

MedProgramme: Building Capacities on Conjunctive Management of Coastal Aquifers in View of National Dialogues in Six Mediterranean Countries Example of Lebanon

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Global Workshop on Conjunctive Management of Surface
Water and Groundwater (16 – 17 October 2023)

 med
PROGRAMME

MedProgramme CP 2.1 - Water Security, Climate Resilience and Habitat Protection

UNESCO Component 2 on “Management of Coastal Aquifers and Related Ecosystems”

Output 2.1

Assessment of priority coastal aquifers and related coastal ecosystems, vulnerability maps and recommendations for land use planning

Output 2.2

National dialogues for potential conjunctive management solutions and training modules

Output 2.3

National assessments of submarine groundwater discharges and of marine-freshwater Interactions

Output 2.4

Priority aquifers coastal management plans and monitoring multi-purpose networks and protocols

Output 2.5

Facilitation of broader adoption of approaches by the project on long term sustainability and stakeholder involvement

Programme results: output 2.2 (May 2022-May 2023) – Planned National Dialogues in 2023/2024

6 reports in Albania, Lebanon, Montenegro, Morocco, Tunisia

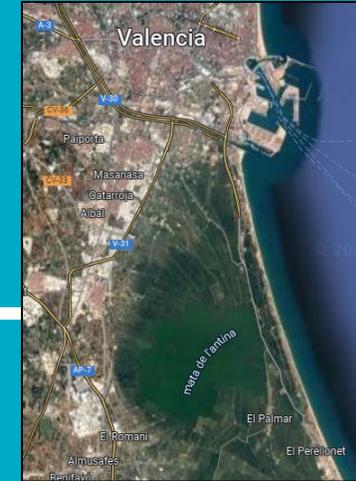


Training Course on “Conjunctive Management Solutions of Surface and Groundwater”

VALENCIA (SPAIN)
17 to 19 May 2023



- 17 and 18: theoretical and practical part (in classroom)
- 19 study visit: Albufera Natural Park (20 km from the city):
 - Lake: 21 km²
 - Park: 211 km²



Albania, Bosnia and Herzegovina, Lebanon, Libya, Montenegro, Morocco, Tunisia



Training Course on “Conjunctive Management Solutions of Surface and Groundwater”

Theme 1: Introduction to conjunctive use (2h)

- Planning and management of water resources
- Concepts of guarantee, de resilience and risk
- Definition of conjunctive use and integrated management of water resources systems
- Potential advantages
- Typology of conjunctive use
- Governance aspects of conjunctive use

Theme 2: Groundwater characterization (2h)

- Hydrogeological research
- Groundwater Modelling
- Model MODFLOW – examples
- Examples. Aquifer of Plana Sur de Valencia, and wetlands of The Albufera

Theme 3: Surface water characterisation (2h)

- Introduction
- Precipitation runoff models
- EVALHID Model – examples
- Generation of future series

Theme 4: Integrated modelling of water resources management (4h)

- Concept and need for a modelling of integrated management of water resources systems
- Simulation and optimisation models
- Operating rules
- Decision Support Systems - Aquatool System
- SIMGES Model for the analysis of conjunctive use

Theme 5: Examples of conjunctive use in planning and management (2h)

- Conjunctive use in the *Mijares* River Basin
- Conjunctive use and drought management
- Conjunctive use and quality management - Simplified quality model in the Wetland of *Albufera* of Valencia
- Economic aspects of conjunctive use

Kick-off of the National Dialogue on “Conjunctive Management Solutions of Surface and Groundwater” in Lebanon

