

# Feasibility study on the development of a regional water observation mechanism in the Mediterranean region

## FINAL REPORT OF THE STUDY

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**June 2008**

MEDA Water



With the support of the European Union

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## Disclaimer:

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## Thanks

*IOWater and EMWIS Technical Unit thank the members of the Steering Committee of the study, the consultants involved in the analyses, and all those who, through their comments and answers to the national and regional surveys, contributed to the drafting of the recommendations of this study, the first elements of which were approved by the Euro-Med Water Directors’ committee in Athens (November 2006).*



## Abstract

The Mediterranean basin is encountering long-term and strong climatic trends (drought, climate warming, lowering of depressions, increase in temperature and salinity of the deep layers of the Mediterranean); they are associated with an inter-annual natural variability and with extreme events (heat wave, drought, stormy weather).

Without substantial changes in current practices, critical situations will appear in the first half of this century, from a quantitative and qualitative viewpoint. In order to set up policies for sound water resources management, **knowledge of the data on consumption and the resource** is required to prioritise actions and to assess the performance of the initiated actions.

This study, carried out upon EMWIS<sup>1</sup> request under IOWater<sup>2</sup> technical co-ordination, was submitted in 2008. It is based on a needs analysis for the parties concerned showing that the difficulties encountered in exchanging information are linked to the lack of system interoperability at the national and regional levels and that a general interest is arising for an « observation mechanism », provided that it does not duplicate the existing organisations and systems.

This mechanism could cover all the Mediterranean countries as a priority as well as nearby countries having Mediterranean hydrographical characteristics (21 Mediterranean countries, Portugal, Jordan).

Designed as a regional tool for co-operation and decision-making support, the proposed mechanism would have the main tasks of developing:

- rules and national capacities for production, shared management and analysis of the expected comparable aggregated data,
- common procedures at the regional level for the production of comparable information by the countries,
- technical infrastructures allowing the networking of services,
- production, interpretation and dissemination of regional information.

The proposal for a « **Mediterranean Water Data network**» (Med-Aquanet), is based on two major principles: the voluntary partnership of the States which would like to join the project through a charter, and compliance with data confidentiality.

The study defines the principles and common rules aiming at enhancing the existing systems, with, in particular, co-ordination of the actions and stakeholders in each partner country and at the regional level, the development of system interoperability based on international standards, the organisation of metadata<sup>3</sup> production, etc.

An action plan could be launched over two years with the participation of about 10 volunteer countries, and in agreement with the main regional organisations directly involved in water resources management actions.

<sup>1</sup> EMWIS: Euro-Mediterranean Information System on Know-how in the Water Sector

<sup>2</sup> IOWater: International Office for Water

<sup>3</sup> Metadata: information describing the water data series and services and allowing data searches, inventory and use



The proposed action plan includes a preliminary phase for structuring the Mediterranean partnership for water data administration between the States and the regional organisations, then two main lines for actions to be carried out at the same time:

1. One in the volunteer countries aims at homogeneously building the technical capacities of each partner country, with:
  - a. organisational and institutional actions that can be the subject matter of an invitation to tender,
  - b. a phase for drafting technical terms of reference for development and training,
  - c. actions for the technical reinforcement of management and training infrastructures.
2. The other, at the regional level, aims at having tools and services enabling the production of information necessary for decision-making and expected for facilitating water resources management.

This two-year action plan should:

- Reinforce the water information infrastructures in the volunteer countries.
- Structure collaboration at the regional level.
- Develop the interoperability of the regional and national information systems.
- Organise the rational production of a first series of indicators of general interest, based on a consensus between the regional and national organisations on the definitions, the procedures for calculation and production and expected quality.

At the national level, the study details the standard actions aiming at building the human and material capacities of the national institutions; these actions could be implemented through invitations to tender by specialised offices; a summary of these standard actions is appended to this abstract.

Implementation of the action plan requires the funding of a regional component estimated at about M€ 1.3 for 2 years, and a financial support to the volunteer countries of the South estimated at about K€ 500 per country.



## Summary of the proposed actions at the national and regional levels

### Actions at the national level

#### Organisational and institutional actions

- ☞ Strengthening of the framework for collaboration between institutions at the national level
- ☞ Production of metadata
- ☞ Definition of the rules for production, management and sharing
- ☞ Development of semantic interoperability on priority data
- ☞ Organisation of the regular production of priority indicators and other expected information (e.g.: map, indicators, documentation, summary note, etc.)
- ☞ Analysis of procedure effectiveness and identification of the needs for reinforcement of the information infrastructures
- ☞ Production of a national action plan for data administration (data master plan)

#### Drafting of the terms of reference for technical development and training

#### Actions for reinforcing technical infrastructures and capacity building

- ☞ Development of infrastructures for information management
- ☞ Training of human resources

### Actions at the regional level

#### Development of priority tools for the regional infrastructure

- ☞ Regional Web portal
- ☞ Regional catalogue of metadata
- ☞ Data base of the indicators used by the partners

#### Development of rules and common reference frames for data and service interoperability

- ☞ Rules for the production and declaration of metadata
- ☞ Rules for data confidentiality and sharing
- ☞ Data templates and reference frames for semantic interoperability on priority topics
- ☞ Rules necessary for technical interoperability
- ☞ Development of the first on-line services between regional organisations

#### Generation of priority synthetic products expected at the regional level

#### Actions for technical co-ordination and enhancement of the « acquis »

- ☞ Regional workshops for dialogue /validation
- ☞ Co-operation with and support to the other regional bodies
- ☞ Drafting and dissemination of the guidance documents and technical procedures

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## I. INTRODUCTION

### “Knowledge is a prerequisite to action”

Stakes related to water resources management in the Mediterranean countries have always been significant. These stakes are continuously increasing with climate change related risks that may, in particular, result in a decrease in rainfall and an increase in the return periods of drought and water scarcity phenomena, etc.

In this context, regular access to reliable and relevant information is essential to support any policy of water resources management and risk prevention, whether at the national, international or local level.

On the basis of the mandate assigned to EMWIS by the Euro-Mediterranean Ministers at the Turin Conference on Local Water Management, the Euro-Mediterranean Water Directors decided, during their last conference in Rome in November 2005, to conduct a **“Study, with the volunteer countries, of the objectives and feasibility of building up, within EMWIS, a Mediterranean water observation mechanism to monitor the indicators towards the achievements of the Millennium Development Goals related to water and sanitation in the Mediterranean, as well as the implementation of the “water” component of the Mediterranean Strategy for Sustainable Development<sup>4</sup>, based on the information provided by the National Water Information Systems, when they do exist.”**



In accordance with the appended terms of reference, this study was carried out in 2 phases:

- A 1<sup>st</sup> analysis phase, carried out at the end of 2006, with the objective of identifying the key orientations proposed for this mechanism;
- A second phase, carried out in 2007, to define detailed proposals for the implementation of this mechanism.

<sup>4</sup> The follow up of WSSD implementation is provided by the Blue Plan

This report presents the outcomes, conclusions and recommendations of the study, with in particular:

- A reminder of the **context** and **stakes**;
- A summary of the **current situation and needs expressed** in the surveys carried out at the international level, involving a large number of initiatives and regional organisations<sup>5</sup>, and at the national level in seven pilot Mediterranean countries: Cyprus, Spain, France, Jordan, Malta, Morocco and Tunisia;
- **A proposal for the setting up of a Mediterranean Water Data Network** according to a pragmatic approach, in order to provide the functions, identified in the study, of a Mediterranean water observation mechanism, which defines:
  - o Objectives, assignments and main characteristics
  - o Principles and rules for implementation
  - o An outline of a 2-year action plan with a budget estimate and planning for implementation
  - o Expected results and benefits

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<sup>5</sup> Among the international organisations involved there were: the European Environment Agency, the World Bank, the DG-Env. of the European Commission, the World Water Council, Eurostat/ MEDSTAT, FAO, GWP-Med, IME, Med-EUWI, Observatoire Sahara et du Sahel (Sahara and Sahel Observatory), WHO/UNICEF-JMP ..., MAP-INFO-RAC, MAP-Medpol, MAP-Blue Plan, UNEP-MAP, UNESCO WWAP, etc.





## II. STAKES AND CURRENT SITUATION

### A. Stakes

#### # An already huge pressure

**Being the most populated arid region of the world, the Mediterranean and Middle Eastern countries are facing major challenges with respect to the management of their natural resources.**

Water, in particular, is a crucial stake in an area of strong regional imbalances, persistent political instability, and significant social disparities.

**Fresh water is very unevenly distributed among the Mediterranean countries** and prone to very strong seasonal irregularities and high inter-annual fluctuations. **The irregularity of the surface water regime** requires controlling efforts through regulating infrastructures, most of them being already built. **The overexploitation of ground water resources** leads to their depletion.

Access to drinking water remains insufficient in rural areas and water quality is a concern for many cities due to chemical and bacterial pollution. The supply networks are often obsolete and high losses in the systems lead to significant withdrawals to meet the demands.

As regards sanitation, it is estimated that **47 million people have no adequate sanitation system**, while **only 69% of the 601 Mediterranean coastal cities of more than 10,000 inhabitants operate a waste water treatment plant**<sup>6</sup>.

Therefore the pollution discharges into the natural environment **cause a deterioration of the resources quality**.

**Drought phenomena** are already a major problem for water resources management and the environment. According to the first data provided by the EU Member States, the economic impact of these events was estimated at **100 billion Euros**<sup>7</sup> in Europe over the last 30 years, with a twofold increase in the cost over the last 15 years and an average of 6.2 billion Euros/year during the past years.

<sup>6</sup> Source : Follow-up sheets of the MSSD (UNEP-MAP-Blue Plan)

<sup>7</sup> Source: "Water scarcity and drought in-depth assessment" report, June 2007- DGenv-EC



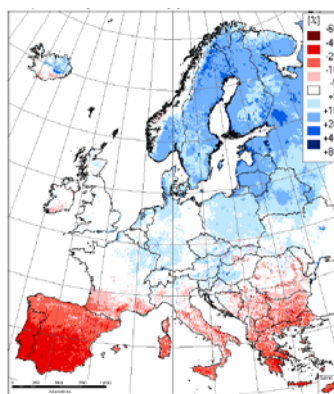
### # A pressure on water resources which will increase

The significant **demographic growth** of this geographic area combined with an **increase in the urbanisation rate in general and in the coastal areas**, will contribute to intensify these pressures on the resource.

In addition, the Mediterranean basin is one of the areas of the Earth for which there is a **major consensus concerning climate change in the 21st century, with prospects which will worsen the pressure on the resources**. The Mediterranean basin is indeed the area where long-term trends have been observed for several ten years of drought, climate warming, lowering of depressions, increase in temperature and salinity of the deep layers of the Mediterranean. These phenomena combined with a strong inter-annual natural variability and with extreme events (heat wave, drought and stormy weather of the Cevennes storm kind) are likely to have a strong sociological impact.

In Southern Europe, a **rise in temperatures, a decrease in rainfall** and in the average flow of rivers are foreseen.

Some basins of the Mediterranean area, which already suffer from water scarcity, could see their water resources dropping by 10% from now up to 2030, and even more significant changes are foreseen later on.<sup>8</sup>

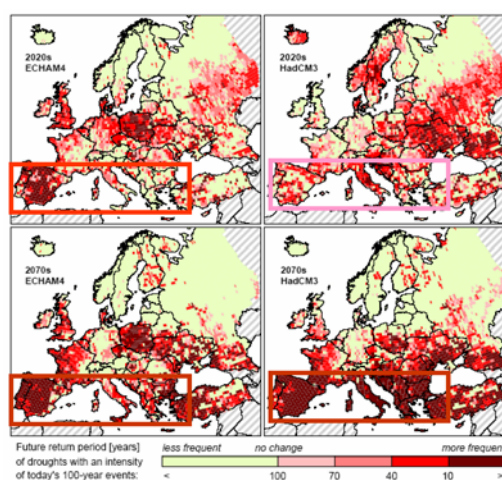


Map of forecast of the changes in rainfall expressed in percentage ( EC Green Paper 2007)

**Drought phenomena** will also be intensified with increasingly shorter return periods.

Water scarcity situations are likely to have a social impact (job losses in some sectors, migration of industries) and will have an impact on the environment (lower groundwater levels with the risk of marine water intrusion, difficulty in maintaining a minimum surface water flow, with, at the same time, a possible increase in the pollutant concentration, drying up of wetlands).

