‘KEY THEME PAPER’ : WATER DEMAND MANAGEMENT

Leaders	**Egypt & France**
Contributors	

Disclaimer:
This document has been developed through a collaborative process involving the Euro Med and South-Eastern Water directors as well as stakeholders participating in the Water Directors Forum. It is based on a number of reports referenced at the end of the document. The document does not necessarily represent the official, formal position of any of the partners.

1. Summary

Access to good quality water in sufficient quantity is fundamental to the daily lives of every human being and to most economic activities. With increasing population growth, environmental degradation and impacts of climate change, it is no longer possible to simply satisfy all water demands by increasing the supply; there is little potential for developing new resources or increasing current ones.

Therefore, an integrated approach for water resources management, based on water demand management is absolutely vital if the Mediterranean community is to ensure that enough water is available to all Mediterranean citizens, economic activities and the environment.

The WDM approach is not a new paradigm for the Mediterranean and the concepts appears in a number of international conferences. Despite the fact that WDM is being analyzed and discussed for a number of years and that several countries have already implemented actions, a lot remains to be done, in particular in the context of the impacts of climate change. International recommendations provide a way forward but it is up the local, national and regional bodies to tackle the issue as appropriate.

The state of play indicates that a number of prerequisites are to be implemented if we are to further develop WDM measures in the Mediterranean. Strengthening legislation and capacity building, developing appropriate technologies, enhancing training, delivering adequate water pricing policies are a number of actions that should be promoted in the Mediterranean in order to facilitate the WDM approaches. In addition, the costs and impacts of these actions should be assessed.

The way forward should include the following:

- Promotion of ‘no regret’ solutions based on water efficiency measures through:
  - Adoption of a quantified water saving target at regional level, based on technical and economical analyses and to be translated at national level;
  - Identification of concrete water efficiency based projects in the region;
- A wider reflexion of the interlinkages between water and trade, agriculture, energy, tourism.

2. Challenges

The challenges of poverty and hunger remain as great and compelling as ever. The number of the world's under-nourished is still on the increase, despite the remarkable progress made in agricultural development. Increasing food production to meet the basic needs of the increasing world population on a sustainable basis remains the primary goal of all nations.

In this context the importance of irrigated agriculture needs no emphasis. Currently, production from the irrigated lands, which constitute about 17 percent of the total arable lands, accounts for 35 percent of the global food harvests. Irrigation has the ability not only to increase production per unit area of land but also to stabilize production. Indeed many countries will look to irrigated agriculture as the only reliable means to increase production on a sustainable basis.

Nowadays, a growing realization that an increasing number of countries are approaching full utilization of their conventional surface water resources and that the quantity of good quality water supplies available to agriculture is diminishing. What is left is water of marginal quality such as saline groundwater and drainage waters. More attention should be given for using such quality water and its effect on the ecosystem. Moreover, it needs more investigation from the economic point of view.

Access to good quality water in sufficient quantity is fundamental to the daily lives of every human being and to most economic activities.
In a number of countries where food security is no more a challenge, water resources management still remains an issue, in particular in water scarce areas where water is a natural resource requested for economic development. Agriculture, industry, tourism, energy, transport and urban development require good quality water available all the year long with seasonal peaks.

Worldwide water is becoming increasingly scarce. In the past times, at least in non-desert areas, water availability was unquestioned. It has been available from surface or groundwater sources and ready to be applied in multiple uses. With increasing population densities on one hand, and environmental degradation on the other, there is an increasing pressure on water and water systems for direct consumption and for productive use.

In a context where changes in climate are expected to worsen the trend, where drought episodes will become more frequent with an increased intensity, effective strategies should be devised.
It is no longer possible to simply satisfy all water demands by increasing the supply; there is little potential for developing new resources or increasing current ones.

2.1. Demand vs supply

Water management strategies have always focused on developing new supplies to satisfy the ever-increasing demand from all sectors and on building the infrastructures to convey and distribute these supplies to the different users. Till recently, very little attention was given to reduce the demand or improve the water

quality. Almost all the supplies have been developed in the water scare countries. Quality management seeks to maintain the usability of resources by controlling pollution. Environmental protection has become the focus of water management in many countries. However, preserving the ecology of the water resources system should not prevent its development for the benefit of the other sectors. A compromise can easily be reached if the spirits of cooperation prevail during the planning and management activities.

