Blue Plan Notes
Environment and Development in the Mediterranean
N° 4 October 2006

Facing water stress and shortage in the Mediterranean

In the countries bordering the Mediterranean Sea, water resources are limited and unevenly apportioned over space and time – Southern Rim countries are endowed with only 13% of total resources.

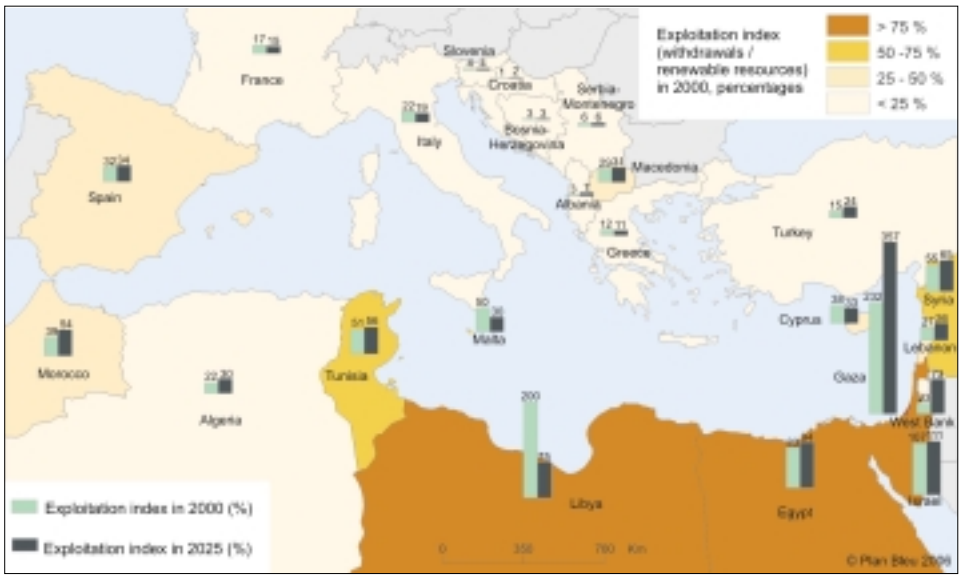
Thirty million Mediterranean people, particularly in the South and East, are deprived of access to drinking water.

Within a context of worsening shortage in parts of the region and in view of the uncertainties brought about by climate change, the Blue Plan work highlights the absolute need to adapt water management policies, to better manage the different water uses and to ensure more optimal and effective use of resources, if present and future needs of populations and development are to be satisfied.

Growing pressures on water resources

During the second half of the 20th century, water demand, i.e. the amount of resource abstraction (95% of total withdrawal, including losses during transport and use) plus unconventional production practices (desalination, wastewater reuse…), has increased twofold, reaching 290km^3 in all riparian countries in 2000. Agriculture is the main water-consuming sector and accounts for 63% of total water demand (42% in the North and 81% in the South and East), while it only remains marginal in the Eastern Adriatic countries.

Figure 1 Exploitation indices of renewable natural water resources, per country, 2000 and 2025



Source: Plan Bleu, J. Margat
Note: Indices nearing or exceeding 75% reveal very strong pressures exerted on water resources; ratios between 50 and 75% point out significant medium-term risks of structural stress; indices between 25 and 50% indicate that countries may endure local or fluctuating stress.

By 2025, the significant increase in pressures on water resources, gauged by *the exploitation index of renewable natural water resources*, highlights strong and sometimes alarming contrasts as regards the "future of water" (Figure 1). Today, in some countries, water withdrawals already near or even exceed the limit threshold of renewable resources. Current and future

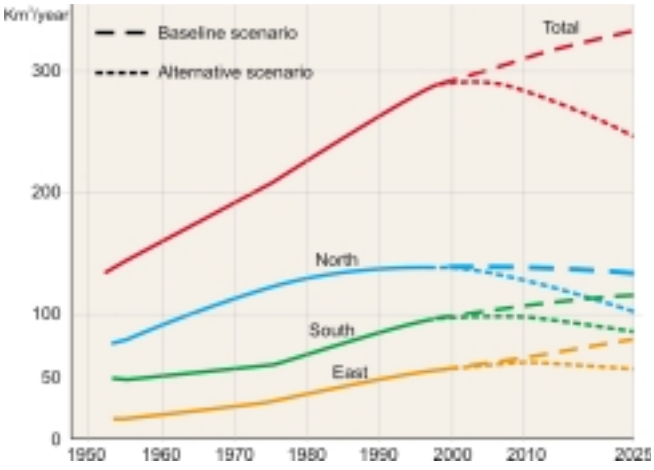
situations are even more alarming when the index is calculated at the scale of the Mediterranean catchment areas, rather than at the country scale.

Pressures can also be qualitative. Many aquifers, particularly in the North, show excessively high contents of pesticides or nitrates. Twenty-seven million Mediterraneans are deprived of access to improved sanitation systems, mainly in the South and in the Middle East. And everywhere, many rivers are subjected to chronic pollution due to non-treated domestic and industrial discharges.

