CLIMAGINE Workshop I Report

Integrated Management Plan for the Damour River Basin - GEF MedProgramme, Child Project 2.1.

UNESCO Regional Office, Beirut, Lebanon - 1 – 3 July 2025

2.1
Mediterranean
Coastal Zones Climate
Resilience Water Security
and Habitat Protection"

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1 Introduction

1.1 THE GEF MEDPROGRAMME AND THE INTEGRATED MANAGEMENT PLAN FOR THE DAMOUR RIVER BASIN

The Mediterranean region faces acute challenges from climate variability and change, compounded by socio-economic pressures and increasing environmental vulnerability—particularly in its coastal zones. These dynamics place Mediterranean communities and ecosystems at heightened risk, underscoring the urgent need for integrated and adaptive management approaches.

In response, the Global Environment Facility (GEF) MedProgramme: Enhancing Environmental Security (2019–2026), implemented by the United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP), has launched a comprehensive initiative to address these challenges. The MedProgramme's Child Project 2.1, "Mediterranean Coastal Zones: Water Security, Climate Resilience, and Habitat Protection", brings together key partners—GWP-Med, PAP/RAC, Plan Bleu/RAC, and UNESCO IHP—to support Mediterranean countries in implementing the Integrated Coastal Zone Management (ICZM) Protocol of the Barcelona Convention and advancing sustainable development objectives.

Within this framework, the Integrated Management Plan (IMP) for the Damour River Basin in Lebanon is being developed using the "Source to Sea" approach and the Integrative Methodological Framework (IMF). The Damour IMP covers the river basin, underlying aquifers, adjacent coastal zones, and the marine area influenced by the Damour's hydrology and socio-economic activities. The plan aims to:

- Reduce transboundary environmental stresses
- Enhance climate resilience
- Ensure water security
- Protect and restore habitats
- Promote equitable access to clean water
- Support sustainable socio-economic development

The participatory Climagine methodology is central to this process, fostering stakeholder engagement and integrating local expertise into the assessment of sustainability, vulnerability, and future scenarios. Through a series of local dialogue workshops, the IMP process ensures that every stakeholder is recognized as an expert at their own level, contributing to the co-development of solutions for the Damour area's sustainability and resilience.

Furthermore, the Damour IMP is aligned with the Sustainable Development Goals, notably SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action), and is designed to generate practical, gender-sensitive, and climate-resilient management strategies. Despite regional instability and project delays, the collaborative approach and ongoing stakeholder dialogues remain vital to shaping an integrated vision for the future of the Damour River Basin and its communities.

1.2 OVERVIEW OF THE DAMOUR RIVER BASIN

The Damour River Basin is a key hydrological and socio-economic region located just south of Beirut on Lebanon's Mediterranean coast. It covers an area of approximately 333 square kilometers, stretching from the high elevations of the Shouf and Barouk Mountains down to a narrow coastal estuary about five kilometers wide, where the river meets

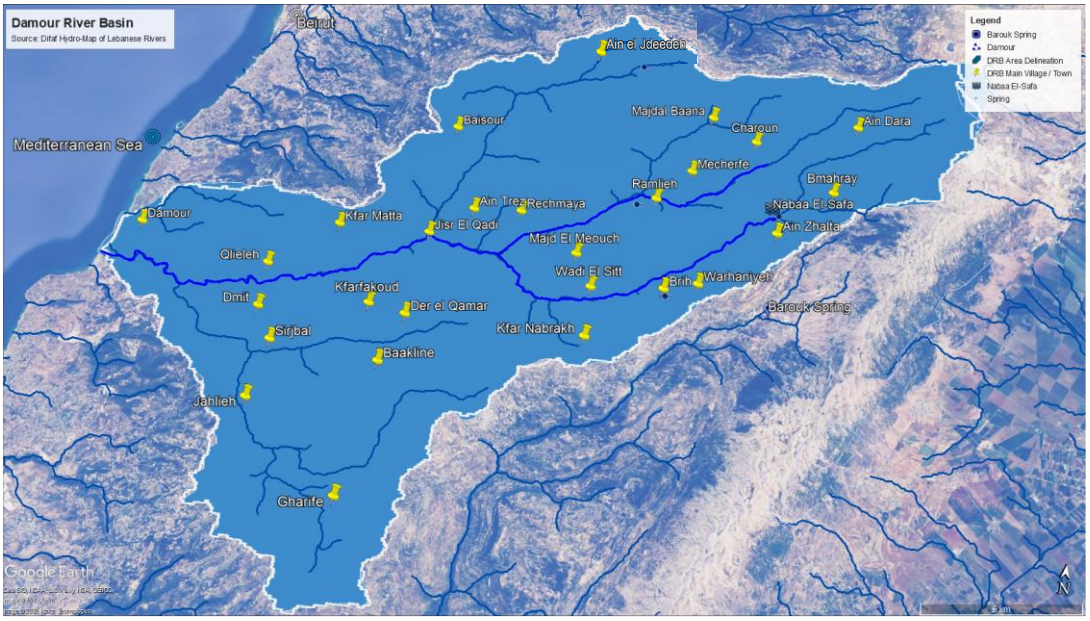
the Mediterranean Sea. The Damour River itself is a perennial watercourse, extending over 35 kilometers and fed by major springs such as Nabaa Al Safa and Barouk, which emerge from Jurassic limestone formations in the uplands.

Figure 1. Delineation of DRB River Basin & Watersheds

Source: Difaf

The basin encompasses more than thirty municipalities, including well-known towns and villages such as Damour, Baakleen, Rechmaya, Ain Dara, Kfarmatta, and Deir el-Qamar. It serves as a vital corridor connecting Beirut to southern Lebanon and the Mount Lebanon region, and is recognized for its strategic socio-economic significance. The population of the Damour River Basin is estimated to be between 200,000 and 400,000 inhabitants, with higher densities in coastal towns like Damour and Jiyeh, and more dispersed populations in upland villages such as Baakleen and Maasser El Shouf. The area is characterized by a mix of urbanized centers, peri-urban zones, and rural mountain communities, reflecting diverse socio-economic and demographic profiles.

Figure 2. DRB River Basin Area & Main Villages



Source: Difaf

Seasonal population fluctuations are common due to tourism and internal migration from Beirut and Mount Lebanon suburbs, and in recent years, the basin has seen an increase in internal displacement and the presence of Syrian refugees, especially in lower elevation areas. The Damour River Basin extends primarily across the Shouf and Aley districts, which together display varied socio-economic characteristics. Urban centers such as Aley and Deir el-Qamar are more service-oriented, with strong representation in education, healthcare, real estate, and construction, while upland areas maintain agricultural traditions, particularly fruit tree cultivation and seasonal farming, although agriculture's contribution to household income has become secondary to public employment and informal trade.

