PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme: Nature-based Water Management & Data-Driven Strategy for Climate Resilience in Akkar, Lebanon

Countries: Lebanon

Thematic Focal Area[1]: Water Resource Management and Climate Resilience

Type of Implementing Entity: United Nations Agency

Implementing Entity: UN-Habitat

Executing Entity/Entities: UNICEF, North Lebanon Water Establishment (NLWE), Lebanese Agricultural Research Institute (LARI), Municipalities, Local NGOs, Academic institutions, Private technical consultancy firm.

Amount of Financing Requested: 5,000,000 (in U.S Dollars Equivalent)

Project Formulation Grant Request: Yes ☒ No ☐

Amount of Requested financing for PFG: 250,000[2] (in U.S Dollars Equivalent)

Letters of Endorsement (LOE) signed for all countries: Yes ☒ No ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☒This pre-concept has been submitted before 30 June 2025

☐ This is the first submission ever of the pre-concept

In case of a resubmission, please indicate the last submission date: Click or tap to enter a date.

[1] Thematic areas: Nonprescriptive

[2] A Project Formulation Grant (PFG) of $250,000 is being requested. Of this amount, $100,000 will be allocated to hire an individual consultant who will lead and support the proposal development process. The remaining funds will be mostly used to conduct comprehensive assessments and studies under Component 1. These studies will focus on both public and private (including unlicensed and unregulated) wells, with the objective of estimating water withdrawals and identifying the aquifers being exploited.

Please note that pre-concept should not exceed 5 pages (in addition to this first cover page)

Project/Programme Background and Context:

Lebanon is facing a severe and worsening water crisis, driven by climate change, unsustainable management practices, and socio-political instability. The country's water resources are under stress, with total available freshwater resources estimated at approximately 714 cubic meters per capita annually, well below the 1,000 m³ threshold for water scarcity, while Lebanon maintains a relatively high level of water stress that is likely to increase in the coming years due to climate change impacts (National Water Strategy 2024 – 2035) (. Climate projections indicate a 10–20% reduction in precipitation by 2040, coupled with rising temperatures that will exacerbate evaporation and drought (Fourth National Communication to the UNFCCC, 2021).

The national water challenges are numerous and can be listed as follows:
1. Groundwater Overexploitation: 70% of Lebanon's water supply comes from groundwater, but extraction rates exceed recharge by 30–50% in critical basins (MoE, 2022). Illegal wells (estimated at 60,000 nationwide) and weak enforcement have led to aquifer depletion and seawater intrusion, particularly in coastal areas.

2. Non-Revenue Water (NRW) : 40% of piped water is lost due to leaks, illegal connections, and poor maintenance (NWSS 2024).

3.Sub optimal and inefficient Wastewater treatment:
Wastewater treatment plants (WWTPs) are underfunded and non-functional, with only 25% of generated wastewater volumes reaching operational WWTP's. (Ministry of Energy and Water, 2025).

4. Climate Pressures: Increased frequency of "flash floods" (e.g., January 2024 Akkar floods) due to deforestation and degraded watersheds. In addition to prolonged droughts have reduced agricultural yields, pushing farmers to over-pump groundwater, worsening scarcity.

5. Refugee Influx: Lebanon hosts approximately 1.5 million Syrian refugees, increasing water demand by 20–30% in northern regions like Akkar (UNHCR, 2023). From March 2025, additional more than 23,500 refugees have sought refuge in Akkar (UNHCR flash update- April 2025)

Akkar's Water Crisis: A Microcosm of Lebanon's Challenges
Akkar, Lebanon's northernmost governorate, is one of the poorest and most water-stressed regions, with unique vulnerabilities that can be listed as follows:

1. Groundwater Depletion & Seawater Intrusion (SWI): Akkar's coastal aquifer is critically overexploited, with 40% of wells operating illegally (NLWE, 2023). Plus, saltwater intrusion has contaminated 30% of wells in coastal areas, rendering water unfit for drinking or irrigation (LARI, 2022). In Akkar this is noticed up to 7km from the shore (Elias and al.2025[3]).

