European rural development policy.

It might be thought that the appropriation of the Mediterranean Strategy for Sustainable Development is total, to the point where it is impossible to distinguish where it is based on it or otherwise. The greater fear, however, is that it is a far cry from the concerns of the majority of States, for a variety of reasons: in the North, due to a mere lack of interest, in the South, because there are more pressing problems. Yet if States can still find value in this joint project, it will be by constantly building on it, by applying rules of governance and participation which are valid at local level and, it must be said, with greater potential for transfers of resources and know-how.





CONCLUSION



Agricultural and rural development and sustainable development are related in the Mediterranean region, where the population is continuing to grow on land that is struggling to feed it. This work calls for a rethink of agricultural and rural development policies in the Mediterranean as a matter of urgency and raises the question of the place of those policies in the economies of all Mediterranean countries.

After relying perhaps rather too heavily on their natural and cultural amenities (particularly their climate and lifestyle), many Mediterranean countries are now paying the price of their belated entry into the industrial era and of their dependence on a world economic order over which they have little influence. The attraction which the Mediterranean region continues to hold for tourists from the north of Europe in particular originated in the seaside leisure tourism of the wealthy British aristocracy, which began in the early 20th century. As the result of economic choices, these pioneers were followed by mass tourism and “sun merchants”,¹ whose favourable effects on employment or the balance of payments often proved to destroy the fragile balance of societies that were ill-prepared for the shock of the monetary international economy.²

While the residential functions of rural areas are confirmed in the northern Mediterranean countries, those areas are at the same time becoming depopulated and the population is ageing – a phenomenon which is more or less offset by net migration in only a few rare countries such as Greece or Spain. This dual process of a shift to the tertiary sector and the diminishing place of agriculture in rural areas necessarily raises the question of the sustainability of this development model. Agriculture in Europe includes residential farms, but in the southern and eastern Mediterranean countries it includes subsistence farms. Rural tourism is struggling to establish itself in the latter countries as a means of diversifying household incomes, and the productive functions of rural areas are concentrated in a limited number of regions of intensive agriculture that is geared to exports (Chapter 6).

At the same time, the agricultural trade balances of the southern and eastern Mediterranean countries have been steadily shrinking for over 30 years.³ National outputs no longer suffice to feed the populations and food dependency is increasing. This is the case in particular with wheat and is one of the never-ending torments of the Mediterranean. And the rural areas have suffered from bad harvests more than have urban areas, for in the event of food shortages or famine it is the towns and cities that have been the

1 - M. Aymard, “Migrations”, *La Méditerranée. Les Hommes et l’héritage*, Flammarion, Paris, 1986.

2 - International tourism accounts for 6% of the total value of goods and services throughout the world and for 18% to 30% in most southern and eastern Mediterranean countries (Blue Plan, “Priority indicators for the MSSD follow-up”).

3 - www.fao.org

priority recipients of supplies of eelgrass advanced by urban governments.⁴ But in 2008, food riots also erupted in certain Mediterranean towns. Europe's granaries are empty, and the southern and eastern Mediterranean countries are turning to more distant destinations for massive cereal imports or for arable leasehold land.⁵

It may well be the climate, the essential uniting factor of the Mediterranean, which will bring the different shores closer together, for the Mediterranean as a whole is having to meet the challenge of the forecast climate change. As the IPCC has predicted,⁶ the countries on the northern shore must prepare for a series of trends (a drop in the level of annual precipitation, spreading desertification, and so on), which the southern and eastern shores have been facing for decades but which are liable to worsen. The challenge of adaptation, so essential in agriculture (Chapter 3), should lead to reappraisal of North-South relations in a new light of solidarity and partnership.

Natural resources and endogenous knowledge

The question of desertification is related less to poverty and overgrazing than to growing anthropic pressure, irrigation and the progressive loss of soil fertility. The regions in the north of the Maghreb are more threatened than the southern regions, which have been affected by desertification for several decades. It is imperative in this context to establish reference standards in conjunction with measures to set up (or perpetuate) national monitoring and evaluation systems, to assess the direct and indirect impacts, particularly in the socio-economic field (where the need for such assessment is greatest), to develop spatialised information and the use of Geographic Information Systems for measuring physical phenomena and translating them into economic terms, and to conduct studies on trends in soil characteristics in connection with farming practices (properties, functioning, etc.) (Chapter 4). Soil aridity and limited soil water reserves are two phenomena which give cause for concern in the medium term.