The river basin's hydrogeology is defined by both karstic and non-karstic formations, with faulted geology facilitating hydraulic connections between mountain aquifers and the coastal groundwater. The upland catchments receive between 850 and 1,000 millimeters of precipitation annually, supporting significant infiltration into the karstic aquifer system. Long-term assessments estimate the Damour's natural mean annual runoff to be between 100 and 220 million cubic meters, although this has declined in recent decades due to increased extraction and prolonged drought periods. Importantly, the river exhibits marked seasonal variability in discharge, with significantly higher flows during the wet season and substantially reduced flows in the dry summer months. This seasonal fluctuation critically impacts water availability for agriculture, domestic use, and ecosystem health. Over-extraction during the dry season exacerbates downstream water shortages and intensifies conflicts between upstream and downstream communities, highlighting the need for adaptive water management practices that account for these seasonal dynamics.

The Damour plain is among Lebanon's most fertile agricultural areas, with banana plantations occupying over sixteen percent of Damour's total area and more than sixty-five percent of its cultivated land. Tourism and hospitality are significant economic activities, especially in Deir el-Qamar, Barouk, and the coastal zones during the summer months. Many residents commute to Beirut or rely on diaspora remittances, and informal economic activities such as small-scale quarrying persist. The basin faces environmental pressures from urban sprawl, informal housing, infrastructure deficits, and the impacts of climate change, including altered rainfall patterns and a reduction in snowpack. Moreover, the observed changes in rainfall distribution and increased drought frequency have significantly affected local water resources. These evolving climatic conditions pose challenges to water availability, agricultural productivity, and overall socio-economic sustainability in the region.

Noted that governance in the Damour River Basin is fragmented, with regulatory authority held by ministries and public institutions, significant operational influence is exercised by municipalities, private water users, and civil society organizations. Coordination gaps and the underutilization of strategic actors such as academia and NGOs hinder effective resource management. Key environmental issues include declining river flows, groundwater over-extraction from coastal aquifers and consequently seawater intrusion, and pollution, of both surface water and groundwater resources, from untreated wastewater and agricultural runoff. The lack of systematic monitoring and outdated infrastructure further complicate water management and conservation efforts. In summary, the Damour River Basin is a microcosm of Lebanon's broader water and environmental challenges, rich in natural resources and socio-economic potential, but increasingly vulnerable to over-exploitation, climate variability, fragmented management, and lack of accountability.

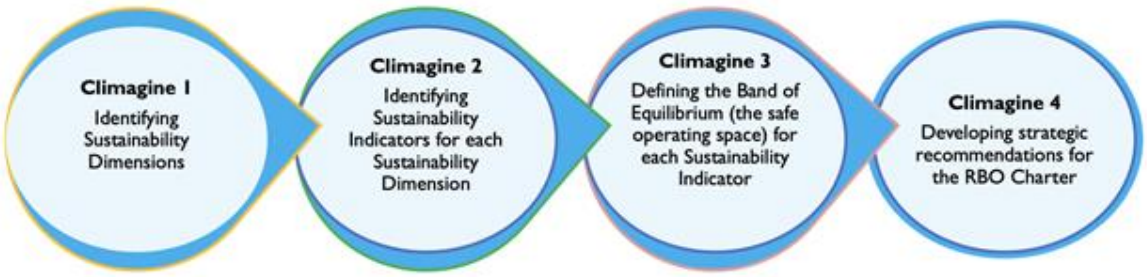
1.3 CLIMAGINE AND THE INTEGRATED MANAGEMENT PLAN FOR THE DAMOUR RIVER BASIN

The Climagine methodology, developed by Plan Bleu, is being applied in the context of the MedProgramme's Child Project 2.1 to support the development of the Integrated Management Plan (IMP) for the Damour River Basin. This participatory foresight approach is designed to engage local and regional stakeholders in a structured process that builds a shared vision for the sustainable management of the Damour area, from source to sea. Due to the challenging regional context and ongoing instability in Lebanon, the first two Climagine workshops were combined, requiring adaptation of the process to ensure effective participation and continuity.

Climagine draws on lessons learned from its application in other Mediterranean contexts, such as Morocco and Montenegro, and adapts them to Lebanon's specific needs. The methodology begins by establishing the local context and mapping key stakeholders' visions for the area, before moving to the identification of priority challenges, sustainability dimensions, and the development of actionable indicators. The process emphasizes the co-construction of scenarios, comparing business-as-usual trajectories with sustainability-oriented visions, and setting clear thresholds for each indicator to monitor progress. Special attention is given to cross-cutting themes, including governance, gender, and education, ensuring that the IMP is inclusive and aligned with both the Integrated Coastal Zone Management (ICZM) approach and the Sustainable Development Goals. By combining participatory engagement with robust technical analysis, Climagine aims to produce a practical, scenario-based dashboard of sustainability indicators, which will serve as a foundation for the Damour IMP and guide its implementation. This approach not only addresses immediate environmental and governance challenges but also builds capacity and resilience among local institutions

and communities, ensuring that the management plan is both effective and sustainable in the face of ongoing change. Throughout the workshops, groups of stakeholders developed, discussed, and presented their proposed indicators, rationales, and priorities, fostering an open dialogue and collective ownership of the plan.

Figure 3. Steps of Climagine methodology



Plan Bleu

STEP I: set the stage / establish and understand the local and regional context / agree on the key issues and priorities / identify sustainability dimensions / map stakeholders' vision of the area / begin forming a local group of experts / map missing stakeholders.

STEP II: engage in Diagnosis, Vision and Future Scenarios by proposing sustainability indicators for the recognized issues / propose minimum and maximum values for these indicators to determine thresholds of sustainability / set priorities for the Coastal Management Plan.

STEP III: determine the Plan's priority issues and strategic objectives / elaborate the Band of Equilibrium and Amoeba diagrams / validate the indicators and identify missing indicators / identify climate change adaptation measures.

STEP IV: final validation of the indicators/diagrams and integration into the Coastal Management Plan.

STEP V: Approval of the Coastal Management Plan and final regional Climagine workshop on ICZM in the Mediterranean's coastal zones.

2 Wokshop summary

2.1 PART 1: INTRODUCTION

The first and second Climagine workshops for the Integrated Management Plan (IMP) of the Damour River Basin were held in Beirut from July 1st to 3rd, 2025, bringing together a diverse group of stakeholders from national and local government, academia, civil society, and international organizations. These workshops marked a significant milestone in the participatory development of the Damour IMP, as they combined the initial two stages of the Climagine methodology due to the challenging regional context and the need for adaptive planning.