Maps of changes in drought periods (Lehner et Al., 2005b)<sup>9</sup>



<sup>8</sup> Water Scarcity and Droughts, Second Interim report, MAY 2007 DG Environment, European Commission

<sup>9</sup> Water scarcity and drought expert network, drought management plan report draft report October 2007

## # Consequences

Without substantial changes in current practices, critical situations will appear in the first half of this century, from a quantitative and qualitative viewpoint.

This leads to get strongly concerned about rationalising uses, controlling demands, fighting against wastage, developing integrated water resources management and the use of alternative resources.

### ***b) A necessary increase in knowledge***

**Knowledge is a prerequisite to action**, but knowledge about fresh water resources and their uses, co-ordinated between all the Mediterranean countries, is currently insufficient especially on groundwater<sup>10</sup>, abstractions<sup>11</sup> and water quality<sup>12</sup>.

The nature of the needs is known but they are insufficiently quantified, especially regarding costs (institutional costs, cost of infrastructures, and cost of the impact in the event of their non-meeting) and investments to be made in the next decades<sup>13</sup>

It is particularly important to increase information gathering for the economic and environmental impact studies of climate change and drought phenomena.

Taking into account the significance of the stakes mentioned in the preceding section, **it is essential to be able to define priorities for actions**, and to monitor and assess the performance of the initiated actions using suitable indicators.

This will mean agreeing, among other things, on definitions of indicators which allow the production of comparable and relevant information at the regional level.

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<sup>10</sup> « If surface water flows are relatively well-known (when they are not confidential) the estimate of the groundwater reserves and flows remains, in most countries, either an unknown or not very reliable factor » (source Medstat - compendium 2005)

<sup>11</sup> « no country has a complete national coverage of abstractions » (source Medstat - compendium 2005)

<sup>12</sup> « knowledge is very sparse on the quality status of natural water, water and on their vulnerability to hazards » (source UNEP/MAP/Blue Plan)

<sup>13</sup> In 2004, the Blue Plan estimated that, to meet the minimum requirements of the urban waste water directive, the Eastern and Southern Mediterranean countries will have to invest a minimum of 2.5 billion euros per year during 25 years, not including the 0.3 billion per year for operating costs. Even if these estimates are approximate, they depict the extent of the problem to be solved and the need for strong policies to optimise the means.



***c) The regional approach: an approach recommended by international organisations***

The **principle of a global observation mechanism on water and sanitation** was supported by the international authorities on several occasions.

The European Union presented its vision during the last Commission on Sustainable Development held in April 2005 in New York. The final document resulting from this Commission incorporates the major provisions proposed by the EU to monitor the progress achieved towards the objectives laid down by the international community: **a global mechanism based on national and regional mechanisms, improvement of data-gathering, comparison of information.**

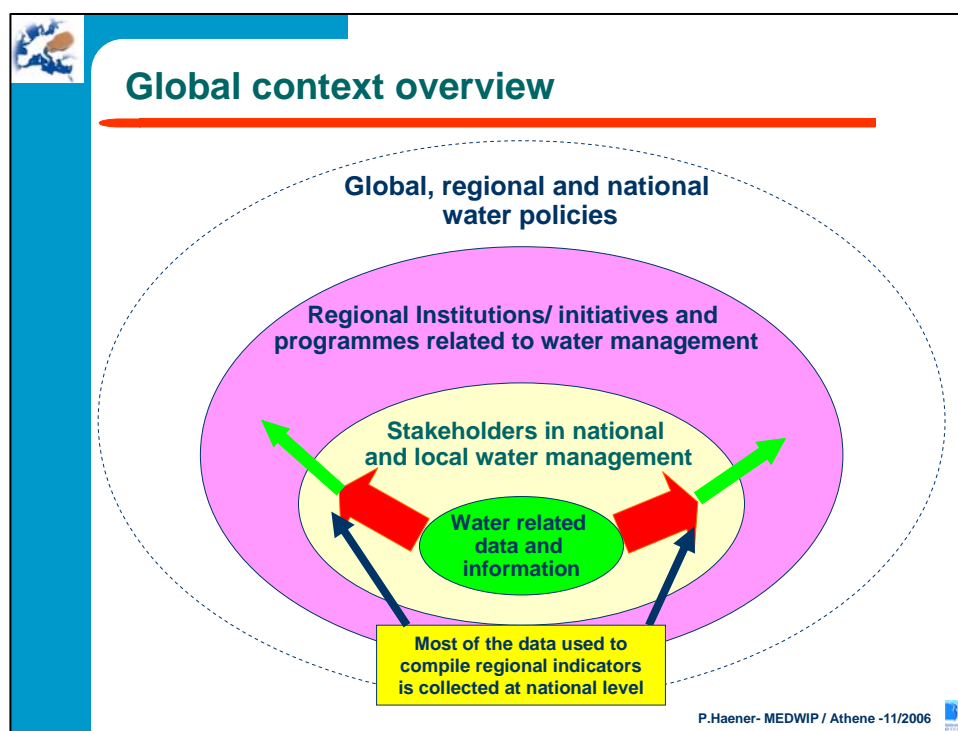


## B. Status of data administration at the regional and national levels

The bibliographical analysis supplemented by the surveys carried out within this study at the regional level, involving the main regional organisations intervening in the water field, and at the level of various institutions of 7 pilot countries<sup>14</sup> allowed to emphasize the following synthetic elements.

### 1. Context analysis

Knowledge of the state of the aquatic environments and of their uses is essential for defining, implementing, controlling and assessing water policies.



### # Multiple policy processes concerned

A specific feature of the Mediterranean region is the involvement of many national and regional policy processes, including a significant water component.<sup>15</sup> Among these there are:

- The national water policies of the 22 Mediterranean countries and territories;
- Various regional policies, covering all, or part of, the Mediterranean countries, such as:
  - ◆ The water policy of the European Union (EU), with the Water Framework

<sup>14</sup> List of the pilot countries: Cyprus, Spain, France, Jordan, Malta, Morocco and Tunisia

<sup>15</sup> It should be noted that, currently, the Mediterranean region has no framework for co-ordinating water policies, contrarily to Europe for instance, which can rely on the Water Framework Directive, or to Africa, which has a vision up to 2025, used as a framework for the various actions in the water field.

Directive, which concerns all the EU countries;

- ◆ The EU policies for co-operation with the Mediterranean countries: (new European Neighbourhood Policy, “Horizon 2020” Initiative to tackle with pollution in the Mediterranean, etc.);
- ◆ The Barcelona Convention of 1976 for the protection of the Mediterranean sea and coastal areas, ratified by 21 Mediterranean countries and the European Commission;
- ◆ The Euro-Mediterranean Partnership; created by the Barcelona declaration of 1995<sup>16</sup>, and signed by the EC and many Mediterranean countries
- ◆ The African water policy co-ordinated by AMCOW, which concerns the North African countries, among others;

In addition, water directly or indirectly intervenes in many indicators established at global level with regional approaches, especially for following-up:

- ◆ The achievement of the Millennium Development Goals (MDGs) by the countries;
- ◆ The implementation of the “Plan for the implementation of the World Summit for Development” (Johannesburg 2002) and of the “Mediterranean Strategy for Sustainable Development” (2005).

#### # Multiple stakeholders and information systems at the regional and national levels

To implement the policies mentioned in the previous section, many stakeholders intervene at the national and regional levels, through many initiatives, programmes and/or projects, some of them being based on very comprehensive work programmes.

In the regional Mediterranean area, **these organisations often intervene in a dispersed manner**, according to their own objectives and action logics and to the policy framework of their supervisory body.

Thus, many monitoring processes and information systems already exist, among which: WISE, Eurowaternet, EIONET, INFO/MAP, EMWIS, JMP database, Monitoring water alliance, AQUASTAT, IBnet, Geonetwork FAO, etc.

In addition, considering needs for co-ordination, bilateral/multilateral partnerships between organisations are multiple and various think tanks, on the processes for data collection and harmonisation in particular, have already been created (UN-WATER, EEA/JRC/DGenv on Wise, EEA/UNEP/MAP, etc.).

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<sup>16</sup> Initially signed by the 15 EU Member States and 12 Mediterranean third countries, this partnership has now extended to 35 countries, as a result from the enlargement of the Union, and includes the environment as one of the priorities of economic co-operation.

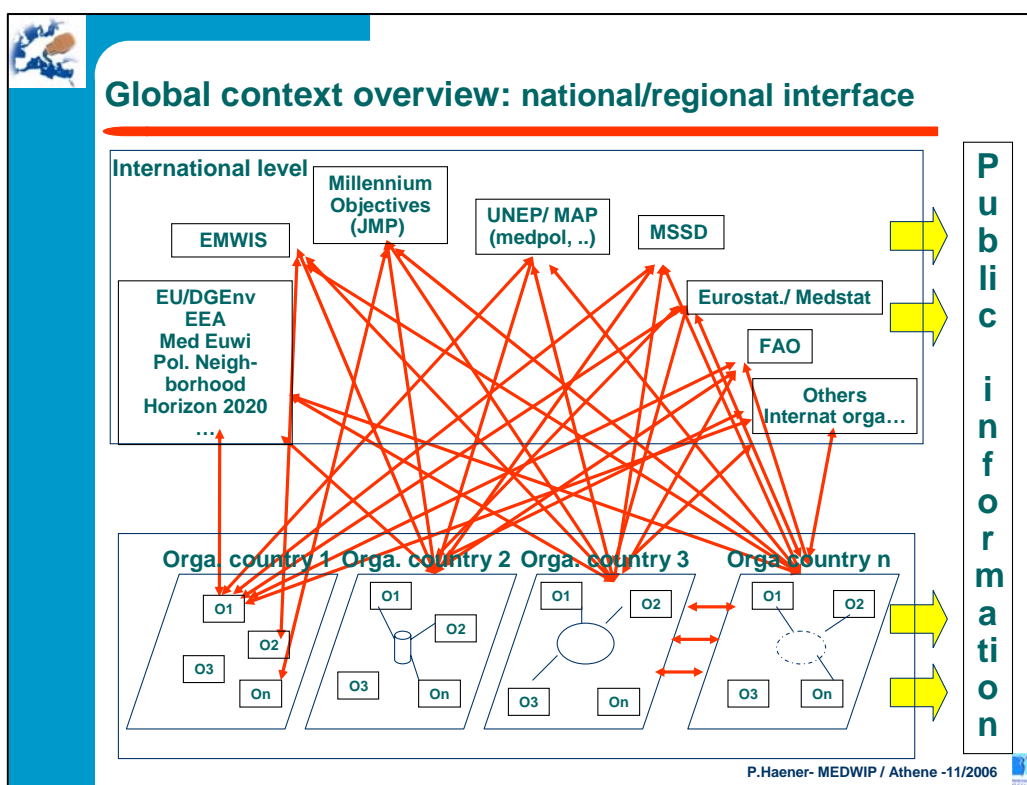


## # Significance of the national data

**Water data and information are at the core and often the basis of the various stakeholders' actions.** Indeed, for either regulatory, planning, risk management actions or public information, the managers of water resources need to have, in a lasting way, reliable, updated and relevant information available.

It is important to emphasize (see figure above) that **most of the indicators used at the regional and/or global level, are based on data produced at the national and/or local level**, therefore smooth operation at the national level and of exchanges with the regional level is of utmost importance.

## # About exchanges of and access to data and information



The above figure shows a summarised vision of the main problems encountered in the sharing of data and information necessary for implementing water and sanitation policies.

The first findings are based on the fact that **exchanges between regional and national organisations are most often bilateral**, with the following consequences:

- On the one hand, **each country endeavours to provide consistent information in reply to the multiple requests of the regional organisations;**
- On the other, **each regional organisation tries, at its own level, to standardise its exchange procedures with the countries, in order to receive from them data that are the most comparable possible**, thus there are dispersed actions at country level, and duplications of activities between the various regional processes.

In addition, the surveys reveal that **each international organisation usually relies on its own network of national focal points** and that these focal points are seldom the producers of the disseminated information. However, given that most of the countries have not developed their internal procedures for accessing, exchanging and enhancing data and information, **the national focal points are often encountering difficulties in accessing to the national information** required by the regional level.

