



Creating Shared National Water Data Management Systems
towards a Mediterranean Water Knowledge Hub

**Technical workshop on integrated water resources
management (IWRM) indicators**
Sep 30th - Oct 1st 2013, Barcelona

**IWRM Framework
& Water Management System**

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MEW & IWRM Planning in Lebanon

Progress & achievements

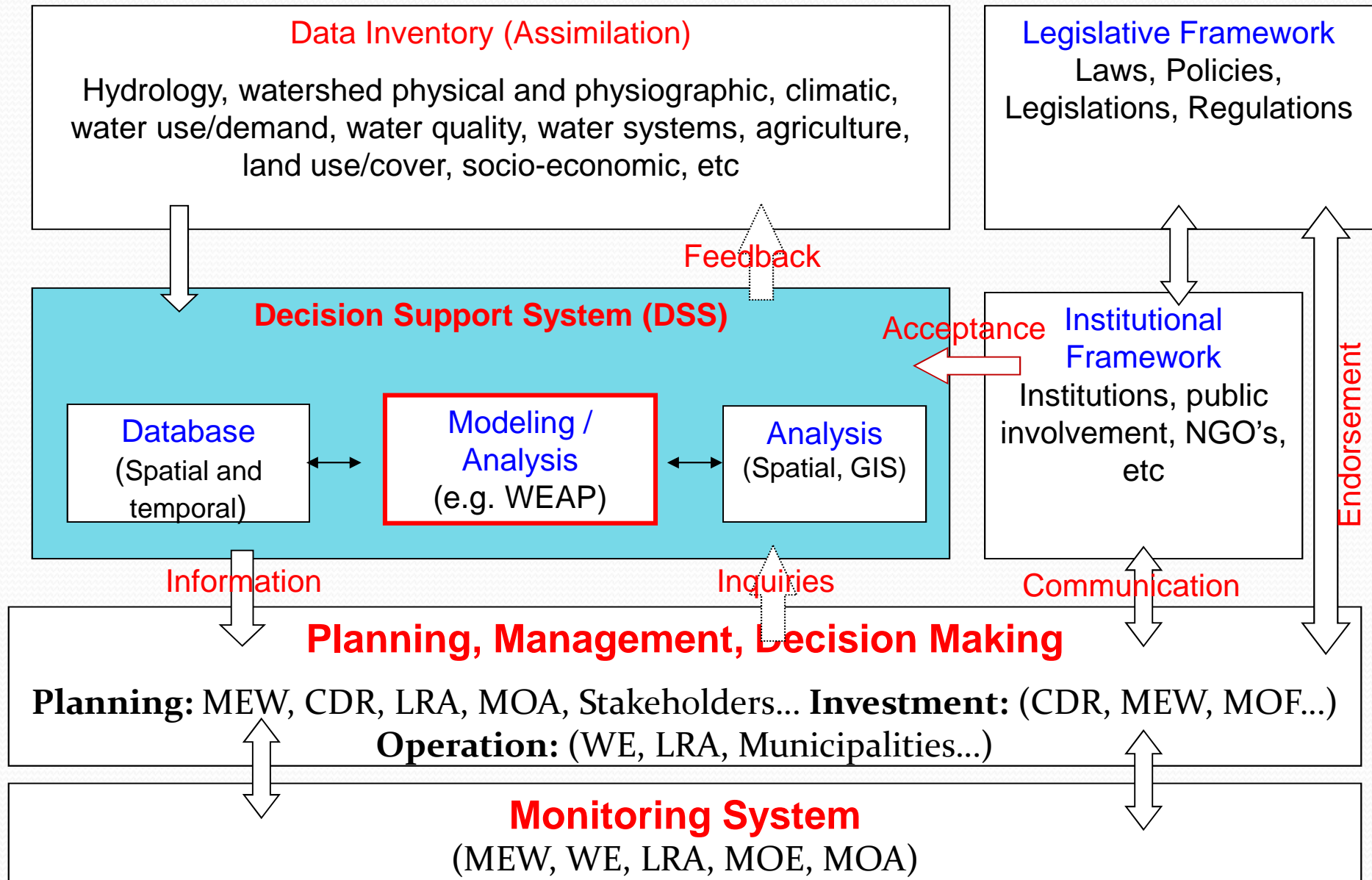
- IWRM concepts and approaches have been introduced in Lebanon in the late 90s and have inspired:
 - Gathering **political will** and support for IWRM and the planning process;
 - **Creation of a framework for broad stakeholder participation**
- **Revision of water Legislation** (2000) and its amendment (2001)
- **Preparation of the National 10-year Strategy Plan for the Water Sector** by GDHER / MEW (2000-2009)
- **Preparation of the National Water Sector Strategy (NWSS)** aligns with IWRM principles (approved March 2012)
- **MED EUWI Country Policy Dialogue on IWRM in Lebanon** (Phase I - concluded in 2009; Phase II (2010 - ongoing))