Water demand incompatible with resource availability

According to the projections of the Blue Plan baseline scenario, water demand may increase by a further 43km^3 by 2025, essentially in the Southern and Eastern countries, and mainly in Turkey and Syria (Figure 2).

Figure 2 Total water demand, baseline and alternative scenarios (entire countries)



Source: Plan Bleu

Agriculture is expected to remain the main water user in volume, for water resource to satisfy irrigation requirements, in particular in the South and East. According to FAO, irrigated surfaces could increase by 38% in the South and by 58% in the East by 2030, whereas in the North, water demand for agriculture would remain stable and even decline (Italy).

Growth in *drinking water* demand is also expected to continue, to satisfy the needs of ever-larger urban populations - additional 98 million urban residents are expected in the South and East by 2025 - and ever-expanding tourism.

The difficult-to-quantify *environmental* water demand, essentially required for the proper operations of ecosystems, may also increase. Some countries have included in their legislation the respect of a minimum flow in rivers set for the survival of species (France) or have included more explicitly an environmental demand (Spain). Other countries, such as Italy, are considering similar measures.

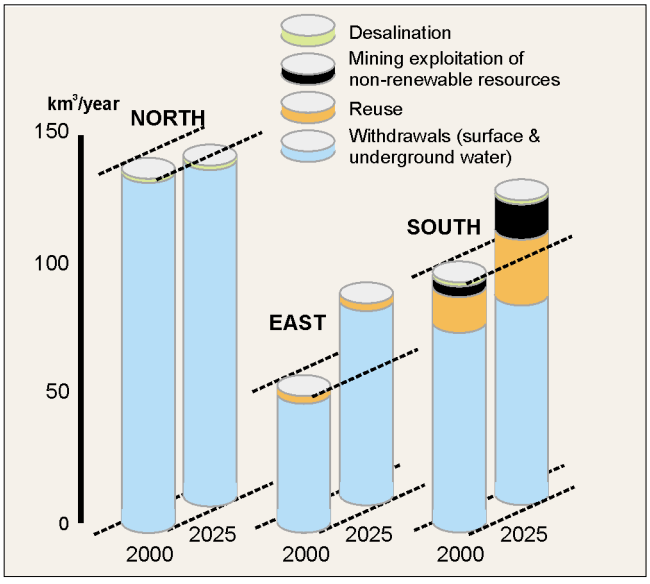
Water policies still too supply-focused

To meet growing demand, national strategies essentially rely on the extension of water supply and on major waterworks to enhance resource management and reduce risks resulting from natural constraints – 1,200 large dams are already recorded in the sole watershed area. The supply-based approach is expected to remain prevalent and lead to the following consequences (Figure 3):

➤ Increased withdrawal of renewable resources through major hydraulic projects, overexploitation of underground water and development of interregional and international transfers, while conflicts over management of shared resources, such as transboundary rivers and aquifers, could be accentuated;

➤ Increased "mining" exploitation of non-renewable underground water resources in the Saharan basins of several Southern Mediterranean countries. Such excessive abstraction may more than double by 2025, particularly in Libya and Algeria;

Figure 3 Water supply sources in Mediterranean countries (baseline scenario)



Source: J. Margat

➤ The use of return water from agricultural drainage (Egypt) and the reuse of treated wastewater for irrigation (Spain, Israel, Cyprus, Egypt, Tunisia);

➤ Industrial freshwater production through desalination of seawater or brackish water, as is currently the case in Malta, Spain, Algeria and Israel.

Desalination costs have been significantly reduced, making this approach to resource supply more competitive than transfers. The use of freshwater produced in this way is no longer limited to satisfying drinking water requirements, but may also be used for irrigation, until now considered as too expensive. Spain already ranks first in the use of desalinated water for agriculture – over 22% of production worldwide. However, the total volume of treated wastewater and of desalinated water is expected to account for only 25km^3 in 2025, 90% of which in Egypt with the recycling of agricultural drainage water.

The continued application of policies focused on extending supply and pursuing abstraction, using and constantly deteriorating natural resources, represents severe risks in the long-term, such as the rapid depletion of some fossil resources, the destruction of coastal aquifers through seawater intrusion, the degraded quality of water and aquatic systems, reduced flows and the drying-up of wetlands. The factors of increasing "water vulnerability" (production costs, conflicts, sanitary risks) could be aggravated. Supply-based policies are therefore reaching physical, socio-economic and environmental limits, as demonstrated in the South and East by the current condition of dams, where silting will probably reduce most of their capacity (in Algeria, some reservoirs have already lost 25% of their initial capacity).

