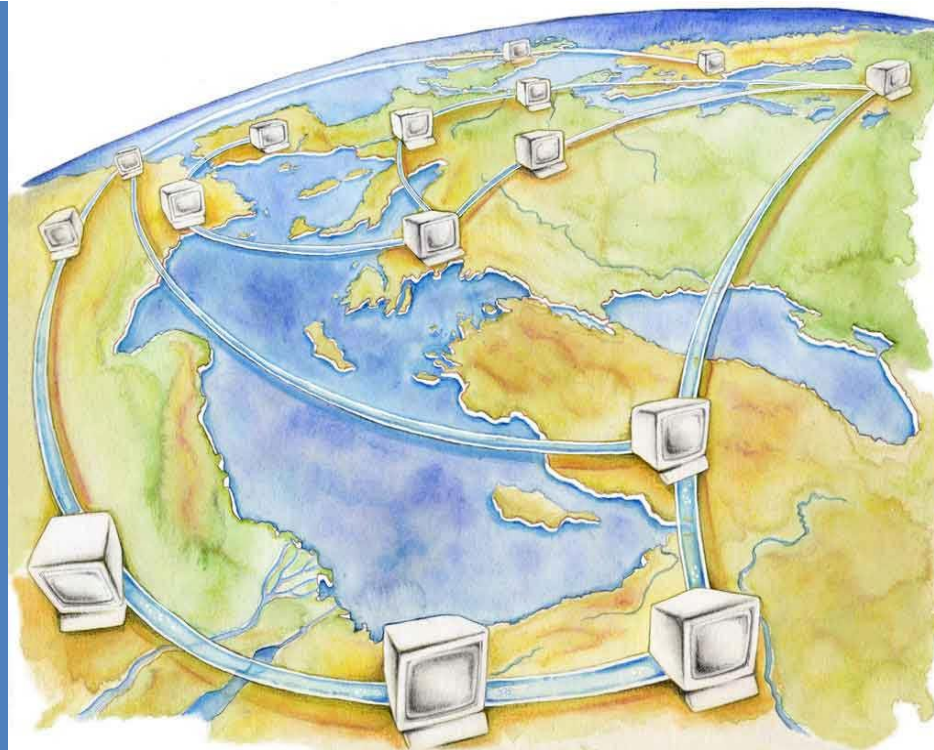


# SEMIDE

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النظام المعلوماتي الأورومتوسطي للمعرفة في  
مجال المياه

# EMWIS

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Euro-Mediterranean  
Information System on  
know how in the water  
sector

# WATER MONITORING REPORT

Madrid (Spain), 10 November 2010

Union for the MEDITERRANEAN



# SUMMARY

- INTRODUCTION
- MONITORING UNDER THE EU WATER FRAMEWORK DIRECTIVE
- OBJECTIVES OF MONITORING UNDER THE WFD
- MONITORING TARGETS FOR THE DIFFERENT WATER BODIES
- WFD, REPORTING AND DISSEMINATION
- EXPERIENCES WITH WFD-MONITORING IN EU-MEMBER STATES
  - JUCAR BASIN (SPAIN)
  - EFFORTS TO MONITOR THE WATERCOURSES IN France
- THE SITUATION REGARDING MONITORING IN MPC
- CASE STUDIES IN MPC RIVER BASINS
  - SEBOU (MOROCCO)
  - LITANI (LEBANON)



# INTRODUCTION

“Joint Mediterranean Process” (JP): technical platform for collaboration between the countries bordering the Mediterranean.

WFD’s framework:

- Status of water resources;
- Sustainable water use;
- Discharges of priority substances;
- Pollution of groundwater; and
- Floods and droughts.

6 working groups:

- Groundwater management
- Drought and water scarcity
- Shared water resources management
- Monitoring networks and programmes
- Waste water re-use
- Linking rural development with water management

“Monitoring networks and programmes” is the most recent. Objective: better understanding of the situation in the Mediterranean Partner Countries (MPC), to identify the main priorities for improving the water monitoring systems.



# INTRODUCTION

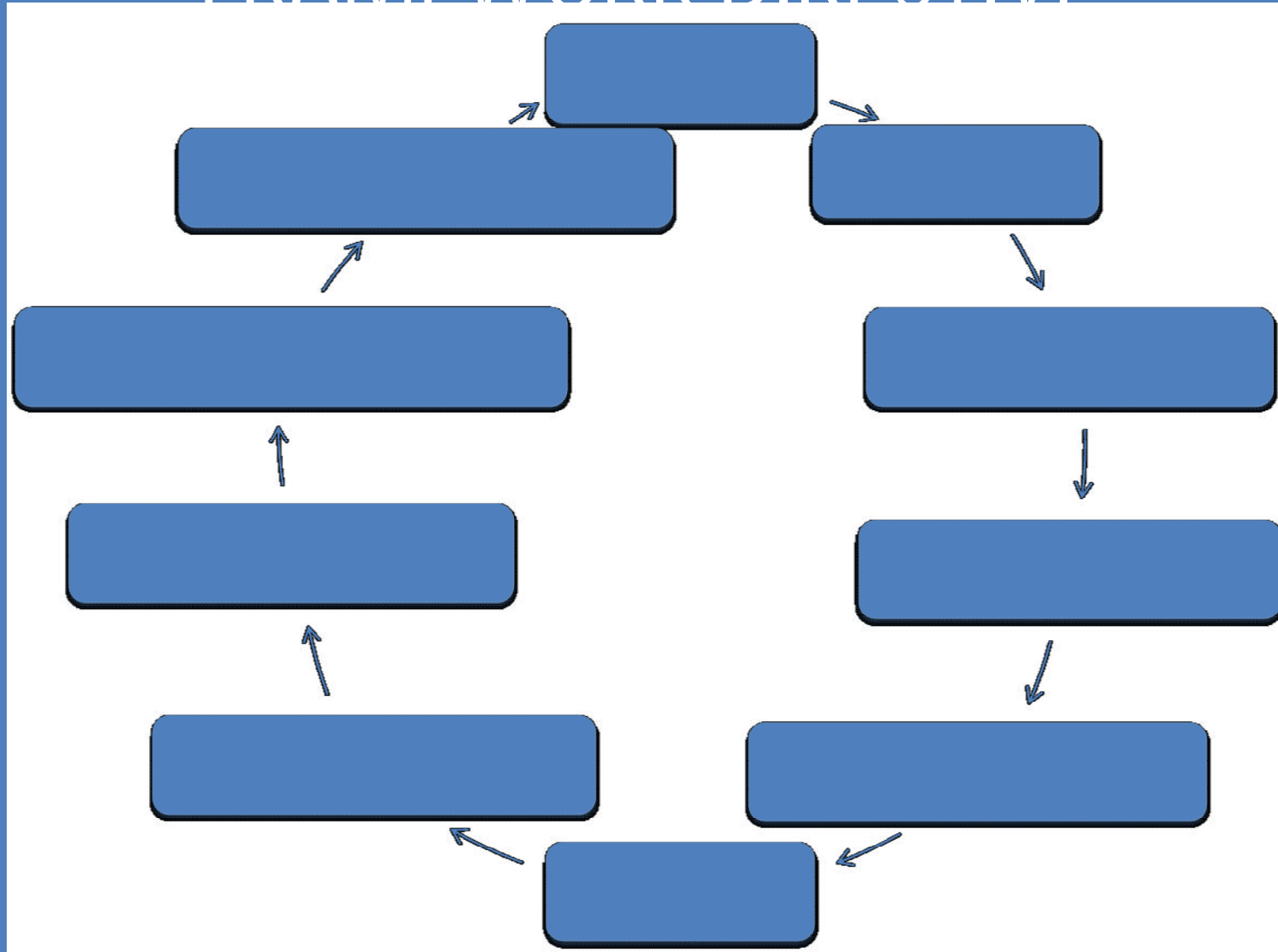
The action plan:

- Assessing and monitoring water resources and demands for both human activities and the environment.
- Assessing water monitoring networks , build water information systems.
- Testing at local levels through pilot basins, where established water quality measurements networks are set.

