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INTEGRATED WATER RESOURCE MANAGEMENT (IWRM) AND ITS ADAPTATION TO THE LEBANESE CONTEXT

Why should we be interested?

IWRM is a multi-sectoral approach that aims to encompass the various sectors (drinking water, sanitation, industry, agriculture, etc.) that exert pressure on the water resource. The traditional fragmented approach is no longer viable and a more holistic approach to water management is essential. This approach aims at protecting the environment and natural resources, foster economic growth and democratic participation in governance,

The world's fresh water resources are limited, and growth that is unmanaged and not sustainable will lead to increased poverty and decline of the environment. Due to the scarcity and pollution of fresh water resources, the need to provide water in an equitable way to the different users is reinforced.

To face these issues, there is a need for a more coordinated decision-making across sectors and direct involvement of all stakeholders

What is IWRM?

Integrated Water Resources Management, as defined by the Global Water Partnership, is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

An IWRM project consists of defining a coherent hydrographic perimeter (river basin, sub river basin), carrying out a multi-sectoral diagnosis, and finally setting up a mode of governance for this river basin.

The participation of the different stakeholders concerned by the resource is an essential issue in this process.

The elements that seem essential to an IWRM project are the following (this list is not exhaustive, however, and IWRM projects do not necessarily address all of these aspects)

1) Identification of a territorial scale having a hydrographic coherence: watershed, sub-watershed

2) Diagnosis of the state and functioning of the water resource and the pressures it is subject to

- Studies of the state of the resource: qualitative, quantitative, hydrological functioning; and identification of the problems of quality, quantity, recharge capacity...
- Study of the uses and users of the resource; and identification of unsatisfied needs and conflicts of use. It is relevant to adopt a participatory approach for this diagnosis
- Study of the pollution suffered by the resource: location, qualification of the discharges; and identification of the sources of pollution that are problematic with regard to the uses and the environment

3) Setting up a governance system for the management of the resource at basin level, including a participatory approach

- Identification of the stakeholders (users and polluters; institutions and associations concerned), with a transversal and multi-thematic approach.
- Setting up a coordinating body: basin committee/agency
- Setting up consultation bodies, including the participation of stakeholders
- Definition of consultation and decision modalities

4) Establishment of an action plan: planning of actions to improve the quality of the resource and develop the use of the resource in an equitable and sustainable way

- Establishment of rules to control uses and pollution: declaration, limitation, invoicing of pre-drawings and discharges
- Definition of concrete projects that contribute to improving the quality of the resource or to developing the use of the resource to meet the needs of the various users, in an equitable and sustainable way - water access and sanitation projects, irrigation projects, ecological restoration projects...

At the end of the project phase, it is expected that an IWRM operation will be operational.

- the basin committees are sustainably carrying out the functions for which they were created; the participatory consultation bodies are functioning
- the action plan is implemented and its benefits are monitored through an evaluation process (including monitoring of the quality of the resource)

Water resources management at the level of river basins according to the IWRM model is in full development in the world, in particular on the scale of large river basins and transboundary basins.
It is worth noting that the French water agencies are promoting the IWRM model internationally on the scale of large river basins, through institutional cooperation.
Initiatives of resource management by basin or sub-basin, can also be developed on a more local scale, at the initiative of local stakeholders.

IWRM in Lebanon

Institutional framework

The water sector in Lebanon is managed within a legal framework based on the 221 law (2000), amended by law n°377 (2001) which established 5 public water establishments (WEs), namely: (i) the Litani River Authority (LRA); (ii) Beirut and Mount Lebanon (BMLWE); (iii) North Lebanon (NLWE); (iv) South Lebanon (SLWE); and (v) the Bekaa (BWE). The 4 regional WEs have all prerogatives for water management and sanitation, in the three main areas: drinking water, irrigation and wastewater; whereas the Ministry of Energy and Water (MoEW) was entrusted with important regulatory, planning, oversight and management roles and functions in the water sector. Adding to this, a Water Law was adopted in its first version in 2018, with an updated version ratified in October 2020. It defines further rights and governance schemes. Within a comprehensive and integrated framework, it aims to tackle governance, institutional and management issues and recommends provisions for the implementation of sustainable management of water resources.

IWRM is integrated in the 2020 Water Law which mentions both planning master plan for water resources (Art. 16) and river basins as essential elements (Art. 21). It is also integrated in MoEW national strategy. The MoEW

has developed a conceptual framework for IWRM and worked so far at the level of the Decision Support System (DSS) which is intended to establish an integrated modeling approach that supports in particular: hydrologic analysis; assessment of water resources use/demand; water resources management; water resources planning; scenario evaluation; analysis of alternatives; integration of future projections; and water quality modeling.

