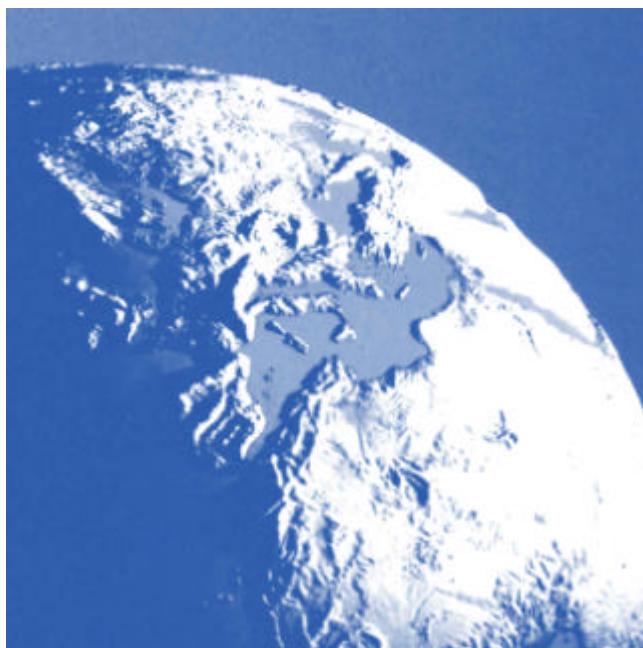




POLICY AND INSTITUTIONAL ASSESSMENT OF SOLID WASTE MANAGEMENT IN FIVE COUNTRIES

Cyprus, Egypt, Lebanon, Syria, **Tunisia**



Cedare



**Blue Plan
Regional Activ
Centre**

**Sophia Antipol
December 200**

Regional Study on

**Policies and Institutional Assessment of Solid Waste
Management in Tunisia**

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**The Study was coordinated by CEDARE and revised by The Dutch NGO,
WASTE- Advisors on Urban Environment and Development.**



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1. General Country Background

1.1 Physical geographical environment

Table 1. Characteristics of the Physical Geographical Environment

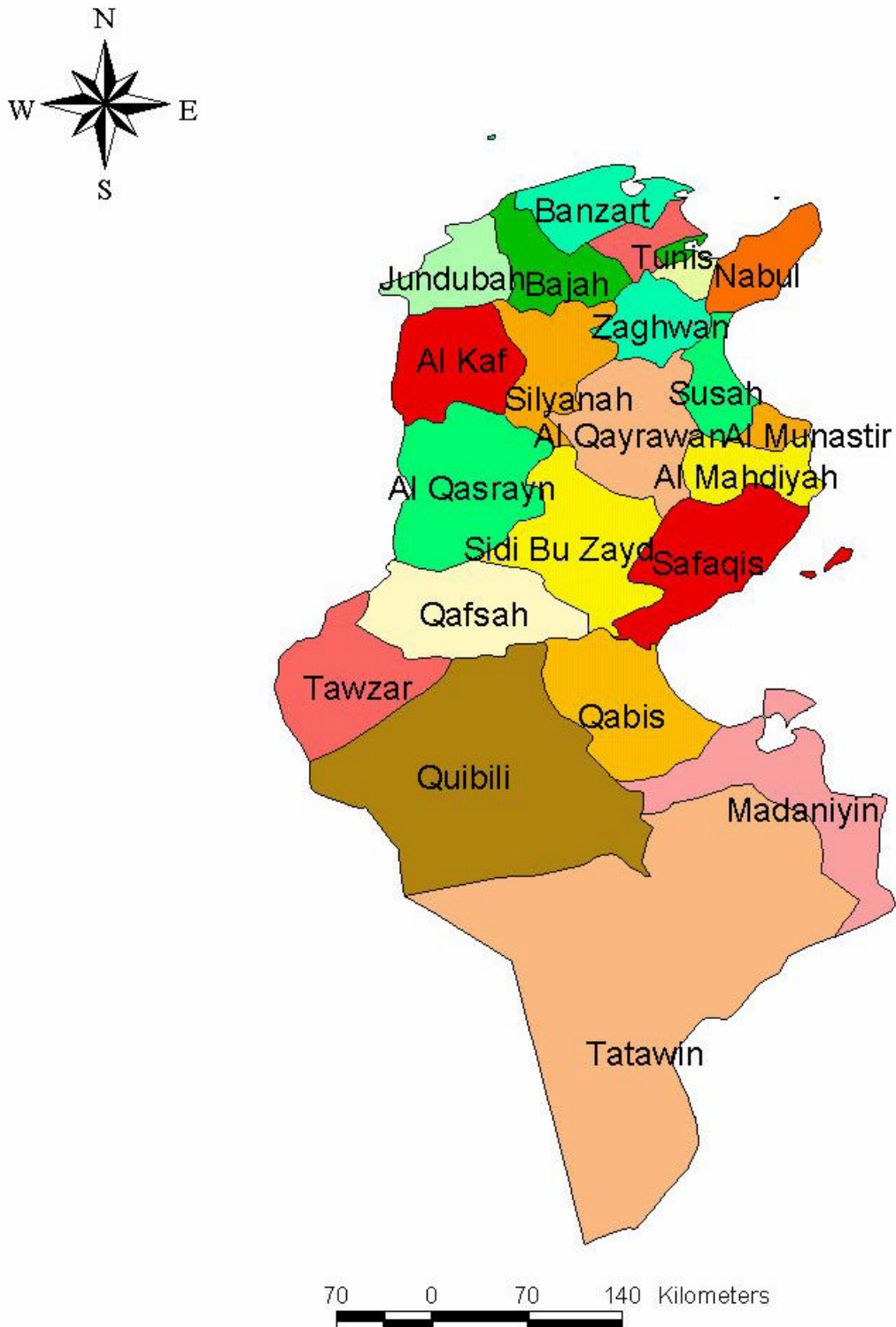
Characteristics	Data
Location	Northern Africa, on the south cost of the Mediterranean Sea, between Algeria and Libya
Geographic co-ordinates	34 00 N, 9 00 E
Area	<i>total</i> : 163,610 sq km: <i>land</i> : 155,360 sq km, <i>water</i> : 8,250 sq km
Land boundaries	<i>total</i> : 1,424 km <i>border countries</i> : Algeria 965 km, Libya 459 km
Coastline	1,298 km
Climate	Mediterranean in the north and coastal areas with mild, rainy winters and hot, dry summers; desert in south
Terrain	mountains in north; hot, dry central plain; semiarid south merges into the Sahara,. Average altitude:7000m
Natural resources	petroleum, phosphates, iron, lead, zinc, salt
Land use	<i>arable land</i> : 19% <i>permanent crops</i> : 13% <i>permanent pastures</i> : 20% <i>forests and woodland</i> : 4% <i>other</i> : 44%
Irrigated land	3,850 sq km
Capital	Tunis
Money	Dinar (1 dinar= 0,8 \$US in 1999)
Administrative divisions	23 governorates; Tunis, Ariana, Ben Arous, Nabeul, Bizerte, Zaghouan, Sousse, Monastir, Mahdia, Sfax, Gabès, Mednine, Tataouine, Kébili, Tozeur, Gafsa, Kasserine, Kairouan, Sidi Bouzid, Séliana, le Kef, Béja, Jendouba