The following activities were carried out:

- a survey addressing the non EU countries of the Mediterranean area (Spring/summer 2009),
- a workshop for feedback and discussion on the survey results and exchange of good practices (October 2009, Beirut),
- updating the survey synthesis and preparing a draft report,
- working group meeting to finalise the report and its recommendations .

# MONITORING UNDER THE EU WATER FRAMEWORK DIRECTIVE



# OBJECTIVES OF MONITORING UNDER THE WFD

To establish an overview of water status within each River Basin District and to classify surface water bodies into one of five classes and groundwater into one of two classes.



# OBJECTIVES OF MONITORING UNDER THE WFD

- Surveillance monitoring:
  - Picture of the ecological and chemical status.
  - Classification of water bodies in 5 classes.
  - Supplementing the impact assessment procedure
  - Designing future monitoring programmes
  - Assessing long term changes
  - Undertaken for at least one year during the period of a RBMP
- *What to monitor?*
  - Parameters indicative of biological, hydromorphological and physico-chemical quality elements
  - Priority List substances if discharged
  - Other pollutants if discharged

# OBJECTIVES OF MONITORING UNDER THE WFD

- Operational monitoring:

- Establish the presence of pollutants
- Establish status of water bodies at risk
- Assess changes in the status from the programmes of measures
- Based on the pressure and impact analysis.

- *What to monitor?*

- Parameters indicative of biological and hydromorphological quality, sensitive to the pressures
- Priority substances discharged, and other significant pollutants

- *Where to monitor?*

- Number of monitoring stations sufficient to assess
- More than one station per water body may be required
- Water bodies can be grouped as long as groups are similar in terms of type and sensitivity



# OBJECTIVES OF MONITORING UNDER THE WFD

- Investigative monitoring:
  - To ascertain the causes of a water body or water bodies failing to achieve the objectives
  - To ascertain the magnitude and impacts of accidental pollution
- *When to monitor?*
  - The reason for any exceedences is unknown;
  - Surveillance monitoring indicates the objectives are not to be achieved and operational monitoring has not been established;
- Monitoring for protected areas
  - Drinking water abstraction points and habitat and species protection areas.
  - Areas designated as bathing waters, as vulnerable zones and sensitive areas.

# MONITORING TARGETS FOR THE DIFFERENT WATER BODIES

	River	Lake	Transitional water	Coastal water	Heavily modified or artificial	Ground water
Ecological status	√	√	√	√	x	x
Ecological potential	x	x	x	x	√	x
Surface water chemical status	√	√	√	√	√	√
Groundwater chemical status	x	x	x	x	x	√
Groundwater quantitative status	x	x	x	x	x	√

# WFD, REPORTING AND DISSEMINATION

INSPIRE (Infrastructure for Spatial Information in Europe): sets the legal framework and general rules for geographical data exchange between users.

WISE (Water Information System for Europe): collection and dissemination of information of European water policy. Visualization aspects, support to surveys and analysis and research scenarios.

WISE and INSPIRE are in line with SEIS (Shared Information System), common environmental information system, to maintain and improve data quality and availability.



# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Júcar Basin (Spain)

- East of the Iberian Peninsula.
- 15 hydrogeological units some shared with other river basins.
- The Albufera Lake is wetland of great value.
- An important proportion of surface waters are regulated with dams.
- There is over-exploitation in some aquifers.
- Water resources are greater than water demand.
- Agricultural water use accounts for around 90%.
- There are two water transfers from this basin.



# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Júcar Basin (Spain)

- SIMGES (water allocation) and GESCAL (water quality) basin scale models have been used to deal with:
  - high degree of use of the water,
  - point and diffuse pollution,
  - complex water quantity management of the basin.

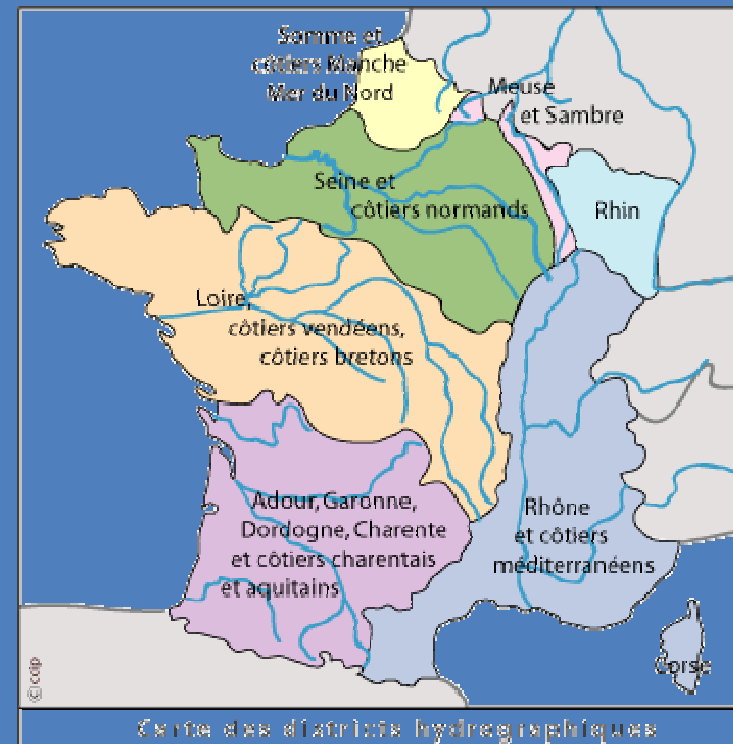
Both are part of the Decision Support System AQUATOOL.

- Networks for surface and groundwater monitoring. Automatic and real time monitoring systems. Automated System of Information on Water Quality (SAICA).
- The Automatic Hydrological Information System (SAIH) allows to control levels and flow rates of rivers and reservoirs, raising the alert for areas at risk of floods and droughts.

# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

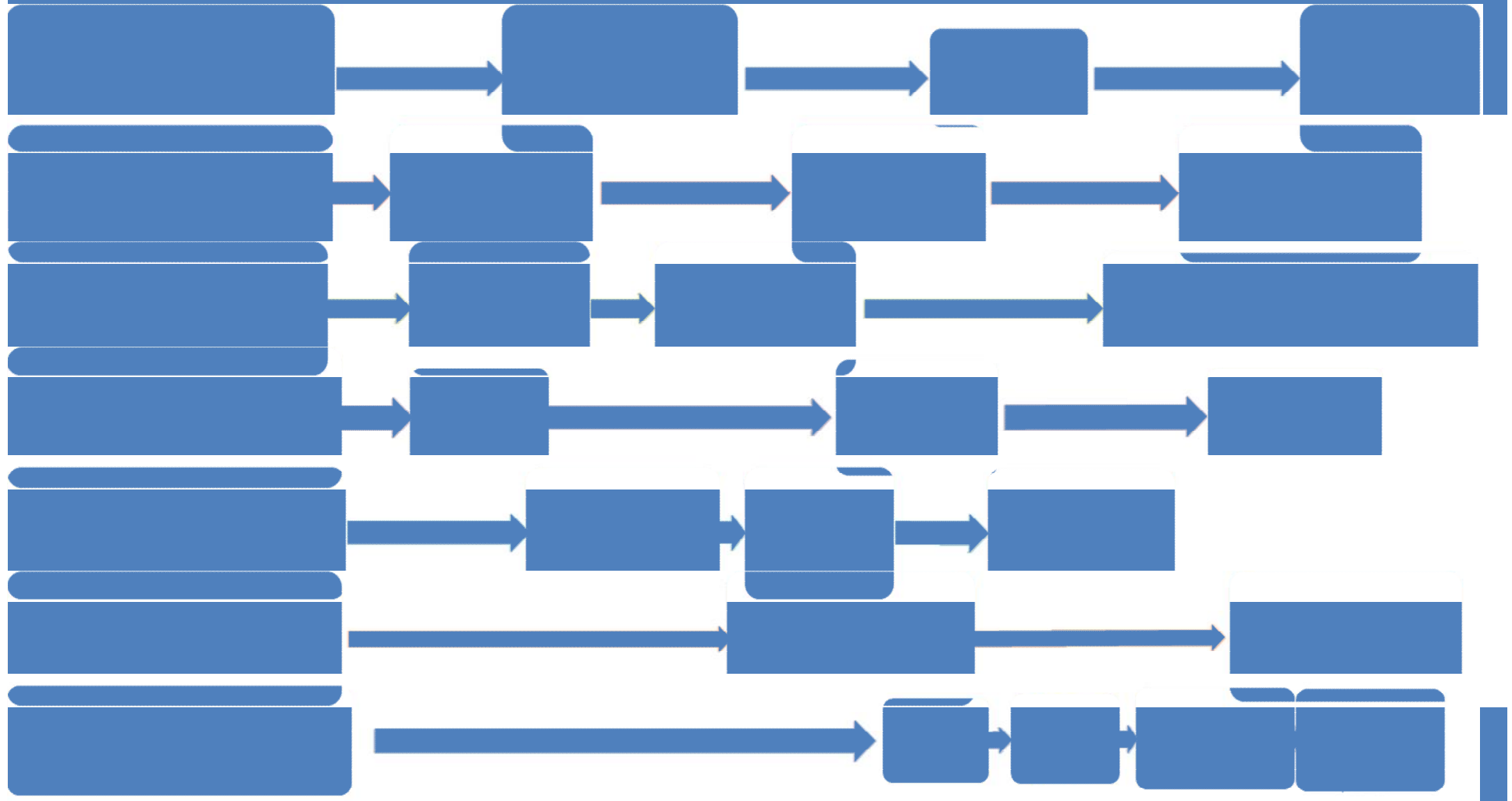
## Efforts to monitor the watercourses in France

- 1- Assessment of monitoring and data banking  
– 1964-1986: birth of monitoring against  
pollution and decentralized  
institutional structure, first steps of  
monitoring streams.  
– 1987 to 2006: to meet regulatory  
requirements and address the  
growing problems of pollution, the  
enhancement of monitoring the  
quality of rivers.  
– Since 2007: the principles of the  
Water Framework Directive.



# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Efforts to monitor the watercourses in France



# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Efforts to monitor the watercourses in France

### 1.2. Indicators of monitoring and data banking efforts

Analysis of indicators shows the increasing efforts to monitor the water quality of rivers since the 1970s:

- More stations of measures.
- More study, and in different media: samples on water, and progressively also on sediment, suspended solids and bryophytes.
- More sought parameters: monitoring, initially on the physico-chemical, also on micropollutants from the 1990s, then on the biology and hydromorphology in the 2000s.