Although Mediterranean agriculture is essentially rain-fed, the sector consumes the lion's share of available water resources. Despite a centuries-old tradition of agricultural water schemes and infrastructures, the resource is unevenly distributed in terms of both space and time, a fact which limits its availability and means that its various uses are in competition while making stringent water demand management policies imperative.⁷ Water can be economised both at plot level and in supply networks, but it is also advisable to plan measures to restore a balance in how water is allocated amongst the countries of the Mediterranean Basin through international trade in bulk commodities on the basis of the concept of virtual water (Chapter 2). This trade in virtual water is actually already taking place in trade in agricultural commodities; attention should be focused more on the concept per se.

Food security in the Mediterranean cannot, however, be based solely on securing food imports. It is imperative that such measures be accompanied by adaptation strategies

4 - F. Braudel, "La terre", *La Méditerranée. L'espace et l'histoire*, Paris, Flammarion, 1985.

5 - "L'actualité agricole en Méditerranée", *Les notes d'analyse du Ciheam*, 42, 2008.

6 - European Environment Agency, *Impacts of Europe's changing climate. 2008 Indicator-Based Assessment*. Luxembourg, Office for Official Publications of the European Communities, 2008.

7 - This management will also involve the use of meter provers for sprinkler irrigation systems in the Arab world.

at several levels. At producer level, the strategies for coping with weather hazards that until recently prevailed in the traditional pastoral lifestyle of communities in the south and east of the Mediterranean region – a lifestyle that has been lost definitively as tribes have settled – merit closer examination. They consist of a combination of a wide range of factors: diversification of supply sources (selection of varieties, stocking of reserves, distribution of space according to priority uses, recycling of harvest by-products, etc.), cash flow and controlled flexible flock reduction, but also engagement in several different activities and mobility (Chapter 7).

The State plays a complementary, but essential, role in these adaptation strategies of the various indigenous population groups, consisting mainly of ensuring reliable and stable agro-support sectors, providing price support and market access, drawing up stock conservation plans, and clarifying land status. Pastoral policies should also be regarded as agro-environmental policies, and rightly so, since they are applied in regions where the ecological issues at stake are particularly important. The most significant measures to integrate practices that are environmentally sound concern action to restore and regenerate rangelands and to delimit nature reserves, which is often combined with measures to protect forest stock (Chapter 7).

Mediterranean forestland is the world leader when it comes to loss of biodiversity and continues to be subject to strong pressures despite the fact that the economic exploitation of the resource is limited. But it is not the only resource that must be protected. With the adoption of the Convention on Biological Diversity biodiversity became an issue of national sovereignty, and the developing countries immediately set about classifying their genetic resources. Numerous inventories are now available in the Mediterranean countries (Chapter 1), but two fundamental questions are still unanswered: that of the patentability and marketing of life, and that of the extension of intellectual property rights to all genetic resources.

Thanks in part to the Millenium Ecosystem Assessment, the concept of supplying services through biodiversity (pest control, reduction of pesticides, etc.) can now no longer be dealt with as an issue separate from agriculture, and vice versa. In the effort to develop agricultural models, and in particular those of the Mediterranean countries, the constant concern must be “to produce more and to produce more efficiently”. The model of intensive cropping in the plains is called in question in this context, since it combines at least two factors limiting biodiversity – monocultures and environmental homogenization. It is becoming imperative to re-introduce structural landscape diversity if progress is to be made towards that objective, and the northern Mediterranean countries can learn from certain countries in the south and east of the region in this context of change: greater diversity of domestic varieties, a potential source of older, hardier varieties (yield stability over time, resistance to disease), closed short-circuit agricultural systems, and mixed “mutual benefit” systems, whose principles must no doubt be adapted.