Tunisia has a Mediterranean climate with a great variety of seasonal changes. The annual temperatures vary from 6 °C in the North West in winter (December monthly average) and 33°C in the South in summer (August monthly average). The average country temperature is 12 during winter and 30 for summer. The hottest months are July and August and the coldest are December and January. The temperature rarely falls below the freezing point.

Annual rainfall is irregular and is mostly in the cold season. The average rainfall in the North is 800 to 1000 mm/year and in the south 50 to 150 mm/year.

Below is the Administrative Map of Tunisia Fig 1.

Fig.1- Administrative Map of Tunisia



1.2 Demographic Development

Table 2. Characteristics of the Demographic Development

Characteristics	Data
Population	9,513,000 (estimated in 1999) 8,785,711 in 1994
Urban population	62.40%
Age structure	0-14 years: 31% (male 1,513,296; female 1,417,166) 15-64 years: 63% (male 3,006,029; female 3,018,411) 65 years and over: 6% (male 283,026; female 275,675)
Population growth rate	1.15% (estimated in 1999), 1.70 in 1994
Birth rate	19.72 births/1,000 population (estimated in 1999)
Death rate	5.05 deaths/1,000 population (estimated in 1999)
Net migration rate	-0.74 migrant(s)/1,000 population (1999)
Sex ratio	at birth: 1.08 male(s)/female under 15 years: 1.07 male(s)/female 15-64 years: 1 male(s)/female 65 years and over: 1.03 male(s)/female total population: 1.02 male(s)/female (1999 est.)
Infant mortality rate	31.38 deaths/1,000 live births (1999)
Life expectancy at birth	<i>total population: 73.35 years</i> <i>male: 71.95 years</i> <i>female: 74.86 years (1999)</i>
Total fertility rate	2.38 children born/woman (1999)
Literacy	<i>definition: age 15 and over can read and write</i> <i>total population: 66.7%</i> <i>male: 78.6% female: 54.6%</i>
Labor force	3.3 million (1994)
Labor force—by occupation	services 55%, industry 23%, agriculture 22% (1994)
Unemployment rate	15 % (estimated in 1999)

1.3 Economic conditions

Tunisia has a diverse economy, with important agricultural, mining, energy, tourism, and manufacturing sectors. Due to its limited natural resources, Tunisia has focused on developing its human resources: the bulk of the national budget has been allocated to education, health care, housing and social services.

The private sector is encouraged to play a leading role in economic growth, and as a result, Tunisians have created a diversified market-oriented economy based on an efficient agricultural sector, a growing manufacturing sector, and a thriving tourism industry.

Tunisia's GNP and social indicators have risen steadily since independence. Per capita income has increased, from 117 Dinars in 1966 to 960 in 1986 and 2,444 in 1998. Tunisia has enjoyed an average growth rate of nearly 5% a year during the last 10 years. The GDP in current prices in 1996 is 18,994.5 million Dinars and 20,995.0 in 1998.

Tunisia's association agreement with the European Union entered into force on 1 March 1998, the first such accord between the EU and Mediterranean countries to be activated. Under the agreement Tunisia will gradually remove barriers to trade with the EU over the next decade. Real growth averaged 4.0% in 1993-97 and reached 5.0% in 1998. Inflation has been moderate (3.7 %). The Growth in tourism and the increased trade have been the key elements in this steady growth.

Table 3. Characteristics of the Economic Conditions

Characteristics	Data
GDP	purchasing power parity—\$49 billion (estimated in 1998)
GDP—real growth rate	5% (1998)
GDP—per capita	purchasing power parity—\$5,200 (estimated in 1998)
GDP—composition by sector	<i>agriculture: 14%</i> <i>industry: 28%</i> <i>services: 58% (1996)</i>
Population below poverty line	14.1% (estimation.)
Budget	<i>revenues: \$5.8 billion</i> <i>expenditures: \$6.5 billion, including capital expenditures to \$1.4 billion (1998 est.)</i>
Industries	petroleum, mining (particularly phosphate and iron ore), tourism, textiles, footwear, food, beverages
Debt—external	\$12.1 billion (1998 est.)
Environment—international agreements	

1.4 Socio-cultural setting

The demographic growth rate in Tunisia is 1.15%. Tunisia is a melting pot of different civilizations. Arab, Berber, African, European and Mediterranean influences have shaped the Tunisian cultural identity. The majority of the population is Muslim, and the official religion is Sunni Islam. The national language is Arabic, and most of the people speak French, and many of them speak English.

At international level, Tunisia is a party to a number of environmental conventions, namely: Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Wetlands, Marine Life Conservation, Law of the Sea, Marine Dumping, Ship Pollution, Nuclear Test Ban.

1.5 Political structure

The Government of Tunisia is a republic. Independence from France was declared on March 20, 1956 and the constitution of the new republic was adopted on June 1st, 1959. This constitution was amended

on the 12th of July 1988. The Legal system is based on both the French civil law system and the Islamic law. The executive and legislative bodies are elected.

The Suffrage type is universal based on 20 years of age. The President is elected by popular vote for a five-year term; the last elections were held in 1999. The Prime minister, (head of government), and the Cabinet (Council of Ministers) are appointed by the President.

The legislative organ is constituted by a unicameral Chamber of Deputies, which is elected by popular vote to serve five-year terms. The most important political parties are the Constitutional Democratic Rally Party (RCD) with President BEN ALI as president and the Movement of Democratic Socialists (MDS). Five other political parties are active in the country.