To facilitate a river basin approach to resource management, 2 needs emerge:

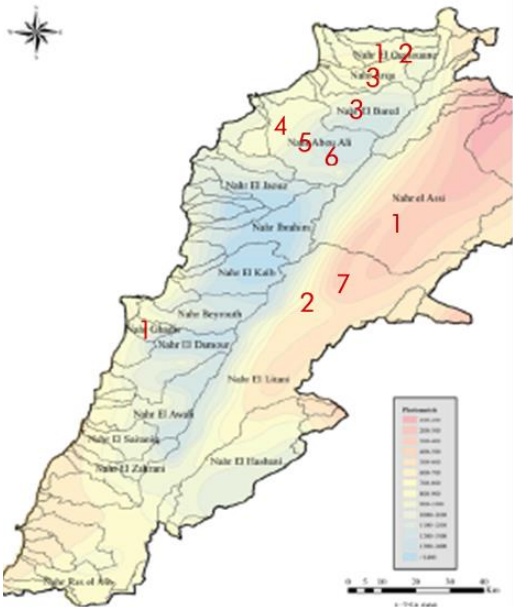
- A **unified and shared cartography of river basins**. Several works have been done towards this, separately by the CNRSL (Lebanese National Council for Scientific Research), the Ministry of Energy and Water, FAO (United Nations Food and Agriculture Organization), and UNESCWA (United Nations Economic and Social Commission for Western Asia); however, there isn't a comprehensive map of the whole country which would be shared by the different actors. Efforts should be made to 1) collect data and map resources at the national level and 2) develop a culture of data sharing among actors so that the knowledge on resource can be accessible to all.

- The definition of **governance models at the river basin level**. On this point, the role of WEs as prerogative holders is central, as national institutions aren't willing to add yet another authority which would add to overlapping competences and lack of communication. The MoEW is looking at governance model to facilitate IWRM at basin level while leaving the management to regional WEs. However, the administrative division between the four regional WEs poses a challenge for IWRM as it doesn't take into consideration hydrological profiles – with river basins sometimes overlapping two or three regions, ie managed by different WEs. **Public-public partnerships are seen as a potential solution for river basin management**. Article 58 of the 2020 Water Law open the doors to partnerships between WEs and municipalities – while local collectivities are so far very little integrated in discussions on water. Experiences from projects implemented by international actors or decentralized cooperation (see below) have provided example of river basin management models – either through public-public cooperation, and/or by creating participatory processes (consultation and/or multi-stakeholders' management).

The interest for IWRM and its inscription in the 2020 Water Law still lacks translation into an accepted legal framework that reconciles needs for governance at river basin level with institutions' prerogatives. According to the Water Law, Water basins plans are intended to be developed by the concerned Water Establishment, after a Council of Ministry decree, upon recommendation of the MoEW, classifies basins or water regions and defines types of procedural approach to Water Basin Master Plans based on their specific conditions.

Project proposing a IWRM approach in Lebanon

Seven projects focusing on resource management were identified as currently underway in Lebanon. (Contact LEWAP to share other projects). These projects address the issue of water resources management from different angles, proposing different governance approaches, building on local needs and issues and mobilizing existing stakeholders. They are of real interest at the scale of their field of action, but also provide examples from the field that can inspire national approaches.



1. Integrated Water Resource Management (HawkaMaa-EU): El-Ostuan, El-Assi, El-Ghadir
2. Flood Risk Management with an integrated approach: El-Ostuan, Litani
3. Improved Water Resources Management at regional level in Lebanon: El-Barid, Arqa
4. Creation of an Agency for urban planning and territorial development in the Nahr Abou Ali Basin (AUDETA): Abou Ali
5. Development of touristic strategy in the Caza of Bcharré: Abou Ali
6. Valorization of tourism and cultural heritage in Zgharta-Ehden: Abou Ali
7. Groundwater study for potable water adduction in Zahlé: Litani

Integrated Water Resource Management (HawkaMaa-EU)

Implementing partners: ACTED, WeWorld-GVC, LebRelief, ACF, Solidarités International.

Supporting partners: IMPACT, LCPS, Nahnoo, LEWAP.

Donor: European Union (EU-MADAD Program).

Timeframe: 2021-2023.

River basin(s): El-Ostuan (North); El-Ghadir (Mount Lebanon); El-Assi (Bekaa).