The opening session featured welcoming addresses from high-level representatives, including the MP H.E. Dr. Najat SALIBA, the Director of Water at the Ministry of Energy and Water, Eng. Mona Fakih, the Director of UNESCO's Regional Office in Beirut, Mr. Paolo Fontani, the MedProgramme Coordination Unit at UNEP/MAP, Mr. Mohamad Kayyal, GWP-Med, Ms. Barbara Tomassini, and PAP/RAC, Ms. Daria Povh Skugor. The session provided an overview of the MedProgramme's objectives and the importance of integrated resource management in the Damour area, emphasizing the Source-to-Sea approach and the WEFE (Water-Energy-Food-Ecosystems) Nexus. Introductory presentations by experts from GWP-Med, Ms. Barbara Tomassini, UNESCO-IHP, Mr. José Luis Martin Bordes, PAP/RAC, Mr. Ante Ivčević, and Plan Bleu, Ms. Éloïse Leguérinel, set the stage for the workshop by highlighting the need for coordinated governance, conjunctive management of surface and groundwater, and the integration of ICZM principles.

2.2 PART 2: CLIMAGINE WORKSHOP

The first technical session presented the current status of the Damour IMP, including key findings from the inception phase, governance analysis, and the rapid stakeholder assessment previously conducted by Hussam Hawwa from Difaf. These presentations provided participants with a comprehensive understanding of the basin's environmental, institutional, and socio-economic context, and identified the main challenges facing the Damour area, such as water scarcity, pollution, urbanization, and pressures on biodiversity.

The core of the workshop was dedicated to the Climagine participatory process, which aimed to build a shared vision for the sustainable future of the Damour River Basin. Participants were introduced to the methodology and objectives by Éloïse Leguérinel, including the identification of priority sectors and the development of sustainability indicators.

During the Climagine workshop dedicated to building a shared vision for the Damour area, participants were divided into four thematic groups, each focusing on a key sector:

- Water Supply and Wastewater Management
- Agriculture and Rural Development
- Environment and Biodiversity (terrestrial and marine)
- Urban Development, Land Use Planning, and Governance.

The session began with an overview of the Integrated Management Plan process and the Climagine participatory methodology, with facilitators, Hussam Hawwa and Éloïse Leguérinel, explaining the importance of collaborative engagement, scenario building, and the definition of sustainability indicators. Each group was tasked with establishing the current context for their sector using available data, identifying the main challenges and drivers, and distinguishing between a "Business as Usual" scenario and a "Sustainability Vision" for the Damour River Basin.

Within their groups, participants discussed the sustainability dimensions most relevant to their theme, such as water quality and accessibility, agricultural productivity, ecosystem health, urban sprawl, and governance effectiveness. They collectively listed all relevant sustainability indicators for their sector and then selected three indicators that were considered the most representative and impactful. The choice of indicators was guided by the RACER criteria—ensuring that each was relevant, acceptable, clear, easy to monitor, and robust over time.

Each group elaborated on their indicator choices, considering how these could be used to monitor progress and inform decision-making within the IMP framework. The discussions also integrated cross-cutting issues such as governance, gender equality, and knowledge building, recognizing that sustainable management of the Damour area requires an inclusive and holistic approach and in order to ensure that the IMP would be inclusive and aligned with both national priorities and the Sustainable Development Goals. The main outcomes of the discussions are detailed below :

Group 1	**Water Supply and Wastewater Management**
Key Challenges	- Upstream water withdrawal and declining surface runoff due to drought - Pollution from untreated wastewater and insufficient inflows to wastewater treatment plants (due to incomplete networks or coverage) - Olive oil and hydrocarbon (fuel) pollution from untreated discharges at gas stations and small industries - Pollution from pesticides and agrochemicals entering via drainage channels - Decreasing aquifer recharge rates due to climate change and urbanization - Inefficient irrigation and water use in agriculture - Weak water governance and lack of monitoring (water rights, metering, management) - Soil erosion, urban encroachment on public river spaces, and runoff issues due to increased hard surfaces from urbanization
Priority Actions / Solutions	- Construction of new hill lakes and rehabilitation of abandoned quarries for water harvesting, storage, and use, as well as promoting household and local-level water harvesting - Integrating decentralized water management and a participatory approach in the upper, middle, and lower basin through the establishment of Water User Associations (WUAs) or responsible local actors managing irrigation supply - Promoting water-efficient irrigation techniques to replace flood irrigation and outdated agricultural methods - Upgrading and decentralizing wastewater treatment infrastructure

	- Implementing water metering at wells and improving monitoring and accountability to control over-pumping and prevent illicit groundwater withdrawals - Conducting awareness campaigns for water conservation and pollution prevention - Adopting sustainable and native crop cultivation and farming methods - Practicing soil management to reduce runoff and agrochemical pollution, and promoting biopesticides and terracing for soil and water conservation - Enforcing oil and industrial pollution treatment stations by developing regulations, standards, and accountability
All Identified Indicators	- Number and total area of operational hill lakes (e.g., 60 lakes = 360,000 m²) - Number of abandoned quarries repurposed for water harvesting - Number of active Water User Associations (WUAs) in the upper, middle, and lower basin - Percentage of conventionally irrigated areas replaced by water-efficient irrigation techniques - Number of actionable large-scale irrigation schemes by 2030 - Area under Good Agricultural Practices (GAP) - Number of farmers applying biopesticides - Number of monitored public wells equipped with functional vs non-functional water meters - Number of monitored private wells equipped with water meters - Ratio of illicit private wells to licensed wells - Percentage of area covered by decentralized wastewater treatment plants (WWTPs) - Annual volume (m³) of wastewater treated - Number of operational industrial pollution treatment stations - Number of terraced agricultural lands - Percentage of households and facilities connected to decentralized or centralized WWTPs - Rate of groundwater abstraction - Mean groundwater level change (m/year or m/month) to reflect aquifer health - Estimated natural recharge rate (safe yield) versus abstraction rate to assess sustainability - Incidence and extent of seawater intrusion (e.g., salinity levels in groundwater) - Number of pollution incidents from surface discharge and return flows
Key RACER Indicators (ranked)	**- Rate of groundwater abstraction** **- Mean groundwater level change (m/year or m/month)** **- Annual volume (m³) of wastewater treated** **- Percentage of households and facilities connected to decentralized or centralized WWTPs** **- Number of monitored public wells equipped with functional vs non-functional water meters** - Number of monitored private wells equipped with water meters - Ratio of illicit private wells to licensed wells - Percentage of conventionally irrigated areas replaced by water-efficient irrigation techniques - Percentage of area covered by decentralized wastewater treatment plants (WWTPs) - Number of terraced agricultural lands
Linked Sustainability Dimensions	Water security, public health, agriculture, climate adaptation, governance, pollution reduction, rural development