Rural activities and societies

Action must be taken as a priority to identify and name all forms of agriculture and ruralism in the Mediterranean. This will inevitably involve constructing typologies of Mediterranean agriculture in each country. It is now obvious to all that precedence must

be given to agriculture, but the question of the means of action to be employed is still open. It is advisable and of advantage to make a distinction between arid and semi-arid regions, etc., and to reaffirm, as an environmental imperative, that agriculture will be maintained in areas where constraints are considerable in order to avoid the risk of concentrating efforts on the more prosperous regions.⁸ From this point of view, it is imperative to interlink regions so that all of the national territory is concerned. It is no longer a matter of choosing one type of agriculture; all types must be named, and then several must be taken out of the political no-man's-land where they have been shelved so that they can be deemed public policies. New fields of investigation thus open up such as productivity in conservation agriculture and mixed crops, or the advantages of land-sparing over wildlife-friendly farming,⁹ in contexts of arid regions and irreversible natural processes.

Agricultural multifunctionality and diversification are flourishing in the north of the Mediterranean but still depend on a sound principal activity or an acquired heritage that is to be developed. Quality products, in particular the produce of organic agriculture, are flourishing; in addition to national structures for assisting farmers in marketing their products and for promoting producer organisations, these products are supported by the European system for improving quality and certifying product origin, which has been operating since 1991. Despite the importance the southern and eastern Mediterranean countries attach to crops and animal products with high value-added, with which they can maximise the value of their labour force – their other asset –, the fact that there is practically no diversification either on farms or in rural areas is symptomatic of the difficulty people in these countries have in drawing sufficient income from agriculture in particular and in rural areas in general. It must be stated that the economic alternatives are still limited. The agro-food industry offers interesting prospects of boosting local supply as long as it is accompanied by measures for redistributing wealth at the local level, marketing mechanisms, infrastructures, etc. For the risk is that the Mediterranean middle classes buy mainly from large and medium-sized chain stores, which obtain their supplies from global rather than local markets. It is thus essential to explore avenues for diversifying rural economies in the Mediterranean region (Chapter 9).

Farm structures and the status of workers determine the opportunities for households to engage in several different activities as a means of managing risks and contributes to small farm viability. This form of diversification is accompanied by a high degree of commuting and geographic mobility, which has always been typical of the Mediterranean countries. As Maurice Aymard wrote in 1986, "Mobility is an integral part of everyday [Mediterranean] life. It is a permanent, almost repetitive, feature, yet it is generally silent, since it is a matter of long-standing custom. It reflects the people's ability to adapt to the environment, to respond to propositions from other areas, and to adopt and assimilate those external inputs which they can make their own." Whereas paid employment is having to develop in the northern Mediterranean countries, it is merely one of many forms of status in the countries in the south and east. If this fact is disregarded,

⁸ - See also the report of the Bari workshop on *Agriculture and rural development in the Mediterranean*, May 2008 (www.planbleu.org/themes/atelier_rural_bari.html).

⁹ - Wildlife-friendly farming consists of increasing acreage in order to maintain output level; in some research work it is opposed to land-sparing, which reduces acreage by intensifying production. These two farming models affect natural resources, each in its own way.

a rapidly growing population which agriculture can no longer absorb will face an even greater risk of insecurity (Chapter 6).

Regions, policies and governance

Rural areas both in the northern Mediterranean and, in particular, in the south and east are lagging behind, and the rural-urban gap is widening: it concerns literacy training, education, health, quality and perpetuation of basic services and facilities, equal opportunities, and so on. Sustainable development cannot be measured solely in terms of consumption and production patterns; living conditions must also be taken into account.

This concern is reflected in the rural development policies of European countries for the most recent planning period (2007-2013), which have been drawn up within the framework of the European regulation on support for rural development, by the decisions to restore balance in the budgets allocated to disadvantaged areas and to improving quality of life. But the measures to modernise State intervention and the targeting of aids must promote greater efficiency. Agriculture and efforts to reduce poverty remain the two priority objectives in the southern and eastern Mediterranean countries. Given the degree of urgency, States are relying more on the private sector and are seeking investors as a priority objective, but this raises the question of the sustainability of the resulting development model (Chapter 8).

Instruments facilitating regional approaches have proved their worth for rural development, but their limits have been identified: the areas concerned are of modest proportions, the resulting profusion of institutions leads to overemphasis on the regional aspect, and the acquired benefits do not always survive the term of the project. The difficulty in the southern and eastern Mediterranean countries is threefold: there is no regional framework modelled on the structure which exists at the European level and whose influence is decisive in national policies; there is difficulty in translating concepts into reality; and concertation mechanisms are still weak on the whole. Regional projects bring new forms of governance, and this is their main virtue (Chapter 5).

