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UNICEF Libya
Water Scarcity and Climate Change:
an analysis on WASH enabling environment in Libya

Executive Summary

Libya experiences critical water stress and a recent study by Water Resources Institute (WRI) in 2019 ranked Libya as sixth most water stressed country globally[1]. Projections to 2040 suggest water stress will increase threatening national water security and economic growth[2]. According to Global Facility for Disaster Reduction and Recovery (GFDRR), water scarcity is classified as high level of hazard for the whole country, with droughts expected to occur every 5 years (GFDRR, 2021). Libya has a total renewable water resource per capita of the equivalent of 287 liters per person/ per capita /per day (lpcd), decreasing 11% between 2007-18, and has no dependency on renewable water resources from outside its territory. According to the World Health Organization (WHO), between 50 and 100 liters of water per person/per day is considered as the essential level to ensure that most basic needs are met, and few health concerns arise[3]. Libya has relatively high-water consumption per capita (2,392 lpcd) when compared to MENA and global levels of 889 and 784 lpcd respectively. The majority of extractions being unsustainable from groundwater sources (79%). Agricultural consumptions account for 83.1% of total freshwater resources [4](FAO, 2022). Municipal consumptions vary greatly amongst cities and regions ranging from an average of 415 lpcd (VNR, 2020), with domestic water demand expected to increase by 39.5% between 2010 and 2030.

Some of the key drivers of water scarcity in Libya are the following:

- limited available water resources, receiving 56 mm of long-term average precipitation annually leading to total reliance on non-renewable aquifers and desalination.
- population growth and increasing water demands by all users, with extremely high withdrawal rates, available renewable water resources of 105 cubic meters per capita.
- the protracted crisis leading to collapse of the Libyan water sector.
- deteriorating groundwater quality due to over abstraction; contamination of aquifers by seawater intrusion.
- inefficient use of irrigation water;
- highly subsidized water tariffs (average rate of 0.15 US$/m3 for domestic use (LAS, ESCWA, ACWUA, 2016); this is below the MENA average (0.75 US$/m3) and the Global Average (2.04 US$/m3) (GWI, 2020);
- underperforming governance and institutional capacity; high non-revenue water (NRW) due to technical constraints and inadequate managerial capacities.

On a technical, financial, and administrative level, Libya's water sector faces numerous challenges, such as outdated sector strategies; weak institutional frameworks and policies; data availability and accessibility; lack of accountability and law enforcement; poor coordination mechanisms; overlapping responsibilities between different institutions; lack of monitoring and evaluation tools; and a lack of financial resources. Around $ 3.44 billion dollars is estimated to ensure sustainable water supply in Libya[5], and an additional amount of $200 million dollars for rehabilitation of the desalination plants[6]. Climate finance is severely lacking and non-existent for WASH.

Despite Libya signed the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 and ratified the Paris Climate Agreement in 2021 , it has not submitted the requisite policies, plans or reports, such as a National Determined Contribution, National Adaptation Plans, or National Communications (CCA;2021). However, starting from 2019, the government prepared a five-year investment plan[7] to ensure the implementation and sustainable operation of water and sanitation projects. Additionally, Libya has transboundary agreements in place and has taken some steps to reform water governance, but impediments remain, including unclear responsibilities, lack of coordination, inefficient institutions, limited public awareness, highly centralized decision making.

[1] https://www.wri.org/insights/17-countries-home-one-quarter-worlds-population-face-extremely-high-water-stress
[2] https://www.wri.org/insights/ranking-worlds-most-water-stressed-countries-2040
[3] https://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_media_brief.pdf
[4] https://data.worldbank.org/indicator/ER.H2O.FWAG.ZS?end=2017&locations=LY&start=2017&view=bar
[5] https://www.reuters.com/article/us-libya-security-water-insight-idUSKCN1TX0KQ
[6] https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water
[7] https://www.humanitarianresponse.info/en/operations/libya/document/assessment-national-water-systems-libya
CCA: https://unicef.sharepoint.com/teams/LBY/Document Library/13. Information Management/Common Country Assessment 2021/0a793d44-0215-48f3-9331-66cdd05cfa6d_United_Nations_Libya_Common_Country_Analysis_2021.pdf

The key recommendations and priority areas for Libya CO for 2023-2025 includes:

I. Development of water sector and climate change strategy for Libya in collaboration with MoWR and Ministry of Environment..
II. Strengthen Institutional arrangements in collaboration with governmental and UN partners to engage more on coordination for integrated water resource management, streamlining the service delivery in water sector.
III. Investment in climate resilient water safety and security pilot implementation to ensure sustainable water resource in the country. UNICEF will also conduct a cost and feasibility study for solarization of desalination using new technology and environmentally friendly desalination model.
IV. Strengthen Planning, Monitoring and Evaluation: UNICEF will support in conducting assessment of water security and safety along with climate resilience needs. Risk assessment will be conducted on drought based on global and local data, developing the base for a Drought Early Warning System (DEWS) in the country.
V. Support in capacity development of water sector players: on climate change and water scarcity in coordination with MoWR and Ministry of Education (MoE) and the different stakeholders in government and national NGOs.
VI. UNICEF will continue on Advocacy, social and behavior change communication will be a cross cutting element for UNICEF to invest and design long standing national level campaigns on water scarcity and climate change awareness including and engaging the youth in collaboration with MoWR, MoE, UN partners, Private sector, and local NGOs