In the Mediterranean, during the second half of the 20th century, water demand, i.e. the amount of resource abstraction (95% of total demand, including losses during transport and use) plus unconventional production practices (desalination, wastewater reuse…), has increased twofold.

In 2005, the total water demand was around 280 km3 and 64% was used by agriculture (more than 80% for Southern and Eastern countries), 14% by local authorities for public drinking water networks (including tourism), 7% industry, 15% energy (cooling towers). The water demand in the Mediterranean is expected to increase by 50 km3/year by 2025 to reach 330 km3/year[1].

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:

- a first group of countries, where water abstraction are close or exceed the average annual volume of renewal resources: Egypt, Israel, Libya, Jordan, the Palestinian Territories and Spain's Mediterranean basins;
- a second group of countries where the total demand represents a growing share of the average annual volume of renewable resource, but where the exploitation index will stay between 50 and 75% until 2025: Malta, Syria and Tunisia
- a third group of countries where the exploitation index lies between 25 and 50% may experience nevertheless local or exceptional stress: Lebanon, Cyprus, Morocco, Turkey and Algeria
- a foruth group of countries where the exploitation index is less than 25% Greece and Eastern Adriatic, France and Italy where total demand is dropping.

Pressures can also be qualitative. Many aquifers, show excessively high contents of pesticides or nitrates.

2.2. What does Water Demand Management mean?

Water demand management refers to the implementation of policies or measures which serve to control or influence the amount of water used[2]. Water Demand Management can be a viable management option to complement supply management in alleviating problems of water stress.
Fortunately, the demands of most sectors are not absolute, but amenable to management, which should aim at optimizing the return from the various allocations under the expected conditions of scarcity. In this respect, non-engineering demand-

[1] Plan Bleu data
[2] European Environment Agency (EEA) Glossary

oriented measures, such as inter-sectoral collaboration, building public awareness and economic incentives will have an important role in order to match demand with available supply.

Demand management addresses three level of actions:

(i) proper allocation of water use between all uses (economic sectors needs, the environment),
(ii) how water is channeled to users,
(iii) how it is used.

Demand- oriented measures could be classified in one of four main measures; Technical, Institutional, Legal, or Economic (see Annex 1 for further details).

These measures that can be non-financial (e.g., awareness) or financial (e.g., incentives), and they can also, be mandatory (e.g., regulations) or optional (e.g., market systems) [3].

Demand management aims at reducing and controlling demands and improving water use efficiency. Shifting to less water demand crops for example, by replacing rice by other crops could reduce the demand. Another measure could be the improvement of the efficiency by reducing the losses in the system, which include seepage, percolation and spillage in the agricultural sector and distribution losses of the public water supply network in the municipal sector.

2.3. What is the potential for Water Demand Management policies in the Mediterranean?

Information about the potential water savings in the Mediterranean and the European Union is available through a number of studies performed by the Blue Plan and the European Commission. The results illustrate that water savings would allow significant reduction of water consumption for all uses.

Today, in the Mediterranean, the various losses due to transport, leaking and the various uses could exceed 100 km3/year. According to the Plan Bleu study, the improvement of water demand management would make it possible to save 25% of water. This represents theoretical water savings up to 85km3/year, which is bigger than the water demand increase between 2005 and 2025 (50km3/year).
The most important potential concerns **irrigation** with possible savings five time higher (in volume) than in the domestic sector. The water saving potential in agriculture represents 65% of the total water saving potential identified in the Mediterranean Region by 2025. In most arid and semi-arid countries of the Mediterranean Region, water efficiency of irrigation is below 45%.

In general, agricultural is most water consumer where 80% of water is used in agricultural worldwide. It assumed that 15% saving in agricultural will be enough to cover water supply for whole world population. Therefore, taking action in this sector is of utmost importance. In addition to water savings in agriculture, improving the productivity of water in agriculture should be considered. Crop water productivity is

[3] For details see Water Scarcity & Drought management, Joint Process Phase 1

the amount of water required per unit of yield and a vital parameter to assess the performance of irrigated and rained agriculture. Crop water productivity will vary greatly according to the specific conditions under which the crop is grown. Producing more crops, livestock, and fish and forest products per unit of agricultural water use holds a key to both food and environmental security. A variety of options exist for improving the productivity of water in agriculture through breeding, better management practices and supporting policies and institutions.

A report published by the European Commission in 2007 states that the water use in the European Union could be reduced by about 40% through technological improvements alone and that changes in human behaviour or production patterns could increase such savings further.