Finally, it seems that the various regional and national stakeholders disseminate the information independently and without co-ordination. The users are thus faced with **multiple information sources** specific to a topic and/or a sub-region, and have no tool allowing them to easily identify the existing data, assess their quality and easily access relevant data to meet their needs.

#### **# Indicators which vary according to institutions but which use similar basic data**

The work completed during the study on some basic indicators for the MSSD reveals that:

1. Indicators required by the regional institutions usually **use similar basic data**<sup>17</sup>, therefore there are possible synergies in the production processes;
2. **Issues related to the achievement of synthetic indicators are more often linked to problems involving a lack of definition** (non-existent, insufficient or not comparable definitions) **and a lack of organisation of the production** (lack of any organisation responsible for the production/regular dissemination of synthetic data), than to a real lack of data;
3. **Lack of data** is a problem:
  - a. Regarding specific topics and fields (climate change, drought, investments to be planned for, performance of urban services, etc.)
  - b. When performing sectoral assessments (e.g.: industrial uses, etc.)
  - b. For the calculation of indicators at sub-national level (assessment per administrative units, assessment per basins, etc.)

<sup>17</sup> Basic data according to the OECD <http://stats.oecd.org/glossary/detail.asp?ID=4331>





**On the other hand**, this problem of lack of data is relatively limited when it involves the production of overall indicators **at national level (e.g.: assessment of available resources, abstracted quantities, etc.)**, given that even when there is no comprehensive monitoring, there are acceptable estimates in most cases.



## 2. Analysis of the needs and expectations related to the mechanism

### a) Analysis of expectations at the national level

Most of the regional information being based on national data, it is necessary to look for an effective and lasting participation of the countries in the mechanism.

However, the countries' participation in this Mediterranean water observation mechanism will be only effective and lasting if the countries really benefit from it.

Surveys were carried out within the scope of this study in each of the 7 pilot countries to analyse the countries' needs and expectations.

The main conclusions of these surveys are as follows:

1. The answers emphasize **the broad interest of the consulted organisations in a “water observation mechanism in the Mediterranean area”** or equivalent (see box below);

#### Extracts from national reports relative to the countries' interest in a regional observation mechanism (see annex 2)

##### Extract from the “Cyprus” report

“All of the interviewed persons were in agreement that such a system would be beneficial to their work. As expected, different organizations gave priority to different types of required information.”

##### Extract from the “Spain” report

“According to the surveys received so far, most of the people interviewed consider that an Observation Mechanism for the Mediterranean is very important and could help Spain, and the rest of the Mediterranean countries, to organise and homogenise their information systems. It also provides an umbrella for a wider perspective of inland water issues and a forum where stakeholders could participate and share their particular views.”

##### Extract from the “France” report

The contacted people agreed to say that the observation mechanism would be useful for international organisations. Mediterranean and European organisations are mainly concerned: General Directorates of the Environment and Eurostat of the European Commission, the European Environment Agency, UNEP (for following up the Mediterranean Action Plan), the Mediterranean Commission for Sustainable Development, etc.

##### Extract from the “Malta” report

“Despite the fact that the expectations of most stakeholders rotate around the current needs to establish a national observation mechanism rather than a regional one, it must be made clear that the sharing of information at the Mediterranean level is deemed to be essential since in itself it is a learning process and there is much to be gained from regional collaboration. Cooperation between European and North African Countries is believed to be central to managing water conflicts in this semi-arid region. The sharing of data is thus envisioned as a possibility to enhance relationships between countries.”

##### Extract from the “Morocco” report

“As regards the component on support for the organisation and development of national water information systems of the requesting Euro-Med countries, all the assignments were globally considered to be very important to important.”... “The observation mechanism of this study, considered in its national scope, could also help **to support an enabling environment for inter-institutional exchanges.**”



**Extract from the “Jordan” report**

All interviewed stakeholders agreed on the importance of the Water Observation Mechanism (WOM) for the following target groups: international organizations, stakeholders in water resource management at the national level, cooperation organizations intervening in water resource management, civil society organizations.

**Extract from the “Tunisia” report**

“Practically all the contacted institutions emphasized: 1/ the usefulness of a water observation mechanism in the Mediterranean area which would facilitate the water information flow in the Mediterranean area and promote experience sharing between the Mediterranean countries as well as the financing of projects for water resources development and their protection against pollution in order to ensure a satisfying well-being of the population.”

2. The **expectations** expressed in the countries concern, above all, **the development of National Water Information Systems (NWISs), with requests for exchanges of experience on:**
- **Organisation of inter-institutional co-operation to ensure effective data exchange while complying with data confidentiality**

*Examples:*

- *Cyprus: One major concern about the project is the responsibility about the NVIS and coordination of all the stakeholders. Another concern that was mentioned by most interviewed stakeholders was the confidentiality of some of the data and the need for an effective data security mechanism.*

- *Spain: “our biggest problem is the big number of organisations and institutions with competence over water management and thus, in its information systems. This situation causes organisation problems and makes it difficult to know who should provide which information and how it should be displayed. Added to this, each institution chooses the topics of its interest, but there is no consensus on which are the most important.” (SP)*

- *Jordan: “Most stakeholders agreed that the mechanism would support the organization and development of national water information systems in the interested countries.” (JO)*

- *Morocco: “The Moroccan regulation does not clearly define the responsibilities regarding data publication, the frequency of publication and data availability for the stakeholders and the public. The organisations which have to centralise water data are not also defined.”*

- *Malta: “it is necessary that different memoranda of understandings are established between authorities to enhance ties. The transparent sharing of data would also reduce the degree of unreliability often brought about by crude estimates and use of proxies rather than the actual quantification of it.*



- **Development of a common language** for data to ensure semantic standardisation during exchanges (e.g. data dictionaries, common coding lists, central standard format)

*Example (France): For most interviewed organisations, the mechanism should also be a relay between the collection processes at the international level and the national and local sources, in order to facilitate the collection and the production of comparable information at the regional level, especially for:*

- *Supporting the definition of common reference frames between the international organisations and the countries*
- *Supporting the production of missing information at the regional level*

*Example (Malta): "In the case of the creation of the regional water observation mechanism, common thesauri, metadata approaches and language were deemed essential ingredients."*

- **Organisation of the dissemination and access to the data** made available by the producers

*Examples (Tunisia): Importance of entrusting the future mechanism with potential assignments, dealing with:*

- *... The methods for collecting and producing information and for its dissemination at regional level.*

- **Data enhancement**

*Example (Jordan): "There is a need for development of a **set of indicators** that cover the important elements in the water sector (such as sanitation, delivery of water, networking, etc.) to be linked with **MDG7 and poverty alleviation**"*

However, it should be noted that Malta rather plans to work on a environment focused system:

*"with an increasing need for data to be collected from different stakeholders at the local and national level due to significant data requirements at European level, stakeholders are becoming aware of the benefits that can be obtained from a central database system which not necessarily centres on water-but the environment."*

### 3. Other more specific expectations were also expressed and concern:

- **Support to the production of missing information (identification/financing/standardisation of processes), etc.;**
- **Promotion of common methodologies for analyses** at the regional level (especially a method for assessing the resources, uses, socio-economic impact, water accounting, etc.);

*Malta: "there is a need for the setting up of standard procedures to collate all data."  
Cyprus: People appeared happy to cooperate and work for it provided they receive the necessary resources, guidance and clear instructions from the management.*

- **Strengthening of international co-operation between Mediterranean countries.**

*E.g. Malta: "Despite the fact that the Maltese Islands have no transboundary waters, it was stated that data sharing and management would lead to better exchange of experiences and, transboundary water management would surely benefit."*



### ***b) Analysis of expectations at the regional level***

The surveys made at the regional level, involving the main regional organisations intervening in the water sector, show a great interest of the consulted experts and representatives.

The major problems raised by the international and regional organisations are as follows:

#### **1/ The organisations encounter great difficulties in identifying and accessing data.** These are mainly caused by:

- ◆ **A great number of fragmented and uncoordinated collection processes**, including validation;
- ◆ **The lack of tools that can be easily used for identifying** existing data (e.g.: a tool of the information source catalogue type)
- ◆ **The general lack of metadata** on the available national data specifying the production methods (who, when, where, how, on what, etc.)
- ◆ **The dispersion and little accessibility of the existing data** at the level of the various national and/or local stakeholders (ex: data seldom available on the Internet)

#### **2/ The regional organisations emphasize the difficulties encountered in the collection steps**, even within established processes (Blue Plan, Medstat, Aquastat, IME, etc.) for the following reasons, in particular:

- ◆ **The national focal point is not always the data producer** and is seldom connected to a smooth system of exchanges with the other national producers (lack of NWIS), therefore, there are:
  - Significant delays in obtaining data updates;
  - Erratic data updating;
  - An uncontrolled and uncontrollable information quality as there is no indication on the production process;
- ◆ Some European countries are “overbooked” by their obligations of producing data for the European directives.

#### **3/ The organisations are encountering major problems of heterogeneity, completeness and quality of the received data** (JMP, Aquastat, Medstat, IME, OSS.), caused by:

- ◆ Problems linked to the lack of clear production processes and of a common technical language for exchange, leading to:
  - Heterogeneities between countries, due to the lack of common definitions or consistent definitions of variables and indicators
  - Non comparable information due to the lack of standardisation of production processes or calculation methods (heterogeneities in the calculation methods between various organisations of the same country, and/or between various international organisations);
- ◆ The lack of metadata which would enable them to know the data production and/or aggregation processes
- ◆ A strong monitoring discontinuity in time or geographically
- ◆ Provided data which are incomplete or not adapted



**4/ The organisations mention the lack of data** on major topics, especially those which would enable a comprehensive characterisation of:

- ◆ Water resources: lack of data on the description of aquifers, groundwater quality, resources availability
- ◆ Uses: lack of data on water demands for the various uses (agriculture and industry in particular); the qualities abstracted in self-supply
- ◆ Socio-economic aspects: lack of data on on-going investments, the investments needed for achieving the MDGs, the impact of water shortages and droughts, socio-economic data on uses
- ◆ Drinking water supply and sanitation utilities: lack of data on the drinking water supply and sanitation coverage rate in rural areas, results of the benchmarking of urban utilities

They also emphasize **the lack of key attributed data facilitating syntheses:**

- ◆ At basin (or sub-national) level for all topics
- ◆ According to the kind of data
- ◆ For each ecological area (marine waters for instance).

**5/ Finally, the regional organisations emphasize the interest of developing regional collaboration** taking into account:

- **The needs for co-ordination of data production for the regional level:** The proliferation of the collection processes at regional level means that the countries are not readily willing to provide information
- **The problems of sustainable financing of monitoring:** Many systems for monitoring the resource status are stopped for lack of sustainable financing while many surveys are never carried out for lack of financing
- **Difficulties in exchanging information linked to the lack of operability of the existing information systems either at the national or regional level.**



### 3. Conclusions and recommendations

#### a) *Main conclusions of the analysis of expectations*

##### # **A major problem of access to the information...**

The stakes related to water resources management in the Mediterranean area are significant and imply the effective organisation of access to the information useful for decision-making.

However, whatever their level of action (regional, national, local), most stakeholders are encountering **problems related to the availability, quality, organisation, accessibility and pooling of the water information necessary for achieving the objectives laid down in these programmes.**

##### # **Difficulties more often related to the lack of organisation and co-ordination than to the lack of the data themselves**

Admittedly, a **lack of specific data** is noted on some topics, but **the problems of accessing to the information are above all related to a lack of organisation and co-ordination in data production and dissemination.**

Indeed, the existing data are often under-exploited (even under-exploitable) as a result of:

- lack of organisation and sharing of responsibilities in data production
- lack of definition and common rules allowing the production of comparable data
- lack of rules for sharing between public authorities
- lack of interoperability of the existing systems
- lack of tools and procedures allowing the easy identification of existing information and the assessment of its quality

##### # **A general interest for a “mechanism” provided that...**

All the international organisations and most national organisations **strongly demand a mechanism of the “regional water observation mechanism” type** (or equivalent).

However, when these various stakeholders are asked about the assignments to entrust to such a mechanism, the answers reveal that **each of them has his own vision according to his expectations**, and multiple recommendations and proposals were submitted in the survey outcomes.