1. Background: water scarcity in Libya

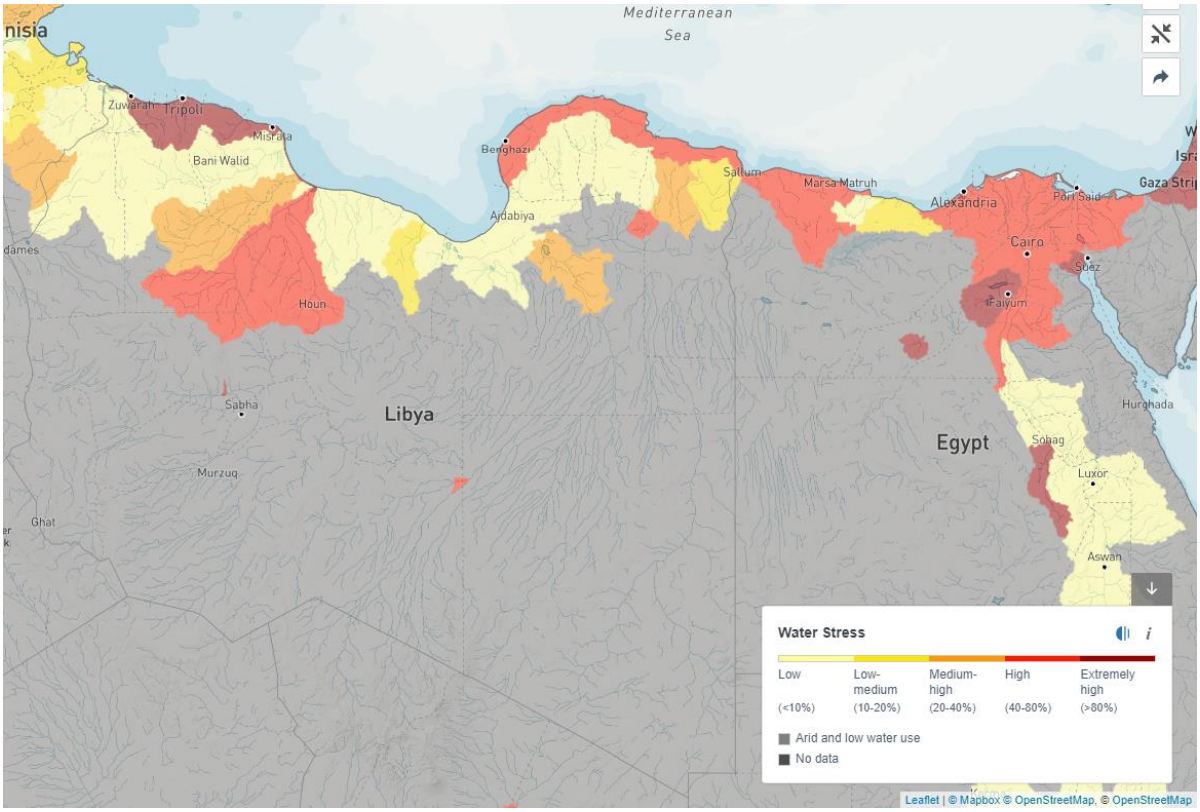
Libya experiences critical water stress[8] (FAO, 2022) and is ranked in the top six most water stressed countries globally (WRI, 2019). Projections of future water stress to 2040 under a Business-as-Usual Scenario[9] suggest worsening water stress (WRI, 2015).

KEY POINTS:

- Libya experiences critical water stress
- Libya is in the top six most water stressed countries globally
- Projections to 2040 under a business-as-usual scenario show increasing water stress

Water scarcity is described as a condition where water demand exceeds over available water supply. A country or a region faces "water scarcity" when the availability of natural hygienic water falls below 1000 m^3 per person per year[10]. According to Global Facility for Disaster Reduction and Recovery (GFDRR), water scarcity as a hazard is classified as high for the whole country, with related droughts expected to occur on average every 5 years (GFDRR, 2021). Water scarcity topped with climate change leads to waterborne diseases, malnutrition, economic and political instability, and potential conflict between countries. Libya's vulnerable socio-political status makes it even worse[11]. Different areas of the country experience various levels of water stress as can be seen in Figure 1 (WRI, 2019).

Figure 1: Map of water stress in Libya (WRI, 2019)



[8] FAO AQUASTAT data informs SDG 6.4.2, which measures "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources" with a scale ranging from Critical (>100), High (>75-100), Medium (>50-75), Low (>25-50), No Stress (>0-25)

[9] The "business as usual" scenario (SSP2 RCP8.5) represents a world with stable economic development and steadily rising global carbon emissions, with CO2 concentrations reaching ~1370 ppm by 2100 and global mean temperatures increasing by 2.6–4.8°C relative to 1986–2005 levels.