Group 2	**Agriculture and Rural Development**
Key Challenges	- Lack of water due to infrastructure, mismanagement, and water quality issues - Impacts of climate change on crop yields and water availability - Limited integration and coordination among farmers and agricultural actors - Lack of agricultural credit and financial support - Heavy reliance on imported inputs and lack of market protection - Ineffective or unsafe pesticide use and limited awareness of best practices - Pollution from untreated sewage and poor irrigation water quality - Inadequate irrigation infrastructure coverage - Lack of incentives for sustainable practices - Weak farmer associations and limited capacity building - Low adoption of modern agricultural techniques - Poor governance and limited Ministry of Agriculture (MoA) outreach

Priority Actions / Solutions	- Re-establish agricultural credit systems and increase financial support - Expand and modernize irrigation schemes and promote efficient water use - Increase training and awareness workshops for farmers on smart agriculture, pesticide management, and climate adaptation - Strengthen farmer associations and cooperatives - Diversify crops and promote sustainable practices - Protect local agricultural markets through social protection measures and prioritization in national budgets - Increase taxes on imported vegetables to support local production - Promote the use of biopesticides and organic farming - Improve irrigation water quality and monitoring - Enhance coordination between farmers, cooperatives, and value chains - Implement social protection and incentive measures for sustainable agriculture
All Identified Indicators	- Percentage of agricultural land covered by modern irrigation schemes - Percentage of agricultural products with pesticide residues below safety thresholds - Number of active farmer associations, water-user associations, and cooperatives - Number of MoA trainings delivered annually - Number of incentives provided through social protection programs - Percentage of polluted irrigation water - Number of farmers applying biopesticides or organic practices - Area under Good Agricultural Practices (GAP) - Number of agricultural credit beneficiaries - Areas irrigated with treated wastewater (re-use) according to FAO or Libnor standards for irrigation - Number of crop diversification initiatives - Number of local agricultural markets protected or established - Number of value chain development projects - Number of youth and women involved in agriculture - Number of workshops and awareness campaigns conducted
Key RACER Indicators (ranked)	**- Percentage of agricultural land covered by modern irrigation schemes** **- Area under Good Agricultural Practices (GAP)** **- Number of active farmer associations, water-user associations, and cooperatives** **- Areas irrigated with treated wastewater (re-use) according to FAO or Libnor standards for irrigation** **- Number of youth and women involved in agriculture** - Number of farmers applying biopesticides or organic practices - Percentage of polluted irrigation water - Number of persons reached by workshops and awareness campaigns conducted
Linked Sustainability Dimensions	Governance, rural development, food security, environmental health, economic resilience, education, social protection, climate adaptation, gender inclusion

Group 3	**Environment and Biodiversity**
Key Challenges	- Landscape degradation (quarries, sandpits, urbanization, forest fires) - Pollution from solid waste, wastewater, pesticides, oil and hydrocarbons - Loss of natural habitats, invasive species, uncontrolled hunting and fishing - Weak enforcement of environmental regulations - Unsustainable tourism and agricultural practices - Water diversion and reduced environmental flows - Insufficient integration of science and decision-making - Air pollution and lack of monitoring - Unregulated return flows and riverbank activities - Lack of baseline biodiversity data and environmental assessments

Priority Actions / Solutions	- Restore degraded landscapes (reforestation, quarry management) - Strengthen and enforce local and regional regulatory frameworks - Implement solid waste and wastewater management systems and reduce pollution - Raise awareness and provide outreach to farmers on sustainable agriculture and pesticide reduction - Adopt and implement biodiversity management plans; control invasive species - Monitor and enforce laws on hunting, fishing, and forest fire prevention - Advocate for linking scientific assessments with policy and decision-making processes - Monitor air quality and adopt regulations for industry and tourism - Promote organic farming and sustainable systems - Develop and implement riverbank and ecosystem restoration plans
All Identified Indicators	- Area of restored habitats (hectares or percentage of territory) - Area of protected habitats (hectares or percentage of territory) - Number of functional wastewater treatment plants - Annual m^3 of wastewater treated - Number of environmental violations detected and addressed (e.g., infractions removed, fines issued) - Number of sites with updated management plans and adopted regulations (regional and local) - Percentage of agricultural area under sustainable practices, including Good Agricultural Practices (GAP) as defined by FAO, organic farming, and agroecology initiatives - Number of farmers reached through outreach and training on good agricultural practices - Number of air quality monitoring stations and air quality index trends - Number of hectares managed for forest fire prevention - Number of forest fires per year - Number of invasive species monitored - Number of published baseline biodiversity assessments and the total area covered by these assessments - Number of riverbank restoration projects and area restored - Volume of water maintained as environmental flow in the Damour River (percentage of water flow maintained for environmental needs vs total volume) - Number of solid waste dumpsites identified - Number of operational industrial pollution treatment stations
Key RACER Indicators (ranked)	**- Area of restored habitats (hectares or percentage of territory)** **- Area of protected habitats (hectares or percentage of territory)** **- Number of functional wastewater treatment plants** **- Annual m^3 of wastewater treated** **- Percentage of agricultural area under sustainable practices, including Good Agricultural Practices (GAP) as defined by FAO, organic farming, and agroecology initiatives** - Number of hectares managed for forest fire prevention - Number of forest fires per year - Number of riverbank restoration projects and area restored - Volume of water maintained as environmental flow in the Damour River (percentage of water flow maintained for environmental needs vs total volume) - Number of invasive species monitored - Number of published baseline biodiversity assessments and the total area covered by these assessments - Number of solid waste dumpsites identified - Number of operational industrial pollution treatment stations
Linked Sustainability Dimensions	Biodiversity, governance, landscape restoration, climate risk management, environmental education, sustainable agriculture, pollution control, water management