On the contrary, even when the opinions vary and diverge on the scope of the assignments to be entrusted to the mechanism, **all of them agree to say: “be careful not to duplicate existing institutions or existing information systems”**

***b) Recommendations for the proposal***

- (1) Taking into account the multiple initiatives already existing in the Mediterranean area, which produce and use data and information on water, **the proposal should represent a significant added value** to their actions, while respecting their respective activities and developing their know-how.
- (2) **As the data necessary for producing the information expected at the regional level are, above all, produced at the national level**, it will be necessary **to support the setting up of consistent information systems in each country** while seeking a certain level of **comparability of the produced data and interoperability of the systems**: Not only the proposal will supplement the initiatives by establishing a framework having to support their **interoperability**, but it will also endeavour to benefit from the experience and existing initiatives, without duplicating the work already completed.
- (3) The proposed mechanism will **have to prioritise the water data held by the public authorities** or on their behalf, and the use of water data by the public authorities in carrying out their public assignments. Under certain conditions, it could also apply to the water data held by persons or entities other than public authorities, in so far as the aforementioned persons or entities request it.
- (4) The proposal should **promote the production of new complementary data** in order to cover the topics planned in its implementation programme.
- (5) The **waste of time and resources caused by the search for existing water data** or for establishing their usefulness for a particular end are a major obstacle to the full use of the available data. The mechanism should thus **support the provision by the concerned States of the descriptions of the water data series and of the services available in the form of metadata**.
- (6) As there is a **great diversity in the formats and structures** used for the organisation of water data and their access in the Mediterranean area, this prevents the effective formulation, implementation, follow-up and evaluation of the Mediterranean programmes having a direct or indirect impact on water resources management. It is advisable to plan for **implementation rules based on international standards** in order **to ensure the interoperability of data series** and thus to facilitate the use of water data coming from various sources
- (7) In order to **facilitate the identification, sharing and enhancement of water data** between the various stakeholders involved in the national policies on water resources management, it is deemed important to **develop services in an ad hoc network, in each country on the one hand, and at the regional level on the other**.





### III. PROPOSAL FOR THE IMPLEMENTATION OF A MEDITERRANEAN WATER DATA NETWORK

#### A. Objective

Taking into account the results on the current situation and expectations, it is recommended to initiate a “**Mediterranean Water Data Network**” named hereafter “**Med-Aquanet**”<sup>18</sup>.

The main objective of this network could be:

**“To build the national and regional capacities for the production, enhancement and sharing of comparable and quality information, useful for sustainable water resources management in the Mediterranean area.”**

**This tool is proposed for supporting the various regional and national policies** and actions likely to affect water resources management in the Mediterranean area.

It is in line with a global approach to the development of a **Mediterranean network of water information and competences** for water resources management in the Mediterranean region.

At the organisational level, it is based on the **principle of partnership between stakeholders intervening in complementary fields.**

From a technical viewpoint, it is based on the reinforcement of the **information processes and infrastructures related to water resources management** operated by the regional organisations and the States of the area, while making them compatible through common implementation rules and accessible through networked services.

#### B. Main assignments

Designed as a **regional tool for co-operation and decision-making support** for the follow-up, evaluation and management of resources and water policies, this Mediterranean data network will have the main task of:

- 1) Developing **rules and national capacities for the production, shared management and analysis of the expected comparable and aggregated data** in the volunteer countries, with the support of the regional organisations concerned, through:
  - a. **Activities of technical assistance and training** on the organisational and technical aspects of data administration (rules for sharing, interoperability, development of infrastructures for the management and dissemination, interpretation and analyses of data quality, etc.);

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<sup>18</sup> “**MEDWIS**” for “Mediterranean Water Information System”



- b. **Experience sharing** and provision of tools and methods for data administration and sharing;
  - c. Support to the **gathering and production of missing data**.
- 2) Developing **common procedures at regional level**, validated by the regional and national organisations concerned, for the comparable production of information by the countries:
  - a. Accurate and joint definitions of the expected aggregated data, the methods for the calculation and gathering of the necessary basic data;
  - b. Identification of the production processes, the rules for sharing and interoperability of data and services (identification, consultation, access, etc.).
- 3) Developing the **technical infrastructures in the volunteer countries** and at the regional level, allowing the networking of the services for data and information identification, consultation and downloading, according to the access rights which will have been defined (regional and national portal, regional and national metadata catalogues, service for the dissemination of the reference frames facilitating data interoperability, cartographic Web services, etc.).
- 4) **Organising the production, interpretation and dissemination of the regional information** in collaboration with the regional organisations concerned.

## C. Characteristics

### 1. Some definitions

Within the purpose of this proposal<sup>19</sup>:

- 1) “Data network” : used here in the sense of information system, i.e. an organised set of resources (persons, data records, procedures, equipment, software,...) to collect, store, organize and communicate information in the form of texts, images, sounds or data encoded (broader sense that a computer based information system),.
- 2) “water data” refers to any data that can be directly or indirectly useful in a water resources management programme;
- 3) “metadata” refers to the information describing the water data series and services and enabling their search, inventory and use;
- 4) “water data services” refer to the operations which may be carried out using a data-processing application on the water data contained in water data series or in the related metadata (search, consultation, downloading, etc.);

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<sup>19</sup> Most definitions submitted hereafter are in conformity with those adopted by the Inspire directive



- 5) “interoperability” refers to the possibility of combining water data series and of an interaction between services, without recurrent manual intervention so that the result is consistent and the added value of the data series and services is increased;
- 6) “water information infrastructure” refers to metadata, water data series and data services related to water data; networked services and technologies; agreements on sharing, access and use; and systems, processes and procedures for co-ordination and follow-up, established, operated or made available in accordance with this proposal;
- 7) “MEDWIS portal” refers to an Internet portal which gives access to the services planned for in this proposal;
- 8) Indicator refers to the value of a relevant parameter allowing the evaluation and follow-up of the characteristics of a field and thus the making of the necessary provisions as soon as possible (ISO definition)

## 2. Action scope / Targeted public

This network **prioritises all the Mediterranean countries and the countries having Mediterranean hydrographical characteristics** (Portugal, Jordan).

But, as shown in the results of the survey carried by this study, the “Mediterranean area” implies different spaces or geographies according to the topics or subject matters in which one is interested.

Thus beyond the 21 Mediterranean countries, this network should be able to cover variable scopes according to topics and political contexts, concerning for example:

- **Coastal areas** for the tourist aspects;
- The Mediterranean **river basins** for IWRM (integrated water resources management) and pollution aspects;
- **The 21 countries** globally for the general aspects of water resources management, with extensions to close non-bordering countries in some cases (Jordan, countries of the Balkans);
- **Euro-Mediterranean space** for some political, socio-economic and environmental aspects. Within this framework, work will be co-ordinated with the tools implemented by the European Union.

With regard to the targeted public, the Mediterranean data network firstly concerns:

- a) Local, national and regional “**public authorities**” of the water sector, namely any public administration, including advisory public bodies, at national, regional or local levels, having missions of public administration, in relation with water resources management;



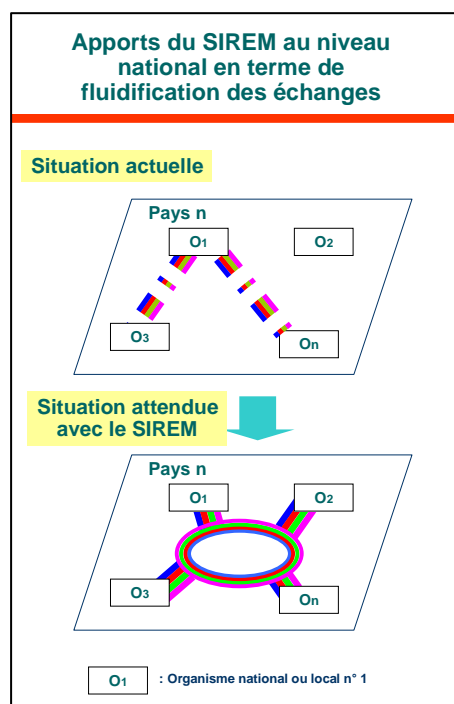
- b) **The person or entities having public responsibilities** or functions, or providing public services related with water resources management under the supervision of an organisation or a person mentioned in a);
- c) In addition, within a function of **public information**, it should also offer specific access to any person or entity other than a public authority.

### 3. Overall expected benefits

#### a) *Benefits for the States*

In the volunteer States, MEDWIS should contribute to:

- **Develop lines for collaboration between the national authorities** aiming at an effective administration of water data and information at the national level;
- **Develop the infrastructures of the national partners** and the implementation of networked information services to facilitate identification, consultation, and sharing of data series and information while complying with the confidentiality rules and access right established by the data producers;
- **Facilitate exchanges of comparable data between national services** in order to best meet the needs of the national and local water resources management;
- **Develop the production of national and sub-national quality data** and information of common interest;
- Define and **adopt procedures** aiming at organising the **interoperability of data and services** between the public authorities of the country (national and local level) and with the regional organisations, in order to facilitate data access and sharing;
- **Increase the completeness and quality of the information provided to the regional organisations** by ensuring complementarity of actions and by avoiding duplicating production.



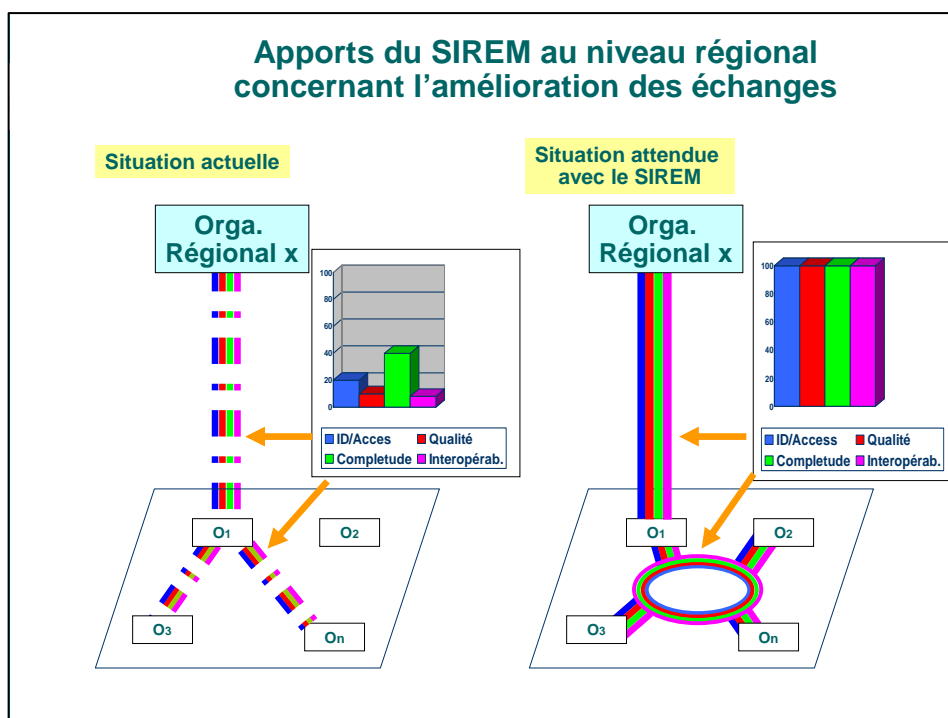
To this end, the partner States should be able to benefit in the short-term from actions of technical assistance allowing the organisation of a network of national partnerships and specifying the requirements for reinforcing the infrastructures with the preparation of the corresponding specifications.

In a second step, projects dedicated to reinforcing infrastructures for data and information management will have to be developed. They will have to include the reinforcement of technical infrastructures and training of human resources.