The Mediterranean States are faced with difficulties in implementing measures to decentralise decision-making. In both North and South, this raises the question of the levels at which decisions are taken, and in particular decisions on funding management. The success of this decentralisation depends mainly on the level of training of the staff of the local extension services, and action to integrate and interlink traditional approaches and public policies must furthermore become an objective in its own right.

The Mediterranean Strategy for Sustainable Development provides an effective regional framework for exchanging notes on experience and pooling achievements in these various fields, but the evaluation of its implementation reveals that the States and their political, environmental, social and economic institutions are still having difficulty in resolving all of the problems that have been identified (Chapter 11). These difficulties, which are also found in other international frameworks, are an argument in favour of including regional cooperation in the revision of agricultural and rural development in the Mediterranean, which has become an imperative. Perhaps the Union for the Mediterranean will provide that opportunity.

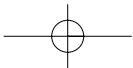


Table OF DOCUMENTS

Chapter 1: Preserving natural resources

Chart 1	Total irrigated areas in the Mediterranean countries, 1961-2005	29
Table 1	Volume of water as a ratio of AGDP in Spain, in m ³ /\$	31
Chart 2	Total cultivated areas in the Mediterranean countries, 1961-2005	33
Chart 3	Arable land per inhabitant in the Mediterranean countries, 1961-2003	33
Table 2	Loss of arable land in Greece 1995-2005 in hundreds of hectares	34
Map 1	Salinated or alkalisated areas in several Mediterranean countries	35
Table 3	Projects for rehabilitation of pastures and grazing in Turkey 2000-2007	38
Chart 4	Consumption of fertiliser, 1961-2005	40
Table 4	Quantity of fertilisers sold by AGDP in Spain, in t/million \$	41
Table 5	Quantity of pesticides sold by AGDP in Turkey, in tonnes of active substance	42
Map 2	Proportion of forest, woodland and agricultural land in the Mediterranean, 2005	44
Chart 5	Forested area, 2005	44
Map 3	The Mediterranean, sanctuary of world biodiversity, 2005	49
Table 6	Protected zones in Greece	53
Table 7	National parks, biosphere reserves and biological reserves in Morocco	54
Table 8	Proportion of protected areas out of the total area of Turkey 1966 to 2004 (%)	55
Table 9	Census of animal and plant species in Egypt	59

Chapter 2: Revising water strategies

Figure 1	Green water, blue water and water evapotranspired by crops	64
Table 1	Shares of rainwater and irrigation water in Mediterranean agricultural production in 2005	65
Map 1	Irrigated area in the Mediterranean countries, 2005	65
Map 2	Share of irrigated acreage equipped with spray or drip irrigation systems, 2005	66
Chart 1	Irrigation water demand per irrigated hectare in various Mediterranean countries, 2005	67

Chart 2	Share of irrigation water demand in total water demand, 2005	67
Chart 3	Water demand by sector of use in the Mediterranean region, trend and alternative scenarios	69
Map 3	Renewable natural water resources exploitation index, 2005-2025	69
Table 2	Estimation of recoverable losses by Mediterranean sub-region in 2005	71
Figure 2	Various agricultural water management tools used in the Mediterranean region	73
Chart 4	Water efficiency according to various irrigation techniques in Syria, 2007	73
Table 3	Strategies to reduce irrigation water needs through crop management and the management of interplanting	74
Figure 3	Timing of irrigation decisions at farm level	76
Table 4	Economic instruments and incentives for economising irrigation water in the Mediterranean region	77
Table 5	Irrigation water pricing in the Mediterranean region and water-saving incentives	78
Chart 5	Virtual water content per product, 2004	88
Map 4	Net results per country of virtual water flows connected with trade in cereals, soy beans, olives, specific crop products and beef and veal, average for the 2000-2004 period	89
Chart 6	Virtual water imports connected with cereal and soy bean imports, average for the 2000-2004 period	90
Map 5	Share of irrigation water of the Mediterranean countries that is exported via gross cereal and soy bean exports, average for the 2000-2004 period	90
Chart 7	Shares of green, blue and virtual water in the water demand of the Mediterranean countries for agriculture and food	91
Chart 8	Shares of green, blue and virtual water in the net food demand of the Mediterranean countries	91
Annex 1	Irrigation water efficiency in various Mediterranean countries	96