[10] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/water-scarcity

[11] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3076402/#:~:text=Water%20scarcity%20alone%2C%20however%2C%20is,concerning%20environmental%20and%20resource%20issues.

2. Available water resources in Libya

Renewable water resources: Libya has a total renewable water resources of 105 cubic meter (m3 /per capita (c)/year (y) (287 lpcd), which is the 8th lowest in the MENA region (of 20 countries), is lower than the MENA (283 m3/c/yr.) and global levels (3247) m3/c/yr.) (FAO, 2022). The availability of <500 m3/c/yr. renewable water resources represent absolute water scarcity on the Falkenmark Water Stress Index[12]. Total renewable water resources per capita has decreased 11% between 2007-18 (FAO, 2022). Libya has a total internal renewable water resources equal to the total one, since it receives zero renewable water resources from neighboring countries (FAO, 2022).

Transboundary waters: Libya has no renewable surface water resources from neighboring countries, so its dependency ratio is 0% (FAO, 2022). There are a number of transboundary aquifer basins however, including the North-Western Sahara Aquifer System (NWSAS) that covers Libya, Algeria, and Tunisia; the Système Aquifère de la Djeffara covering Tunisia and Libya and the Nubian Sandstone Aquifer System (NSAS) covering Chad, Arab Republic of Egypt, Libya, Sudan (WB, 2018)[13].

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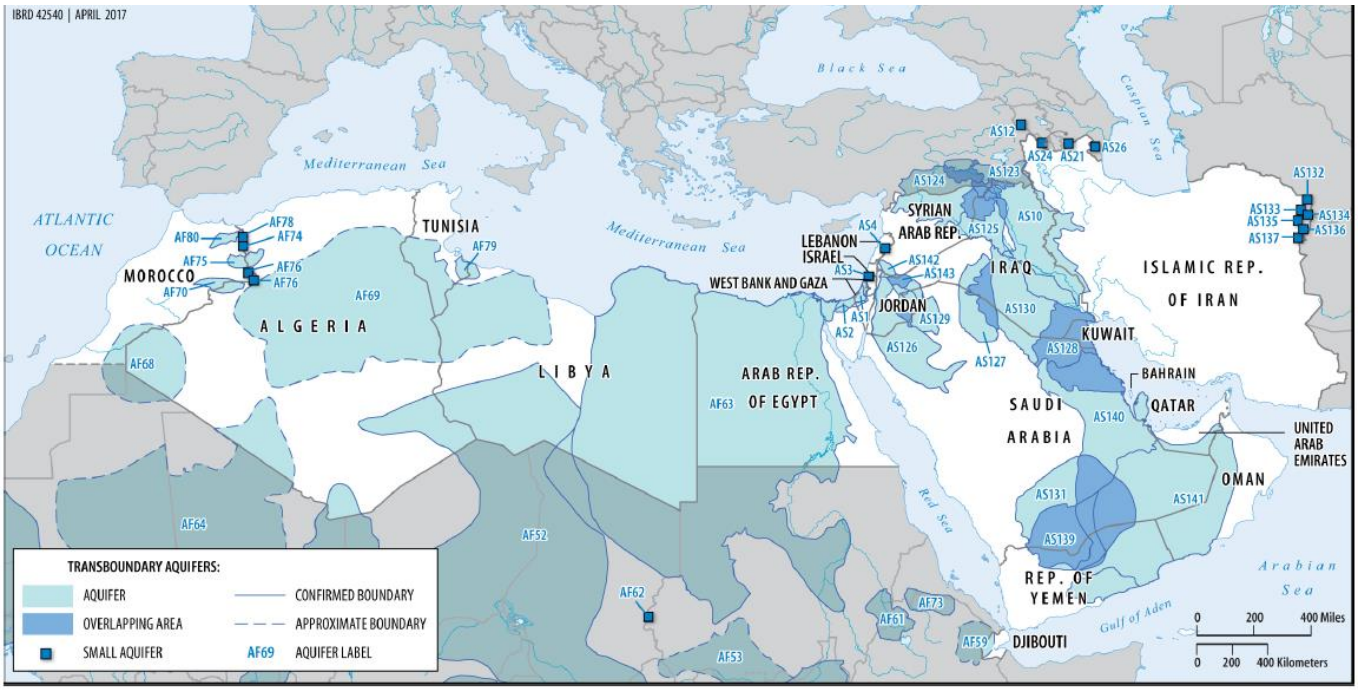
Figure 2: Major Transboundary aquifers in MENA region



Source: International Groundwater Resource Assessment Centre.