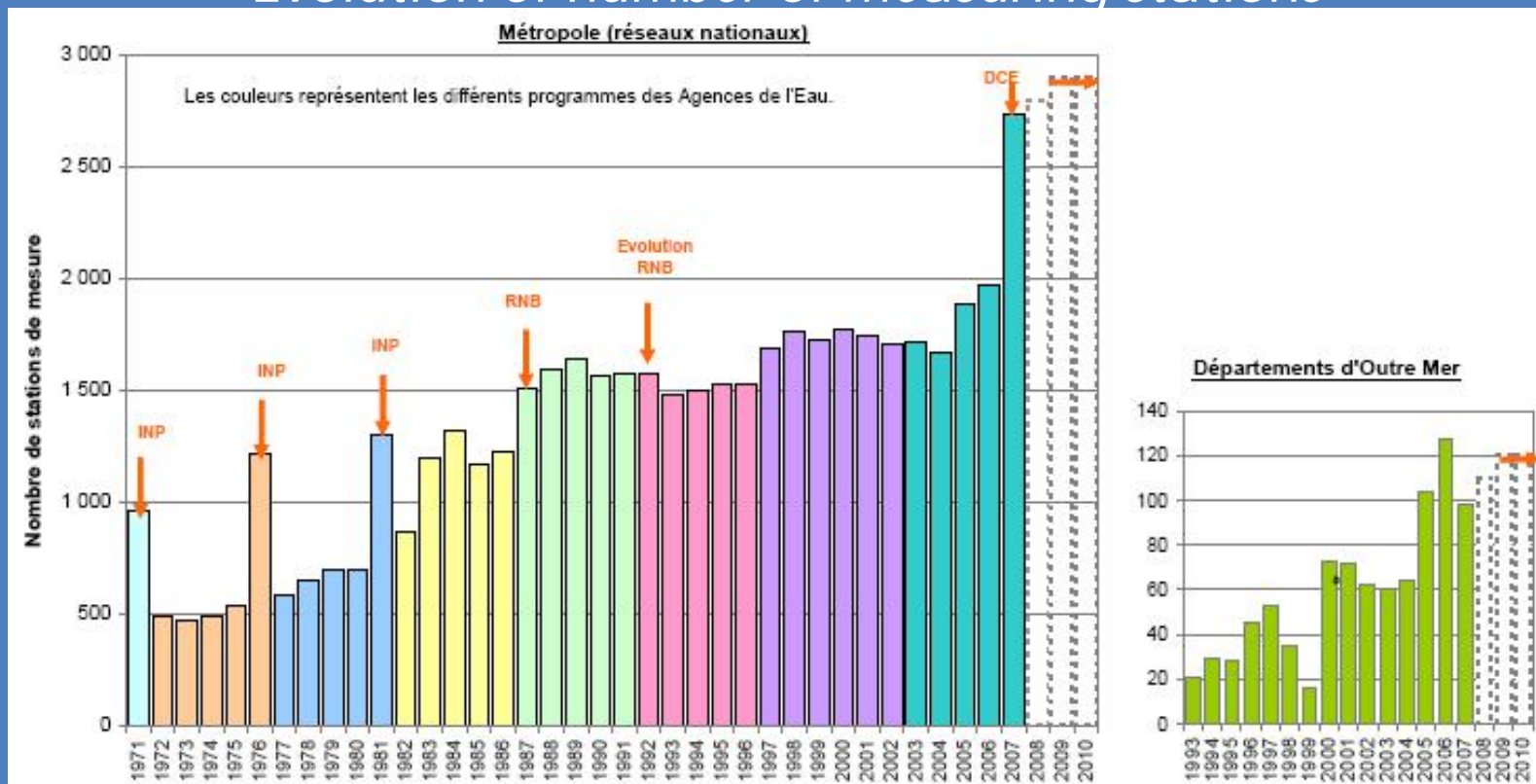


# EXPERIENCES WITH WFD-MONITORING IN EU-MEMBER STATES

## Efforts to monitor the watercourses in France

### 1.2. Indicators of monitoring and data banking efforts

*Evolution of number of measuring stations*

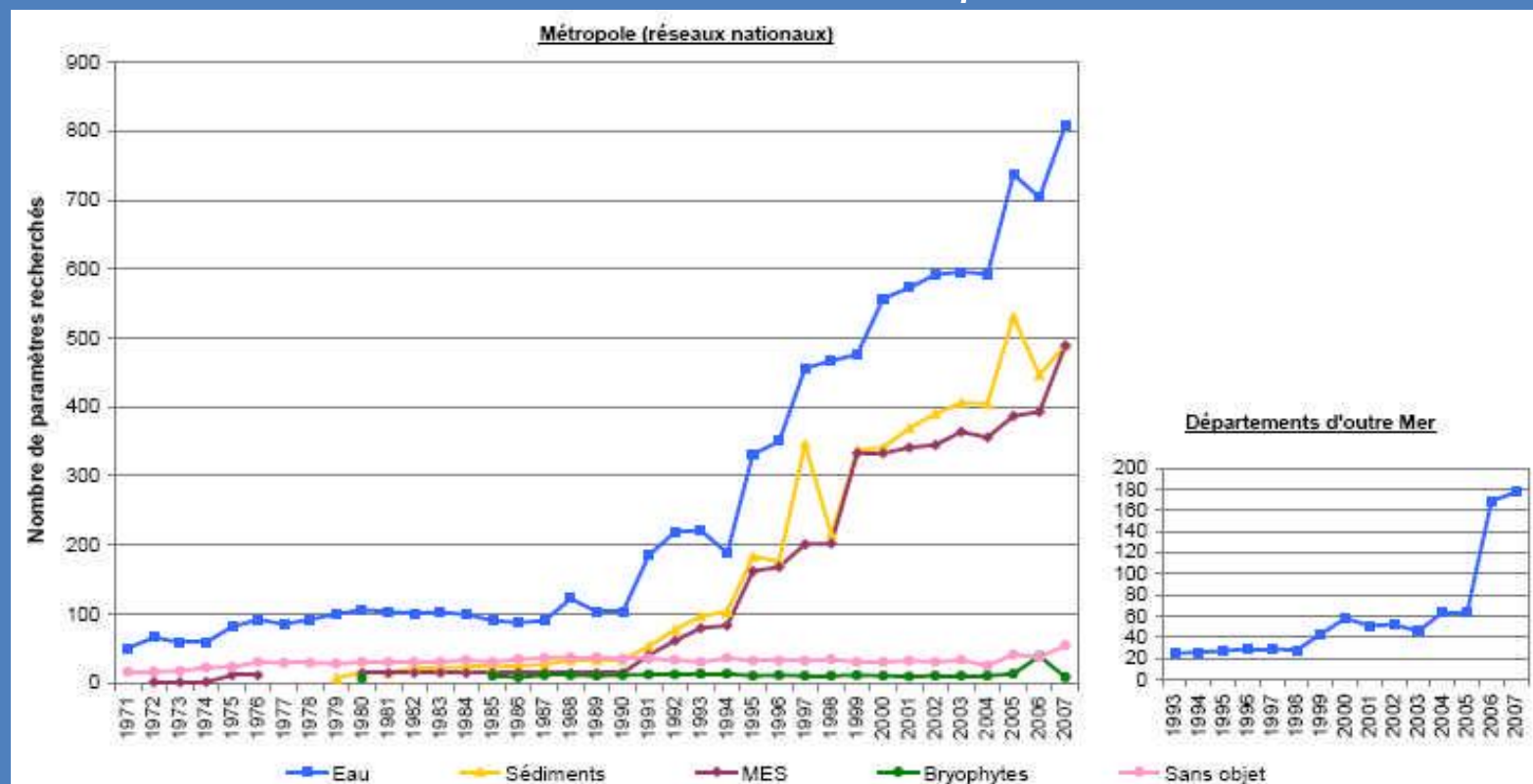


# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Efforts to monitor the watercourses in France