## b) Benefits for regional organisations

Within a close co-operation with the various regional partner organisations, while respecting the prerogatives of each of them, MEDWIS will contribute to:

- 1) Solve the problems of access, quality and comparability of water information;
- 2) Pool the efforts of the regional organisations for:
  - a. Supporting the countries in the production of basic information useful at the national and regional level;
  - b. Producing the metadata required for data identification and analysis of production processes;
  - c. Establishing rules for data interoperability and sharing;
- 3) Increase the production of regional information on water resources management;



The regional partner organisations will see their processing capacities increased and their tasks simplified thanks to:

- **Tools and procedures** at the Mediterranean regional level allowing, via a single access point:
  1. Identification of the data on a topic or a national or international geographical area
  2. Consultation of the corresponding metadata
  3. Consultation and downloading of the data made available by the countries and the other regional organisations according to the rights defined by the producers and managers

4. Access to the definitions and methods for calculating indicators used by the various stakeholders in water resources management
  5. Dissemination of information on the activities carried out at the regional level in the sector of water resources management (Web portal, catalogues of events, E-flash, etc.)
- **Exchanges of experience** with the countries and the other regional organisations on the procedures and techniques of shared administration of water data
  - **Better efficiency of the focal points in the countries**, which will have less difficulty in gathering the expected information from the other national authorities in the countries which will have upgraded their national information system, and will be able to provide more regularly information of better quality and more complete
  - **Better standardisation of data** collected from the various national focal points
  - ...

### ***c) Benefits for « Water and Environmental » resources management at the regional level***

Generally, this Mediterranean data network will allow improving water resources management at the regional level insofar as it will contribute to:

- Facilitate the follow-up and evaluation of the policies and programmes related to the water sector (and thus partly to the environment) carried out at the regional level
- Develop a shared Mediterranean system of environmental information as a component of such a system
- Structure the actions of the water sector financed within the regional policies (Neighbourhood policies, African Water Facility)

### ***d) Benefits for regional co-operation***

This Mediterranean data network will promote the development of exchanges between the countries.

It will develop procedures and tools which could be included in other activities (transport, etc.).

Finally, by supporting the sharing of water information, it will be an enabling factor for the solving of conflicts linked to water resources management in the sub-region.



## D. Implementation principles

This section outlines a set of general principles recommended for implementing the system.

### 1. Priority to reinforcement at national level

Knowing that the data and information necessary for water resources management are mainly produced at the national level, the proposed network should, above all, **be an incentive added value for the States to ensure their sustainable participation**, while supporting the sovereign process of water information management at national level.

Accordingly, the Mediterranean data network should, in particular, **be based on the water information processes and infrastructures established by each partner State**, and build the capacities of each partner country in terms of production, management and provision of information of common interest for water resources management.

### 2. Principle of voluntary participation

**The States will be invited to participate in the Mediterranean data network on a voluntary participation basis.**

To this end, the representatives of the States could be invited to sign a partnership charter in order to be fully associated in the system.

### 3. Principle of enhancing the existing infrastructures

The Mediterranean data network will have, above all, to rely on the information infrastructures related to water resources management established by the **concerned States** and by **the regional organisations**.

### 4. Principles of declaring metadata and data confidentiality

#### *a) Declaration of metadata*

The waste of time and the costs resulting from the search for existing and available water data, then for establishing their usefulness for particular purposes are a major obstacle to the full use of the available data.

Thus, access to the metadata of the data series and information is essential for:

- Identifying the existing and available data and information
- Allowing the producers to specify the conditions for data production and access
- Allowing the users to check that the quality of the available data meets their needs.



The network should thus **support the provision, by the States concerned, of the descriptions of the water data series and services available in the form of metadata**, especially through the drafting of **catalogues of metadata**.

### ***b) Data confidentiality***

**Declaring metadata does not mean that the corresponding data are automatically available:** at this stage, it merely means that each stakeholder informs the other partners that it manages or produces such data or information.

In a second step, each data producer or manager will be free to make the corresponding data and information available, by defining the group(s) of users having the right to access or download the corresponding data and information.

## **5. Common regional procedures validated with the national partners**

**The problems related to the availability, quality, organisation, accessibility and sharing of water information are common to a great number of policies and topics in the water field and at various levels of public authority (regional, national, local).**

Solving these problems requires the adoption of **measures regarding the exchange, sharing, access and use of interoperable** water data and water data services at the various levels of the public authority involved in water resources management.

To facilitate the **development of compatible national infrastructures**, the **common measures and rules**, which will be proposed at the regional level, will be validated with the national partners.

These measures shall contribute, in particular, to the **establishment of sharing rules** to obtain the **interoperability** of the information infrastructures related to water resources management, created by the States, and allow their use in a Mediterranean and transboundary context.





### # Examples of common procedures at national level

With a concern for consistency with regional actions, information infrastructures related to water resources management will be developed in the concerned States so that:

- a. the concerned data are produced, stored, maintained, processed and made available **at the most suitable level**,
- b. the water data **are made available on a voluntary basis** and under conditions which will not unduly prohibit their use,
- c. the information is **provided once and usable for several processes**,
- d. the water data produced at each level (regional, national or local) can be **shared between the public authorities**,
- e. **searching for available water data**, assessing their adequacy with the pursued objective and knowing conditions applicable to their use shall be easy,
- f. **combining these water data in a consistent way and sharing them between several users and applications shall be** technically feasible, according to the access rights established by each partner.

This means, among other things, **the adoption of common data models for information exchanges, of joint definitions of the indicators and of their calculation method.**

## 6. Pragmatic and gradual approach

With a concern for pragmatism, the network will gradually deal with the topics of the water sector with a priority order, **while focusing, above all, on indicators of common interest.**

In its initial phase, the Mediterranean data network could, for example, focus on

- the **priority indicators on water and sanitation of the Millennium**, and on
- the **indicators of the Mediterranean Strategy for Sustainable Development (developed and defined by the Blue Plan in charge of MSSD implementation)**,

while firstly working on a **limited number of aggregated data** concerning:

- 1) The assessment of renewable water resources
- 2) The assessment of the water uses and demand per sector (domestic water, irrigation, industry)
- 3) The evaluation of the access rates to drinking water supply and sanitation
- 4) The assessment of the pollutant discharges into the Mediterranean.

Other complementary indicators and topics will then be identified according to the needs and will be approached according to the orientations which will have been validated by the steering committee of the system.

### # A shared leadership of the topical groups



In order to support collaboration between institutions, the co-ordination of the activities related to a topic will, as far as possible, be under the responsibility of a specific regional organisation or a volunteer country, the network playing, above all, a role of overall co-ordination.

This shared leadership shall enable the promotion of the skills of each organisation.



## E. Implementation rules

### 1. Data Interoperability

The **large diversity in the formats and structures**, used for the organisation of water data and access in the Mediterranean area, prevents the formulation, implementation, follow-up and effective evaluation of the Mediterranean programmes having a direct or indirect impact on water resources management. It is advisable to plan for **rules allowing the enhancement** of water data and information from various sources of information in the various partner States.

These rules shall **ensure interoperability** and will be **based** as much as possible on international standards without involving excessive costs for the concerned States.

Therefore, this will mean above all the **development of the existing systems** while enabling them to communicate through a common language and common exchange procedures (common reference frames, common coding procedures, etc.).

#### # Definition/adoption of general principles for data and services interoperability and sharing

Achieving effective data and services interoperability firstly means:

- Organising production of metadata on data and services
- Defining and adopting common rules for data and services sharing and
- Drawing up and disseminating guidance documents

- **Metadata**

The data producers will be in charge of providing and updating metadata related to the water data series corresponding to the topics processed by the system.

These metadata will include minimum information allowing:

1. identification
2. classification (type and topic)
3. geographical and temporal characterisation
4. data quality, validity and conformity
5. conditions for access and use
6. organisations in charge of the implementation and dissemination



- **Common rules for data interoperability**

- (i) General principles for production / gathering / processing / dissemination

General principles for production / gathering / processing / dissemination should be adopted so that:

- The data are systematically produced, stored, maintained at the most suitable level
- Information can be provided once and usable for various processes
- A single supplier can be associated to each type of data

- (ii) Access rules

The partners should also adopt rules defining the general conditions for access and use of the data and services they provide.

- (iii) Interoperability rules

Common rules for data interoperability will be designed in order to allow comparability of information obtained from various water data series.

- (iv) Rules for the organisation of networked services

This activity will aim at specifying the principles governing implementation of networking services for data identification, consultation and downloading.

## 2. Data sharing

**The public authorities should be able to easily access the water data series and services necessary for carrying out their public assignments that may affect water resources management.**

This access can be hindered when it depends on ad hoc individual negotiations between public authorities each time access is required. The regional organisations and volunteer States will be invited to take the necessary measures **to prevent such practical obstacles** to the sharing of data, while resorting, for example, to prior agreements between public authorities.

Therefore, it is recommended that each **partner Member State adopts measures concerning the sharing of water data series and services between its public authorities.**

These measures shall enable the access of these public authorities to data series and services, their exchange and their use for carrying out public assignments that may affect water resources management.



### 3. Development of networked services

**Networked services are necessary for sharing water data between the various levels of public authority** in the Mediterranean area.

These networked services shall especially allow **searching, consulting and downloading** of water data and resorting to specific data services able to facilitate the **transformation or processing** of these data.

These services shall operate in accordance with mutually agreed specifications and criteria of minimal performance in order to ensure the interoperability of infrastructures established by the concerned States.

These services shall take into account specific user requirements and shall be made available to the public, easy to use, and accessible via the Internet or any other suitable telecommunication means.

### 4. Co-ordination of the actions and stakeholders in each partner country and at the regional level

Effective implementation of the Mediterranean data network requires a close co-ordination of all the stakeholders involved in data production, in the setting up of infrastructures for data administration, and in the processing of the information.

**At the national level**, it is especially advisable that suitable co-ordination structures are implemented in each partner country.

For each indicator or other synthetic information to be produced, the most suitable national body to be in charge will be identified. The latter will be designated in agreement with the other national partners, which will commit themselves to provide the data and information required for its task.

**At the regional level**, the existing regional processes will be invited to co-lead the network: they could be considered as **resource centres networked via Med-Aquanet** for water data administration at the regional level.

Accordingly, it is planned to develop in particular:

- The compatibility and interoperability of the data and services with WISE (addition of a Mediterranean entry point in WISE and adaptation of WISE for the consultation of Mediterranean data)<sup>20</sup>
- Actions for co-ordination with the existing or emerging ISs at the regional level (ex Information System of MAP (Infomap) whose SIMEDD developed by the Blue Plan, and the Information system of Medpol, etc.)
- Actions for co-operation and support to the other regional bodies and working groups (MED-EUWI, Joint Process, water monitoring working group, water scarcity and drought working group)

<sup>20</sup> Actions initiated at the beginning of 2008 within the “Toward A Mediterranean Water Information Mechanism compatible with the Water Information System for Europe (WISE)” project



## IV. A 2-YEAR ACTION PLAN

### A. Objectives

This action plan aims at:

- **Structuring collaboration at the regional level** for a consistent administration of water data and information, **between the volunteer States and the regional organisations** on the one hand, and **between the regional organisations** on the other;
- **Reinforcing the water information infrastructures of the volunteer countries** through:
  - o **organisational support projects**
  - o **technical projects** for reinforcing the infrastructures (equipment, software, specific application software, etc.) and for training human resources;
- **Developing the interoperability of the regional and national information systems, and the networked services** at the national and regional level facilitating identification of existing data, and if necessary their access according to the rights defined by the producers;
- **Organising the rational production of a first series of indicators of general interest**, which will imply, above all, obtaining a consensus between the concerned regional and national organisations on definitions, calculation or production procedures and expected quality level.

This 2-year action plan is based on the participation of **10 volunteer countries**, in agreement with the **main regional organisations** directly involved in actions of water resources management at the regional level.

Among the 10 countries, the participation of the 7 countries having contributed to the feasibility study is expected (Cyprus, Spain, France, Jordan, Malta, Morocco and Tunisia) and the participation of at least 3 other volunteer countries will be looked for.

At the regional level, the main international organisations involved in water resources management in the area will be invited to collaborate and promote their resource centres. Among those: the European Commission DG-Environment via the European Environment Agency (EEA), Eurostat via MEDSTAT, the MAP via the Blue Plan and Medpol, UNWater via the FAO as well as the Joint Monitoring Programme (WHO/UNICEF), the World Water Council, GWP-Med, IME, Med-EUWI, OSS, MAP-RACs (INFO-RAC), other United Nations agencies (UNEP UNESCO,...), the WWAP, etc..