2. Total Collapse of Wastewater Management: No functional WWTPs exist in Akkar; untreated sewage flows directly into rivers and agricultural lands, contaminating crops with E. coli and heavy metals (MoE, 2023). This has led farmers to rely on polluted water for irrigation, posing public health risks. (e.g., cholera outbreak in 2022 started in Akkar).

[3] https://doi.org/10.1080/02626667.2025.2468839

3. Ecosystem Degradation: Deforestation (loss of 35% forest cover since 2000) and abandoned terraces have reduced natural water retention, worsening floods and soil erosion (FAO, 2021). The example of Wadi Khaled, a key watershed, is drying up due to unchecked sand mining and diversion for agriculture.

4. Institutional and Data Gaps: No integrated monitoring of surface/groundwater exists, leaving policymakers without data to regulate extraction or plan interventions (NWSS 2020). This is coupled with lack of funding and technical capacity due to the financial crisis in Lebanon that leave water establishments without proper tools to maintain infrastructure.

Why This Project is Critical for Akkar?
The proposed project directly addresses Akkar's crises by:
- Filling data gaps through a real-time monitoring network (first of its kind in Lebanon).
- Piloting nature-based solutions (wetlands, Rainwater harvesting) to reduce pollution and recharge aquifers.
- Empowering local communities to support sustainable water management, aligning with Lebanon's NDC commitment to nature-based solutions (NbS).

Project/Programme Objectives:

(List the main objectives of the project/programme.)

The project aims to: (1) establish a robust water monitoring network to inform sustainable management and develop hydrogeological model of the different aquifers in Akkar; (2) pilot scalable NbS for wastewater treatment and rainwater harvesting; and (3) strengthen local capacities to ensure long-term ownership of adaptation solutions. By aligning with Lebanon's Nationally Determined Contribution (NDC) and the National Water Sector Strategy 2020 (NWSS), the project will directly contribute to national targets for water security, climate adaptation, and ecosystem restoration.

Without intervention, Akkar's water scarcity will deepen, threatening food security, public health, and social stability in a region already strained by poverty and displacement. This project offers a scalable model for Lebanon's water crisis response.

Project/Programme Components and Financing[4]:

(Fill in the table presenting the relationships among project components, outcomes, outputs and countries in which activities would be executed, and the corresponding budgets.)

Project/Programme Components	Expected Outcomes	Expected Outputs	Countries	Amount (US$)

[4] IE and EE fees calculator: https://www.adaptation-fund.org/document/ie-and-ee-fees-calculator/

1. Akkar Water Monitoring Network	*Reliable hydrological data for decision-making*	*Hydrogeological model of Akkar, SCADA system for real-time monitoring, 5 upgraded meteorological stations, Replication toolkit for other regions*	*Lebanon*	*$*	*2 197 800*
2. Nature-based Solutions (NbS)	*Improved water quality & reduced demand*	*Constructed wetlands for wastewater treatment, Rainwater harvesting (RWH) systems (Compliance with country norms (i.e. Decision 8/1 MoE 2000), Replication plan for 10+ villages*	*Lebanon*	*$*	*1 663 200*
3. Awareness & Capacity Building	*Empowered local institutions & communities*	*Trained NLWE/municipal staff (50+ people), 20 community water stewards, Gender-inclusive farming programs, Reduced groundwater extraction by 25% in the targeted area*	*Lebanon*	*$*	*405 940*
Total Program component cost				*$*	*4 266 940*
4. Project/Programme Execution cost				*$*	*341 355*
5. Total Project/Programme Cost				*$*	*4 608 295*
6. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)				*$*	*391 705*
Amount of Financing Requested				*$*	*5 000 000*

Project Duration: ***3 years (36 months)*** *(In years and months)*

PART II: PROJECT/PROGRAMME JUSTIFICATION

1. Locally Led Adaptation (LLA) and Decision-Making Empowerment

The project is designed to decentralize water governance by placing adaptation planning and implementation in the hands of sub-national authorities (such as the NLWE), local stakeholders (such as municipalities), ensuring community ownership and long-term sustainability.