### 1.2. Indicators of monitoring and data banking efforts

*Evolution of number of parameters*

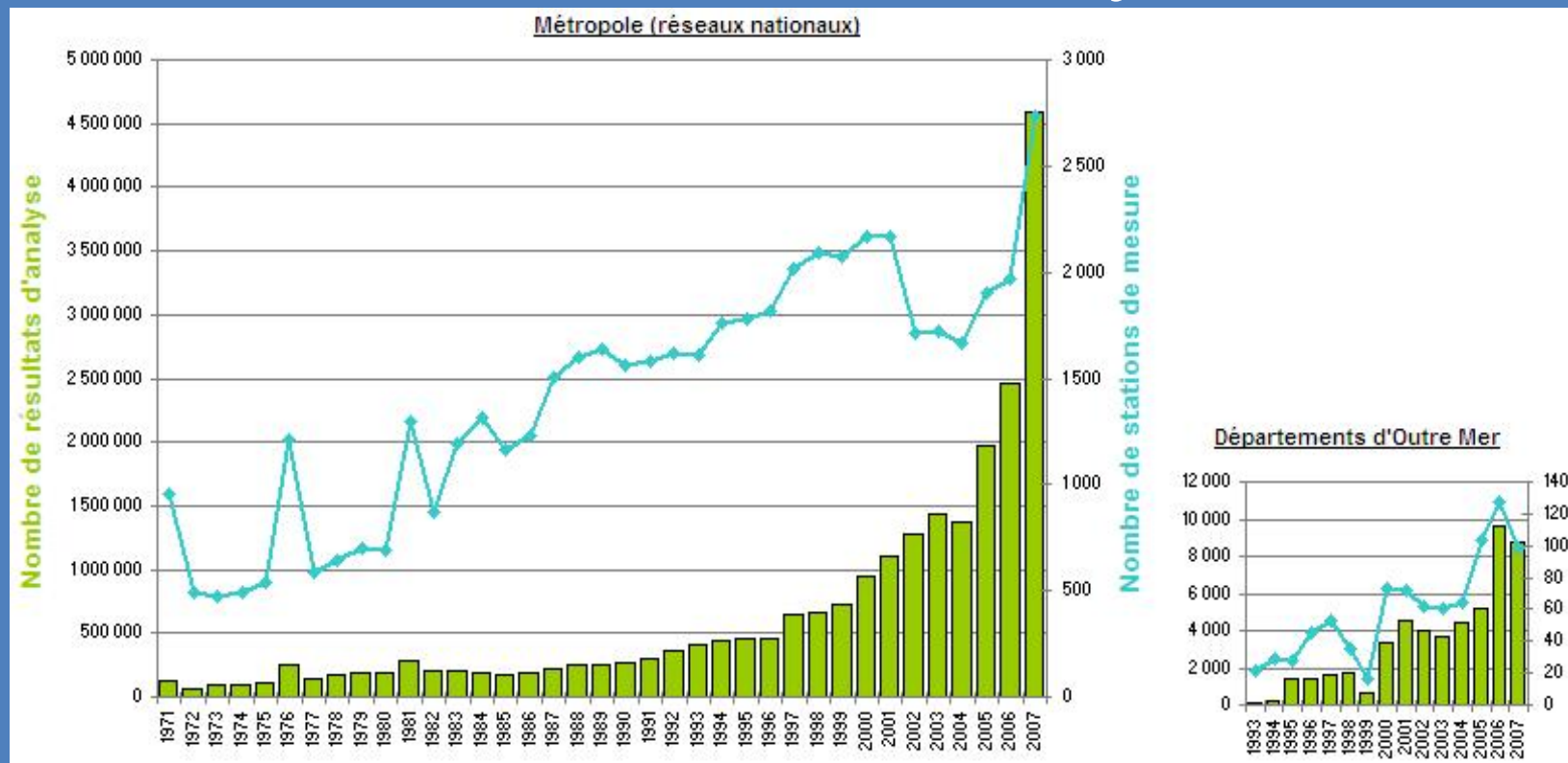


# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

Efforts to monitor the watercourses in France

1.2. Indicators of monitoring and data banking efforts

*Evolution of number of analysis*

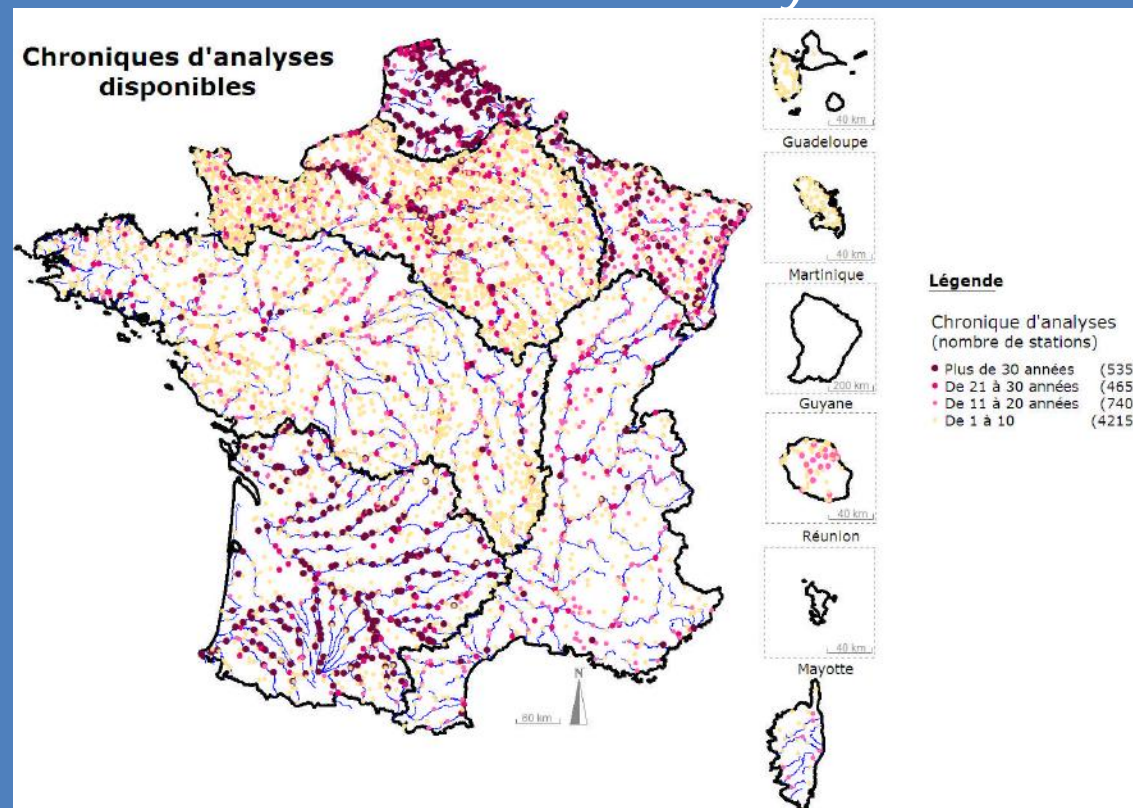


# EXPERIENCES WITH WFD- MONITORING IN EU-MEMBER STATES

## Efforts to monitor the watercourses in France

### 1.2. Indicators of monitoring and data banking efforts

*Evolution of available analysis records*

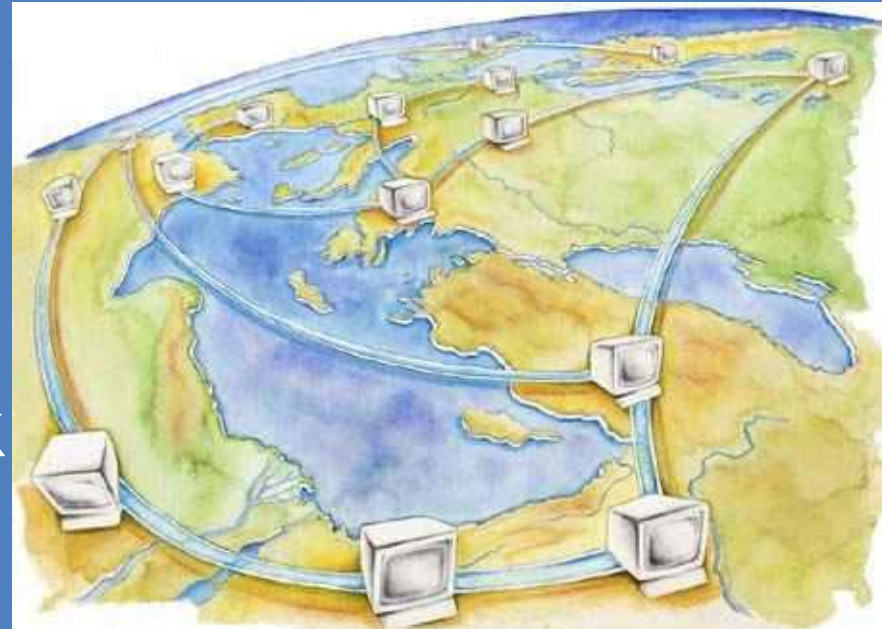


# THE SITUATION REGARDING MONITORING IN MPC

## Introduction

To describe the status of water monitoring networks and programmes in Mediterranean Partner countries, EMWIS, with support of Aquapôle, has carried out a survey among water authorities in the Mediterranean Partner countries between April and September 2009.

It includes answers from 11 countries (Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia and Turkey) which took part in this questionnaire.



# THE SITUATION REGARDING MONITORING IN MPC

## 1. Legal and institutional framework

The Ministry in charge of water resources is always the main body responsible for quality monitoring. In two cases only, the Ministry in charge of water is also in charge of the Environment. The Ministry for Agriculture (8 x) and the Ministry for Health (7 x) are most often in charge of part of the water-quality



# THE SITUATION REGARDING MONITORING IN MPC

## 1. Legal and institutional framework

- Water sectors are privatised in 6 countries, not in 5 and partially in Tunisia.
- Integrated water resources management is effective in 9 countries.
- Water is managed in: river basins (x4), administrative units (x7), and other (x2): hydro-geological basins (Israel), and both river basins and administrative units (Turkey).
- The river network is subdivided in water bodies, within the WFD meaning, in 2 countries (Cyprus and Morocco). Turkey is developing a project.
- Achieving good qualitative status of rivers or water bodies is an objective defined in the legislation of 5 countries (Algeria, Cyprus, Jordan, Syria, and Tunisia).
- Most countries (x9) have a regulatory framework for the discharge of pollutants and environmental quality. Lebanon and Israel still don't, but in Israel there is a proposal of standards.