Water consumptions: Libya has a total water consumption per capita of 873 m3/c/yr. (2392 lpcd), and is ranked 4th highest in the MENA region, with consumptions per capita above the MENA (889 Lpcd) and the global level (784 Lpcd) (FAO, 2022). Agriculture consumptions are 1,990 lpcd, which is 4th highest in MENA region and above MENA and Global levels of 691 lpcd and 477 lpcd, respectively (FAO, 2022).

Industrial consumptions are 115 lpcd, 5th highest in MENA region and above MENA and Global levels of 28 lpcd and 60 lpcd, respectively (FAO, 2022). As per Voluntary National Review VNR (2020), average municipal consumptions are 415 lpcd, above both the MENA and Global levels of 125 lpcd and 160 lpcd, respectively). Higher rates were also recorded in many locations, for example reaching 450 lpcd in Greater Tripoli (VNR, 2020).

[12] https://core.ac.uk/download/pdf/84797448.pdf
[13] https://openknowledge.worldbank.org/handle/10986/27659

Agricultural consumptions account for 83.1% of total freshwater resources[14] and is ranked 4th highest in the MENA region. The country is above the MENA (77.9%) and the global (1.9%) levels (FAO, 2022). Between 2010 and 2030, domestic water demand is expected to increase by 39.5% (WB, 2018).

Water use efficiency: For Libya, water use efficiency for industry, irrigation and services sectors are 59 US$/m3, 0.02 US$/m3 and 12 US$/m3, respectively. Water use efficiency for the agricultural and service sectors are below the MENA and global levels (FAO, 2022).

Figure 3: AQUASTAT indicators on Water Resources for Libya

FAO AQUASTAT Selected Indicators for Water Resources (2022)	**Libya**	**MENA Level**	**Global Level**
Total renewable water resources per capita*)*	105 (*m3/c/yr.)* 287 (lpcd)	283 (*m3/c/yr.)* 776 (lpcd)	3247 (*m3/c/yr.)* 8895 (lpcd)
Total internal renewable water resources per capita	105 (*m3/c/yr.)* 287 (lpcd)	136 (*m3/c/yr.)* 372 (lpcd)	2516 (*m3/c/yr.)* 6893 (lpcd)
(Transboundary water) Dependency ratio *(%)*	0.00%	3.5%	5.8 %
Total water withdrawal per capita	873 (*m3/c/yr.)* 2392 (lpcd)	325 (*m3/c/yr.)* 889 (lpcd)	286 (*m3/c/yr.)* 784 (lpcd)
Agricultural water withdrawal *(lpcd)*	83.19%	691 (lpcd)	477 (lpcd)
Industrial water withdrawal *(lpcd)*	4.80%	28 (lpcd)	60 (lpcd)
Municipal water withdrawal *(lpcd)*	12.01%	125 (lpcd)	160 (lpcd)
Agricultural water withdrawal as% of total renewable water resources *(%)*	692.9%	77.9%	1.9%
SDG 6.4.1. Industrial Water Use Efficiency *(US$/m3)*	59 (US$/m3)	171.2 (US$/m3)	51.1 (US$/m3)
SDG 6.4.1. Irrigated Agriculture Water Use Efficiency *(US$/m3)*	0.02 (US$/m3)	0.7 (US$/m3)	0.3 (US$/m3)
SDG 6.4.1. Services Water Use Efficiency *(US$/m3)*	12 (US$/m3)	59.2 (US$/m3)	63.9 (US$/m3)

3. Drivers of water scarcity in Libya

In any country facing water scarcity, there are usually multi-faceted and inter-linked drivers for it. This section analyses the complex context of Libya, by presenting some of the key drivers of water scarcity which uses the a commonly accepted global framework on water scarcity.

Physical barriers to water access: With the limited available water resources, Libya is classified as the sixth water poorest country worldwide, receiving 56 mm of long-term average precipitation annually (over space and time) (FAO, 2017). Libya has experienced progressive seawater intrusion in the coastal aquifers since the 1930s because of its ever-increasing water demand from underground water resources. Tripoli city is a typical area where the contamination of the aquifer in the form of saltwater intrusion is very high (Alfarrah & Kristine, 2018).

Population growth: With increased population from 4.44 million in 1990 to 6.87 million in 2020 (WB, 2021), Libya's population is expected to grow to 8.43 million by 2080 (UN DESA, 2019). Libya relies on groundwater reserves for consistent and adequate water supply. This population growth has implications in terms of increased

[14] https://data.worldbank.org/indicator/ER.H2O.FWAG.ZS?end=2017&locations=LY&start=2017&view=bar

drinking, industrial and agricultural water demand (Divakar, 2020).

Impacts of conflict: The protracted conflict in the country led to numerous water cuts and destruction of systems that impacted millions of people across the nation (Divakar, 2020). The repeated attacks on the Manmade River systems caused about 190 wells to be rendered out of service, bringing this vital sector to the brink of collapse[15].