More than 7000 NGOs are active in Tunisia, more than 200 of them in environment and urban development

2. Policy framework

2.1 Policy framework, Laws and Regulations

2.1.1 Laws and Regulations

In Tunisia, a comprehensive legislative framework for Solid Waste Management has been enacted. Under this strengthened legislative framework, SWM has been given National Priority at the Presidential Level, due to the awareness of its linkage to the broader economic development of the country, especially tourism, which is a major economic activity in the country.

Tunisia has numerous laws and regulations dealing directly or indirectly with the different aspects of solid waste. However, Law n°41 approved on June 10, 1996 constitutes the most detailed regulation of the management, elimination and control of solid waste at national and local levels. Its key elements are:

- ♦ classifies waste according to its origin and characteristics;
- ♦ defines government and municipal responsibilities;
- ♦ encourages private sector participation;
- ♦ establishes priority of waste minimization, recycling and composting;
- ♦ establishes that producers, importers and distributors of packaging are responsible for their products when they are discarded as wastes;
- ♦ provides basis for national waste management facility siting programme;
- ♦ establishes procedures for managing waste, monitoring facilities, and enforcing standards.

On the basis of this law, the basic regulatory framework for the management of dangerous waste was developed with the following components:

- ♦ a decree with a list of dangerous waste products;
- ♦ a modal register prepared specially for dangerous waste producers;
- ♦ a modal annual declaration specifically for dangerous waste producers, and
- ♦ a monitoring form specially for the transport of dangerous waste.

A list of dangerous waste producers is under study and companies are being classified according to the category of waste produced. This will help to provide improved quantitative and qualitative knowledge of waste categories in Tunisia.

The Local Authorities Organic Law, (Law no. 95-68 of 24 July 1995, article 129) gives responsibility “for collecting, sorting, processing, removing and burying waste in controlled dumps” to the municipalities. The decree no 97-1102 gives the conditions and methods for the recovery and processing of used packaging.

These laws and regulation were adopted recently between 1995 and 1997. However, numerous laws and decrees applying to the financial aspects of solid waste were adopted in Tunisia since 1975. The oldest regulation dealing with waste is the decree n°68-88 dated March 28, 1968 regarding "dangerous, unsanitary or annoying establishments". The Water Code issued in 1975 introduces a series of prohibitions to prevent the pollution of water.

The law regarding the establishment of the National Environment Protection Agency (ANPE) N°88-91 was issued in August 1988. It prescribed obligations of individual and corporate polluters and penalty provisions against violators involved in environmental pollution.

The decree n°90-2273 dated December 25, 1990 prescribed the functions of the expert inspectors of environment in ANPE, a new corps of pollution control.

2.1.2 Policy framework

The IX Plan of the Government of Tunisia (1997 - 2001) has placed a major emphasis on the amelioration of quality of life in urban areas, the protection of the environment and the increased participation of the private sector in economic growth and the delivery of environmental services.

In this context, the Ministry of Environment and Land Use Planning (MEAT) and the Ministry of Interior (MI) formulated strategies and programs to ameliorate the quality of environment in urban areas and to enhance the role of the private sector in managing solid waste to meet the following requirements:

- ♦ to enhance municipal management by increasing use of improved management techniques and practices by municipal staff;
- ♦ to enhance the participation of private environmental services providers and particularly in SWM;
- ♦ to enhance and strengthen the capacity of local authorities;
- ♦ to develop public-private partnerships for SWM;
- ♦ to develop good governance on both civil society and local authorities through strengthening institutional capacity of key partners;
- ♦ to enhance the efficiency of public services.

In the Solid Waste Management Sector the MEAT and MI programs developed activities to:

- ♦ help municipalities become more efficient and accountable;
- ♦ have community participate in local decision-making;
- ♦ strengthen accountability and implementation capacity at municipal level;
- ♦ ameliorate the legal and institutional framework.

2.2 The Main Elements of the SWM Framework in Tunisia

The two main elements of SWM Framework are:

1. the Municipal Development Plan (**PDM**)
2. the national program for management of solid waste (**PRONAGDES**).

2.2.1 Municipal Development Plan (PDM)

In order to meet the challenges of the economic growth, the framework for Tunisia's governance strategy addressed mechanisms to provide conditions that promote and enhance societal values, support economic growth and an accountable government.

The Municipal Development Plan (PDM) addressed the mean characteristics of "good governance" and particularly accountability, management effectiveness and availability of information and communication. The PDM gives a great support to the non-governmental organizations, as a new form of policy pluralism in governance.

The PDM encourages municipalities to develop the ability of local authorities to skillfully and efficiency use public resources. Decentralization is the base of actions. It is not limited to administrative arrangements, it is a reinforcing policy to political and institutional reform and economic liberalization. Through which Local Authorities can implement policies and enhance programs' management. The policy adopted in the IX Plan contains a number of initiatives that are intended to increase public participation to built civic spirit.

Municipalities implement local service and infrastructure policies, and are one of the three forms taken by the administrative decentralization in Tunisia:

- a) decentralization with central ministry staff to regional offices;
- b) delegation of responsibilities to public service agencies;
- c) transfer of service responsibilities to local authorities with elected governing boards.

For each governorate, the governor of the region is the chief of each ministry at the regional level. The regional council approves all central government projects at regional level, and the governor manages the budget of these projects.

Many urban services have been delegated to specialized public service agencies such as:

- sewerage collection and treatment;
- potable, water distribution;
- electricity;
- fire protection.
- housing development and urban rehabilitation;
- pollution control...

The responsibilities of Municipalities include solid waste management, road construction and maintenance, street lighting and public markets. Municipalities have financial autonomy. They collect a variety of local taxes. They receive important resources from the central government as grants and they decide on their budgets, hire staff and contract services.

Each municipality has its Municipal Investment Plan (PIC) which constitute the principal vehicle for planning infrastructure investments at the local level including for solid waste management.

2.2.2 The PRONADGES

The PRONADGES constitutes the national strategic and operational plan for Solid Waste Management.

Plans and Strategies:

The PRONADGES is the national plan for managing solid waste in Tunisia. This plan was launched in 1993 with three pilot projects:

1. *The Khadhra Selective sorting pilot project:*

Based in a Tunis residential area, the Cité El Khadhra, this project, implemented by the Ministry for the Environment and Land Use Planning in collaboration with the Municipality of Tunis, aims to demonstrate the economic and ecological advantages of the selective sorting of household waste. The neighborhood concerned has a population of over 20,000 and the number of homes is estimated at 6,500.