Chapter 3: Adapting agricultural systems to climate change

Table 1	Public measures and constraints	101
Table 2	Impact of climate change on potential exploitable water resources by 2025 (in billion m ³)	107
Table 3	Impact of climate change on winter cereal yield by 2020, Algeria	108
Table 4	Impact of climate change on winter cereal yield by 2020, Morocco	108

Table 5	Impact costs expressed as a percentage of gross agricultural product (GAP) by 2100	111
Table 6	Impact costs by 2100 in billion dollars	112
Table 7	Estimate of impact costs expressed as a percentage of GDP by 2100	112
Table 8	Outlook regarding irrigation water and irrigated areas by 2025	114
Chart 1	Trends in water consumption and costs in Tunisia, 1990-2000	115
Table 9	Trends in land use in Tunisia during the 1961-2003 period	121
Table 10	Trends in cereal acreage (in hectares)	121

Chapter 4: Fighting desertification

Map 1	Trends in land use in the steppe observatory south-west of Oran, 1978-2004	139
Map 2	The Menzel Habib region: a landscape now heterogeneous and fragmented	141
Table 1	Annual impact of environmental degradation on the natural capital, 2003 (% of GDP)	144
Map 3	Spatialisation of the risk of desertification, scenario 1	143
Map 4	Spatialisation of the risk of desertification, scenario 2	143
Table 2	Restoration costs as a percentage of (annual) GDP	145
Table 3	Variation in average agricultural output following measures to combat desertification (Tunisian dinars per ha)	149
Map 5	The Green Dam Project in Algeria	157
Table 4	Projects conducted within the national agricultural and rural development programme in Algeria, 2000-2007	157
Table 5	Distribution of public investments in agriculture in the 9 th and 10 th development plans, Tunisia (in million dinars)	159
Table 6	Trends in the share of the various activities in public investments in agriculture in the 10 th and 11 th development plans, Tunisia (in million dinars)	159
Table 7	Public investments involved in the Economic and Social Development Plan in Morocco, 2000-2004	161
Annex 1	The indicators selected by Morocco for monitoring and evaluating the national action plans	175

Chapter 6: Rural life

Chart 1	Rural population in the Mediterranean and the world, 1960-2005	207
Chart 2	Urban and rural population of the two shores of the Mediterranean, 1950-2045	207
Table 1	Rural population of Turkey, in 1980, 1990 and 2000 (in millions and as percentage)	210

Chart 3	AGDP/GDP in the Mediterranean countries, 1980-2005	212
Chart 4	Agricultural and rural population of the shores of the Mediterranean (excluding Balkans), 1960-2005	213
Table 2	Agricultural and non-agricultural employment in Turkey, 1990-2006 (thousands)	215
Table 3	Trends in agricultural family and wage work in Egypt (in thousands)	221
Table 4	Literacy rate and level of education in rural and urban areas in Egypt in 2005 (%)	223

Chapter 7: Managing collective land and rangelands

Map 1	Locating the <i>badiya</i>	234
Chart 1	Sheep population trend in Syria, 1961-2003	252
Chart 2	Saudi live sheep imports	255

Chapter 8: Improving rural governance

Chart 1	Percentage of public expenditure by category in EU-15, 2000-2006	276
Chart 2	Modernisation of structures versus environment in the rural development strategies of the EU-15, 2000-2006	277
Chart 3	Share of public expenditure by type of investment in EU-15, 2007-2013	278
Table 1	Summary table of territorial constructions in the North and South of the Mediterranean	291

Chapter 9: Diversifying rural activity

Chart 1	Distribution of PDO/PGI in Europe, 2008	305
Chart 2	Organic land area in France, Italy and Spain, 2001-2007	309
Table 1	Rural Tourism in France	310
Chart 3	Distribution by sector of rural employment in Algeria	313
Table 2	Organic Farming in Southern and Eastern Mediterranean Countries and the Balkans, 2006	319
Chart 4	Rural and total unemployment rates in the Mediterranean	325

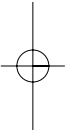
Chapter 10: Measuring agricultural and rural development