Low value of water and subsidized water tariffs: Prior to 2011 conflict, and the collapse of the water sector, the water and wastewater tariff in Libya was highly subsidized with an average rate of 0.15 US$/m3 for domestic use (LAS, ESCWA, ACWUA, 2016); this is below the MENA average (0.75 US$/m3) and the Global Average (2.04 US$/m3) (GWI, 2020). In the current post-war era, the institutions are weakened with no formalized revenue generation. However, there are discussions on the possibility of putting a price on water to increase the awareness of people on the importance of preserving water as an essential component of their social contribution[16].

Non-Revenue Water (NRW): Water stress faced in Libya is exacerbated by the losses due to old distribution networks and inadequate management. The General Company for Water and Wastewater suffers from the deterioration of the water network, causing the loss of large quantities of water between 35 and 50% (UNICEF, 2021; ADF, 2020).

Unsustainable water management: The agricultural sector, which is still the biggest water user in Libya, is still substantially inefficient in using irrigation water compared with other uses. There is an over- exploitation of fossil ground water resources to meet the irrigation demands which will eventually lead to depletion of the country's ground water resources as they are non- renewable [17]. The future productivity of the groundwater resources is expected to further decrease, resulting in increasing water scarcity. Moreover, desalination plants suffer from lack of equipment needed to carry out maintenance and chemicals to sustain operations, thus decreasing their operational capacity (operating at 27% of capacity) (UNICEF, 2021).

Key drivers of water scarcity in Libya

- Extremely limited available water resources, receiving 56 mm of long-term average precipitation annually leading to total reliance on non-renewable aquifers and desalination
- Population growth and increasing water demands by all users, with extremely high withdrawal rates, above available renewable water resources
- The protracted conflict led to collapse the Libyan water sector
- Deteriorating groundwater quality due to over abstraction
- Inefficient use of irrigation water
- Highly subsidized water tariffs
- Underperforming governance and institutional capacity
- High NRW due to a technical constraints and inadequate managerial capacities.

Deteriorating water quality: With the continuous over-abstraction of groundwater resources in Libya, the water table depth is increasing, leading to an increase in the salinity and mineralization of abstracted groundwater. Deteriorating water quality is then becoming a limiting factor for water use and eventually requires water treatment by cost-intensive technologies and disposal of brines. Due to the steady water table decrease over the last 25 years, the water quality has most likely continued to deteriorate and putting more stress on the availability of water resources (Divakar, 2020). Furthermore, untreated wastewater is disposed of in the open, or in the sea, resulting in water pollution (Brika, 2019).

[15] https://www.libyaobserver.ly/news/unicef-warns-imminent-water-shortage-libya
[16] https://www.arab-reform.net/publication/water-politics-in-libya-a-crisis-of-management-not-scarcity/
[17] https://www.researchgate.net/publication/225650141_An_alternative_solution_of_the_water_shortage_problem_in_Libya

4. Enabling environment analysis

This section presents an in-depth analysis of the enabling environment within the WASH, water resources and climate sector, analyzing how the enabling environment is setup to deal with water scarcity and climate change shocks.

It is structured in line with the building blocks and governance functions of the WASH Enabling Environment (Table 1), which are employed by the WASH Bottleneck Analysis Tool (WASHBAT) and are also aligned with the Sanitation and Water for All (SWA) building blocks (SWA, n.d.).

Table 1: Sanitation and Water for All (SWA) Building Blocks and Selected Governance Functions

SWA Building Blocks	**Governance Functions**
Sector policy and strategy	Sector policy and strategy
Institutional Arrangements	Coordination
	Service Delivery Arrangements
	Regulation
Budgeting and Financing	Financing
Planning, Monitoring and Review	Planning
	Monitoring, Evaluation and Learning
Capacity Development	Capacity Development

The assessment looks for the existence of policies and strategies, regulations, plans, monitoring and coordination mechanisms, and financial flows. However, it does not assess the effectiveness of the implementation in addressing water scarcity.

Policy and strategy

In 2019, Libya has adopted a five-year investment plan for the advancement of the water resources sector 2020-2024 within a strategic national plan related to water resources[18] (IWRM Data Portal, 2020). In addition, a proposed national strategy for water supply is included in the Libya 2020 Vision report (Libya Institute for Advanced Studies, 2020). As of April 2022, Libya does not have a Nationally Determined Contribution (NDC) or National Adaptation Plan (NAP) in place.

With regard to the transboundary water challenges, various conventions, agreements, and instruments have been established between Libya and neighboring countries in order to provide a framework for the joint management of cross-border aquifer resources to address vital challenges including water scarcity (IWRM Data Portal, 2020).

In the 1990s, a strategy for irrigation management transfer was proposed. However, this strategy was never implemented (FAO, 2016).