Group 4	Urban Development, Land Use Planning, and Governance
Key Challenges	- Over-abstraction of groundwater and declining groundwater quality, including inadequate well licensing and permitting - Insufficient monitoring of groundwater quantity and quality, compounded by limited community involvement - Seawater intrusion due to over-extraction - Pollution from surface discharge and return flows from urban and industrial activities - Unregulated urban expansion along riverbanks, sensitive areas, and natural recharge zones (which can become impervious due to urban sealing) - Loss of ecosystem and riverbank biodiversity - Weak enforcement of land use regulations, environmental standards, and well licensing - Lack of baseline data for riverbank, ecosystem status, and socio-economic impacts - Insufficient integration of disaster risk reduction in urban planning - Inadequate coordination among institutions and stakeholders
Priority Actions / Solutions	- Establish comprehensive groundwater monitoring systems for both quantity and quality, including community-based monitoring to reduce authority burden and enhance public awareness and participation - Develop and enforce land use plans that restrict urban expansion in sensitive or high-risk areas, explicitly including protection of natural recharge areas from impervious surface sealing - Implement regulatory, green infrastructure-based, and nature-based measures to prevent and mitigate seawater intrusion (e.g., hydraulic barriers, recharge enhancement, vegetated buffers) - Improve surface water quality monitoring and regulate return flows from urban activities - Restore and protect riverbank ecosystems and biodiversity - Strengthen governance, inter-institutional coordination, and enforcement mechanisms for land and water management - Integrate disaster risk reduction and climate adaptation measures into urban planning processes - Develop and regularly update baseline data on riverbank, ecosystem, groundwater status, and socio-economic conditions - Promote public awareness, participatory urban planning, and citizen engagement in reporting violations and monitoring efforts

All Identified Indicators	- Number of groundwater level monitoring activities conducted annually (measuring quantity)
	- Number of groundwater quality monitoring activities or reports published annually
	- Percentage of urban expansion occurring outside designated safe zones or in violation of land use plans
	- Status of riverbank and ecosystem restoration (e.g., area restored or protected, biodiversity indices)
	- Water quality indicators in urban and peri-urban areas, such as nitrate (NO_3), electrical conductivity (EC), salinity, E. coli, heavy metals (e.g., lead, arsenic, mercury), and others relevant to public health
	- Number of enforcement actions taken for land use violations (e.g., encroachment on public river space, unlicensed wells)
	- Number of land use plans developed or updated since 2020 within the IMP Damour area
	- Number of disaster risk reduction measures integrated into urban planning
	- Number of stakeholder coordination meetings and joint actions
	- Availability and regular updates of baseline data on riverbank and ecosystem status
	- Citizen participation indicators: number/percentage of citizens involved in monitoring/reporting violations
	- Percentage of new urban projects that integrate climate adaptation measures
	- Socio-economic impact indicators such as :
	  - Changes in property values in sensitive areas
	  - Number of households affected by water shortages or pollution

Key RACER Indicators (ranked)	**- Percentage of urban expansion occurring outside designated safe zones or in violation of land use plans**

	- Water quality indicators in urban and peri-urban areas, such as nitrate (NO_3), electrical conductivity (EC), salinity, E. coli, heavy metals (e.g., lead, arsenic, mercury), and others relevant to public health **- Number of enforcement actions taken for land use violations (e.g., encroachment on public river space)** **- Number of groundwater level monitoring activities conducted annually (measuring quantity)** **- Number of groundwater quality monitoring activities or reports published annually** - Number of land use plans developed or updated since 2020 within the IMP Damour area - Number of disaster risk reduction measures integrated into urban planning - Number of person reached by stakeholder coordination meetings - Status of riverbank and ecosystem restoration (e.g., area restored or protected, biodiversity indices) - Citizen participation indicators: number of citizens involved in monitoring/reporting violations - Availability and regular updates of baseline data on riverbank and ecosystem status
Linked Sustainability Dimensions	Governance, water security, environmental health, public health, disaster risk reduction, biodiversity conservation, climate adaptation, sustainable urban development, socio-economic resilience, community participation, and equity

After group deliberations, participants presented their findings, proposed indicators, and sectoral priorities in a plenary session. This presentation phase encouraged active listening, feedback, and constructive debate, allowing for the consolidation of ideas and the identification of synergies between sectors.

The workshop successfully fostered a participatory environment where local expertise and diverse perspectives contributed to a shared understanding of the Damour area's challenges and opportunities. The outputs of this session—a set of priority sustainability indicators and a preliminary vision for each sector—will serve as a foundation for the next phases of the Integrated Management Plan, ensuring that the process remains grounded in local realities and stakeholder aspirations.

Gender Inclusiveness at the First Climagine Workshop

A key pillar of the MedProgramme is gender equality and the integration of gender perspectives, as set forth in the MedProgramme Gender Mainstreaming Strategy. In line with this commitment, the Damour Climagine workshop was designed to foster an inclusive and representative environment, both in its methodology and in the composition of its participants.

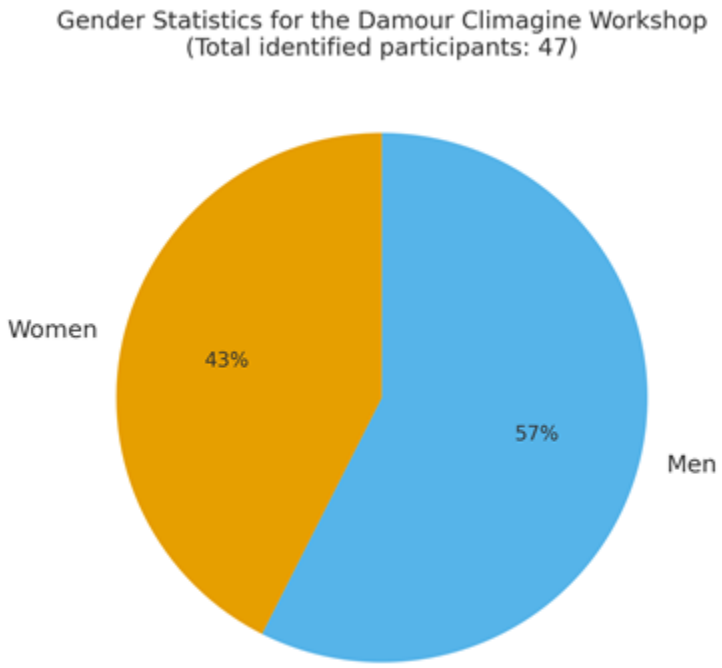
The workshop brought together a diverse group of over 47 participants and speakers, representing a wide range of sectors, including government ministries (Energy and Water, Agriculture, Public Works and Transport, Environment, Industry, Tourism), local authorities (Municipality of Damour), academic and research institutions (Lebanese University, CNRS, LARI, National Council for Scientific Research), United Nations agencies (UNESCO, FAO, UNDP, UN/ESCWA), consulting firms, NGOs, and civil society leaders.