MEW & IWRM Planning in Lebanon

Progress & achievements (2)

- The **Water Code** - a cooperation programme between the Lebanese and the French Government
 - Aims to tackle and recommends provisions for the implementation of sustainable management of water resources
 - Following a comprehensive and integrated framework for governance, institutional and management issues
- **The Water Code has been submitted to the Council of Ministers for approval.**

IWRM Conceptual Framework (MEW Lebanon)



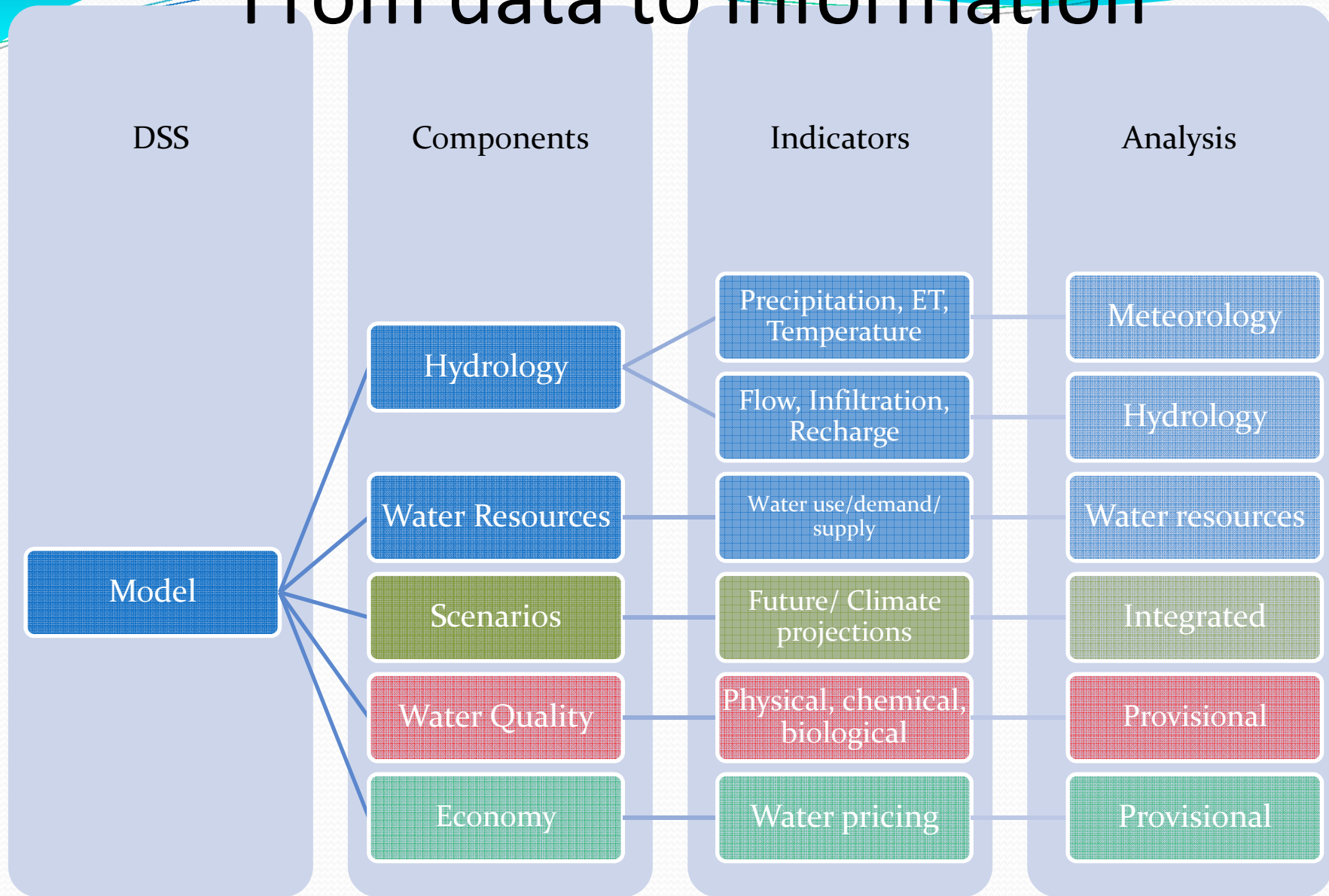
Insights (Data/ Information)