With regard to the priority topics, in addition to the topics related to the **millennium indicators** (rate of access to drinking water supply and sanitation), it is proposed to **prioritise the quantitative aspects of water resources management** with a search for consensus on a limited number of indicators for each following topic:

- Quantitative assessment of the available water resources (surface and groundwater)
- Quantitative assessment of the abstractions
- Quantitative assessment of the discharges

## B. Description of the action plan

The 2-year action plan submitted hereinafter includes:

- a preliminary phase for the **structuring the Mediterranean partnership on water data administration** between the States and the regional organisations
- and **2 main lines for actions to be carried out at the same time:**
  3. **One in the volunteer countries** to homogeneously build the technical capacities of each partner country, with:
    - a. **organisational and institutional actions**, which may involve calls for tenders
    - b. A phase of **drafting technical terms of reference** for development and training
    - c. **Actions for the technical reinforcement of the management and training infrastructures**
  4. **The other at the regional level** to benefit from enhancement **tools and services** at the regional level, which will facilitate the **production of the information** necessary for decision-making and expected for facilitating water resources management at the regional level

### 1. Structuring the Mediterranean partnership on water data administration

This first phase consists in initiating and organising the partnership, **between the volunteer States and the regional organisations** on the one hand, and **between the regional organisations** on the other, with the creation of a unit for the technical co-ordination of the data network.

The partnership will be based on a **charter** which will specify, in particular, the basic principles of its organisation and operation, such as:

- The principle of the members' voluntary participation;
- The principle of opening to all the producers, administrators and/or users of water data and information in the Mediterranean area;
- Priority topics to deal with ;
- Principles for the organisation of the partnership with, in particular, the role and composition of the technical unit for regional co-ordination;
- The quality search principle.
- .....



This charter shall facilitate partnership between stakeholders intervening in complementary fields at the regional level: each stakeholder, recognised as leader in its field or geographical area, shall lead its topical or geographical working group, its network and its gathering of data and knowledge, the **complementarity and self-sufficiency** of each stakeholder being also required.

In addition, it will specify the roles of the **Technical Unit for Regional Co-ordination** of the network: a permanent and small team which will take daily care of the development of the partners' network and of the co-ordination of the technical activities.

Finally, the charter could then be supplemented by **specific agreements** which may specify the actions to be developed between 2 or several partners (example: on-going actions between EMWIS and the EEA aiming at ensuring that the future Mediterranean data network is compatible with WISE (Water Information System for Europe)).

## 2. Typical actions in a partner country

Two groups of actions are considered with the volunteer countries. They concern:

1. Organisational and institutional actions
2. Technical actions for the technical development of the information infrastructures and for the training of human resources.

Each one of these 2 groups of actions can result in projects that may involve calls for tenders.

### a) *Organisational and institutional actions*

The final objective of this group of actions is to formulate a “**National Plan for water data administration**” and to apply it for producing priority data of regional and national interest.

According to the countries, this line for action could include:

- Strengthening of the framework for collaboration between institutions at national level;
- Production of metadata;
- Definition of rules for production, management and sharing;
- Development of semantic interoperability of the data necessary for producing priority indicators through:
  - o Analysis of the processes on priority data
  - o Production of generic and specific data models
  - o Definition of reference frames
- Provision of data necessary for producing priority indicators;
- Production of other aggregated data of national interest (maps, indicators, summary notes, etc.);
- Assessment of the efficiency of the procedures used and identification of the infrastructures and networked services to be developed;





- Production of a national action plan for data administration (data master plan).

All these organisational and institutional actions could involve a call for tenders (named “Institutional Call for tenders”).

### # **Strengthening of the framework for collaboration between institutions at national level**

A framework for collaboration at national level should be defined in each country, in a specific way to facilitate collaboration between the national institutions, and to allow the focal points of the regional organisations to have the necessary information.

Depending on its legislative and institutional context, this institutional framework could be either an agreement or a legislative text, or a combination of both.

In any event, it will be necessary to **clarify the distribution of the roles and responsibilities between the main data producers and managers**, without dealing, at this stage, with the technical details of the exchange formats and of the data to be collected.

### # **Production of metadata**

For all the basic data required for producing the expected aggregated data, it is necessary to:

- Identify the existing data series and therefore to have the metadata from the various existing information sources,
- Access the data which are relevant for the calculation of indicators.

The declaration of the metadata of existing data will therefore be one of the first actions to be carried out at the national level. These metadata shall enable the identification of available information and the assessment of the compatibility of their production/aggregation method with the planned processing and the expected level of data quality.

This action will be set up using the procedures which will have been defined in agreement with the regional level.

### # **Definition of rules for production, management and sharing**

National rules for production / gathering / processing / dissemination will be adopted in each country while making sure that:

- 1) The national and local data are systematically produced, stored, maintained at the most suitable level.
- 2) Information can be provided once and usable for various processes.
- 3) A single supplier can be associated with each type of data.



In addition, the involved national institutions will agree between them on the sharing rules and on the conditions of access and use of the data and services which they make available. This will be done through:

- An analysis of the existing situations in terms of access right, user rights, copyright, etc.;
- Taking into account of the models for data sharing which will have been prepared at the regional level;
- The partners' commitment regarding the information to produce or maintain, and agreements on the access rights and on the enhancement of the data made available at the national level.

### # Development of semantic interoperability on priority data

Each partner country will integrate the interoperability rules which will have been formulated at the regional level, and will specify the specific interoperability rules adopted at the national level in order to achieve comparability and compatibility with the expectations at the regional level for data series and information made available by the national producers.

To this end, for all the data required for producing priority indicators, it will be recommended to carry out an analysis of data production and management processes and to share the “acquis” developed at the regional level in order to specify:

- A national generic water data model<sup>21</sup> used as a reference for the establishment of specific models (reference standards, modelling principles, rules for identification, etc.).
- Specific national models according to the topics dealt with.
- Common national reference frames and coding rules which will facilitate the single identification of the objects
- ....

### # Organisation of the regular production of priority indicators and other expected information (e.g.: map, indicators, document, summary note, etc.)

The objective is to produce the priority information expected at the regional and national levels, by establishing the procedures which will ensure a regular and lasting production of this information.

This production will be based on the information systems already existing in each country. It will be organised in a specific way in each volunteer country by taking into account the roles, competences, human resources and equipment provided by the various national institutions concerned.

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<sup>21</sup> The link will be closely related to the “acquis” resulting from the implementation of the Inspire directive.



With a concern for pragmatism and efficiency, the production programme will be spread out over time by successively approaching the topics with a priority order.

For each aggregated data to generate, it will mean:

- Identifying the national organisation which will be responsible for its production, to avoid duplicating production and allow the traceability of the production;
- Identifying the information sources and the relevant usable basic data (use of metadata);
- Analysing the data sources worthy of interest, with production of data dictionaries describing the main concepts used as well as the definitions and formats of the attributed data;
- Drafting a production protocol using the production principles, reference frames and networked services adopted at the regional level.

### **# Analysis of the efficiency of the procedures and identification of the needs for the reinforcement of the information infrastructures**

For each country, a complete evaluation of the first production exercise will be carried out, especially to:

- Analyse the efficiency of the inter-institutional agreements and of the procedures used for data identification, access and enhancement;
- Identify the needs for reinforcement of the information infrastructures in terms of:
  - o Software and services
  - o Training of human resources (training needs)
  - o Capacity for producing basic data

### **# Production of a national action plan for data administration (data master plan)**

A summary document of the type “Water data master plan” will be drawn up in each country.

This document will be used as a reference for the continuation of activities. It will summarise all the organisational aspects and procedures to be implemented and shall ensure the sustainability of the collection, conservation and access to basic data operations allowing the production of the expected aggregated data.



### ***b) Drafting of the terms of reference for technical developments and training***

Upon completion of the organisational assistance phase, terms of reference will be drafted in order to specify the contents of the later phase of technical reinforcement of the infrastructures and training of human resources.

These terms of references will be based on:

- the outcomes of the “Analysis of the efficiency of the procedures and identification of the needs for the reinforcement of the information infrastructures”,
- the national action plan for data administration.

They will have to be used as the basis for launching the technical invitation(s) to tender.

### ***c) Actions for the reinforcement of technical infrastructures and training***

Technical projects will be developed in each country to **reinforce the information systems** existing at the national level, and to **build the capacities of the human resources** operating these systems.

The final objective will be that each country has available an effective and consistent national water information system allowing the enhancement of the actions of each national partner while meeting the needs of the decision makers and managers of water resources at the national, local and regional levels.

These development and training activities could involve calls for tenders based on the previously established terms of reference.

#### **# Development of infrastructures for information management**

The aim is to reinforce national infrastructures in terms of production, administration and services for access to the information, while helping obtaining a semantic and technical interoperability with the other countries at the regional level.

This development programme could include actions dealing with:

- The **development** of basic **national infrastructures** for data management:
  - o Acquisition/reinforcement of the national platform (servers, software, etc.) to facilitate the shared administration of data
  - o National Web portal
  - o National catalogues of metadata



- Creation or development of the information systems (data bases, GIS, exchange interface) of the main national partners in charge of the management of topical or geographical data
- The **development of reference frames and procedures** regarding technical **interoperability**:
  - Definition of models and global data dictionaries of the water sector or on specific topics (e.g.: surface water quality)
  - Production of common reference frames (administrative and hydrological reference frames (GIS layers of river basins, water bodies, aquifers, etc.), coding of parameters, etc.)
- The **development and networking of services** via the Internet for data and information identification, consultation and sharing according to the rights granted to the various users
- The **development of tool boxes for the national partners** aiming at disseminating to the national and local partners the guides and tools (software, application software, etc.) recommended by the regional level and the country.

### # Training of human resources

The programme for training human resources will be carried out simultaneously with the actions for the development of infrastructures.

It will be defined and based on the needs analysis previously carried out and shall allow a strong appropriation of the data administration methods and tools while emphasizing the operational character of the training.

This program will include:

- General training on environmental data administration (production process, dashboard concepts, indicators, data quality, etc.);
- Technical training on software or techniques, non-specific to the water and environment sector: managers of data bases, geographic information systems, exchange formats, Web services, etc.;
- Training on methods and tools, specific to water data administration at the national and regional level.

### 3. Actions at the regional level

The regional actions will consist in:

1. Defining, developing and using the tools, procedures and other common rules necessary for facilitating data and services identification, access and interoperability at the regional level



2. Enhancing the data made available by the national partners to organise the production of priority indicators and synthetic products expected by the decision makers
3. Organising the dissemination of the obtained results and the regular information of the partners

These actions will be carried out at the same time as the national actions, and most often in advance, so that the countries can benefit from the “acquis” validated at the regional level.

They will be co-ordinated by the “regional Technical Unit for the co-ordination of the water data network” set up at the end of the partnership organisation phase

### ***a) Development of priority tools for the regional infrastructure***

In order to facilitate the synthesis of what exists and information sharing between partners, it is planned to create, at the beginning of the project:

- A regional Web portal
- A catalogue of metadata
- A data base of the indicators used by the various regional and national partners.

#### **# Regional Web portal**

In accordance with the principle of enhancing what exists, MEDWIS should, above all, rely on the information infrastructures related to water resources management established by the **concerned States** and the **regional organisations**.