The project was launched in January 1994. It is a pilot project to experiment whether selective sorting can be more widely used in Tunisia, and under what conditions. The results obtained so far seem positive: the project has made Tunisians aware of the advantages of selective collection, the composition of household waste has been better studied, along with the opportunities for reducing the volume of waste through compost techniques for organic waste and recycling paper and plastic.

2. *The Khadra Sorting Center pilot project:*

The creation of this center marks a further stage in the execution of the Khadra selective sorting pilot project. The role of this center is the sorting of non-organic waste collected in order to prepare it for transfer to recycling units. The center is equipped with a conveyor belt, metal and paper compression machines and other machines for crushing plastics. The center also has 60 containers for the storing of dangerous household waste, such as medicines, dry batteries, and detergents. However, the collection and sorting of these materials are not subject to formal regulations.

3. *The pilot Compost units:*

The two pilot projects at Tunis and Béjà aim to demonstrate the ecological, economic and agronomic advantages of compost made from household waste. The pilot composting units were used to demonstrate the usefulness and viability of composting in agriculture.

The PRONADGES constitutes the national strategic plan for Solid Waste Management. It is also a regional strategic plan for each district in the country (governorates). This program aims to improve urban waste management and is based on three principles:

- the polluter pays,
- the producer gets the waste back,
- reduction of quantities of solid waste generated at source at source.

The main components of this program are; the rehabilitation and the closure of illegal tips; the opening of 29 new landfills in the major towns of the country; the construction of 4 composting units and a discharge for toxic waste.

At the local level, only major cities in the country will have their own SWM plans, like Tunis, Sfax, Sousse, Ariana...

Tunisia benefited from international donors to prepare studies and plans in the area of solid waste: USAID, World Bank and GTZ have provided technical assistance and financial support to Tunisia to increase the private sector involvement in the provision of urban environmental services.

Through this technical assistance and financial support a large number of activities were undertaken to contribute to the achievements of the strategic objective of municipal development in the country dealing with the efficiency in the delivery of environmental services and particularly in solid waste management.

Numerous components of PRONAGDES are financed by The Municipal Development Plan which focuses on municipal management effectiveness and the ability of local authorities to skillfully and efficiently use public resources. PDM is financed by a World Bank loan and is realized by the ministry of Interior. A good coordination is assured between PDM and municipal PICs, through the MI and

CPSCL. The numerous studies realized in the sector of waste helped to a better development of PRONAGDES.

With the development of the institutional framework and the creation of a Solid Waste Department in ANPE the PRONADGES can be considered as the keystone of the national solid waste policy.

The main objectives of PRONAGDES are to equip the country with adequate waste treatment units and to find appropriate solutions to all waste management aspects (technical, regulatory and institutional).

In short term, the major objective of PRONAGDES is:

- a) the creation of 29 processing centers in the main towns of each "gouvernorate" as well as in tourist towns and composting units,
- b) the establishment of a center for processing dangerous waste with an annual capacity of 85,000 tons,
- c) the establishment of a public system for waste recovery and reuse Eco-Lef¹.

3. Institutional and financial framework

3.1 Organizational structure (existing institutional framework)

The existing institutional framework of Solid Waste in Tunisia is currently under revision and development. Actually both public bodies (at national and local levels) and private sector are concerned with SWM.

Fig. 2 – shows the the Administrative setup of the Urban Solid Waste Management System in Tunisia .

3.1.1 Public institutions:

At the national level, the public institutions concerned with SWM are:

- The Ministry of Interior.
- The Ministry of the Environment and Land-Use Planning (MEAT).
- The National Environmental Protection Agency (ANPE).
- The National Waste Treatment Agency (Office National d'Assainissement).
- The International Center for Environmental Technology (CITET).
- The Ministry of Public Health.

¹ Eco-Lef is a public system for the recovery and reuse of used packaging, set up by decree no. 97-1102 managed by ANPE.

This system focuses on the reuse of bags and wrapping made of plastic or metal destined for the local market. Membership costs are set by the ANPE on the basis of the quantities and types of packaging used and are used to finance various programs of environment protection.

Since the 1st January 1998, any producer or distributor selling bags of packaged products, and any person responsible for their initial marketing (in cases where the producer and distributor are unknown) must provide for the recovery of used bags or packaging in order to recycle them.

The system was set up for two categories of activity : one upstream for members (membership contracts, monitoring of the logo, etc), and one downstream using funds collected.

Eco-Lef system was launched in 1998. Partnerships with industrial firms have been developed and by the end of 1998, around 30 companies involved in the packaging of water, fizzy drinks, juices or milk products had joined the Eco-Lef system.

Information and awareness-raising campaigns are organized by ANPE to promote this system

- ♦ The Ministry of Industry.

At the local level, the public institutions concerned with SWM are:

- ♦ Municipalities.
- ♦ The Municipal Agency for the Treatment and Reuse of Waste (AMTVD) in the District of Tunis.

Both at the national at local levels the public institutions concerned with SWM are:

- ♦ The Municipal development Authority (CPSCL).
- ♦ The Municipal Training Center.
- ♦ The National Federation of the Cities of Tunisia (FNVT).

3.1.1.1 Ministry of the interior

The Ministry of Interior (MI) is the ministry responsible for the local authorities. The MI is concerned with all aspects of managing the public services provided by the municipalities, including solid waste management. A special environment directory within the General Directory for Local Authorities (DGCPL) has a number of responsibilities, including:

- ♦ Improving the Government's policy in the municipal development sector.
- ♦ Implementation of the National Program for Quality of life, Cleanliness and the Protection of the Environment.
- ♦ Issuing collective calls to tender for the purchase of equipment for local authorities.
- ♦ Assisting municipalities in promoting solid waste management.
- ♦ Strengthening municipal capacity for the provision and financing of urban infrastructure including SWM.
- ♦ Encouraging private sector provision and delivery of urban infrastructure including SWM.
- ♦ Monitoring achievements in SWM using objective and verifiable indicators.

The Ministry of Interior has the responsibility of approving Municipal Investment Programs (Plans d'investissements communaux) PIC and monitoring their achievements. PICs constitute the development framework of municipal action. PICs are financed by municipalities, grants from the Government and loans from CPCPL.