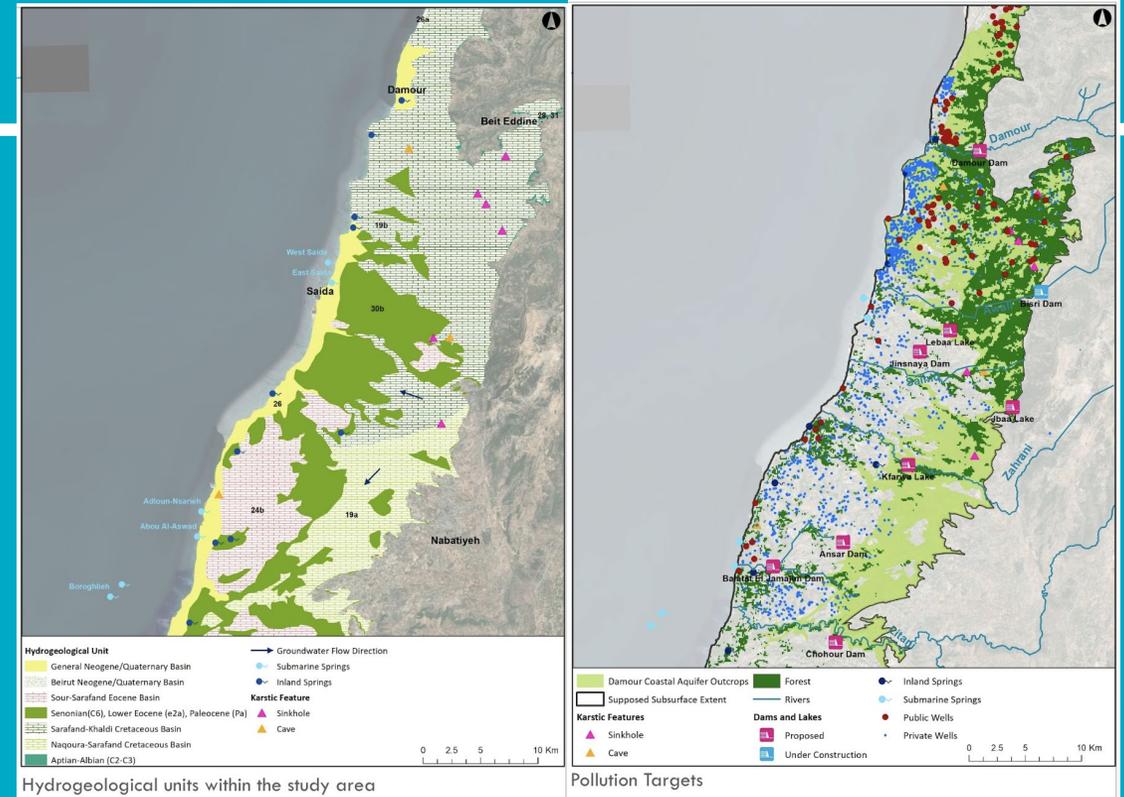
CP 2.1 Partners: GWP-Med, PAP-RAC, Plan Bleu, UNESCO-IHP

2nd Multi-stakeholder Consultation on the Water-Energy Food-Ecosystems (WEFE) Nexus in Lebanon, Beirut, 27-28 February 2023



Next National Dialogue in Lebanon foreseen in December 2023

Damour Coastal Aquifer Area



The National Dialogue on Conjunctive Management of Surface water and groundwater in Lebanon aims at engaging concerned stakeholders and brainstorming on the challenges that threaten the Damour aquifer as well as feasible solutions and action points.

Objectives of the National Dialogue are the following:

1. To engage water actors that have a role in the management of the Damour coastal aquifer.
2. To understand their vision and resolve possible conflicts through dialogue as a continuous action to address water-related problems in the aquifer.
3. To identify challenges that hinder the proper management of the aquifer and develop solutions that can be agreed upon by actors.