# THE SITUATION REGARDING MONITORING IN MPC

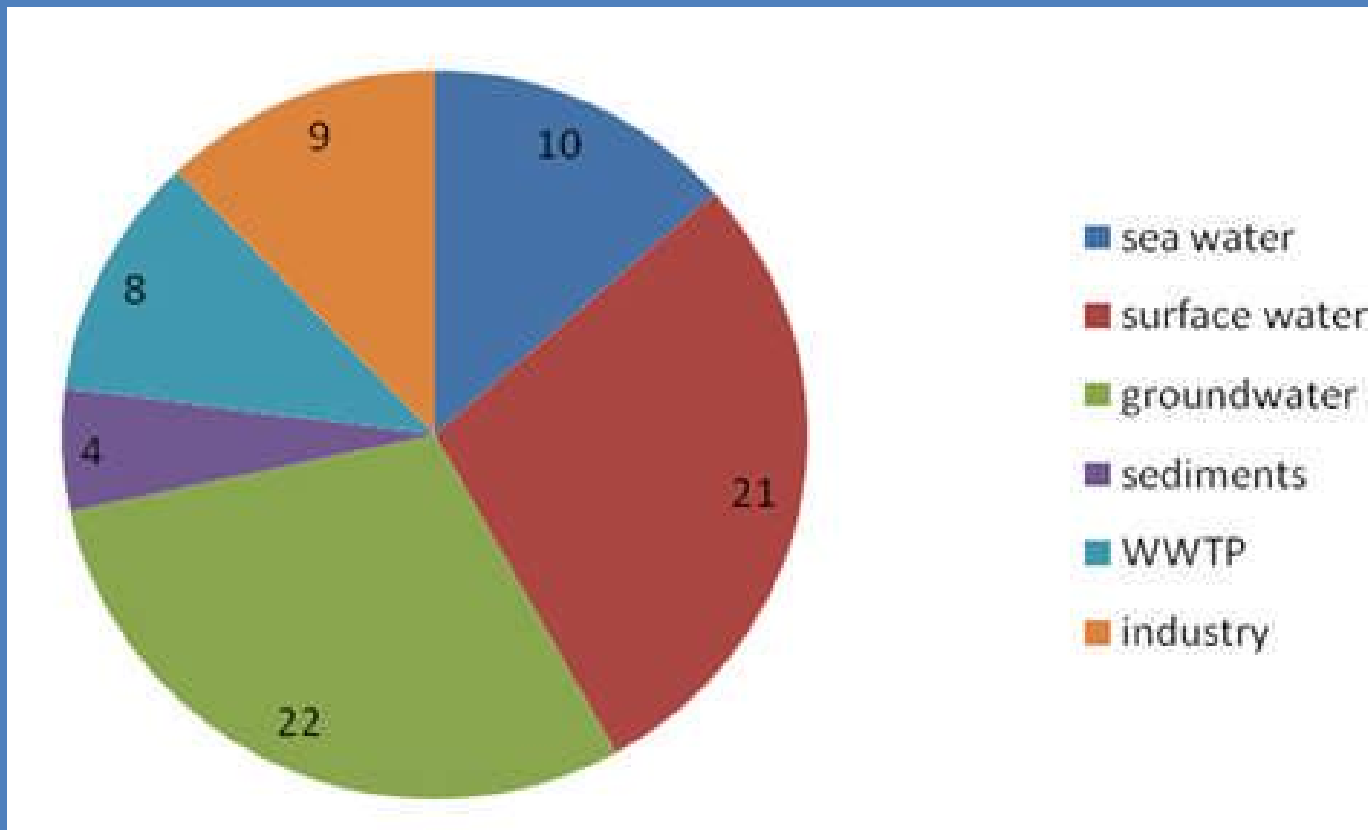
## 2. Mechanisms and networks for monitoring

- Algeria: 2 monitoring networks, ANRH (inland waters) and MATET (sea waters).
- Cyprus: 4 public networks for monitoring and operational control. 1 for groundwater, 3 for part of the lakes, rivers and coastal waters. Water uses: drinking water, irrigation and nature conservation.
- Egypt: 3 public networks, 1 for monitoring and 2 for surveys.
- Israel: 3 networks: 1 public (coastal water and industrial effluents), 2 public&private (swimming pools and drinking water). They provide survey, monitoring and control.
- Jordan: 1 public network (groundwater and lake water) for survey, monitoring and control. Drinking water supply and irrigation.
- Lebanon: 10 networks (8 public and 2 private) for groundwater, rivers and lakes, wetlands and coastal waters. Drinking water supply (10 networks) and irrigation (2 networks).
- Morocco: 2 public networks; 1 for surveys for sea waters and inland waters; 1 for monitoring for groundwater, rivers, wetlands, lakes. 1 public and private network for operational control for discharges of industries and WWTP.
- Palestine: 3 networks: 1 for monitoring and operational monitoring; 1 for surveys; and 1 for surveys monitoring and operational monitoring. 1 for WWTP discharges; 2 for groundwater and WWTP discharges.
- Syria: 3 public networks. For inland and coastal waters
- Tunisia: 7 public networks; 6 for monitoring control and 1 for the 3 types of control. For groundwater and rivers, wetlands, lakes, dam reservoirs and coastal water.
- Turkey: 4 public networks including: 2 survey networks for inland surface waters, 1 operational network for sea water and 1 network for the three types of control