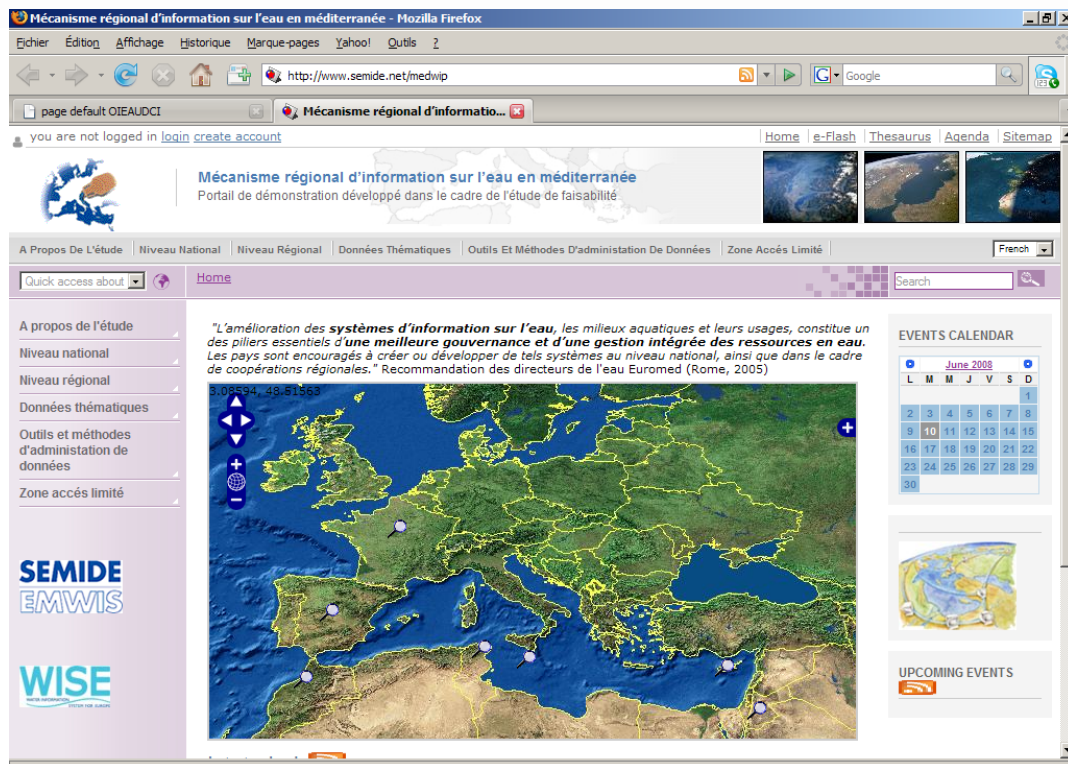
Bridges will thus be established between the various levels, and the access points, which the States and regional organisations will have decided to open, will be accessible via a **Web portal of the Mediterranean data network**, which will be maintained by the co-ordination unit of the system.

This portal will be used as an entry point for consultation of the Mediterranean synthetic data and for access to the various tools and regional and national water data management services (catalogues of data sources, cartographic services, etc.) and to all the guides and recommendations developed to ensure interoperability at the regional level.

A prototype of regional Web portal was developed within this feasibility study and can be consulted at the following address:

<http://www.semide.net/medwip>





### # Regional catalogue of metadata

All the metadata describing the national sources of information as well as the regional sources of information, will be accessible at the regional level via a regional catalogue of metadata, which will be able, among other things, to rely on the national data catalogues.

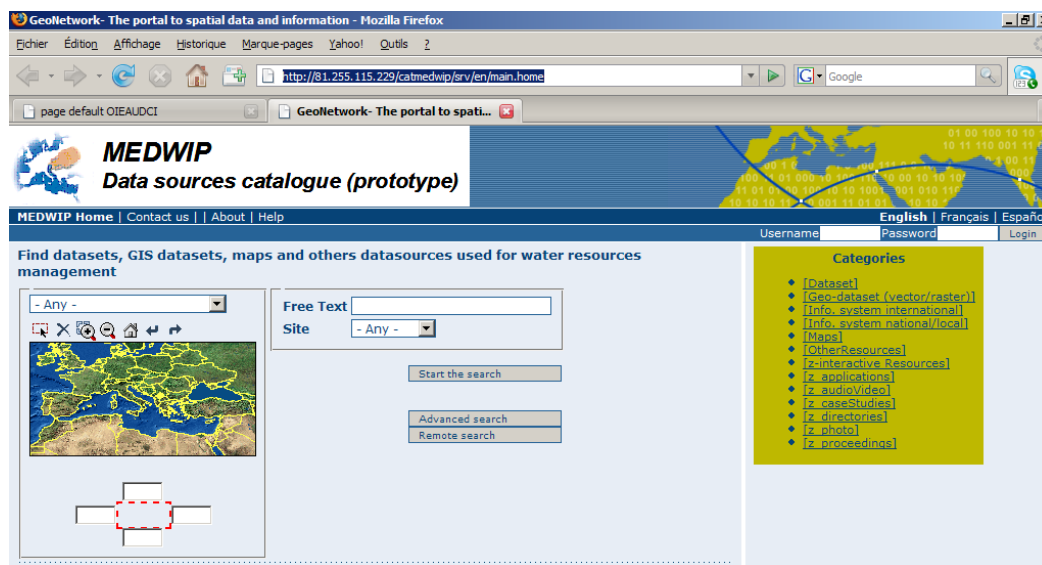
This regional catalogue will be used as a basic tool:

1. By the **metadata producers** and will enable them to:
  - **Enter on line** (or import) the metadata of the identified sources of information and made available by the partners
  - **Define the access rights** to the available metadata and data series by specifying the access rights for each group of users
2. By the **users** and will enable them to:
  - **Search and identify the available data sources** through a simple and multilingual interface, allowing combining the search with a keyword and the search through a geographical interface;
  - **Download the data** themselves, or access the available interactive maps, according to the access rights which will have been granted to them by the producers;

Its implementation will imply:

- The adoption of a metadata management tool after an analysis of the existing tools
- The definition of rules for metadata management (profile, keywords, multilingual management, management of the versions, etc.)
- A seminar for the validation of the procedures and the organisation of metadata production

A prototype of regional catalogue of metadata was developed within this feasibility study and can be consulted on the abovementioned Web portal:



### # Data base of the indicators used by the partners

One of the major problems encountered at the regional level being the non-comparability of indicators used by the various partners, it is recommended to record, in a common data base, the definitions and methods used for the calculation of the indicators generated by various producers in order to compare them.

This kind of basic data, used during the feasibility study, had allowed emphasizing various problems of data comparability on various indicators. (See examples at the following address:

<http://www.semide.net/medwip/topics/WSS/donnees-chiffrees/MDG7-C> )



## ***b) Development of common rules and reference frames for data and services interoperability***

Various common rules and reference frames will be established at the regional level to reinforce the rules for collaboration between the regional organisations on the one hand, and, on the other, to be used as an example at the national level and thus prevent duplicating activities. These common rules will especially concern:

- Rules for metadata production and declaration
- Rules for data confidentiality and sharing
- Data models and reference frames for semantic interoperability of the priority topics
- Rules required for technical interoperability

### **# Rules for metadata production and declaration**

The rules for metadata production and declaration will ensure the comparability and standardisation of produced metadata on the one hand, and, on the other, their availability according to common procedures.

To this end, after analysing the metadata management procedures existing at the regional level, the following shall be specified in particular:

- Metadata profiles to be adopted
- Rules for the management of the multilingual aspects
- Topical and geographical keywords to be used to achieve MEDWIS objectives as well as possible.

### **# Rules for data confidentiality and sharing**

A study of the access rights, user rights and copyrights will be initiated involving the partner regional organisations and a sample of national partners.

This analysis shall highlight the best practices and models for data sharing and lead to the preparation of standard models of agreements related to data sharing.

These models will then be used at the regional level to specify the rules for sharing between regional organisations, and could be used as a working basis for regional studies.

### **# Data models and reference frames for semantic interoperability of the priority topics**

Achieving semantic interoperability implies the adoption of a common technical language for data and information exchange and sharing.



For each priority topic, it will therefore be necessary to specify:

- A generic water data model<sup>22</sup> to be used as a reference for the establishment of specific models (reference standards, modelling principles, identification rules, etc.).
- Specific models according to the topics dealt with
- The definition of common reference frames and coding rules facilitating the single identification of the objects in the context of data exchanges

#### **# Rules required for technical interoperability**

Achieving technical interoperability for the sharing of data and services implies the adoption of a common technical architecture for the development of the networked services, including the definition of:

- exchange protocols
- exchange formats
- ...

#### **# Development of the first networked services between regional organisations**

The first networked services will be established by relying on the previously laid down rules.

Insofar as the services for identification and downloading were already been dealt with when creating the catalogue of metadata, this action shall allow the development of:

- Services for consultation of the available data
- Services for downloading the common reference frames
- The use of cartographic Web services

In addition, it will enable interconnections between regional information systems, including, potential integration with:

- the water information system for Europe (WISE)
- the Mediterranean information system on the environment and sustainable development (SIMEDD) which is being developed by the Blue Plan
- the systems for the dissemination of the Eurostat/Medstat environmental statistics
- ....

#### ***c) Generation of priority synthetic products expected at the regional level***

The objective is to generate the synthetic information expected at the regional level, based on the comparable aggregated data provided by the countries.

This production of regional information will enable checking of the effectiveness of the partnership established at the regional level as well as of the comparability and interoperability of the data and services previously created.

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<sup>22</sup> A link will be established with the “acquis” from the implementation of the Inspire directive.



The table below shows some of the proposed topics and priority indicators to be generated in this action plan:

Topics	Indicators
Quantitative assessment of water resources	- Exploitable inland water resources (10 <sup>9</sup> m <sup>3</sup> ) - Renewable surface water resources (10 <sup>9</sup> m <sup>3</sup> / year) - Renewable groundwater resources (10 <sup>9</sup> m <sup>3</sup> /year)
Quantitative assessment of abstractions	- Total abstractions (all sectors included) (10 <sup>9</sup> m <sup>3</sup> / year) - Total abstraction for agricultural uses (10 <sup>9</sup> m <sup>3</sup> / year) - Total abstraction for domestic uses (10 <sup>9</sup> m <sup>3</sup> / year) - Total abstraction for industrial uses (10 <sup>9</sup> m <sup>3</sup> / year) - Abstractions from surface waters (10 <sup>9</sup> m <sup>3</sup> / year) - Total abstraction from groundwater (10 <sup>9</sup> m <sup>3</sup> / year)
Quantitative assessment of discharges	- Direct industrial discharges (m <sup>3</sup> / year)
Millennium indicators related to drinking water supply and sanitation	- Rate of population's access to drinking water supply (%)
	- Rate of population having access to sanitation (%)

The production of each indicator will require, in particular:

- The adoption, by the countries and regional organisations, of common definitions, indicators and calculation methods (it is to be noted that these indicators are already collected by various regional organisations but according to variable procedures)
- The analysis of the comparability of the available basic data through the analysis of their detailed metadata.

#### ***d) Actions for technical co-ordination and enhancement of the “acquis” at the regional level***

##### **# Regional workshops for dialogue/validation**

Active participation is expected from the national and regional stakeholders in all the steps of this action plan and, in particular, during:

- the organisation of the partnership and validation of the objectives
- the definition of common rules (metadata production, information sharing, definition of the data models and reference frames for interoperability)
- the generation of priority products
- ...

Workshops for information, dialogue and validation will be regularly held (3 to 4 each year) to facilitate this participation.



**# Co-operation with and support to the other regional bodies (MED-EUWI, Joint Process,...)**

According to the needs, co-operation projects with regional organisations will be directly carried out by the technical Unit for regional co-ordination of the system.