Stakeholder analysis

- Type
 - Primary stakeholders
 - Secondary stakeholders
 - Internal stakeholders
 - External stakeholders
- Ability
 - Interest
 - Influence
 - Importance
 - Power
 - Knowledge
 - Attitude
- Categorization
 - Category 1: High Interest/High Influence
 - Category 2: High Interest/Low Influence
 - Category 3: Low Interest/High Influence
 - Category 4: Low Interest/Low Influence
 - Category 5: High Power/High Influence
 - Category 6: High Knowledge
 - Category 7–High Knowledge/High Importance

Stakeholders	Primary/ Secondary	Internal/ External	Interest	Influence	Importance	Power	Knowledge	Attitude
Ministry of Energy and Water	P	I	5HIGH	5HIGH	5HIGH	5HIGH	5HIGH	SUPPORTER
Ministry of Agriculture	P	E	4HIGH	4HIGH	4HIGH	4HIGH	3MEDIUM	SUPPORTER
Ministry of Environment	P	I	5HIGH	5HIGH	4HIGH	4HIGH	5HIGH	SUPPORTER
Regional Water Establishments	P	I	5HIGH	5HIGH	5HIGH	5HIGH	3MEDIUM	SUPPORTER
Litani River Authority	P	E	3MEDIUM	3MEDIUM	3MEDIUM	3MEDIUM	3MEDIUM	SUPPORTER
Ministry of Interior and Municipalities	P	E	3MEDIUM	4HIGH	4HIGH	4HIGH	3MEDIUM	SUPPORTER
Ministry of Public Health	P	E	4HIGH	4HIGH	2LOW	3MEDIUM	3MEDIUM	SUPPORTER
Ministry of Public Works and Transport	P	E	3MEDIUM	2LOW	2LOW	3MEDIUM	3MEDIUM	SUPPORTER
Ministry of Industry	P	E	4HIGH	4HIGH	3MEDIUM	4HIGH	2LOW	SUPPORTER
Municipalities and Union of Municipalities	S	E	4HIGH	4HIGH	4HIGH	4HIGH	3MEDIUM	SUPPORTER
Ministry of Tourism	P	E	4HIGH	4HIGH	3MEDIUM	4HIGH	2LOW	SUPPORTER
Farmers' cooperatives	S	E	4HIGH	4HIGH	4HIGH	2LOW	3MEDIUM	SUPPORTER
NGO's	S	E	3MEDIUM	4HIGH	3MEDIUM	3MEDIUM	3MEDIUM	SUPPOORTER
Various media	S	E	2LOW	4HIGH	2LOW	3MEDIUM	2LOW	SUPPORTER

The National Dialogue on Conjunctive Management of Surface water and groundwater in Lebanon

- The first National Dialogue workshop on Conjunctive Management of Surface water and Groundwater was launched on the 28 February 2023 during the 2nd Water-Energy-Food-Ecosystems (WEFE) Nexus multi-stakeholder Consultation took place (27-28 February 2023) in Beirut, Venue Crown plaza Hotel, This Workshop is jointly organized by UNESCO IHP with the Global Water Partnership-Mediterranean (GWP-Med), the Priority Actions Programme Regional Activity Centre (PAP/RAC) and Plan Bleu/RAC in the framework of the GEF / UNEP MedProgramme.
- This workshop was achieved through a half day dedicated workshop, gathering approximately 82 participants from different concerned Ministries, International Organisations, NGO's, and the private sector: representatives from the Ministry of Energy and Water, Beirut and Mount Lebanon Water Establishment, Ministry of Environment, Ministry of Agriculture, Ministry of Public Works and Transport, Ministry of Defense, Lebanese Army-Directorate of Geographic Affairs, Security General, Ministry of Interior and Municipalities, Municipality of Damour, CNRS, LARI, Civil Aviation Department , LCEC, UNICEF, UNDP, ACTED, GIZ, USAID, Private Sector, academics, NGOs, and others.

Questions for the stakeholder consultation on Conjunctive Management

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1. How can coastal farmers be supported in their needs for water of good quality, considering the water salinity issues they experience?
 2. How can wastewater leakage (from utilities, disposal wells, septic tanks, etc.) be controlled?
 3. How can the use of surface water resources be enhanced so as to decrease the stress and over-exploitation of groundwater?
 4. Which measures can contribute to reduce industrial pollution sources of groundwater?
 5. Are groundwater-dependent ecosystems in need for protection and, if yes, what can be the means to achieve this?
 6. Uncontrolled urban sprawl is a major problem in many regions of Lebanon; how recharge zones be protected from land activities? Specifically, how can Damour's aquifer recharge areas be protected?