- Collection of available data
 - analysis of water resources situation (availability, uses, needs, etc);
- Preparation of integrated water resources management scenarios:
 - base for decision-making
 - creation and operation of a DSS model for selected Lebanese river basins;
- The DSS maximizes information retrieval, analysis and visualisation
 - Integration of the needs of different sectors that compete for the same water resources (e.g. drinking water sectors, supply and sanitation, industry, agriculture, tourism, the environment, etc)
 - Development of water uses scenarios and resources development, presenting different alternatives and the assessment of these scenarios on their social, economic, environmental and sustainability aspects.

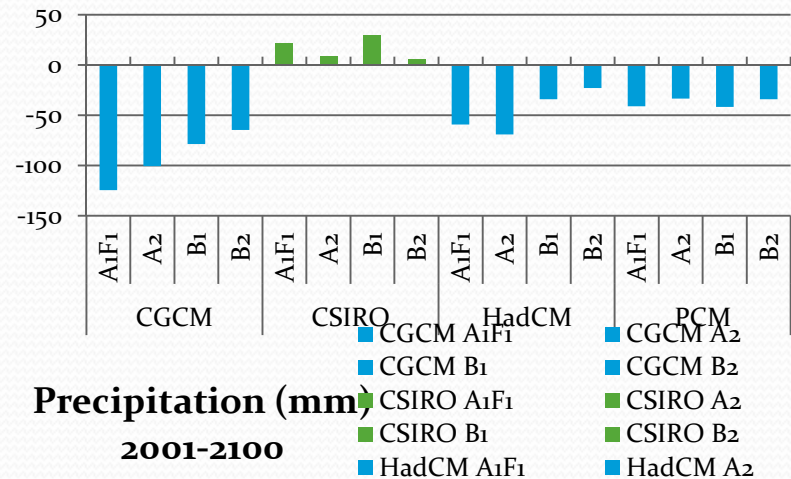
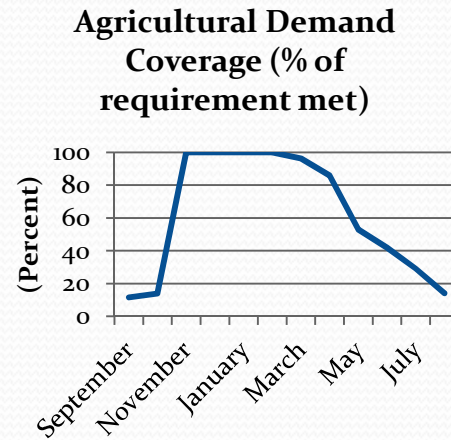
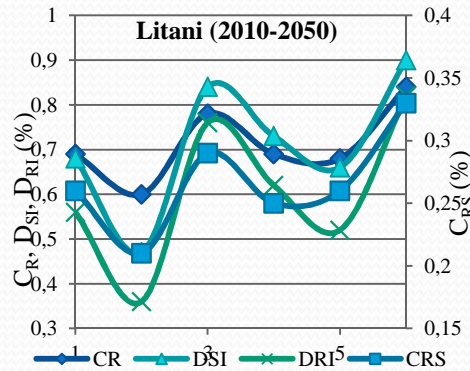
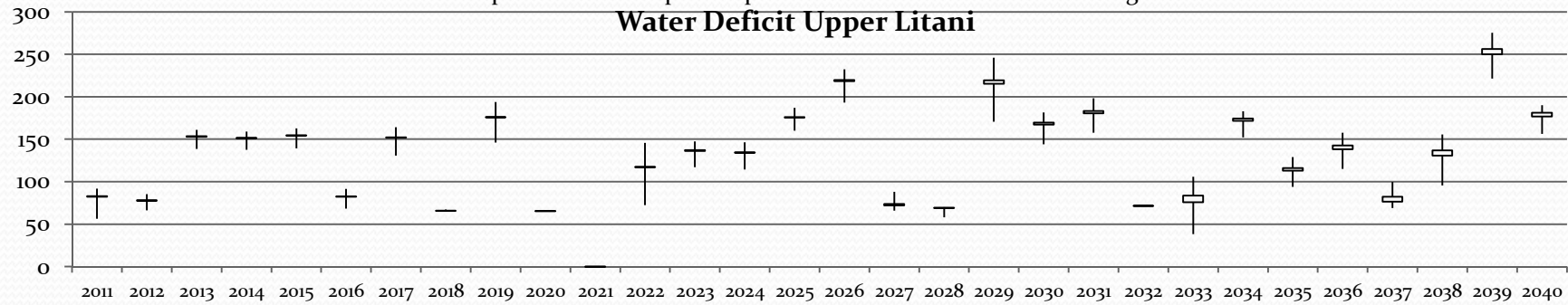
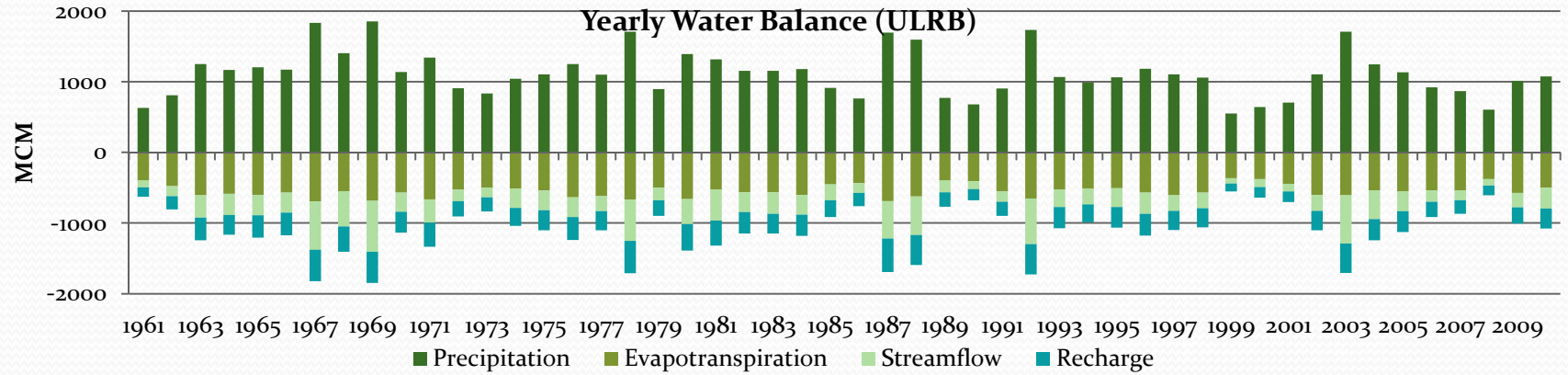
Available Data