3.1.1.2 Ministry of Environment and Land-Use Planning:

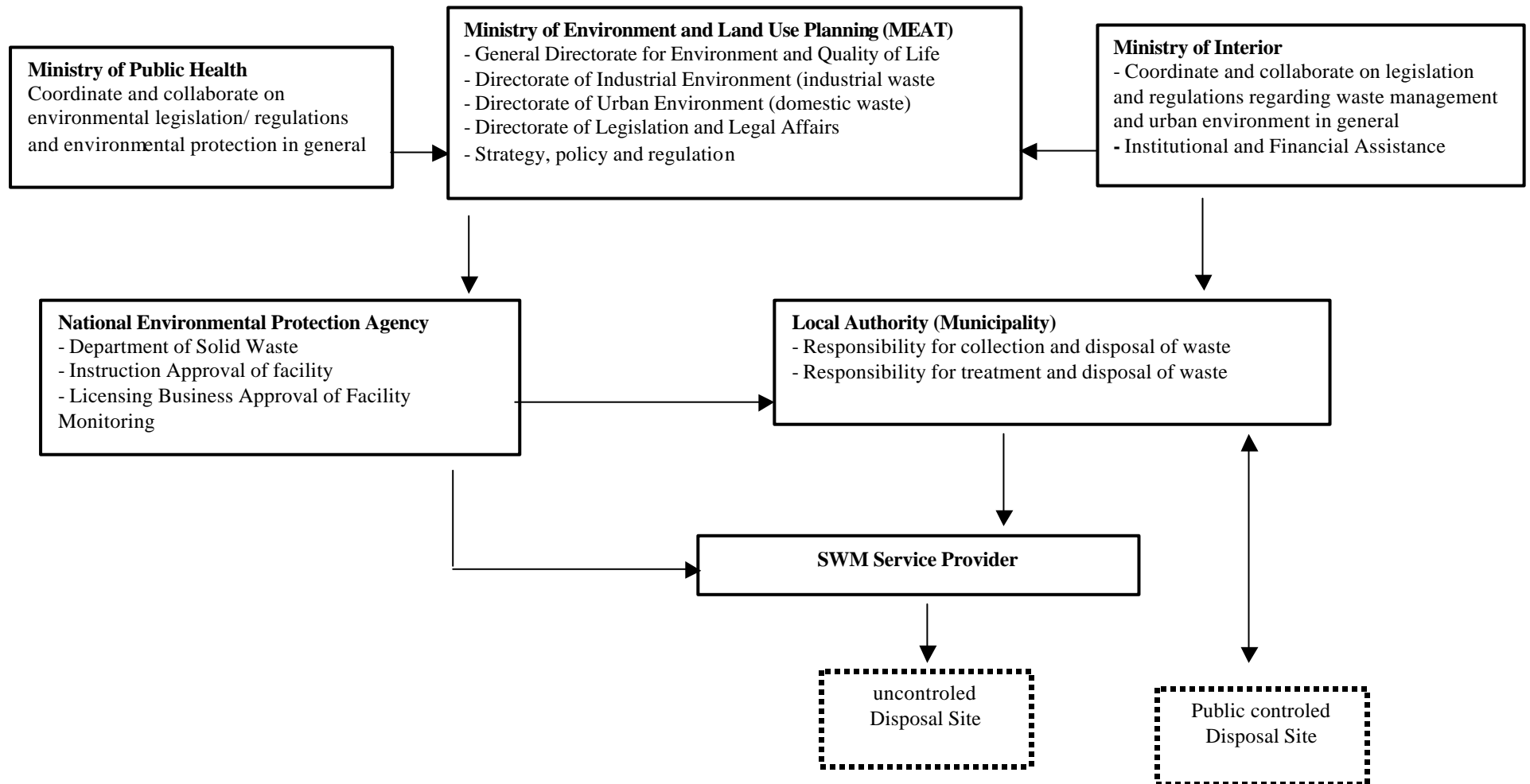
The Ministry of Environment and Land-Use Planning (MEAT) is concerned with all aspects of managing environment in Tunisia, including solid and hazardous waste management. In the field of waste, the MEAT has a number of responsibilities including:

- ♦ the improvement of the Government's policy in environment protection;
- ♦ the establishment of waste norms for all main sectors, (industry, agriculture, tourism, energy, transport and other sectors), and monitoring the application of these norms;
- ♦ approval of investments in environmental protection projects, and monitoring their implementation;
- ♦ issuing authorizations for activities in solid waste management.

The Department of the Urban Environment of the MEAT is responsible for:

- ♦ assisting industrial establishments and polluters in reducing waste and emissions;
- ♦ assisting the local authorities in setting-up and running controlled dumping, and waste sorting and recycling units;
- ♦ setting-up pilot projects in the solid waste sector.

Figure 2- Administrative Setup of the Urban Solid Waste Management System



3.1.1.3 National Agency for the Protection of the Environment (ANPE)

The National Agency for the Protection of the Environment (ANPE) has the following responsibilities:

- ♦ monitoring waste treatment infrastructure and the pollution created by it;
- ♦ promoting training, education, studies and research regarding the protection of the environment and the fight against pollution.
- ♦ Assisting industrials in the elimination or reduction of pollution.

The Department of Solid Waste in ANPE, created in 1996, has the following responsibilities:

- ♦ participating in the improvement of the strategy for solid waste management at the national level;
- ♦ launching and monitoring research in the solid waste sector;
- ♦ drawing-up an inventory of sources of pollution created by solid waste, and monitoring these sources;
- ♦ evaluating authorizations for private companies specialized in solid waste processing;
- ♦ drawing-up and evaluating permits for private companies involved in activities linked to solid waste;
- ♦ participating in drawing-up regulations and international conventions dealing with solid waste management;
- ♦ participating in public information campaigns on solid waste;
- ♦ drawing up hazardous waste treatment plans.

Two other public bodies under the MEAT are concerned with the Solid Waste management: ONAS and CITET.

3.1.1.4 National Sewage Agency:

The National Sewage Agency (ONAS):

It has the following responsibilities:

- ♦ the protection of water resources,
- ♦ the development and execution of integrated projects for the treatment of waste water, rainwater and household waste in local authority areas.
- ♦ Research, studies and consulting missions, dealing with solid waste and residual liquid waste from industrial processes.

ONAS is involved in the implementation of the PRONAGDES:

ONAS had the responsibility of managing the controlled landfills of Greater Tunis (Henchir el Yahoudia and Raoued) from their creation in 1984 until 1990. It also has the responsibility of managing environment programs in the Medjerdah Valley.