Among the participants, there was a strong presence of both women and men in technical, decision-making, and facilitation roles. Notably, women were represented as directors, researchers, engineers, project coordinators, and sector experts, including key figures such as Mona Fakih (Director of Water, Ministry of Energy and Water), and others.

Gender Statistics for the Damour Climagine Workshop

- Total number of participants with gender identified: 47
- Women: 20
- Men: 27
  - Percentage of women: 43%
  - Percentage of men: 57%

Figure 4. Gender Distribution of Participants for the First IMP Damour Climagine Workshop



Moreover, gender was addressed as a cross-cutting theme during the workshop, both in plenary discussions and within the thematic group work. However, as highlighted by participants, significant challenges remain regarding the availability of sex-disaggregated data and the systematic integration of gender indicators in water, agriculture, environment, and governance sectors. The lack of gender-specific data and the limited awareness of gender-differentiated impacts of environmental management and climate change were identified as ongoing gaps, underscoring the need for targeted efforts in future data collection and capacity building.

3 Conclusion and next steps

Throughout the three days, the workshops fostered a spirit of collaboration and mutual learning, with participants actively contributing their expertise and perspectives. The process reinforced the importance of stakeholder engagement and local knowledge in shaping the IMP, and laid the foundation for the next phases of the Climagine methodology, which will focus on refining indicators, defining the Band of Equilibrium for each sector, and developing strategic recommendations for the Damour River Basin.

The next Climagine workshop (Climagine 3), planned for late September or early October 2025 in Beirut, will focus on defining the "Band of Equilibrium" or safe operating space for each sustainability indicator. This stage will involve expert review of the proposed indicators to assess their feasibility, data requirements, and monitoring protocols. Local knowledge and stakeholder experience will then be mobilized to establish minimum and maximum threshold values for each indicator, ensuring that targets are both ambitious and achievable within the Damour context.

In parallel, efforts will continue to address data gaps—especially in relation to gender and governance—through targeted data collection, capacity building, and enhanced coordination among institutions. Strengthening inter-municipal and cross-sectoral cooperation will also be a priority, as effective governance is essential for overcoming local inefficiencies and responding to natural and climate-related hazards. The forthcoming workshop will also provide an opportunity to further integrate disaster risk reduction, climate adaptation, and participatory urban planning into the IMP process.

The participatory approach and the diversity of expertise represented in the Climagine process have laid a solid foundation for the development of a truly integrated management plan for the Damour River Basin. The ongoing commitment of all stakeholders—supported by robust scientific tools and inclusive governance structures—will be essential to ensure that the IMP is both actionable and resilient in the face of future challenges. The project team looks forward to reconvening in the next workshop to further refine these indicators and advance toward the finalization of the Integrated Management Plan.

4 Annexes

4.1 EVENT AGENDA

1st Multi-stakeholder Consultation on the

Integrated Management Plan for the Damour Area from Source to sea

and coordination with efforts towards:

- ***Integrated Coastal Zone Management (ICZM) Strategy and Law***
- ***Conjunctive Management of Surface Water and Groundwater***
- ***Water-Energy Food-Ecosystems (WEFE) Nexus***

1 – 3 July 2025 (Beirut-Lebanon)

July 1 (Opening Session) - Radisson Blu Martinez Hotel
Google Maps location:
https://maps.app.goo.gl/PaSUTfVwSXfMjpgW8?g_st=com.google.maps.preview.copy
Zoom link to join remotely: https://us02web.zoom.us/j/81062706961

July 2 and 3 - UNESCO Regional Office
Google Maps location:
https://maps.app.goo.gl/3iN2cMsVBhTrst2F7?g_st=iw
Zoom link to join remotely on July 2:
https://unesco-org.zoom.us/j/85601075725?pwd=gXnZLNUcsXnQpg1Vc8RKuUa2JFe0eH.1
Zoom link to join remotely on July 3:
https://unesco-org.zoom.us/j/89658359872?pwd=e1jLBbSgJuGZpb0Phy7hSckFM40JbO.1

Simultaneous interpretation available between Arabic and English

The event is carried out on a Hybrid mode

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Draft Agenda

Day 1 - 1st July 2025

15.30 – 16.00 Participant Registration and Coffee Reception

16.00 – 17.30 OPENING SESSION

Chair: Eng. Mona Fakih – Director of Water, Ministry of Energy and Water

Welcoming Addresses

- Mr. Paolo Fontani, Director of UNESCO Regional Office in Beirut and Representative to Lebanon and the Syrian Arab Republic
- Mr. Mohamad Kayyal, MedProgramme Management Officer, United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP)
- Mr. Dimitris Faloutsos, Deputy Regional Coordinator, Theme Leader on Transboundary, WEFE Nexus, and Environment - Global Water Partnership-Mediterranean (GWP-Med)
- Ms. Daria Povh Skugor, Director, Priority Actions Programme/Regional Activity Centre (PAP/RAC)
- Ministry of Energy and Water

Context of the Consultation event: Introductory presentations

- Ms. Barbara Tomassini, GWP-Med – Integrated natural resources management in the source to sea continuum and WEFE Nexus approach
- Mr. José Luis Martin Bordes, UNESCO-IHP – Coastal Aquifer Management
- Mr. Ante Ivčević, PAP/RAC – Integrated Coastal Zone Management (ICZM) Strategy and Law
- Ms. Eloïse Leguérinel, Plan Bleu/RAC – Participatory approach and stakeholder engagement

(group photo)

17.30 – 19.30 COCKTAIL RECEPTION and NETWORKING

Day 2 - 2nd July 2025

I. The development of an Integrated Management Plan for the Damour Area from source to sea (Damour IMP)

9:00 – 10:00	SESSION 1: Overview and status of the Damour IMP development

This session will present the preliminary findings from the work carried out by the various implementing organizations, along with the upcoming steps toward the development of the Damour IMP.

Moderator: Ms. Barbara Tomassini, Senior Programme Officer - GWP-Med

Key expert presentations:

- Findings from inception phase and governance analysis and way forward: Mr. Raji Maasri, MORES s.a.r.l.
- Damour ICZM and marine area: Mr. Andre Kammoun, Marine and Coastal Resources Program, Institute of the Environment – University of Balamand
- Rapid stakeholders' assessment : Mr Hussam Hawwa, Difaf SAL

10.00 – 10.30 Coffee break (group photo)

10:30 – 13:30	SESSION 2: Building a shared vision for the Damour area through the Climagine participatory approach

This session aims to develop a shared vision for the Damour area from source to sea, serving as a foundation for the Damour Integrated Management Plan. Through the Climagine participatory approach participants will work collaboratively to establish the local context based on current data, identify key challenges, and determine priority issues to address.