Table 1	List of rural indicators of the Mediterranean Strategy for Sustainable Development	334
Map 1	Ratio of the agricultural population to the rural population, 1990 and 2005	343
Map 2	Farmland used for organic farming, 2006	343
Map 3	Organic producers, 2006	343

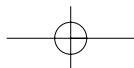
Map 4	Percentage of farms with an acreage of less than 10 ha	344
Map 5	Protected areas	344
Map 6	Afforestation rate, 2005	345
Chart 1	Net loss of arable land, 1980-2005	345
Chart 2	Fertiliser quantities, 1980-2005	345
Chart 3	Pesticide quantities, 1990-2001	346
Chart 4	Number of tractors per arable acreage, 1994-2003	346
Chart 5	Share of paid agricultural labour, 1980-2005	347

Chapter 11: Evaluating the effect of the MSSD

Map 1	National sustainable development strategies	359
-------	---	------------



Λ



Mediterra 2008

The Future of Agriculture and Food in Mediterranean Countries

CIHEAM annual report

MEDITERRA 2008
Annual publication series

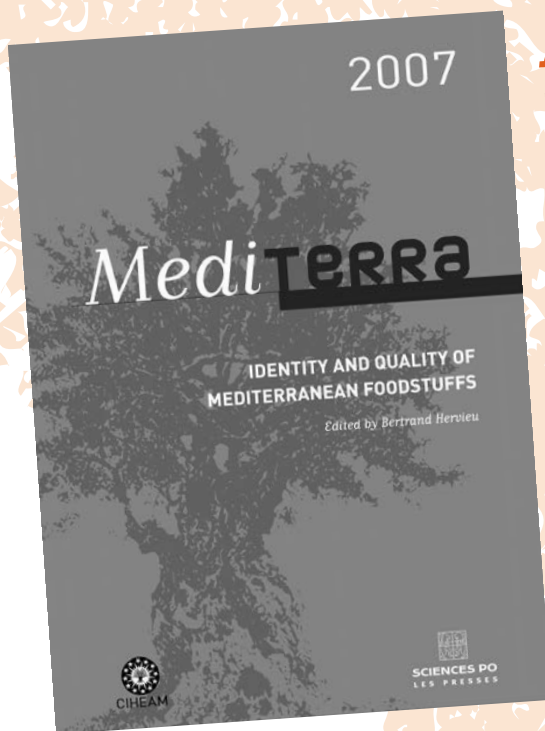
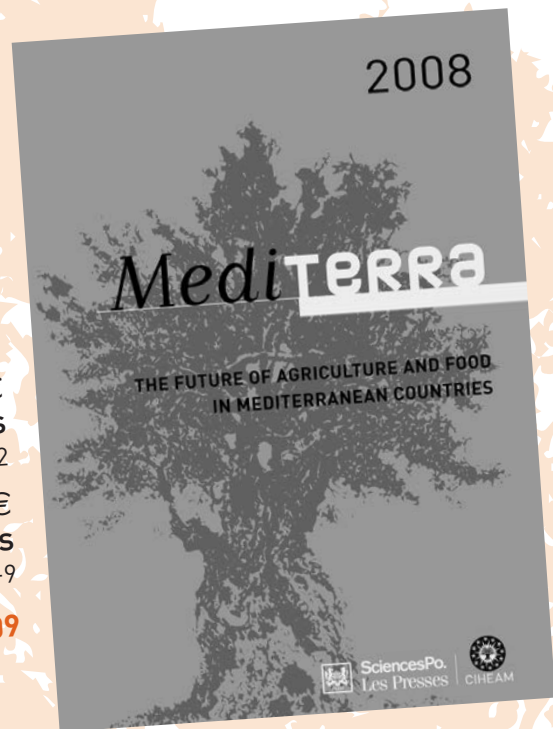
French version : 32 €
376 pages

ISBN 978-2-7246-1064-2

English version : 35 €
360 pages

ISBN 978-2-7246-1065-9

Terra special award 2009



Mediterra 2007

Identity and Quality of Mediterranean Foodstuffs

CIHEAM annual report

MEDITERRA 2007
Annual publication series

French version : reduced price 15 €
376 pages

ISBN 978-2-7246-1027-7

English version: 35 €
364 pages

ISBN 978-2-7246-1028-4

www.ciheam.org

www.pressesdesciencespo.fr