The International Center for Environmental Technology (CITET):

The CITET has the following responsibilities:

- ♦ strengthening national solid waste management capacity by organizing training seminars and sessions;
- ♦ assisting small and medium-sized companies involved in solid waste management through its solid waste department;
- ♦ undertaking research projects on the biological management of landfill, composting, use of waste as source of energy, etc);
- ♦ operating a laboratory specialized in solid waste analysis.

3.1.1.5 Ministry of Public Health

The Ministry of Public Health is involved in the environmental legislation and regulations and in coordinating and defining strategies, programs and projects dealing with solid waste. It is responsible for controlling septic waste in hospitals and clinics.

3.1.1.6 Ministry of Industry

The Ministry of Industry is involved in the environmental legislation and regulations and in coordinating and defining strategies, programs and projects dealing with solid waste. This ministry has the responsibility of controlling classified industries (polluted, dangerous, dirty industries).

3.1.1.7 Municipalities

The Municipalities, as urban local authorities are concerned with all aspects of managing the environment in its areas, including cleanliness and solid and hazardous waste management.

According to the terms of the **municipal organic law** local authorities (the communes) are responsible for "the collection, sorting, processing, removal and burial of waste in specially designated and monitored dumps".

3.1.1.8 Municipal Agency for the Processing and Re-use of Waste

The Municipal Agency for the Processing and Re-use of Waste (AMTVD) is an operator of landfills. It has the responsibility of managing landfill operations in the Greater Tunis area. The agency was created in 1990 under the control of the Municipality of Tunis. Its role is to set up and manage controlled waste dumping operations, and to create waste processing units. The agency is operating in the District of Tunis with its 29 municipalities. The AMTVD manages dumps for 19 municipalities of Greater Tunis and the solid waste of more than 800 industrial companies located in the District of Tunis.

3.1.1.9 Private companies

Numerous private companies are involved in the solid waste sector. The government is encouraging the private sector to be involved in the sector, and since 1992 the Government has actively encouraged local authorities to sub-contract waste collection to the private sector.

Private sector involvement in managing infill centers will start in 2000 with the biggest landfill in the country "Djebel Chekir Unit", and will be further developed once the regulatory framework has been completed.

Some companies are involved in collecting and recycling plastic, textile, paper waste, used tires and metals.

3.1.1.10 Municipal Development Authority

The Municipal Development Authority (CPSCL) has the responsibility of financing Municipal Investment Programs and monitoring their achievements. As PICs constitute the development framework of municipal action. SWM constitutes one of the their main components.

3.1.1.11 *Municipal Training Center*

The Municipal Training Center has the responsibility of strengthening municipal solid waste management capacity by organizing training sessions for local authorities staff.

3.1.1.12 *National Federation of Cities of Tunisia*

The National Federation of Cities of Tunisia (FNVT) has the responsibility of strengthening municipal solid waste management capacity by organizing training sessions for elected bodies in local authorities. It has the responsibility of federating municipalities, awareness and exchange of experience in the field of municipal development.

3.2 Staff/Management (salaries, employment, training)

The management of waste is driven by MEAT, ANPE, MI and municipalities' staff. However, There is no specific data on the staff managing waste at the national level, it is estimated that more than 90% of those involved in SWM are municipal staff. The salaries applied to the staff are determined by the national regulation of salaries for the public sector.

Management staff at the national level also benefit from important training sessions organized by MEAT, MI, ANPE and other donors (USAID, GTZ, METAP...) on solid waste management. The Local Governments support Programs supported by USAID financed activities for training of trainers and courses on development in municipal finance, institutional strengthening, monitoring, and management, evaluation and implementation of special studies on conditions for private sector involvement in SWM. These Programs attempt to increase local government accountability and strengthen the municipal capacity to manage urban services as well as, the development of solid waste pilot projects for the private sector by providing technical assistance and training to:

- i- municipal staff and national government official
- ii- businesses, community groups and NGOs
- iii- elected municipal councils through FNVT.

The municipal Training Center developed training programs for improving municipal management capabilities in SWM and finance dealing with waste management and for encouraging private sector provision and delivery of urban infrastructure and services including waste collection end disposal.

3.3 Conditions for private sector involvement

The Private Sector's involvement in the solid waste sector is recent. This is due to the absence of regulations to authorize the private sector's involvement in environmental service delivery, mainly due to the lack of data on SWM costs. However, as the IXth National Plan (1997 - 2001) has placed a major emphasis on the increased participation of the private sector in the delivery of environmental services, Tunisian legislation and regulations were revised to improve private sector's involvement.

The Investment Incentives Code, which came into effect in January 1994, provides for freedom of investment and declarations, and strengthens the opening up of the Tunisian economy into the outside world. The Code covered the following sectors :agriculture, fisheries, manufacturing industries, public works, tourism, crafts, transportation, education and vocational training, cultural production, youth entertainment, health care, environmental protection, real estate, other non-financial activities and services.

The common incentives for investment in Tunisia are:

- Tax exemption for reinvested revenues and profits, up to 35% of the revenues or profits subject to corporate income tax.
- Customs duties exemption on capital goods with no locally-manufactured equivalent.
- Limitation of the VAT to 10% on imported capital goods.
- Possibility to choose a graduated depreciation system for production equipment whose accounting life exceeds seven years.

The Code also grants benefits for the environmental protection and waste treatment projects:

- Tax exemption of 50% of the reinvested revenues and profits from the net profits subject to corporate tax.
- Reduced taxation of 10% on revenues and profits.
- Subsidy of 20% of the investment value.
- Suspension of the VAT on most capital goods.

The FODEP, anti-pollution fund, was launched in 1993 under the management of MEAT, attributes subsidies to companies to develop SWM collection or disposal infrastructure or to purchase equipments.

3.4 Financial resources (funding, budgeting, fees, etc.)

Although solid waste management is a municipal function in Tunisia, central government play an important role in its financing. Generally, the central government participate in solid waste management financing through capitalization of infrastructure. Thus it has mechanisms for low interest loans or subvention in support of waste management capital investment. While Recurrent costs, such as labor, maintenance and private sector contracts are borne by the municipalities.

The Ministry of Economic Development allocates the budget required for waste management capital expenditures in Tunisia through the mechanism of 5-year development plan. However, the cost recovery mechanisms are limited. There is no parallel consideration to meeting the operating costs to support the investments.