Parameter	Units	Reference	Format
Watershed physical characteristics			
Watershed area	sq km	Catchment, Sub-catchment	Geometry, Attributes
Rivers, streams, springs	Variable	River / RS	Geometry, time series
Lakes	Variable	Base Maps/ RS	Geometry, time series
Dams	Variable	Base maps	Geometry, time series
Wells	Variable	Extraction points	Geometry, time series
Watershed physiographic characteristics			
Kc, RRF, PFD	-	Land cover/Topography	Geometry, Attributes
Water capacity/ Conductivity (surface & deep)	Cm, mm/month	Soil / Geology/Hydrogeology	Geometry, Attributes
Ground water			
Aquifer capacity	MCM	Geology/Hydrogeology	Geometry, Attributes
Aquifer conductivity	mm/month	Geology/Hydrogeology	Geometry, Attributes
Aquifer depth	m	Hydrogeologic maps	Geometry, Attributes
Climate			
Precipitation	mm/month	Hydro/Climatic stations	Time series
ET/ Evaporation	mm/month	Catchment	Time series
Temperature	C	Catchment	Time series
Wind	m/s	Catchment	Time series
Humidity	%	Catchment	Time series
Water Use			
Crop water requirement, Urban consumption...	M3/ha	Demand zone	Geometry, Time series, Attributes
Waste water treatment plants	Capacity, operation	Water dataset	Attributes
Lake, dams	Capacity, operation	Water dataset	Attributes
Supply network			

From data to Information



Indicators



Evaluation of alternatives?

- Answer questions related to
 - Water quantity
 - How to decrease water deficit in specific areas ?
 - Increase water use efficiency for urban consumption?
 - Increase water efficiency in agricultural practices?
 - Decrease water shortage during summer and dry periods?
 - Water quality (Provisional)
 - Quantify point source and non-point sources pollution? waste water impacts
 - Quantify urban, industrial waste water impacts?
 - How to increase water quality for urban and agricultural supply?

Evaluation of Measures (Provisional)

- Interventions to increase water quantity
 - structural, non-structural actions
 - Change in management practices
- Interventions to increase water quality
 - Construct Infrastructures
 - Change in management practices
- Intervention by using regulations and policies

Where we stand from a complete IWRM?

- For surface water:
 - Mapping of the location and boundaries of water resources (e.g. watersheds, rivers, streams, wells, etc);
 - Assessing climate and hydrologic variables;
 - Assessing physiographic and physical hydrologic variables;
 - Detection of baseline conditions for surface water resource (i.e. hydrologic cycle)
- For groundwater:
 - Mapping of the location and boundaries of groundwater resources (i.e. geologic, and hydrogeological analysis);
 - Detection of baseline conditions for ground water resource
- Scenario analysis
 - Water resource management, operations, and planning
 - Climate variability and change analysis
 - Stakeholder consultations / water users contribution

Completed

Ongoing

Planned

Where we stand from a complete

IWRM? (2)

- Preparation of a summary of significant pressures and impact related to human activity on the status of surface water and groundwater including:
 - estimation of pressures on the quantitative status of water including abstractions,
 - analysis of other impacts related to human activities on the water system;
 - estimation of point source pollution,
 - estimation of diffuse source pollution
- Identification of direct stresses and main drivers :
 - Water shortage
 - Natural (e.g. drought),
 - Man-made (e.g. pollution)
 - Social, capital, etc
- Identification of indirect impacts
 - Human health, overexploitation of resources, degradation of ecosystems
- Recognizing of long-term potential impacts
 - cultural deterioration, land degradation, loss of biodiversity
- Preparation of a socio-economic analysis of water use

Completed

Ongoing

Planned

Where we stand from a complete IWRM? (3)

- Defining the main environmental objectives
- Preparation of key potential programs and measures
 - Achieve adequate management of water resources (both as Quantity & Quality)
- Development of a management plan

Completed

Ongoing

Planned



Future Directives (Indicators)

- Continue the assessment of the status of surface and ground water resources nationwide
- Automation of the collection and analysis of :
 - Hydrologic and meteorologic data/information
 - Water resources information
 - Water quality and pollution indicators
 - Agricultural water management
- Development and monitoring of water plans
 - 5 years and 10 years plans

MEW (IWRM Priorities)

- Involve stakeholder participation in decision making
 - Development of Multiple Workshops & Trainings
- Complete stakeholder needs assessment
- Develop Water Resource Management Plan
 - Develop a set of programs and measures
 - Develop a comprehensive monitoring plan

Data Sharing

- Outputs from the DSS and data from the MEW database:
 - Provide information:
 - Water demand/ analysis
 - Hydrologic simulations (e.g. surface runoff, ground water recharge, ET, GW/SW interaction, etc)
 - Reservoir (dam) operation
 - Water demand/use and hydrologic forecasts
 - Climate change impact analysis