Moderator: Ms. Eloïse Leguérinel, Plan Bleu/RAC

- Overview of the IMP Damour process and Climagine methodology, and workshop objectives (participatory engagement, visioning, defining sustainability indicators). (~10 min)
- Overview of Damour's priority sectors (tourism, agriculture, water, waste, infrastructure, environment,...) and introduction to sustainability indicators. (~20 min)
- Explanation of group work: developing "Business as Usual" vs. "Sustainability Vision" scenarios, setting indicator thresholds, and addressing cross-cutting themes (governance, gender, education). (~30 min)
- Around eight thematic groups identify key challenges, develop a shared vision, propose sustainability indicators with thresholds, discuss cross-cutting issues, and set priorities for the IMP. (~1h)
- Groups present their findings, proposed indicators, and priorities; open discussion for feedback and consolidation. (~1h)

13:30-14:30 Lunch

14:30 – 17:00	SESSION 3: Management recommendations for the Damour Coastal Aquifer and Conjunctive Management of Surface and Groundwater

This session will present the key findings from the characterization and assessment of the Damour coastal aquifer, conducted by UNESCO. These findings will provide stakeholders with a clear understanding of the aquifer's current conditions and main challenges, serving as a basis for discussion. The session also aims to engage participants in identifying concrete actions - including conjunctive management approaches - to promote the sustainable management and protection of this critical groundwater resource.

Moderators: Georges Gharios, UNESCO and Nadim Farajalla, UNESCO expert

- Key expert presentation on Damour coastal aquifer characterization and assessment (~15min, as an introduction to the consultation): Mr. Michel Frem
- Key expert presentation on Damour coastal aquifer management options and recommendations for the IMP (~15min, as an introduction to the consultation): Dr. Abbas Fayad
- Key expert presentation on conjunctive management of surface and groundwater options for the Damour area (~15min, as an introduction to the consultation): Dr. Nadim Farajalla
- Stakeholder consultation (working groups and feedback in plenary) (90min)
- Conclusions and recommendations for the Damour Coastal Aquifer management plan and IMP (15min)

17.00 – 17.15	CLOSING OF DAY 2 and COFFEE STATION

Day 3 - 3rd July 2025

II- Cross-sectoral coordination and spatial integration for enhanced natural resources management in Lebanon within the framework of MedProgramme

09:00 – 10:30	SESSION 4: What is new in the ICZM Strategy and Law

This session will provide an overview of the key updates for the Lebanese National ICZM Strategy and Law and discuss the challenges of implementation that lie ahead.

Moderator: Dr. Manal Nader, University of Balamand

- **Key expert presentation on the project's achievements and status**
- **Panel discussion**
  - Eng. Adel Yacoub – Head of Protection of Natural Resources Department, Ministry of the Environment – PAP/RAC focal point
  - Dr. Josiane Yazbeck – Legal expert – ICZM Project
  - Dr. Serge Yazigi – Spatial Planning expert – ICZM Project
  - Dr. Naji Sfeir, Member of the Council of the Syndicate of Marine Establishments
- **Q/A**

10.30 – 11.00 Coffee break

11:00 – 12:00	**SESSION 5: Advancing integrated management of natural resources in the source to sea continuum through WEFE Nexus coordinated governance**

Drawing on the WEFE Nexus initiatives implemented by GWP-Med in Lebanon, this session will explore how improved sectoral coordination and integrated planning can facilitate the prioritization of measures to address trade-offs among water, energy, food, and ecosystem preservation, as well as policy harmonization and multi-stakeholder collaboration.

Moderator: Ms. Barbara Tomassini, GWP-Med

- **Key introductory presentation**
- **Panel discussion**
  - Eng. Mona Fakih, Director of Water, General Directorate of Hydraulic and Electric Resources, Ministry of Energy and Water
  - Ms. Barbara Tomassini, GWP-Med Senior Programme Officer
  - Dr. Abbas Fayad, GWP-Med Country advisor
- **Q/A**

12:00 – 13:00	**SESSION 6: Conjunctive Surface Water and Groundwater management**

This session will review the key findings and recommendations from the stakeholder consultation held during Session 3. It will also feature a panel discussion on the necessary conditions and enabling environment for implementing CWM in Lebanon.

Moderator: Georges Gharios, UNESCO

- **Panel discussion:**
  - Eng. Mona Fakih, Director of Water, General Directorate of Hydraulic and Electric Resources, Ministry of Energy and Water
  - Dr. Nadim Farajalla, UNESCO expert
  - Dr. Abbas Fayad, UNESCO expert
- **Q/A**

13.00 – 14.00 Lunch

14:00 – 17:00	**SESSION 7: Building a shared vision for the Lebanese coastal area through the Climagine participatory approach**

This session aims to develop a shared vision for the Lebanese coastal areas to support on-going efforts for integrated coastal zone management in the country. Through the Climagine participatory approach participants will work collaboratively to establish the local context based on current data, identify key challenges, and determine priority issues to address.

Moderator: Ms. Eloïse Leguérinel, Plan Bleu/RAC

- Overview of workshop objectives, focusing on participatory engagement and sustainability monitoring for Lebanon's coastal management. (~10 min)

- Presentation of key sustainability dimensions and priority sectors for Lebanon's coastal zone; discussion on alignment with stakeholder-identified priorities and identification of any additional sectors. (~20 min)
- Group exercise to assess the current state of Lebanon's coastal areas using data and stakeholder knowledge, creation of a "rich picture" to visualize challenges and opportunities, and plenary sharing of findings. (~30 min)
- Introduction to Sustainability Indicators (SI) and RACER criteria; breakout group work to identify key issues, propose relevant indicators, and define minimum/maximum thresholds for each sector, supported by facilitators. (~50 min)
- Thematic groups develop "Business as Usual" and "Sustainability Vision" scenarios for Lebanon's coastal future, using visual tools (e.g., amoeba diagrams) to illustrate indicator trajectories and desired outcomes. (~50 min)
- Group reporters present their scenarios and proposed indicators; facilitated discussion to agree on preliminary indicators, refine sustainability thresholds, identify gaps, and collect participant feedback before closing. (~20 min)