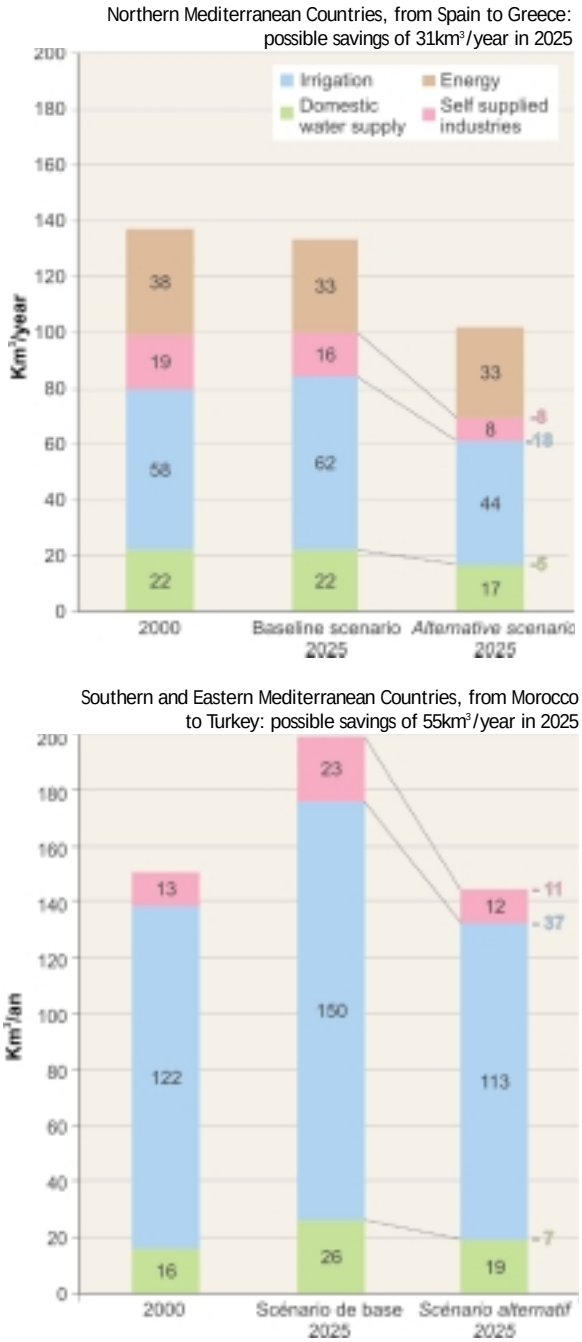
Saving a quarter of water demand

Because water management is also a political issue, current trends may be inverted, through policies aimed at improving efficiency of use and at further reducing losses and poor usage (waste, leaks exceeding 50% in some cities).

There is considerable room for progress since *improved water demand management* (alternative scenario) would make it possible to save 25% of water demand, i.e. approximately 86km^3/year in 2025 (Figure 2 and Figure 4).

Irrigated agriculture represents the largest potential for volume savings, with nearly 65% of total water potential savings identified in the Mediterranean (transport losses reduced by 50%, down to 10%, irrigation water efficiency increased from 60% to 80%). A further 22% in water savings potential can be expected from *industry* (recycling rate up to 50%), and another 13% from *drinking water* supply (transport losses and household leaks reduced by 50%, respectively down to 15% and 10%).

Figure 4 Water demand per sector, baseline and alternative scenarios, entire countries



Source: Plan Bleu, J. Margat

According to this optimistic view, assumed to be generalized throughout the Mediterranean countries, total water demand would level off at 102km^3/year in the North and at 144km^3/year in the South and Middle East, globally equivalent to the drop in total current demand of approximately 40km^3/year (figure 2).

These global estimates, based on concrete experiences carried out in certain countries (insert), show that current trends can be inverted.

Water-saving policies in Tunisia and Morocco

Tunisia has implemented a national water-saving strategy for irrigation, which includes the creation of user associations, pricing aimed at progressive cost recovery, targeted financial instruments for water-efficient farming equipment, and support to farmer revenues. Since 1996, this policy has stabilized irrigation water demand despite agricultural development, and the needs of both the tourism sector (a source of foreign currency) and cities (a source of social stability) have been assured.

In Morocco, increasing water demand in Rabat-Casablanca has been slowed down noticeably during the past fifteen years despite high urban growth. Improved water management (reduction of leaks, progressive pricing, systematic metering, major public awareness campaign) has deferred or perhaps completely avoided some costly investments (dams, transfer canals) initially planned in the 1980 Master Plan, while satisfying the needs. These investments, which are difficult to finance without extra debts, may prove to be unnecessary in the long term.

The challenge of water demand management is not only limited to physical savings. It also means improved economic and social enhancement of mobilized resources and the coverage of water requirements of ecosystems. In Northern Rim countries, rather better endowed with water and where demand is falling, resource quality is prevalent, on a par with the interest in maintaining or restoring ecosystems, generating lesser water supply costs. In the South and East, where countries are facing both the squeeze from limited water resources and the rapidly increasing demand, quantitative aspects are still the main issue.

The necessary reforms to invert current trends

The transition from the baseline scenario to a sustainable development scenario can only be gradual, carried by the indispensable policy reforms posting clear integrated water resource management objectives in all policies – particularly in agricultural ones – and generating the means for implementation, based on the development of sustainable efficiency plans and financial mechanisms.

In this context, both the financing of investments in drinking water supply and sanitation infrastructures (in the South and East) and the recourse to economic instruments such as subsidies and pricing to optimize allocation of available resources, appear crucial for the future. The same applies to strengthening management capability, particularly at local level. Regional cooperation, based on a long-standing tradition in water in the Mediterranean, can certainly contribute as catalyst to accelerate the emergence of the required changes.

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