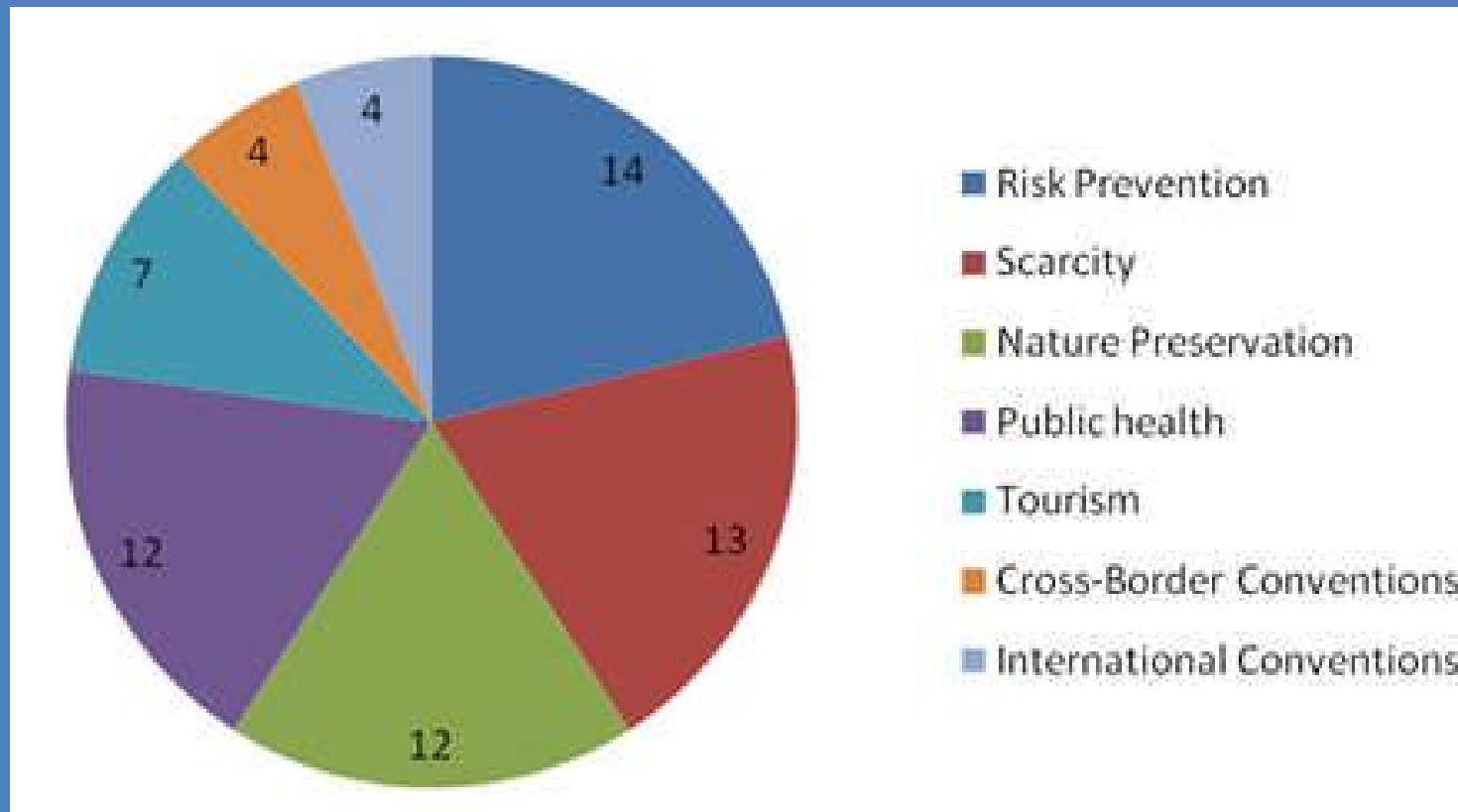
# THE SITUATION REGARDING MONITORING IN MPC

*Total number of networks for each type of water:*



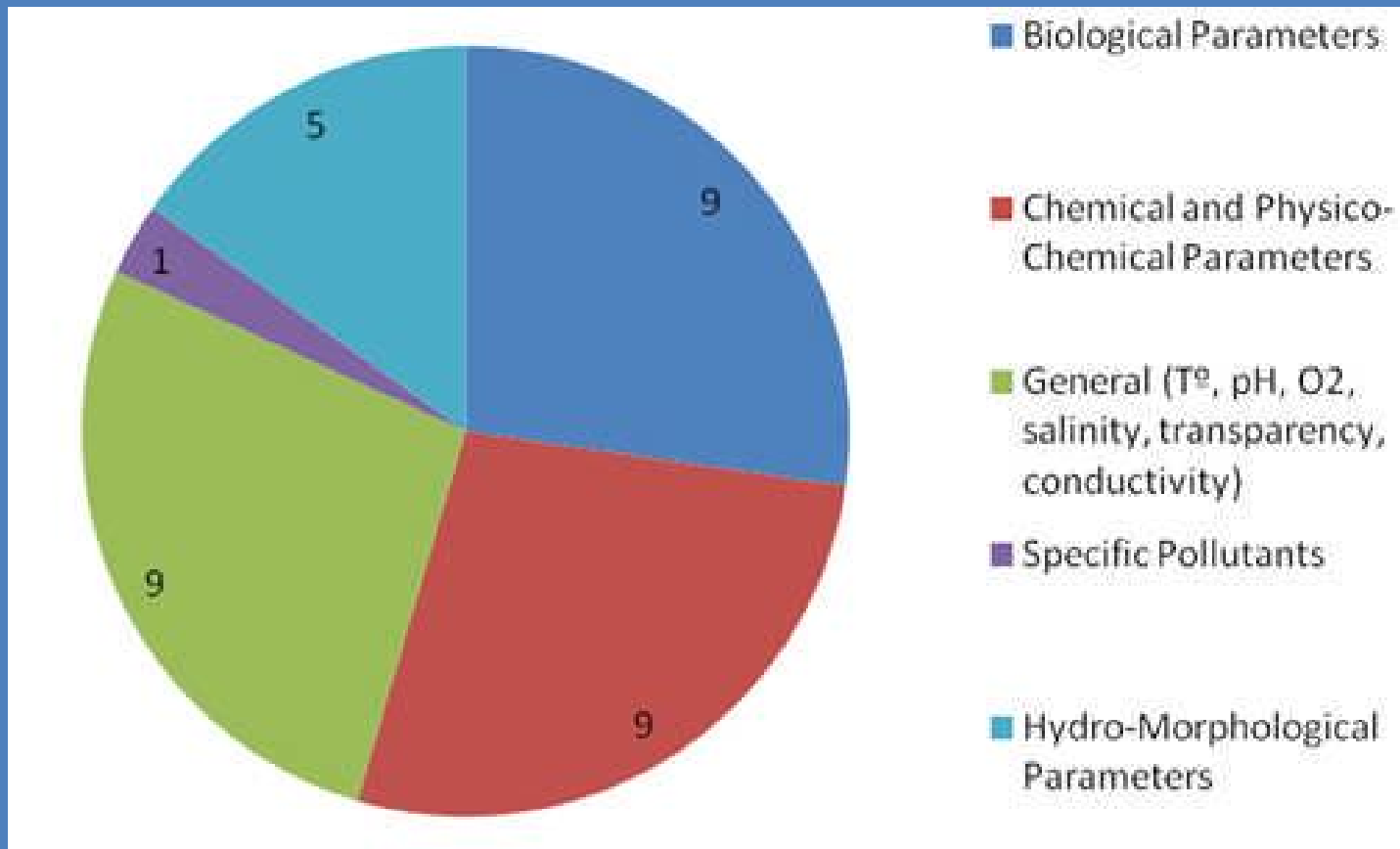
# THE SITUATION REGARDING MONITORING IN MPC

*Main stakes:*



# THE SITUATION REGARDING MONITORING IN MPC

*Number of countries monitoring the different parameters:*



# THE SITUATION REGARDING MONITORING IN MPC

## 3. Data processing and dissemination

- There is a centralised collection and information system in 7 countries, in Lebanon it depends on the network.
- Data entry is manual in almost all the countries (except Morocco, only computer files), but most often coupled with data-processing techniques (at least for certain networks). Tunisia specifies using only manual acquisition.
- In most countries collected data are validated (x8), in Lebanon it depends on the network.
- All the countries store their data on computer media.
- Only in 4 countries data are integrated into a GIS, and in Lebanon it depends on the network.
- Data are accessible on Internet in 2 countries, partially in 3, and not in 6.
- Data are disseminated in 3 countries, partially in 6, and not in 2.
- Data are used for modelling and simulation in all the countries, except in Egypt and in 2 networks in Lebanon. Israel did not answer.