These results illustrate the global potential of water savings but do not integrate technical and economical feasibility. Significant challenges therefore remain to be addressed in terms of technological innovations and advisory services.

2.4. Virtual water in the Mediterranean

The 'virtual water' of a product is the amount of water consumed in its production process.
Virtual water is an indicator that can highlight the various types of interaction between sectoral policies, especially the agricultural ones, and efficient water management. The trade of food leads to virtual flows of water from countries exporting food and manufactured goods to countries importing these commodities. In theory a water scarce country can import products that require a lot of water rather than producing them on its own territory. This is supposed to result in water savings. But due to other considerations related to climate conditions for growing special fruits and vegetables or to trade conditions, importing countries are not necessarily those which are water scarce.

Virtual water flows related to exchange of cereals are quantitatively significant in the Mediterranean Region[4]. Most of the Mediterranean countries are net importers of virtual water, except France and Serbia-Montenegro; however, a number of countries are virtual water exporter, thanks to the extent of irrigation.
These preliminary results illustrate that water management goes beyond the basin boundaries and that quantification of virtual flow can assist in policy management of water resources, in particular in water scarce region. The analysis should be deepened at country level. An economic analysis, complementary to the agronomic analysis, should make it possible to address the objectives of the agricultural policies in terms of trade balance and food security, so as to then study their impacts on the management and distribution of water in the countries considered.

[4] Blue Plan

2.5. What is the economic, social and environmental added value of such policies?

To date, there is no impact assessment of the implementation of water demand management measures in the Mediterranean countries.

Information available from the European Commission Impact assessment accompanying the Communication on water scarcity and droughts[5] gives a number of elements when comparing a 'water supply only' option, a 'water pricing policies only' option and an 'Integrated approach' (efficient allocation and sustainable land use planning, foster water performance technologies and practices, foster the emergence of a water saving culture) aimed at addressing the increasing impacts of water scarcity and droughts in the European Union.
The last option appears to be the most promising solution. It ensures the best-cost effectiveness ratio in the long term. It would deliver results gradually and impacts on the economy are expected to be positive from the outset and grow in the longer term, whereas social impacts would be positive with time. In addition, it would generate the greatest benefit for the environment.

In particular it is worthwhile to mention that water efficiency measures can be consider as 'no regret' solutions as it consists in optimizing water uses by losses limitation, better practices (irrigation, industry, …), etc. Water saving measures would lead to a reduction of water abstraction and therefore would have positive impacts as regards energy saving (avoiding additional pumping for transport, treatment) and environmental preservation. In addition, reductions in water usage can be beneficial to both water utilities and wastewater utilities in terms of flow reduction.

However, economic impacts should be considered in short and longer term, in particular for Southern countries where the adaptation of irrigation practices would represent a major challenge as agriculture represents a large part of the economy.

2.6. Conclusions

Access to water in sufficient quantity is fundamental to the daily lives of human beings and any economic activities. Imbalances between water resources and water demand already have major impacts that are expected to be made worse by climate change.
Therefore, an integrated approach for water resources management, based on water demand management is absolutely vital if the Mediterranean community is to ensure that enough water is available to all Mediterranean citizens and economic activities.

3. Historical/Political Evolution

[5] Summary of the Impact assessment, COM(2007 414 final, SEC(2007) 996

3.1. The Mediterranean Strategy for Sustainable Development (MSSD), agreed in 2005

In the framework of the Mediterranean Action Plan and the preparation of the Mediterranean Strategy for sustainable Development, a number of workshops took place addressing the issue of WDM[6]. They indicated that increasing water supply would be an inadequate and limited policy when considering social, economical or ecological obstacles.
In 2007, the third regional workshop on WDM in the Mediterranean, held in Saragossa, in March 2007 made a number of recommendations which include inter alia the promotion of the implementation of WDM by:

- setting annually national objectives of efficiency, on the basis of regional objectives
- mobilizing, with a concern of social equity, the various instruments and tools (regulatory, normative, tariff, fiscal, contractual, market-based)
- information, responsibilization of stakeholders concerned with WDM and an assessment of progress made every 2 years

The Contracting Parties to the Barcelona Convention adopted in November 2005 the « Mediterranean Strategy for Sustainable Development » (MSSD). The first priority field of the Strategy is improving integrated water resources and demand management including as the first action "To stabilize water demand through the reduction of water losses and the wasteful use of water and increase the added value per cubic metre of water used".