[18] https://www.humanitarianresponse.info/en/operations/libya/document/assessment-national-water-systems-libya

Regulation

Regulation is the responsibility of the Ministry of Water Resources (MoWR) and Ministry of Economy in Libya. The current regulation in Libya addresses water scarcity through the Water Law No.3 of year 1982 which aims to preserve and protect water from pollution and depletion. It prohibits drilling water wells without a permit from the Public Authority of Agricultural Development; the Law also covers the issue of water management (Official Gazette, 1982). Furthermore, Law No. 3 of 1982: organizes the utilization of water resources for agricultural and drinking purposes for both groundwater and surface water. Article 5 of this law grants Libyan citizens the right to use water resources as long as they do not damage those resources and provides for a permit from public water authorities for using the water for drinking or farming. However, these policies impose severe penalties on their violation, but different governments and powers on the ground are far from enforcing them[19][20].As stipulated in the regulation No.57 of the year 2019, water supply and sanitation systems are to be arranged within the administrative boundaries of local municipalities that are directly responsible for maintaining, developing, and managing water supply networks and sanitation systems; it sets the principles for paying a fixed fee, the value of which shall be determined by the regulation issued for this purpose by the Minister of Local Government (Official Gazette, 2019). The regulations do not clearly explain plans on full cost recovery for water services provided.

Coordination

At a local level, the MoWR in coordination with its affiliated institutions of, Man-made River Project (MMRP), General Desalination Company (GDC), General Company for Water and Wastewater (GCWW) is the main decision maker when it comes to the policy making process, and overall sector management. However, other ministries such as the Ministry of Planning, Environment, Health, Economic and Agriculture, have been identified as responsible institutions as well, who are working towards SDGs on safely managed water in the country. There are overlapping areas among the ministries where the service of provision of water to the communities and institutions, maintaining water quality, and prohibiting environmental impact is dealt by different institutions. For e.g., a governance training by UNICEF and SIWI identified lack of coordination, transparency, and answerability between relevant stakeholders as the key challenges for integrated water resource management.

At overarching water sector level, no evidence was found on the existence of active water sector working group. Also, no evidence was found for separate specific coordination or working groups for WASH or WRM sectors, and no drought unit that includes non-WASH and WASH actors in decision making for drought mitigation, preparedness, response, and recovery.

Libya has transboundary agreement with Algeria and Tunisia to coordinate the joint management of water resources in the North-Western Sahara Aquifer System (NWSAS); this is done through a steering committee in charge of water resources in each of the three countries, which act as the national focal points; a coordination unit that is managed and hosted by the Sahara and Sahel Observatory (OSS); and an ad hoc scientific committee for evaluation and scientific orientation (Fanack, 2021).

Service delivery arrangements

The efficiency of domestic water use is still low, and the consumption rates are considered among the highest globally and regionally for several reasons, including the high percentage of losses from distribution networks and the absence of tariff collection, as well as the pricing that does not reflect the real cost of water production (VNR, 2020). Government policies need to be revised to incentivize water efficiency at the household level (Libya Vision, 2020).

[19] https://www.fao.org/faolex/results/details/en/c/LEX-FAOC154434/
[20] https://switchmed.eu/wp-content/uploads/2020/12/Country-Profile-Libya.pdf

In terms of processes for allocation and distribution of water resources, the priority for water distribution is first for municipal sector (VNR, 2020). Supplying drinking water is a right for all in Libya and is protected by law (Libya Vision, 2020).

Financing

Related to the five-year investment plan for the advancement of the water resources sector, it was concluded that the estimated cost of implementing the plan to advance the water resources sector in Libya about $3.44 billion dollars, including all projects: rehabilitation, completion and construction of new projects for the components of water supply and sanitation systems (MoP, 2020). An additional amount of $200 million dollars is estimated to sustainably run the desalination plants. However, due to lack of a unified MIS system in the country it is not clear how much funding has been secured.

OECD (2019) data shows that total Official Development Assistance (ODA) per capita for WASH in Libya across 2010-18 was US$ 0.05, much lower than the level of US$ 15.66 across 14 focus MENA countries. On the other hand, river basin development and irrigation finance for Libya across 2010-18 stood at US$ 0.00/capita, also far below the MENA level of US$ 3.42/capita.

In terms of ODA per capita for "water policy and administration" and for "education and training in water supply and sanitation for practitioners and service providers" across 2010-18, figures stood at US$ 0.00/capita (below the MENA level of US$ 2.36) and <1 US cent/capita (below the MENA level US$ 0.03), (OECD, 2019). On the other hand, ODA finance per capita for "water conservation, including monitoring" was at US$ 0.10, which was at par with the 14 focus MENA countries level of US$ 0.10.

Climate finance

There has been no WASH related climate finance for Libya between 2010-20 and there was some minor water related climate finance for water resources and water policy totalling US$ 627,000 between 2010-18.

The following is a summary of an analysis of bilateral climate finance data for Libya extracted from the OECD Creditor Reporting System (CRS). Data was analysed from 2010–2019[21] and filtered by water-related sectors and sub-sectors, with Rio markers for climate finance were applied to identify finance related to mitigation and/or adaptation, and whether that finance is "principally" or "significantly" contributing to mitigation and/or adaptation[22].

In 2020:

- There was no water related bilateral climate finance for Libya. Sectors like agricuture, health, emergency response recived financial support.