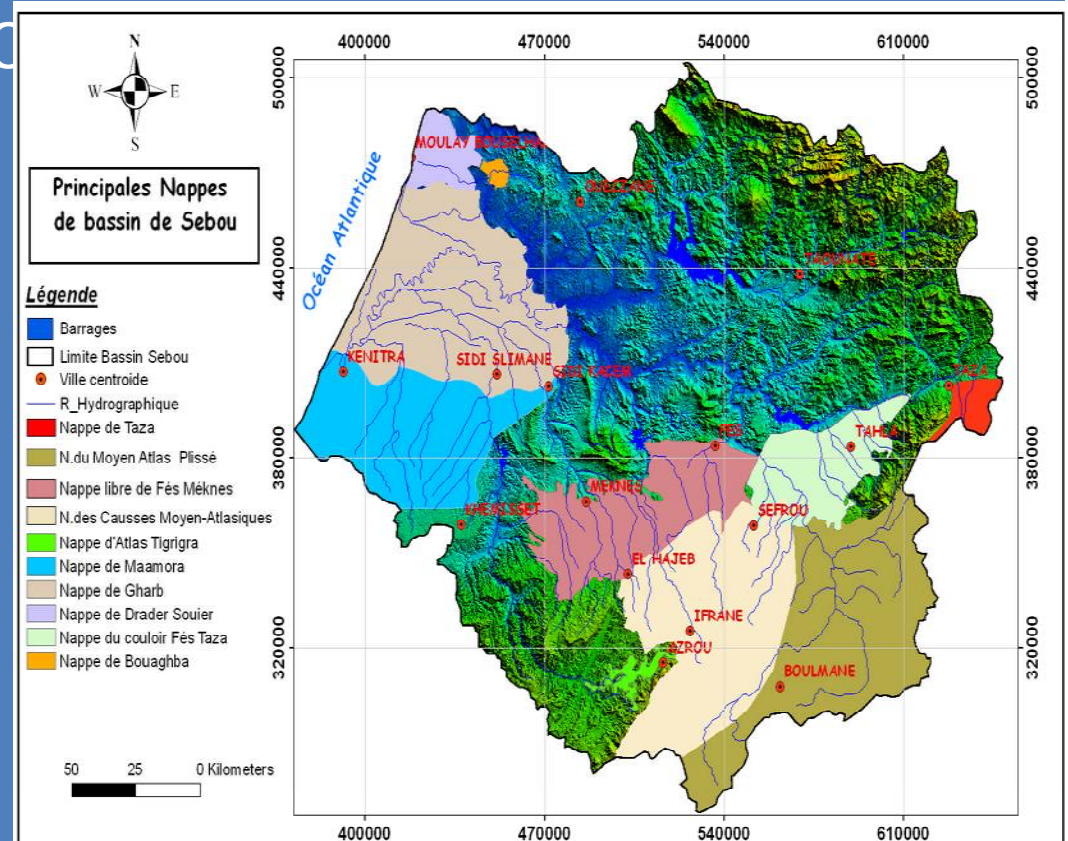
# CASE STUDIES IN MPC RIVER BASINS

- SEBOU (Morocco)

Site of most dynamic agricultural and industrial

activities of Morocco

High demographic growth and increasing pressure on surface and groundwater resources.



# CASE STUDIES IN MPC RIVER BASINS: SEBOU (Morocco)

## Characterization study

- *For groundwater bodies:*

- High nitrate concentrations due to fertilizers.
- Withdrawals are higher than recharges in 7 out of 9 aquifers.
- Saline intrusion.

- *For surface water bodies:*

- Chemical quality damaged by domestic and industrial emissions.
- WWTP will hardly offset water quality due to the increase in pollutant emissions due to population growth.
- Minimal flows downstream of dams are not respected.
- Lack of management and maintenance of treatment plans.

- *For wetlands and protected areas:*

- Geographical expansion of agricultural and urban areas.
- Over-abstraction of water.
- Vegetation along rivers disappearing: bank erosion and sedimentation.

# CASE STUDIES IN MPC RIVER BASINS: SEBOU (Morocco)

## Conclusion and recommendations

Need for complementary knowledge and tools for decision making.

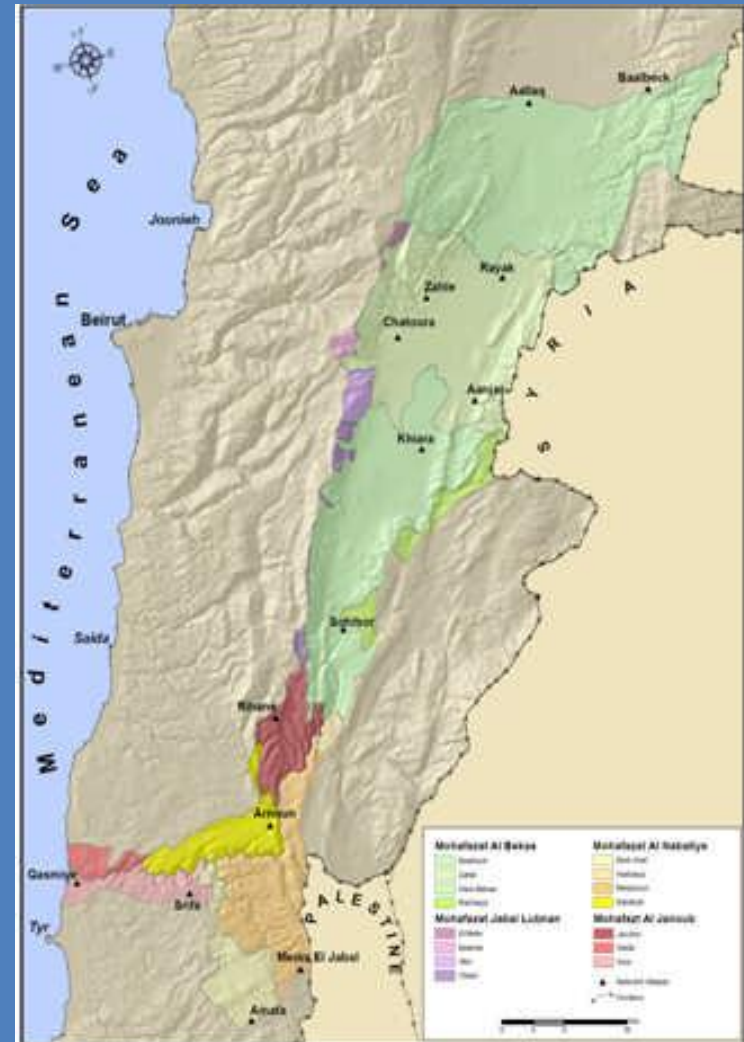
- Determination of flows required downstream of a dam;
- Hydrologic model of the Sebou basin for decision support;
- Estimation and simulation of impact of agricultural and domestic rural diffuse pollution;
- Tools to simulate the auto-depuration capacities of rivers and dams;
- Estimation of evolution of saline intrusion in coastal aquifers;
- Tools to link agricultural fertilization, irrigation practices and nitrate concentrations in groundwater;
- Assessing the economic and social value of water;
- Tools to define the ecological status and ecological potential to be extrapolated to other basins. Indices of biological and hydro-morphological status and evolution are particularly required;
- An inventory of protected areas.

# CASE STUDIES IN MPC RIVER BASINS: LITANI (Lebanon)

## Context

The Litani RB is 20% of Lebanon. 45% is agriculture activities.

- The river system is divided into 3 different surface water bodies: Upper Litani, Quaroun Reservoir and Lower Litani.
- The groundwater bodies are summarized in 3 important groups: Mont Lebanon, Anti Lebanon and Middle region of Bekaa valley.
- The protected areas in Litani RB are: Wetlands: Aammiq and Kfar Zabad; Al Shouf Cedar Natural Reserve; and Quaroun Lake and some parts of riverbank areas below 860m.





# CASE STUDIES IN MPC RIVER BASINS: LITANI (Lebanon)

Main pressures: Sewage water, industrial effluents, solid waste; Landfill leachate; Quarries and stone cutting; Farmer irrigation dams disrupting the water flow; Fertilizers and pesticides; Hydro-morphological modification; Pumping from wells.

Problems: climatic, historical and water quality data are irregular or not complete. For better IWRM, it is necessary a monitoring system for the water status. The conflict and overlapping of responsibilities between many stakeholders is hindering these objectives.

## Conclusion and recommendations

- Accelerating the creation of a High Council of Water which will be the responsible of IWRM at national level.
- Enabling LRA to monitor underground water for quality and quantity.
- Reinforcing the LRA Environmental Department.

These actions would provide LRA access to a reliable database on water quality and water quantity, enhancing the IWRM in the Litani RB.

THANK YOU FOR YOUR  
ATTENTION

Further information at  
<http://www.semide.net/topics/watmon>