A number of examples are provided in the Mediterranean Joint Process Water scarcity & drought report phase II. In the Annex, examples from Egypt and France illustrate the state of play in some countries.

3.2. In 2007, a communication on WS&D on the EU side, promoting such an approach

In 2007, the European Union has addressed the issue of water scarcity and drought and considered that '*the implementation of the **demand-side approach**, the enhancement of water efficiency (e.g. reduction of leakages) and further educational measures must be a clear priority, even though in some circumstances it might be necessary to consider further approaches on the supply side to address the impacts of WS&D*'. It also underlines that '*the River Management Plans, as established under the Water Framework Directive, should take due account of the **balance between demand and supply**, including seasonal and inter annual analyses, to achieve the environmental objectives and consider the need for new water supply measures once the projected impacts of water saving measures prove insufficient'.* The European Council stresses '*that a comprehensive approach to addressing the issues of WS&D should include inter alia the effective implementation of integrated water resources management, **the strengthening of water demand management and water saving policies**,…* '.

[6] Fréjus workshop, 1997; Fiuggi workshop, 2002, Blue Plan

3.3. Recommendations of the 16th Commission of Sustainable development, 2008

The Chair's summary of CSD16 underscores the need for WDM and states that '*while demand for water is increasing in its different uses, climate change is contributing to water scarcity in many areas and regions.* ***Implementing WDM measures will help*** *reducing water losses in public water supply networks, increasing irrigation efficiency, and improving water productivity*.'

3.4. Taking into account the impacts of Climate change

Predictions covering the entire Mediterranean Region suggest up to 35% rainfall reductions by 2071-2100, reducing inland water flows and water yields. The IPCC projects, under a scenario, a 4 to 27% average decrease in precipitation for the south eastern Mediterranean with significant spatial and seasonal variation. Further and following current trends, a tendency to a more extreme climate with more uneven distributions is projected. A 46% increase in 'significantly drier than normal' years is expected for the study area, along with an exponential increase in drought probability. Across the region, climate change is expected to reduce water availability severely, in places by up to 60% in the coming century. Water shortages are likely to worsen and in places become critical.
All these figures show that in a number of places across the Mediterranean Region, all the economic activities will have to adapt to the evolution of water availability. The expected impacts of climate change will also be exacerbated by the projected increasing economic development and growing population.

Impacts of climate change in the field of water are being taken into consideration by decisions makers:

- in the Mediterranean, where an Action Plan was agreed in November 2007 in Tunis[7]. One of the recommendations in the dedicated chapter on 'adaptation to Climate change for better management of water recourse' concerns the development of programmes for water saving and re-use.
- in Africa, were these issues were discussed during the first African Water week (AWW-1) which was held in Tunis from 26-28 March, 2008;
- in the European Union where a White Paper is being prepared including the issue of water resources management.

3.5. Conclusion

The WDM approach is not a new paradigm for the Mediterranean. Despite the fact that WDM is being analyzed and discussed for a number of years and that several countries have already implemented actions, a lot remains to be done, in particular in the context of the impacts of climate change. International recommendations provide a way forward but it is up the local, national and regional bodies to tackle the issue as appropriate.

[7] Action Plan of Tunis : for adaptation to climate change in Africa and in the Mediterranean region, in a context of international solidarity

4. Gap analysis

4.1. An assessment of the situation in 2007

The national reports on « Monitoring progress and promotion of water demand management policies » carried out by different countries in view of the third regional workshop on WDM in the Mediterranean (Saragossa, 2007) made it possible to highlight the reality of the progress made since 2002 in matter of taking into account WDM in the water policies and certain sectoral policies.
In addition, a survey was being conducted in the framework of the Med-EUWI / WFD joint process illustrating the level of implementation of WDM measures and strategies[8].

It has emerged that strategy documents, legislative texts or national law increasingly refer to the WDM and, this, either explicitly or, still too often, in an implicit way.
Despite the fact that WDM policies are being developed by a number of Mediterranean countries, the limits of these initiatives in terms of quantified objectives have been identified.
Economic instruments including water pricing are pointed out as effective instruments to move towards WDM. The usefulness of economic incentives is also pointed out. The need to further raise public awareness and communicate on the impacts of water scarcity and droughts as well as on good practices is also mentioned as a key priority. This also requires a further development of the knowledge on the issue and more efficient systems of data collection. The overview of all possible water demand measures shows that addressing water scarcity and droughts requires a set of complementary policy options including regulatory, economic, technical and educative measures.