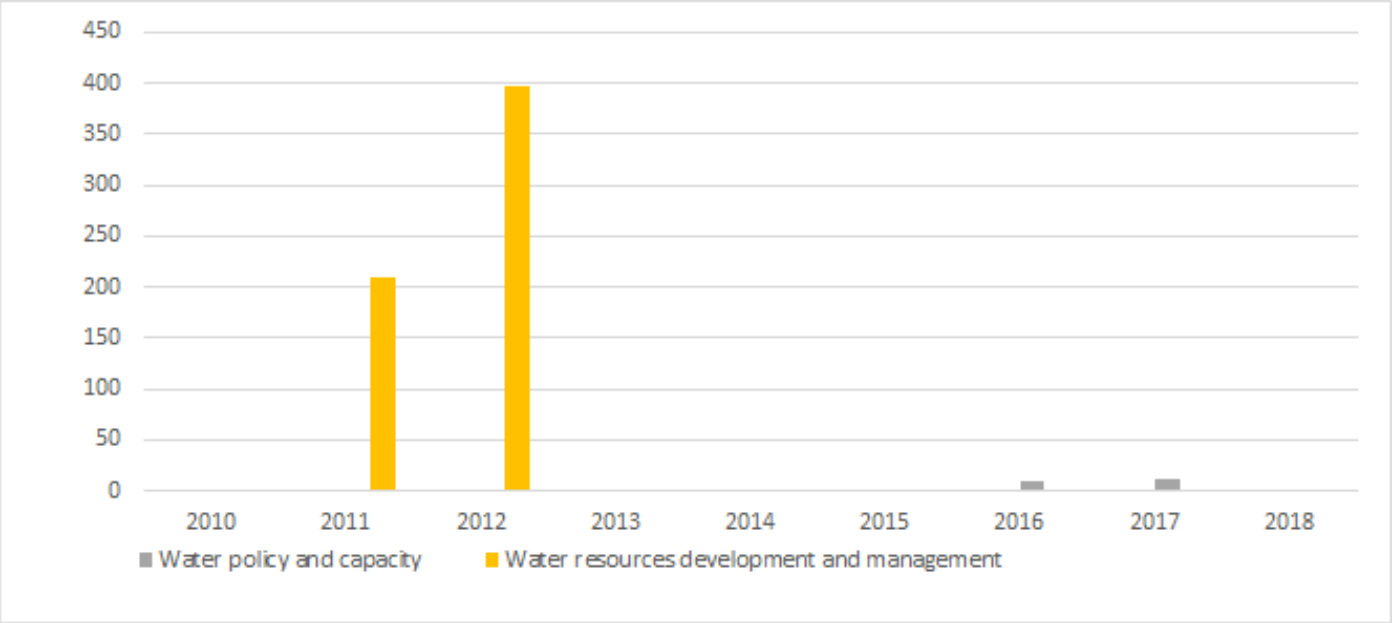
In 2019:

- There was no water related bilateral climate finance for Libya

[21] Note: at the time of the analysis, multi-lateral climate finance figures for 2019 were not yet included in the OECD CRS database, hence why they are not included for 2019. 2010-18 data includes both bilateral and multi-lateral climate finance figures.

[22] An activity can be marked as significant (1) when the objective (climate change mitigation or adaptation) is explicitly stated but it is not the fundamental driver or motivation for undertaking it. An activity can be marked as principal when the objective (climate change mitigation or adaptation) is explicitly stated as fundamental in the design of, or the motivation for, the activity.

Figure 4: The amount, in US$ thousands, of climate-related funding going to water-related sectors, in Libya between 2010 to 2018



In terms of Multilateral Climate Finance Funds, a regional project concept note was submitted on 'Cross border programme to enhance resilience of oases ecosystems and livelihoods in the North African region' (Algeria, Egypt, Libya, Mauritania, Morocco, Tunisia) - submitted to Green Climate Fund (GCF) on 20 November 2019. Water security is among the key focus areas of the project. Under adaptation, the programme aims to improve land and water management practices will demonstrate ways to increase water availability and water quality. WASH is not a main focus, but water resources management is covered. For Libya, the concept note highlights that the Libyan government places significant importance to developing rainfed agriculture in order to raise the efficiency of the available areas and the expansion of irrigated agriculture in the oases.

At regional level, there are significant number of projects under the Global Environment Facility (GEF) Trust Fund (20 in total - 10 primarily on International Waters Focal area and 7 with multiple focus areas including Internal Waters with Biodiversity, Chemical and Waste and Persistent Organic Pollutants). Water security related projects include:

- Mediterranean Coastal Zones Climate Resilience Water Security and Habitat Protection (GEF 6) with grant of US$ 7m. The implementing agency is UNEP. The executing agencies are UN Environment/MAP, UNESCO IHP, PAP/RAC, Plan Blue, GWP-Med
- Enhancing Regional Climate Change Adaptation in the Mediterranean Marine and Coastal Areas (GEF 6) with grant amount of US$ 1m. Water Resources and Water Scarcity a focus but not WASH. Another focus related to water is, mainstreaming climate adaptation into Integrated Coastal Zone Management ICZM) strategies and plans.