- *Direct Access to Finance & Decision-Making: Local institutions (e.g., NLWE, LARI) will lead data collection, NbS implementation (with municipality support), and monitoring, ensuring adaptation aligns with on-ground needs.*
- *Participatory planning will allow communities to prioritize interventions (e.g., wetland construction) Adaptation Fund LLA Guidelines, 2023).*
- *Integration of Scientific Knowledge: create link between local academic institution and decentralize water utilities to combine data compilation with hydrogeological modeling to understand recharge and develop strategies.*

2. Adaptation Activities and Climate Resilience Value

The project's three components address both immediate and systemic vulnerabilities in Akkar:

- *Component 1 (Monitoring Network for the entire area):*

- *Outcome: Create hydrological and Hydrogeological database for National strategy inputs*
- *Enforce Water Framework Directives to limit water extraction to a volume that does not exceed the annual recharge.*
- *Innovation: SCADA system provides real-time data to NLWE, enabling dynamic water allocation during droughts (World Bank, 2023).*

- *Component 2 (NbS Interventions in one or two municipalities):*
  - *Outcome: Constructed wetlands reduce wastewater pollution by 60–80% (LIBNOR 814-2024; Decision 8/1 2000 MoE compliance), mitigating health risks (MoE, 2022).*
  - *Scalability: Pilot RWH systems on greenhouses (inspired by UNICEF model implemented in Zahle under the Water resilient solutions regional project) can expand to farmers in the municipality (UNDP, 2023).*
- *Component 3 (Capacity Building in the selected village(s) for NbS and Rainwater Harvestings):*
  - *Gender Inclusion: Targets women-led farming cooperatives (30% of trainees) to promote equitable resource access (UN Women, 2022 and UN-Habitat 2024 Al Marjeh urban farming project in Tripoli north Lebanon).*

3. Cost-Effectiveness and Execution Arrangements

- *Low-Cost, High-Impact Solutions*
  - *NbS (e.g., wetlands) cost 50% less than conventional WWTPs and have lower Operation and Maintenance (O&M) demands (GIZ, 2022).*
  - *Reusing existing infrastructure (e.g., retrofitting abandoned wells with loggers to monitor the groundwater levels) minimizes capital costs.*

- *Direct Funding Mechanism:*
  - *70% of the budget will be spent on favor to local executors (NLWE, municipalities, LARI), avoiding middle-layer inefficiencies (Adaptation Fund, 2023).*

4. Alignment with National/Sub-National Strategies

The project operationalizes five key national policies:

a. *National Water Sector Strategy (NWSS 2024): Pillar 1 Enhanced Water Security: By 2035, a data management and monitoring system is fully operational at the Ministry.*
b. *National Water Sector Strategy (NWSS 2020): Implements Action 3.4 ("Promote decentralized wastewater treatment").*
c. *NDC (2021): Supports Target 5.3 ("NbS for water security") and Target 7 ("Community-based adaptation").*
d. *Fourth National Communication (UNFCCC, 2021): Addresses Akkar's designation as a "high-risk zone" for climate-induced water stress.*
e. *MoE's National Adaptation Plan (NAP, 2023): Aligns with Priority Area 2 ("Ecosystem-based adaptation in watersheds").*
f. *LIBNOR 814-2024 Standards: Ensures treated wastewater meets reuse criteria for agriculture.*

5. Learning and Knowledge Management

- *Replication Toolkit: Documents best practices for scaling to other governorates (e.g., Baalbek-Hermel and Bekaa, facing similar depletion and BML, North and South facing the Saline Water Intrusion (SWI)).*

- *Academic Partnerships: LARI and American University of Beirut and/or Balamand University will publish case studies and host regional workshops (MoE, 2023).*