In General, the financial resources of SWM are mainly from the public sector. Municipalities finance the collection and transportation of solid wastes. The Central Government gives municipalities subsidies and grants to realize their PICs while, Land fills are financed by national resources. Municipal resources are collected from local taxes and particularly sanitation taxes included in the municipal tax.

4. Private sector profile

4.1 Formal and informal sectors

As mentioned earlier, the private sector became involved in SWM only recently. About 30 municipalities have subcontracted the private companies for the collection of solid waste covering different areas of the municipalities. By the end of 1998, the construction of the in-fill center was fully completed and the Tender for sub-contracting the operation of the landfill of Greater Tunis to the private sector was under way.

However, There is no data collected and published on activities, capacities, sizes, revenues, incomes, employment and costs of formal or informal private sector operating in SWM.

The participation of the private sector in collection activities began to be widely practiced and well developed in large and medium municipalities.

It is expected that the involvement of the private sector will increase in the coming few years in the operation of landfills. The first experience will be in the Djebel Chekir center where tender documents are currently being analyzed to select the private operator.

In the recycling sector, however, significant and ambitious efforts are now being made to build Public Private Partnership PPP that will lead the recycling of plastic packaging. As decree 97-1102 requires that producers and distributors of plastic bags and plastic or metal packaging of 100ml or more are subject to the regulation must:

- 1- be manufactured using non-toxic materials that can be reutilized.
- 2- Recover their packaging or participate in a public organization whose objective is to recover packaging.

The public organization Eco-Lef, discussed previously in (section 2.2.2) of this report was established under the direction of the National Agency for Environmental Protection that will oversee the recovery and utilization of used packaging.

Most private producers/distributors of packaging belong to Eco-Lef. Thus a board including public and private participants has been established to implement the recovery system, sell the recovered packaging and support the purchase of goods manufactured by the recycled materials. The recycled activities of Eco-Lef will be capitalized by the contribution of its private members and shall be sustained by operating revenues.

5. Practices

5.1 Composition and Generation

5.1.1 Composition

In Tunisia the term urban waste includes:

- all domestic and similar waste,
- industrial waste, and
- septic wastes.

Domestic and similar waste includes:

- ordinary waste created by households, offices and services generated by food preparation and cleaning;
- waste produced by the cleaning of daily public markets, public places and squares, streets and public areas;
- waste similar to household waste produced by schools, and public building;
- vegetable waste coming from public gardens and streets;
- used objects and equipments of domestic origin.

Industrial waste includes:

- waste generated by industrial, commercial and craft producing activities;
- special waste of an inflammable, toxic, corrosive or explosive character;
- sludge from sewage treatment plants;
- waste arising from the cleaning and flushing of sewage networks;
- old car bodies;
- debris coming from public and private construction works.

Septic waste includes:

- contaminated waste coming from hospitals, clinics, pharmacies and laboratories;
- abattoir waste;
- corpses of small and large animals.

The average composition of urban solid waste in Tunisia is as follows:

Table 4. Composition of Urban Waste

Composition of urban waste	% ①	% ②
Kitchen refuse	60,26%	68%
Paper	14,65%	11%
Plastic, leather and rubber	5,87%	7%
Plant waste	5,63%	
Textiles	4,58%	3%
Metals	3,36%	4%
Soil and ashes	1,19%	
Glass and ceramics	0,68%	2%
Domestic hospital waste	0,17%	
Industrial waste	0,06%	
Toxic waste	0,03%	
Diverse unidentified waste	3,51%	5%
Total	99,99%	100%

① MEAT . ANPE - 1995

② MEAT . ANPE . Solid Waste department - 1998

This table shows the significant proportion of organic waste (about 2/3 of the total production).

5.1.2 Generation

Waste generation is variable in seasons and years.

These variations are the result of differences in accounting waste components

At national level the total generation is estimated, in 1998, as follow:

- organic waste : 1 500.000 ton/year
- hazardous waste: 320,000 ton/year (mining waste excluded)

The generation per capita was estimated by different studies, realized in Tunisia, as follow:

Table 5. Per Capita Generation of Waste

Year	1977	1980	1984	1988	1992	1993
Generation per capita Estimation in Kg/cap/day	0,4	0,564	0,616	0,600	0,850	Average 0,500

A significant variation in generation and composition is noted in different studies realized from 1977 to 1993. The present table shows theses variations:

Table 6. Variations of Waste Generation Per Component Between Different Studies

Year	1977	1980	1984	1985	1995
Operator/ study	District de Tunis- SCET/Tunisie	District de Tunis- Sotuetec-Sotinfor	ONAS 1984-1988	District de Tunis (composting unit)	ANPE
	%	%	%	%	%
Organic waste	80,8	63,9	58,0	71,5	60,26
Paper	9,6	17,4	16,0	8,2	14,65
Metals	2,1	3,5	7,0	3,8	3,36
Glass and ceramics	1,6	2,6	4,0	4,0	0,68
Plastic and rubber	2,9	5,2	5,0	3,8	5,87
Others	1,2	7,4	10,0	8,7	15,17

The waste generation is estimated as follows:

Table 7. Estimated Waste Generation

Waste Composition	Generation per capita Kg/capita/day
Total Waste generation	0,5 - 1,5
Organic waste	02 - 0,5
Paper	0,03 - 0,05
Metals	0,004 - 0,01
Glass and ceramics	0,004 - 0,01
Plastic and rubber	0,04 - 0,9
Others	

Annual growth of waste generation per capita is estimated at 0.75%

5.2 Collection and transfer

The quantity of solid waste produced by the different sectors of the Tunisian economy continues to grow and put pressure on the environment. A number of projects and new infrastructure realized during the ninetieths have helped to reduce this pressure. These projects and infrastructure concern collection, transfer, treatment and disposal

The amount and composition of solid waste produced by Tunisian cities varies by location of cities and income level in one city. Collection systems varies widely city location (coastal or not) and municipalities revenues and infrastructure level. All the municipalities have a collection service using collection vehicles. The use of garbage containers is frequent in cities and their adequacy is considered moderate to good.

Collection rate is pretty high it is on average over 90% and the total the population receiving waste collection services is between 60-90% depending on the area where areas of higher standards of living and large urban agglomerations receive the better service. This excellent collection service is attributed to the Presidential Priority and to privatization of the service in some municipalities.

The separation at source of organic material, paper, glass, metal,... is not developed.

5.3 Treatment and disposal

Waste disposal remains a problem in all the cities outside the Greater Tunis. Projects planned for the near future will solve the problem in the mean urban agglomerations of the country. In small size cities waste disposal will remain a problem for cities and for environment.