In particular, there is a need to strengthen the capacity of water managers at all levels from farmers to irrigation managers to deal with emerging problems of competition, use of low quality water, managing for multiple uses of water, water savings, and sustainability. The capacity building techniques should include the promotion of good practice, aim to develop an indigenous knowledge base in many developing countries to ensure access of water to everyone. The appropriate technology is a pre-requisite to the avoidance of costly solutions and ensures the durability of the infrastructure in meeting the local requirements.
The construction of water projects, and integrated management of the limited water resources, water conservation projects, water demand management, and capacity building in order to promote the water staff, will help in controlling the water stress. As an example, the available water technologies and models are important tools in the Hydraulics of River Engineering of Nile Basin.

The obstacles and hindrances for WDM policies are of various sorts: institutional constraints (scattering of responsibilities and lack of coordination between ministries involved in the management of water resources), lack of integration of the various policies (water and sectoral policies), absence of a legal framework, lax control, inadequate water pricing, lack of public awareness of the need for water saving, lack of involvement of the users in water resources planning and management, lack of

[8] Med joint Process WFD/EUWI on Water scarcity & Droughts, Report phase II

qualified staff in charge of water management, lack of financial capacity of the States, which impedes the implementation of the national plans for an integrated management of water resources and water demand (implementation remaining dependent on national budget prioritisation), etc.

4.2. Knowledge gaps

The state of play of the implementation of WDM measures provides an analysis of the type of measures implemented. It does not give any information on the economic benefits nor on the economic or social impacts of such measures.
Cost effectiveness and cost benefits analyses for the choice of WDM measures, with a long term dimension, are of utmost importance if we are to promote such an approach. Limitations of WDM approaches, both in terms of economic and social consequences, should be identified.

However the first step of such a regional analysis would be to identify the potential for concrete WDM projects on the ground.
A similar approach that the one developed for identifying projects for the Horizon 2020 initiative should be undertaken. The major actions that might generate the biggest benefits in terms of water savings for the different uses should be prioritized in the different countries. Their costs, technical feasibility as well as their financial modalities should be assessed and presented to the international community.

4.3. Conclusion

The state of play indicates that a number of prerequisites are to be implemented if we are to promote WDM measures in the Mediterranean.
Strengthening legislation and capacity building, developing appropriate technologies, enhancing training, delivering adequate water pricing policies are a number of actions that should be promoted in the Mediterranean in order to facilitate the WDM approaches.
In addition, the costs and impacts of these actions should be assessed.
In order to promote the wide range of WDM options at regional level, a feasibility study should be launched, indicating the types of projects that could be implemented as well as the costs and benefits expected.

5. Ways to explore

If the Mediterranean community wants to tackle the water challenge, the development of a sustainable and secure water policy is crucial. The devising of an effective strategy towards water efficiency can make a substantial contribution to addressing Mediterranean water-related challenges.

5.1. Promotion of 'no regret' solutions and a common target in the Mediterranean

Efforts to use water more efficiently should be considered as 'no regret' solutions and be promoted in a first stage and even included in other sectoral policies.

In water scarce countries where the demand goes beyond the supply, stringent measures to implement water efficiency actions must be developed as a priority, and where impacts of water saving measures are proven insufficient, additional resources might be implemented, from non conventional or traditional water resources.

In order to promote a shared water efficiency culture in the Mediterranean and deliver on concrete water savings, setting water savings targets at regional level could facilitate integration of such policies at national and local level.
A quantified objective should be based on scientific works, and include existing analysis, such as the ones already available through the Blue Plan reports.
The economic, social and environmental feasibility of implementing this quantified target must be assessed and detailed at country level.

5.2. Beyond technical solutions

In addition to technical water efficiency measures, effective water pricing, sustainable land use planning as well as the improvement of knowledge and data collection should also become an integral part of the policy options that have to be promoted.
Mismanagement in water scarce areas should be avoided and attention must be paid in particular to the agriculture and tourism sectors. There, the economic development objectives should integrate -in a long term approach- the limitations of existing available and exploitable water resources.

A reflexion on WDM in the Mediterranean could constitute a starting point for a deepened analysis on development, consumption and production practices as well as cooperation policies. Water is embedded in trade, energy, tourism and agriculture and as such deserves an in depth strategy, based on protection approaches.