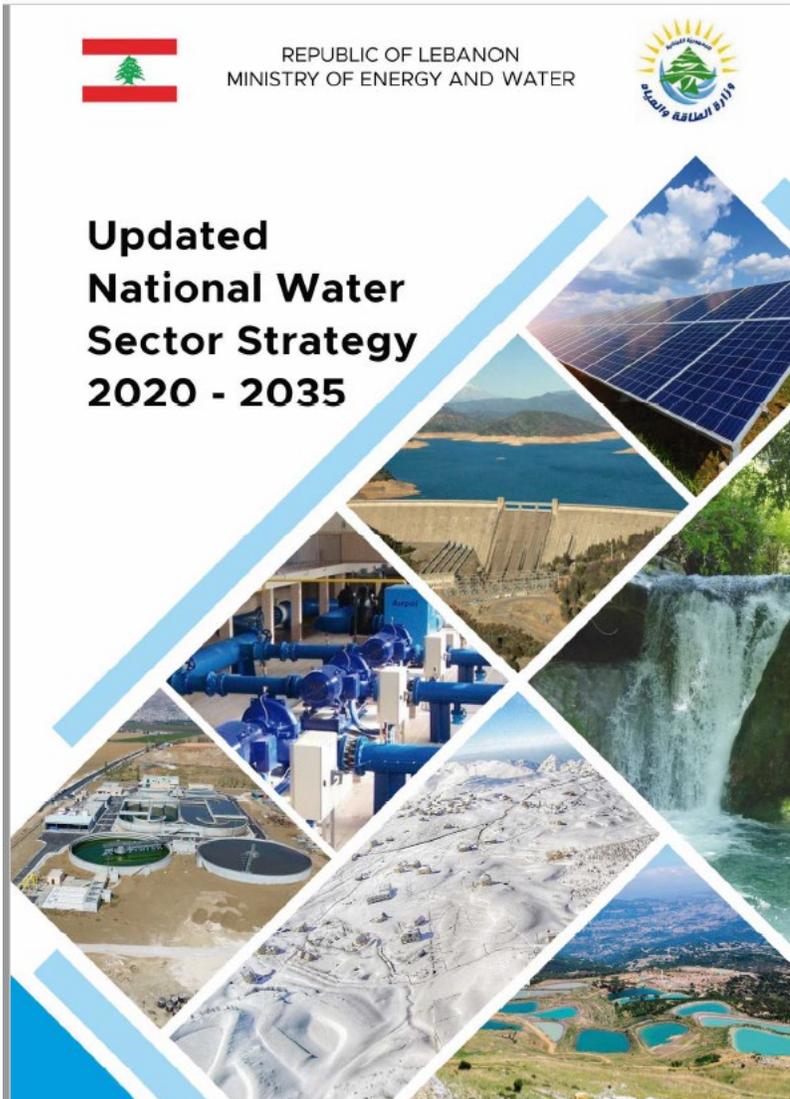
Conjunctive Management in the context of the New Water Code in Lebanon

The Ministry of Energy and Water worked on achieving the recently ratified water code Law 192/2020 whose key features are:

- Promotes IWRM at basin level, and
- Recognizes the development of basin management plans and master plans,
- Calls for the development of water budgets that integrate conventional and non-conventional water resources, surface water, groundwater, submarine springs, water reuse, artificial recharge of aquifers where needed,
- Sets legislation for groundwater protection zones and monitoring of wells, and requirements for integrated monitoring of surface water and groundwater

All the above contribute to a strong enabling environment for the implementation of conjunctive management approaches. the decrees of application for Law 192/2020 (the Water Code) are undergoing