**# Drawing up and dissemination of the guidance documents and technical procedures**

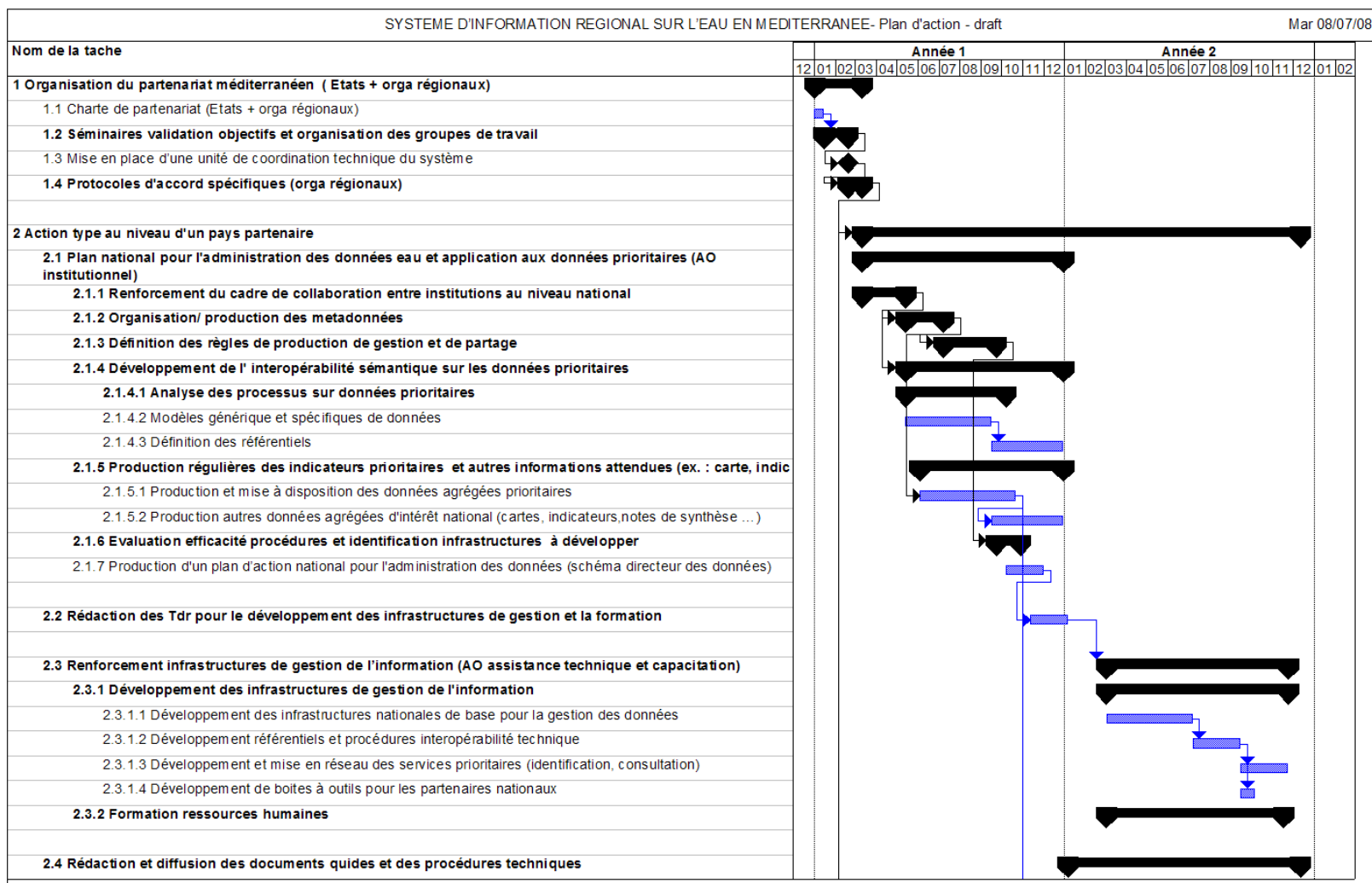
All the rules and procedures established within this action plan will be regularly disseminated by the technical co-ordination unit at the regional level and by the facilitating/ co-ordinating organisations of the national information systems in each country.

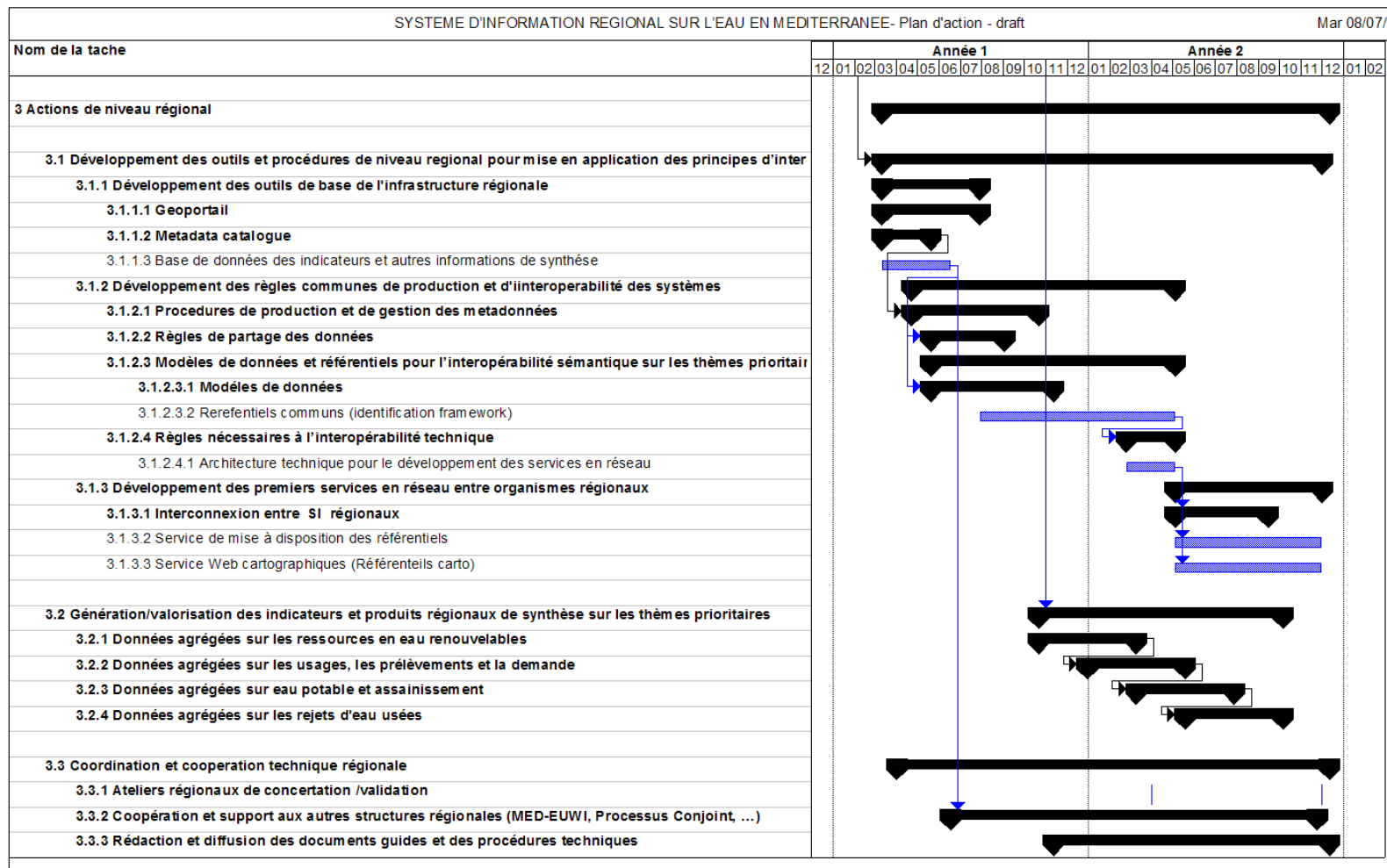
In addition, the handbooks and guidelines adopted by the regional partner organisations will also be available.



## C. Implementation schedule







## D. Budget

The table below displays a first estimate of the budgets necessary for implementing this action plan with a distribution of the costs over 2 years

This budget proposal includes 2 main components:

1. **The Regional component** presents a budget estimate to be planned to cover the investment and operating expenses of the technical co-ordination unit, the expenses for technical assistance to the development of specific procedures and application software, the expenses related to the organisation of 3 international workshops for dialogue/collaboration every year.
2. **The National component** presents a standard budget estimate for a country. This budget covers the expenses for investment, technical assistance and training related to the development of the national water information system within this action plan.

<b>Mediterranean water data network (v110608)</b>	<b>Cost Year 1 (€)</b>	<b>Cost Year 2 (€)</b>	<b>TOTAL 1+2 (€)</b>
<b>REGIONAL LEVEL</b>			
- Technical Unit	433 100	407 400	<b>840 500</b>
- Technical Assistance	136 000	72 000	<b>208 000</b>
- Workshops for dialogue (3/year)	123 000	123 000	<b>246 000</b>
<b>Sub-total "Regional level"</b>	<b>692 100</b>	<b>602 400</b>	<b>1 294 500</b>
<b>STANDARD SUPPORT TO NATIONAL LEVEL / COUNTRY</b>			
Strengthening of the institutional framework	96 000		<b>96 000</b>
Development of the technical terms of reference	16 000		<b>16 000</b>
Reinforcement of infrastructures		300 000	<b>300 000</b>
Information/training of human resources		154 000	<b>154 000</b>
<b>Sub-total "standard support to country"</b>	<b>112 000</b>	<b>454 000</b>	<b>566 000</b>

The costs taken into account to draw up this table are detailed in annex .





## E. Expected outputs and benefits

### 1. Expected outputs

The main results expected upon completion of this 2-year action plan are as follows:

- A **partnership charter**, constituting a framework for water data administration at the Mediterranean regional level, is adopted by the volunteer countries and by the main regional organisations involved in water resources management actions in the area;
- A **national plan for water data administration** is established in the volunteer countries;
- **Technical terms of reference**, specific to each volunteer country, are developed in order to reinforce its information management infrastructures and its human resources;
- **Projects for reinforcing infrastructures and training** human resources are financed;
- **Metadata describing the main water information sources** are developed and made available by the producer and/or manager organisations;
- A **regional catalogue of metadata allows the identification of the water data series and services** available in the countries and in the regional organisations;
- **Reference frames and data models enabling the comparability** of the data necessary for producing regional synthetic indicators are established and used in the exchanges of information;
- **Procedures for access to basic data** and for the production of regional synthetic indicators are established, are applied at least once and will be reusable;
- **Synthetic information useful for water resources assessment and management** at the regional level is generated on priority topics;
- The **experts of the volunteer countries are trained to maintain and develop the national services**;
- **On-line services for identification and consultation** of data and synthetic information are developed in the volunteer countries and at the regional level;
- A **Web portal of the Mediterranean water data network is accessible** to the general public, and specific information supports on the data network are developed.



## 2. Expected benefits

### a) *Benefits for the volunteer States*

In the short term, the volunteer States will benefit from:

- Technical and organisational assistance projects for the development of their water information systems and the formulation of a national plan for water data administration
- Projects for reinforcing the technical infrastructures for water data and information management

They will benefit from on-line services for the identification of the existing data and the sharing of information between the national public authorities; services which could be gradually enhanced later on with their inventory projects. This will allow significant time and cost savings for the studies, especially by reducing the phases of identification of available data.

They will be able to develop their internal procedures for the production of synthetic information and the sharing of water information, which will facilitate:

- the task of the organisations producing data for the regional organisations
- the production of information useful for national planning
- the production of information useful for local planning (for each administrative zone, basin and local authority)

The medium-term benefits are, for example, well described in the national Cyprus report which emphasizes that:

<p>The establishment of a National Information System in Cyprus would achieve the following benefits:</p> <ul style="list-style-type: none"> <li>• Help provide coherent reliable water related data and information for monitoring, management and planning of the water sector thus making more informed planning decisions.</li> <li>• Offer a great opportunity to review and improve the information flows between the various institutions involved in the water sector on the basis of recognized standards.</li> <li>• Facilitate the provision of data relevant to local and international bodies on the basis of information classes.</li> <li>• Eradicate data redundancy, duplication and multiple data sources.</li> <li>• Avoiding the costs of bad decisions based on multiple unreliable data sources.</li> <li>• Saving of sector leadership's time.</li> <li>• Saving the cost of processing &amp; maintaining redundant data stores.</li> <li>• Increasing transparency of information.</li> <li>• Monitoring and controlling data quality and integrity.</li> <li>• Provide a tool for a more effective Water Demand Management Policy</li> <li>• Provide consumers and stakeholders with reliable and easily accessible data</li> </ul>
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**b) Benefits for the regional partner organisations**

While keeping their initial prerogatives, the regional partner organisations will see their tasks simplified thanks to:

- Access to Mediterranean regional tools and procedures allowing, via a single access point:
  - ◆ Identification of the data on a topic or a national or international geographical area
  - ◆ Consultation of the corresponding metadata
  - ◆ Consultation and downloading of the data made available by the countries and by the other regional organisations according to the rights defined by the producers and managers
  - ◆ Access to the definitions and methods for the calculation of the indicators used by the various stakeholders in water resources management
  - ◆ Dissemination of the information on the activities performed at the regional level in the water resources management sector (Web portal, catalogues of events, E-flash, etc.)
- Experience sharing with the countries and the other regional organisations in order to generate comparable indicators and information
- Better efficiency of focal points in the countries, insofar as these focal points:
  - ◆ Will have less difficulty in collecting the information expected by the other national authorities in the countries which will have developed their national information system
  - ◆ Will be able to provide more regularly information of better quality and more complete
- A better standardisation of the data collected from the various national focal points
- ...

**c) Benefits for « Water and Environmental » resources management at the regional level**

Generally, this action plan will allow improving the knowledge of water resources available at the regional level.

This plan will support the development of exchanges between countries regarding water data administration in the Mediterranean area.

It will allow the development of procedures and tools which could be used later on other topics of water resources management and in other industrial sectors (transport, tourism.).



## V. ANNEXES

Available online at: <http://www.semide.net/topics/Obs>