6. References

- Mediterranean WS&D report phase I
- Id. Phase II
- Communication from the Commission to the European Parliament and the Council, COM(2007) 414 final
- Commission Staff working document accompanying the Communication on WS&D, COM(2007) 414 final; summary of Impact assessment
- Virtual water: which perspective for the Mediterranean water management and distribution?, Blue Plan Notes, N°8, April 2008
- Fréjus, fuigi workshops 1997, 2002
- Zaragoza workshop 2006
- Tunis Action Plan, 2007
-

Annex1

WATER DEMAND MANAGEMENT MEASURES

TECHNICAL:
The technical demand-oriented measures to save water include; Deficit irrigation, the application of modern irrigation technologies, weed control in irrigation/drainage channels, drainage reuse, wastewater treatment, groundwater management, building small reservoirs for night irrigation, structural improvement of irrigation systems and public water supply systems, structure measurers for improving the irrigation distribution conveyance efficiency, improving the irrigation distribution/conveyance efficiency, leakage detection and repair in the public water supply system,

INSTITUTIONAL:
The Institutional measures include; reform when it is needed, public awareness programs for water conservation and environmental protection, user participation in O&M, role of Water Users Associations, and stakeholders involvements in decision making.

LEGAL:
The legal measures include; regulation of the farmers' quota, effluent fees (only applicable at the agricultural drainage point sources, by estimating/metering the effluent load), set and enforce the laws which govern the irrigation rules, and enforce the polluter pay principle.

ECONOMIC:
The economic measures include; crop-specific land taxes, crop production charges, effluent fees, per household water-tariff (through a meter in each household), subsidies for low water using in-house devices, effluent charges based in concentrations in the outlet (sewer or drain). These charges have to be coupled with metering the water-intake of the firm otherwise the firm will use more water to dilute the effluent, regulation of the water quota to industries.

Annex 2

EXAMPLE FROM EGYPT: Irrigation Improved Project (IIP), a technical measure

The Irrigation Improvement Project (IIP) started in 1984 with an area of 40,000 acres and extended to cover an additional 350,000 acres. The framework of IIP includes rehabilitation and renewal of water distribution structures, use of pipeline and raised irrigation ditches, use of one-point collective pumping from branch canal into ditches, and land leveling using modern techniques.

The improvement and modernization works to carry out by IIP vary from re-alignment of water courses and distributary canals, land leveling, re-construction of cross section, lining and use of elevated field ditches, use of buried pipeline field ditches, and control of aquatic weeds. It aims to improve water use efficiency, save water (10%), and increase crop yield. The project has proven to be successful and the ministry has established an organization within its structure to expand the project activities to cover most of the old agricultural areas in Egypt.

The main objective of the Irrigation Improvement Project (IIP) in the old lands is to improve the efficiency of water use at the field ditches and farm levels. It also initiates the user participation and involvement in the operation, maintenance, and management of the irrigation system. It also includes the redesign of the field irrigation systems and, most importantly, the formulation of Water User Associations (WUAs) that expresses the new vision for the water distribution management process.
Water Users Associations (WUA) provide ownership, transparency, and ensure the participation of farmers in managing their own affairs. Later it was realized the need to upgrade those WUA models to a higher level than the tertiary. Recently, a policy reform and pilot programs in integrated water management district and irrigation management transfer were undertaken.

The project proved to save water by increasing the efficiency in most of the commend areas by 30% to 40% and reducing the time required to irrigate by 50% for each irritation and costs of pump operation by 25% to 40%.

EXAMPLE FROM FRANCE: WDM instruments in the various sectors[9]

France is implementing a number of WDM actions adapted to the different water users.

Water metering, distribution network indicators and water saving charters with tourism groups are the actions implementing in France in the drinking water and tourism sectors at different level (basin water agencies, local authorities, etc.).

As regards agriculture, a ‘Drought decree appeared in 1992 and makes provision for temporary restrictions on abstraction in accordance with the hydro-climatic variations experienced in the course of the year. Compulsory metering campaigns as well as

[9] MSSD report : National report on WDM

economic instruments and technical measures aiming at improving water efficiency in agriculture are also being utilised.

Industrial taxes collected by water agencies favour reduction of industrial water consumption. In addition, recommendations for the use of best practice and new clean technologies facilitate water efficiency practices.