The use of uncontrolled waste disposal sites could contaminate soil, ground and surface water, and sea water in some cases. In many cases of small size cities waste is burned in disposal sites. Some cities use inappropriate disposal sites which location constitutes a problem for environment, esthetic and in some cases for public health.

However, PRONAGDES is expected to bring solutions to some of the major cities in the country. The projections of PRONAGDES are as follow:

During the ninth Five -Year Plan, the PRONAGDES has undertaken the following activities:

- rehabilitation of abandoned tips;
- establishment of nine household waste processing units: Bizerte, Djerba, Gabes, Kairouan, Mednine, Monastir, Nabeul, Sfax and Sousse;

A master plan was drawn up for Bizete , and the operational studies were undertaken . The call for tender is ready to be made.

Illegal tips to rehabilitate have been listed, and the cost of upgrading these 400 tips was estimated. A first list of 68 tips has been drawn up for priority intervention at a cost of 52 million Dt.

However, Criteria for siting landfills, transfer stations, composting facilities, recycling facilities, ...etc. has been established by PRONAGDES, but it has not been established in the legislation, thus environmentally and socially protective operational criteria does not exist. Furthermore, monitoring of siting criteria and mechanisms for enforcement do not exit as well.

5.4 Recovery

All recovery is an informal private sector activity. Only through Aco-Lef ANPE developing a formal recovery system for plastic packaging is being developed.

The MEAT is encouraging municipalities to introduce recycling, reuse and recovery, but this is at a very preliminary stage. The El Khadra pilot project was developed to demonstrate the advantages of collecting organic waste separately and the value of recovery.

5.5 Hazardous waste

This sub sector is under development in Tunisia through a special activity of PRONAGES. A specialized discharge is planned in Jrada .For septic waste, it is planned to realize an incineration unit in the newly built landfill of Greater Tunis. Regulations for septic waste, adopted by the Ministry of Public Health are well applied for collection and transport.

6. Performance assessment and analysis

6.1 Collection, Transportation and Disposal of Solid Waste Management

While collection systems in Tunisia are generally adequately managed in the major cities of the country, waste disposal remains a problem in all the cities outside the Greater Tunis. Projects planned

for the near future may solve the problem in the main urban agglomerations of the country. In small size cities waste disposal will remain a problem for cities and for the environment.

On the other hand, the use of uncontrolled waste disposal sites could contaminate soil, ground and surface water, and sea water in some cases. In many cases of small size cities waste is burned in disposal sites. Some cities use inappropriate locations for the disposal sites, thus constituting problems for the environment, esthetic and in some cases for public health. Through the achievements of PRONAGDES numerous of those uncontrolled disposal sites will be shut down.

SWM physical systems are not well designed in cities, and in general there is an absence of indicators to describe and evaluate the physical design of SWM operations. Another obstacle is the lack of human resources in municipal SWM services.

The uncontrolled landfills are the field of informal recycling of material and the source of revenue for a great numbers of households and constitute a serious problem of hygienic.

Managing industrial waste is neglected in general and the practice of mixing urban waste and industrial waste at the same disposal site in small cities (and in large ones) is improper for environment and local economy.

6.2 Planning and Standardization

Small municipalities do not have a planning approach to SWM, mainly because of their limited human and financial resources. The largest cities have the same problem, mainly because of the size of their territories regardless their financial resources and pressure exercised on their budget for other urban infrastructures.

Municipalities do not have qualified technical staff for planning SWM. The staff they have is beyond the needs of the municipalities, and all their capacities are used to organize daily work.

The MEAT is not assisting the municipalities in SWM strategic planning. The capacity of the technical staff in ANPE and MEAT are used completely for strategic planning at the national level.

Standards for operating SWM are not available. ANPE is approving new facilities on the bases of technical standards used only in ANPE and not approved by a special regulation. It is problematic to have ANPE managing landfills and controlling its own facilities.

6.3 Regulatory, Institutional and Financial Aspects

Ambitious Integrated solid waste management program planned. The planned policies, standards and regulations may be too ambitious for the available human and financial resources of the local authorities.

The enforcement power and applicability of regulation are very weak in the field of solid waste (comparatively to industrial pollution). This category of enforcement cannot make money to ANPE especially the polluters are municipalities.

The environmental legislation and regulations applicable to solid waste in municipal territories are not well applied and in some cases the level of detail of these regulations is not adequate and the needed detailed to control are not yet prepared and adopted.

The institutional framework needs to be more clear to have more details on responsibilities and to avoid situations of conflicts (All the important decisions dealing with SWM are taken in Cabinet meetings headed by the President).

Inter-municipal cooperation is totally absent, as well as the exchange of experiences based on technical and financial data.

The Municipality which is responsible for the actual SWM operations does not participate in initiating and implementing policies (except for the largest cities as Tunis, Sousse or Sfax).

Cost recovery and institutional aspects require further development to ensure sustainability of solid waste management system. This would probably require institutional reform and regionalization of services.

Investment and operating costs of SWM services are not assessed and recorded adequately. It is almost impossible to have useful information on financing of SWM in the country and in municipalities. It is to have an idea on resources of financing the system and what represents the user fees, the municipal budget, the recovery through local or specific taxes and the grants from the central government through subsidies or incentives.

There is no participation at the regional level. Financing SWM through grants, national programs and projects, strategic planning and assistance with technical expertise are all taken at the national level. The role at the regional level is limited to monitoring. However, in the absence of indicators, this monitoring is very preliminary.

The degree of privatization of SWM, one of the main indicators of sustainability is not high and until now private sector involvement is limited to collection.

Technical performance cannot be monitored due to lack of indicators adopted at national or local levels

Public awareness is not well developed. It takes the form of occasional campaigns.

7. Conclusions and Recommendations

Although the successes of the Tunisian solid waste management system are significant in the region due to a strong legislative framework and the institutional response to this framework, however a number of measures could be taken to ensure the sustainability of this system and enhance the performance.

Institutional capability to manage solid wastes is required side by side with the initiatives that are being taken by the government, namely the Eco-Lef initiative and the proposed national waste management agency. This includes regionalization of at least some waste management functions at the local levels which will be more cost effective.

Human resources capacity building is also required in waste minimization, cost recovery management and contract management.

Options for new methods of cost recovery should be considered.

Additional solid waste management disposal facilities are required.

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