Objectives: Adopt a demand-based approach to resource management; identifying measures to respond to the lack of public networks and to water pollution.

Governance model:

- Concertation with local actors (civil society, municipalities, end users including farmers, industries and domestic users) as well as regional and national institutions (Ministry of Energy and Water, Ministry of Environment, Ministry of Agriculture, North Lebanon Water Establishments, Prefect of Akkar);
- Water committees with municipalities, local NGOs, local representatives and end users to discuss priorities and define a program of measure;
- The pilot phase under MADAD III resulted in governance recommendations for water resource management at the river basin scale, which are being presented to institutions in order to support the definition of an institutional framework at the national scale, coordinated with the redaction of water code's executive decrees.

Topics: Water resource management, including sanitation.

Activities: A pilot was implemented by ACTED in 2020 as part of MADAD II program in Al-Ostuan River Basin; this included a WEAP study conducted by consultant office, and piloting the governance model described before. This pilot was expanded under MADAD III (current project) to 3 river basins (Al-Ostuan, Al-Ghadir and Al-Aassi). It will result in the definition of a concerted program of measures at each basin level, with 8 measures being financed under MADAD III and implemented by the RB committees. Moreover, a map will be realized to facilitate an integrated and shared knowledge at the RB scale, with data on the resource, priorities, stakeholders and implemented measures.

Flood Risk Management with an integrated approach

Implementing partners: Solidarités International, Lebanese Red Cross, French Red Cross, CNRS Lebanon.

Donors: AFD (Agence Française de Développement), DANIDA (Danish International Development Agency).

Timeframe: 2020-2024.

River basin(s): El-Ostuan (North), Litani (Bekaa – sub-basin: Ghzaiel)

Objectives: Defining an action plan for flood protection; Establishing an alarm and response mechanism; Implementing river committee.

Governance model: Municipalities are being informed of the project; river committee implementation is defined as an objective of the project but its composition and power is still to be defined (coordinated by the Red Cross).

IWRM topics: River basin approach to risk management.

Activities: An hydrogeology and hydro-morphology study is conducted by the CNRSL and should be finalized in April 2022. Solidarités International is coordinating Flood risk management activities while the French and Lebanese Red Cross will be implementing river committees.

Improved Water Resources Management at regional level in Lebanon

Implementing partners: UN Food and Agriculture Organization (FAO)

Supporting partners: Ministry of Energy and Water, North Lebanon Water Establishment.

Donor: Swiss Agency for Development and Cooperation.

Timeframe: 2018-2022.

River basin(s): El-Barid and Arqa river basins (North).

Objectives: Improving performances and resources planning capacities of North Lebanon Water Establishment through provision of means to monitor water resources; developing data sharing amongst stakeholders.

Governance model: Collaboration through stakeholder platform gathering water actors at the local and national level (Ministry of Agriculture, UN, NGOs, Water establishment, municipalities, farmer representatives); development of a "water governance" approach to include all actors for problem identification and resolution.

IWRM topics: resource monitoring / water accounting; water productivity.

Activities: Capacity-building of NLWE for monitoring of water quality and quantity through metering equipment development of a Watershed Prototype Monitoring System; capacity-building of end-users (farmers) to optimize practices and enhance water productivity.

Creation of an Agency for urban planning and territorial development in the Nahr Abou Ali Basin (AUDETA)

Implementing partners: Communauté Urbaine de Dunkerque, municipality of Tripoli, municipality of Zgharta-Ehden

Supporting partners: Cités Unies Liban/Bureau Technique des Villes Libanaises, Fédération Nationale des Agences d'Urbanisme, Agence d'urbanisme Flandre-Dunkerque.

Donor: French Ministry of Europe and Foreign Affairs (MEAE).

Timeframe: 2019-2021 (new phase planned for 2022-2024).

River basin(s): Abou Ali river (North).

Objectives: establishing an urban agency which will be acting as a focal point for all urban and territorial development projects implemented at the river basin level.

Governance model: The urban agency is the result of a cooperation between 3 municipalities, including 2 Lebanese municipalities of the river basin: Tripoli and Zgharta-Ehden. Other municipalities are aimed to be included, in particular the municipality of Bcharré.

IWRM topics: River basin approach to consider water resources in local development measures; integrated approach to sanitation.

Activities: The agency aims at realizing an atlas of existing resources, and at being involved in projects implemented in the river basin, including decentralized cooperation projects, to facilitate a river basin approach considering the different stakes, levers and stakeholders.