17.00 – 17.15 CLOSING SESSION OF DAY 2 AND OF THE CONSULTATION and COFFEE STATION

4.2 LIST OF PARTICIPANTS

Title	First Name	Last Name	Organisation/Institution	Position / Fonction
Mr.	Abbas	Fayad	-	National Advisor/Consultant
Mr.	Ali	Ramadan	Directorate General of Urban Planning, MPWT	Executive/Legislature (MPs, DGs, Govt.)
Ms.	Amina	Basbous	CAS	Department of National Accounts and coordination
Mr.	Antoine	Zoghby	Regional Water Establishment of Beirut and Mount Lebanon	-
Mr.	Antoun	Rizkallah	Lebanese Army	Colonel
Mr.	Anwar	Kozah	Ministry of Agriculture	-
Mr.	Ata	Elias	Lebanese University	Academia/Research (Geology/Tectonics)
Ms.	Barbara	Tomassini	GWP-Med	International Cooperation
Mr.	Bashir	Aoun	Municipality of Damour	Lawyer
Mr.	Bassam	Jaber	-	Former Director of Exploitation at MEW / Water Expert
Ms.	Christelle	El Selfani	Plan Bleu / RAC	Head of communication
Ms.	Dina	Sleiman	MoT	-
Ms.	Éloïse	Leguérinel	Plan Bleu / RAC	Project Manager
Ms.	Fatima	Hmede	LARI	-
Mr.	Georges	Gharios	UNESCO	National Programme Officer for Natural Sciences
Ms.	Ghada	Baliis	General Directorate of Hydraulic and Electric Resources	Director General
Ms.	Ghadia	Faour	Ministry of Public Works and Transport MPWT	-
Mr.	Ghaleb	Faour	National Council for Scientific Research	Director – Center for Remote Sensing
Ms.	Hanan	Hassan	Shouf Biosphere Reserve	-
Mr.	Hassan	Bachroch	AMWAJ	-
Ms.	Houra	Daher	CNRS	Researcher
Mr.	Hussam	Hawwa	Difaf	National Expert and Consultant
Mr.	Jean	Stephan	Lebanese University	Associate Professor
Mr.	Jules	Hatem	MORES	-
Mr.	Kamal	Abou Assi	SBR	-
Ms.	Kristelle	Azzi	Municipality of Damour	Interior Design
Ms.	Leya	Zgheib	MoE / UNDP	Project Coordinator
Mr.	Mahmoud	Termos	MoI	Department of Technical Affairs & Industrial Services
Mr.	Malek	Ghandour	Lebanese Environment Forum	President

Mr.	Manal	Nader	Université de Balamand	Consultant
Mr.	Mazen	Saker	-	Maritime expert
Mr.	Michel	Frem	UNESCO IHP	Scientist/Consultant
Mr.	Mohammad	Amin	MEW	-
Ms.	Mona	Fakih	Ministry of Energy and Water	Director of Water
Ms.	Nadia	Al Osta	-	M2 Student
	Nadim	Kanaan	Municipality of Damour	-
Ms.	Nadine	Saade	CAS	National coordinator of the environment sector
Ms.	Najwa	Chaaya	Municipality of Damour	Lawyer
Ms.	Nancy	Awad	Council for Development and Reconstruction	-
Ms.	Nisrine	Ghattas	Ministry of Energy and Water	Civil Engineer / Acting head of programs and monitoring
Mr.	Raji	Maasri	MORES	Consulting
Mr.	Ramzi	Dobeissy	Electricite Du Liban (EDL)	Head of Transmission Network Department
Ms.	Samah	Termos	Remote Sensing Center	Surveying Engineer / Research Assistance
Mr.	Tony	Naufal	MORES	Junior Geologist
Ms.	Tracy	Zarour	UN/ESCWA	-
Mr.	Wael	Hmaidan	IndyACT	-
Mr.	Wissam	Kanj	Ministry of Energy and Water	Head of Irrigation Department
Mr.	Yousef	Bezri	FAO	-
Ms.	Youssra	Ghoussein	CNRS	Researcher

4.3 LIST OF THE MISSING STAKEHOLDERS IDENTIFIED

Despite the broad representation at the Damour Climagine workshop, several key stakeholder categories and specific institutions identified in the Rapid Stakeholder Assessment were not present or were underrepresented. Their future engagement will be essential for a fully integrated and sustainable management plan.

1. **Key National and Regional Authorities**

- Litani River Authority (LRA): As the main water authority for Lebanon's river basins, their technical expertise and regulatory role are critical for inter-basin coordination and water allocation.
- Ministry of Environment (MoE) – Biodiversity and Protected Areas Division: While MoE was represented, the specific divisions responsible for biodiversity, protected areas, and environmental monitoring were not explicitly present.
- Ministry of Interior and Municipalities (MOIM) – Directorate of Municipalities: For stronger municipal coordination, especially for enforcement and spatial planning.
- Ministry of Finance – Directorate of Land Registration and Cadastre: For issues related to land tenure, property rights, and land use planning.
- Ministry of Public Health: Especially for water quality, sanitation, and public health risk management.

2. **Local and Regional Water User Groups**

- Local Water User Associations (WUAs): While WUAs were discussed, direct representatives of these associations from the upper, middle, and lower basin were not present.
- Irrigation Cooperatives: Especially those managing collective irrigation schemes and infrastructure.

3. **Private Sector Stakeholders**

- Private Water Suppliers and Operators: Companies or individuals involved in groundwater extraction, bottled water, or local water trucking.
- Industrial Zone Representatives: Especially from agri-food, chemical, or construction sectors impacting water quality and land use.
- Tourism Sector Associations: Owners/managers of coastal resorts, eco-tourism operators, and tourism syndicates.

4. Civil Society and Community-Based Organizations

- Local NGOs Focused on Gender, Youth, and Social Inclusion: While some NGOs were present, direct representation from women's associations, youth groups, and organizations working on social protection and rural livelihoods was limited. For future workshops, targeted outreach should be conducted to ensure the participation of such groups, including engaging the Lebanon Youth Parliament for Water and exploring the involvement of other climate-focused youth and community organizations. This would help strengthen inclusiveness, diversify perspectives, and enhance the integration of gender, youth, and climate considerations in the discussions.
- Environmental Watchdog Groups: Independent organizations focused on environmental monitoring, advocacy, and legal action.

5. Academic and Research Institutions

- Universities with Specialization in Environmental Economics, Law, and Social Sciences: While technical and natural science expertise was present, social science, legal, and economic research centers were less represented.
- Local Schools and Education Boards: For integration of water and environmental awareness in local curricula.

6. Media and Communication

- Local and National Media Outlets: Journalists and media professionals to support awareness-raising and public engagement.

It is recommended that these missing stakeholders be actively engaged in the next phases of the IMP process, including targeted invitations to future workshops, bilateral consultations, and the establishment of thematic working groups. Their participation will help ensure that the Integrated Management Plan for the Damour area is inclusive, locally relevant, and robust in addressing the full spectrum of environmental, social, and economic challenges.