Conjunctive Management in the context of National Water Sector Strategy



Pillar 1: Implementing Reforms and Improving Sector Governance

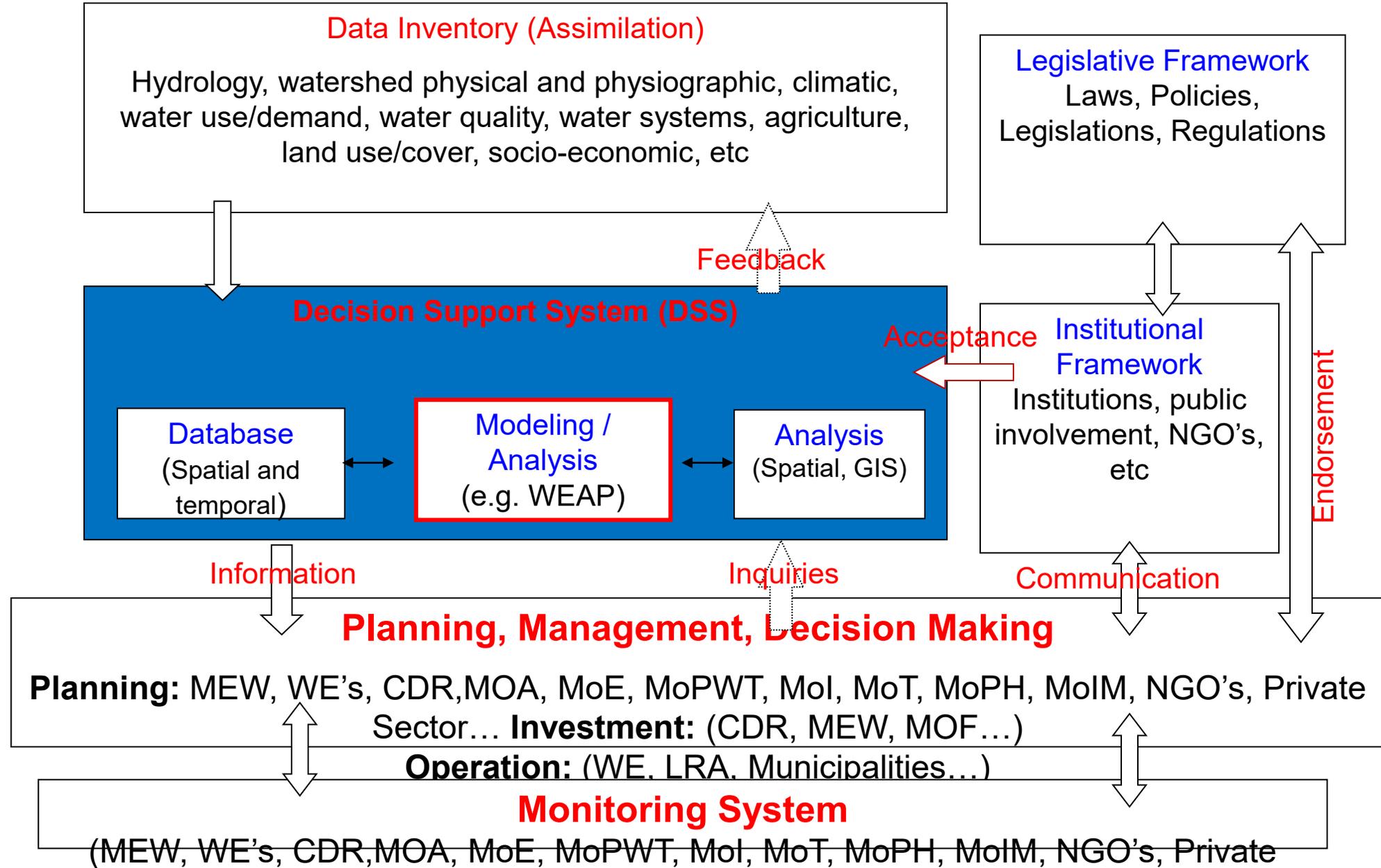
Pillar 2: Integrated Water Resources Management:

Under Chapter 2 “Organizing and Managing Water Resources”, Articles 16 to 23, Law 192/2020 provide extensive details on the methodology to set an **IWRM Master Plan for Lebanon based on Watershed or Basin Schemes** and specifies the requirements for the development of such schemes. The IWRM Master Plan and the Basin schemes are closely interrelated and feed into one another

- ✓ **Integrated Hydrological Information System**(Snow monitoring, surface and groundwater monitoring, water quality monitoring etc.)
- ✓ **Surface and Groundwater resources management**
- ✓ **Non-Conventional water resources**(Artificial aquifer recharge, Water reuse, Rainwater harvesting,)
- ✓ **Disaster risk management**(Flood risk management, Drought mitigation plan.)

Pillar 3: Service Coverage

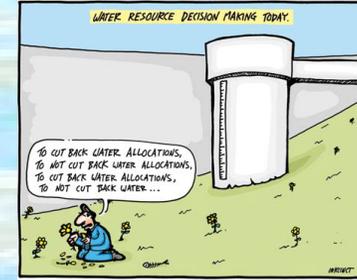
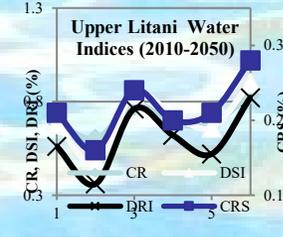
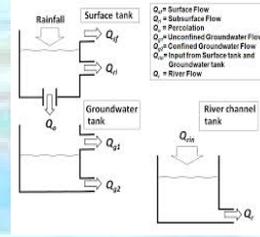
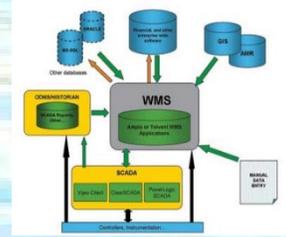
IWRM Conceptual Framework (MEW Lebanon)



Decision Support Systems

Data

Decision



Data

- Historical data
- Monitoring stations
- **Field observations**
- RS datasets
- Statistics and census

Data management system (DMS)

- Hydro database
- Data exporter
- **Data sharing**

Modeling software

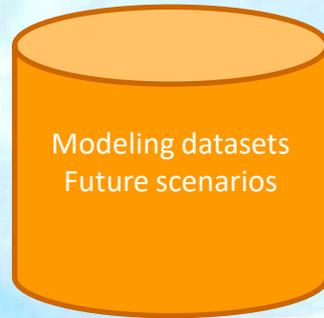
- Surface water
- Groundwater
- Water budget

Modeling indicators

- Water
- Shared information

Decision making

- Informed decision



Way Forward

Water code law 192 is a promising law even it still referencing to some old laws and legal pluralism in water management is still dominating, but it is considered as new law based on the new water management effective approaches based on the application of integrated Conjunctive Water resources management at the basin level with a comprehensive hydrologic and water resources management system and related basin master plans and schemes is a good to start, taking into account climate variability which requires:

- The need for decrees of Application for the Law 192/2020 is the first quick urgent step needed to start in order to implement all of the above

Way Forward

- Implementing ground and surface monitoring system
- Implementation of National Information System is very important
- Action Plans with all related ministries and institutions must be prepared, without forgetting that the setting-up and making operational of a decision support system (DSS) at the River Basin scale with Multi-stakeholder body established leading to the elaboration of a consensual national IWRM action plan with good investment.
- Carrying out National Master plans and basin management plans
- Implementation of Water Demand Management based on conjunctive management strategies to reduce water consumption in the domestic, industrial and agriculture sectors, equitable access to sustainable water supply .
- Implementing Managed aquifer recharge of some selected aquifers

Way Forward

- Establishment of Water User’s Association
- Enforcement of Laws
- Water Awareness
- Applying Polluter Pay Principal
- Enable sustainable mechanisms for collaboration and coordination to improve the sector’s planning and monitoring through the National Water Council