Development of touristic strategy in the Caza of Bcharré

Implementing partners: Ville de Chambéry, Grand Chambéry union of municipalities, Région Auvergne-Rhone Alpes, Caza of Bcharré.

Supporting partners: Corail Développement, Tetraktys, North Lebanon Water Establishment.

Donor: Water Agency Rhone Méditerranée Corse.

Timeframe: Ongoing since 2019.

River basin(s): Abou Ali river (North).

Objectives: Contributing to Caza of Bcharré's touristic strategy

Governance model: Partnership for a "territorial dialogue" between actors of the River Basin (currently on the cazas of Bcharré and Zgharta-Ehden, in partnership with the North Lebanon Water Establishment) to develop knowledge on water resources and the impact of climate change (first phase). The project is implemented through:

- A piloting committee composed of municipalities involved in the cooperation between Chambéry and Bcharré, and between the Département de l'Aude and Zgharta-Ehden;
- A technical committee composed of stakeholders from the river basin and research actors, which gathers on a monthly basis.

IWRM Topics: Water resource monitoring and protection; availability and productivity of water for touristic and economic development.

Activities: For the first phase, a study on the impact of climate change was conducted to identify stakes and levers for agriculture and tourism development, both depending on the availability and sustainability of water resource. The study was finalized and presented to partners in November 2021. The upcoming phase will focus on complementary resources to increase the knowledge on available resources; and on increasing cooperation and participation through the "territorial dialogue".

Valorization of tourism and cultural heritage in Zgharta-Ehden

Implementing partners: Département de l'Aude, municipality of Zgharta-Ehden.

Supporting partners: BRL Ingéniérie

Technical and Financial Partners: Water Agency Rhone Méditerranée Corse, French Ministry of Europe and Foreign Affairs (MEAE).

Timeframe: 2017-2021.

River basin(s): Abou Ali River (North – sub-basin: Rachiine).

Objectives: Valorization of tourism and cultural heritage and development a municipal service for water.

Governance model: Project lead by the municipality of Zgharta-Ehden, in partnership with the North Lebanon Water Establishment. A "river contract" was signed with municipalities and stakeholders of the sub-basin of Rachiine. At a later phase, this project is intended to fall under the umbrella of the Urban Agency AUDETA to facilitate the governance at the River Basin level.

IWRM topics: River basin approach – collective management of water resource and wastewater.

Activities: On wastewater, this cooperation is developing an integrated approach to water management though concertation and measurements, in order to: develop sustainable access to quality water; developing and sharing knowledge, including sensitization to water quality; optimizing resource management to ensure water protection.

Groundwater study for potable water adduction in Zahlé

Implementing partners: APIEU Montpellier, Municipality of Zahlé.

Supporting partners: Bekaa Water Establishement, Litani River Authority

Technical and Financial Partners: Montpellier Méditerranée Métropole, Water Agency Rhone Méditerranée Corse.

Timeframe: Ongoing since 2017.

River basin(s): Litani (Bekaa – sub-basin: Berdawni).

Objectives: Resource protection in urban and rural environment through the contribution to urban development scheme.

Governance model: collaboration with Zahlé Municipality, Bekaa Water Establishment, and Litani River Authority; creation of a platform of local actors, concerted for the diagnosis and for the development scheme; plan to share the experience to neighboring communities and catchment area.

IWRM topics: water protection; groundwater recharge.

Activities: Step 1: participative diagnosis on water resources – creation of a platform for water actors to conduct the diagnosis and work on governance. Step 2: pedology (soil permeability) study and groundwater vulnerability study, in order to contribute to Zahlé's development scheme taking in consideration aquifers recharge. Step 3 (planned): program of measures to increase the city's permeability and focus on agro-ecology at the catchment basin scale.

Sources of information

https://www.hydrology.nl/ihppublications/169-iwrm-guidelines-at-river-basin-level.html

https://www.hydrology.nl/images/docs/ihp/IWRM_Guidelines/IWRM_Part_2-1_Guidelines_for_IWRM_Coordination.pdf

https://www.inbo-news.org/IMG/pdf/GWP-INBOHandbookForIWRMinBasins.pdf

https://www.sciencedirect.com/topics/earth-and-planetary-sciences/integrated-water-resources-management

https://iahs.info/uploads/dms/15054.35-145-158-Yasuro-Nakajo.pdf

http://www.fao.org/3/cb4240en/cb4240en.pdf

https://www.riob.org/sites/default/files/IMG/pdf/MONA_FAKIH_PPT_4thBWW.pdf