6. Consultative Process and Environmental/Social Safeguards

- *Stakeholder Engagement: Q3 2025–Q1 2026 consultations will involve NLWE, Municipalities, farmers, women's groups, and Syrian refugees (AF's "Environmental and Social Policy" compliance).*
- *Conflict Sensitivity: Ensures water access disputes are mitigated via transparent allocation (UNDP, 2022). NLWE will be able to allocate water*
- *Risk Mitigation:*
    - *Environmental: NbS design mitigate water contamination and if quality allow reuse then reduce water over-extraction following the Ecosystem-based approaches to mitigate societal challenges by improving Human well-being and biodiversity benefits (IUCN, 2021).*
    - *Social: Gender audits ensure women's participation in water committees (UN Women, 2023).*

7. Sustainability of Outcomes

- *Financial: Municipalities will levy "small tariffs" on agricultural water use to fund O&M (World Bank, 2023).*
- *Institutional: NLWE will integrate project data into the National Water Information System (NWSS 2024).*

8. Economic, Social, and Environmental Benefits

Benefit Type	Examples	Reference
Economic	*$200K/year saved by reducing groundwater pumping costs*	*NWSS 2020*
Social	*30,000+ people gain access to clean water*	*MoE 2022*
Environmental	*100,000 m3/year of wastewater treated via wetlands*	*LIBNOR 814-2024*

9. Avoidance of Duplication

- *Complements ongoing projects (e.g., AFD project on reduction of flash floods risk in Sahel Akkar, World Bank's Water Emergency Project) by adding NbS and monitoring missing in current efforts.*

10. Justification for Funding

- *Full cost of adaptation reflects:*
    - *Technical complexity of aquifer modeling ($2.2M).*
    - *Community training to ensure ownership ($400K).*
    - *NbS piloting for scalability ($1.6M).*

PART III: IMPLEMENTATION ARRANGEMENTS

Partners	Roles and tasks

Implementing Entity (IE): UN-Habitat	*Ensure project adheres to Adaptation Fund policies and delivers outcomes on time/ budget.* *Lead financial management and reporting to the AF.* *Provide technical oversight for NbS and monitoring components.* *Facilitate knowledge exchange with global NbS initiatives (e.g NATURA, IUCN, etc.)*
Main Executing Entity (EE): UNICEF	*Coordinate field activities, procure equipment, and manage subcontractors* *Deploy SCADA systems and piezometers (with NLWE)* *Construct wetlands and RWH systems (with NLWE, municipalities and farmers)* *Train communities and monitor gender inclusion (With A local NGO)*
Ministry of Environment (MoE) and Ministry of Energy and Water (MoEW)	*Ensure project complies with NWSS 2024 and NDC targets* *Approve hydrological and hydrogeological monitoring protocols* *Endorse replication plans for other areas/ governorates*
North Lebanon Water Establishment (NLWE)	*Operate the SCADA system and facilitate well-metering*
Lebanese Agricultural Research Institute	*Collect and disseminate meteorological data to the NLWE, MoE and MOEW and work closely with the academic institution for the publication on the*
Academic Institutions	*(e.g. AUB, Balamand University) to validate data and publish results*
Private technical consultancy firm	*UNICEF will select a private technical consulting firm to support technical assessment and the data collection on the field.*
Municipalities	*Lead site selection, community mobilization, and O&M planning*
Communities/ farmers	*Participate in training and steward NbS post-project.*

To note that, the project will establish a National Steering Committee chaired by MoE, to ensure multi-stakeholder ownership in order to 1) review quarterly progress reports, 2) approve budget reallocation (if any), 3) resolve conflicts, 4) facilitate permitting processes if needed, and 5) ensure sustainability of the interventions.

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[5] *Provide the name and position of the government official and indicate date of endorsement for the country participating in the proposed project/programme. The endorsement letter should be attached as an annex to the project/programme proposal.*

(Tamara el Zein, Minister of Environment, Lebanon, info@moe.gov.lb)	Date*: (July, 03, 2025)*

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (NDC, NWSS) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Name & Signature Implementing Entity Coordinator 高林 博史	
Date: *(Month, Day, Year)*	Tel. and email:
Project Contact Person:	
Tel. And Email:	

[5] The Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.