Planning

The Libyan Ministry of Housing and Utilities developed a Water Supply Plan envisaged for cities and residential communities (Cabinet Resolution No.352 of 2012). No evidence was found on WASH plans that explicitly factor in drought management and preparedness.

Monitoring, Evaluation and Learning

Water quality is monitored by the Man-made River Project Execution and Management Authority (MMRA) and the General Desalination Company (GDC) who deliver water to the General Company for Water and Wastewater (GCWW) (IWRM Data Portal, 2020). No evidence was found on water quality monitoring at household level, wastewater or effluent monitoring, or of operational drought early warning or drought monitoring system.

Capacity development

Limited national and sub-national capacity building initiatives are being implemented, for example, capacity building workshops for public institutions staff working on the water resource management, irrigation, water drainage, water awareness, laws, and legislation. Almost all capacity developments are built on occasional basis and limited to specific geographic areas; this is done through joint projects between Libya and regional or international water institutions and donors (IWRM Data Portal, 2020). In December 2021, through the collaboration with UNICEF Libya Country Office, the Stockholm International Water Institute (SIWI) led a "Water Governance Tools" training of trainers (ToT) workshop for Libyan water sector government representatives. A five-day training was held with the goal of building the capacities of the participating institutions to be able to self-facilitate moderation of future planed multistakeholder water governance workshops in Libya.

5. Recommendations and Key Priorities for UNICEF Libya in 2023-25

On basis of the analysis of Libya's status on water scarcity and climate change programming, the following are the key priorities for UNICEF in the next Country Programme of 2023-25;

VII. Development of water sector strategy for Libya: UNICEF is proposing to work with MoWR and interested sister agencies and donors to develop a comprehensive and long terms climate resilient water security strategy along with costed/financing plan and detailed water safety plans. This strategy document will be key requiring in depth inter-ministerial coordination such as Ministry of Environment, Ministry of Local Governance etc.

VIII. Strengthen Institutional arrangements: UNICEF, in line with the UN Sustainable Development Cooperation Framework, will work with MoWR, Ministry of Planning, UNDP and other UN partners to establish a sector-wide coordination for integrated water resource management, streamlining the service delivery in water sector at household and institution level, and supporting MoWR to identify the available regulations and accountability frameworks and legislations in the country.

IX. Investment in climate resilient water safety and security pilot implementation: Innovation is key to ensure sustainable water resource in the country. UNICEF will conduct a cost and feasibility study of the existing desalination plants and solarization of selected plants as pilot in consultation with GDC and MoWR. Investment in small scale solarization and water harvesting pilots will be conducted at community and institutions (schools and healthcare facility) and best examples will be disseminated with MoWR and line ministries for scaling up. New desalination technologies environmentally friendly such as graphene, will be explored through public private partnerships (PPPs).

X. Strengthen Planning, Monitoring and Evaluation: UNICEF will support in conducting assessment of water security and safety along with climate resilience needs. Risk assessment will be conducted on drought based on global and local data, developing the base for a Drought Early Warning System (DEWS) in the country. UNICEF will also support government on monitoring of ground water level through installation of dataloggers at selected boreholes/aquifers. UNICEF will advocate with MoWR and MoE on water quality monitoring and

strengthening existing water quality labs. Furthermore, UNICEF will explore collaboration with national and international academia institutions and universities to support on participatory climate research, evaluation, and innovation in water sector.

XI. Support in capacity development of water sector players: UNICEF will support in development of capacity building manuals on climate change and water scarcity in coordination with MoWR and Ministry of Education (MoE). The different stakeholders in government and national NGOs will be further trained on basis of the skill gaps in the country. Local actors will be identified and trained on water scarcity, climate change and disaster risk reduction. Finally,

XII. UNICEF will continue on advocacy and social and behavior change communication to invest and design long standing national level campaigns on water scarcity and climate change awareness. Engagement with youth and adolescents on climate change and water scarcity awareness campaigns will be a key focus for next three years, in coordination with MoE, NGOs and sister agencies, in schools and as part of UNICEF-supported life skills programmes.

6. Estimated funding need for UNICEF in country programme of 2023-25

Key recommended priorities for UNICEF in 2023-25	Estimated funding need for 2023-25 in USD
I. Development of Costed Water sector strategies for Libya including Water Safety Plans, National Determination Contribution (NDC), National Communication and National Adaptation Plan	150,000
Sub-Total of priority I	**150,000**
II. Strengthen coordination and Institutional arrangements	100,000
Sub-Total of priority II	**100,000**
III. Investment in climate resilient water safety and security pilots	
- Cost and feasibility study on solarization of the existing desalination plants and technical needs	100,000
- Innovative pilots for small scale solarization, desalination and water harvesting pilots (solar systems and water harvesting in schools, health and municipal WASH facilities)	5,000,000
Sub- Total of Priority III	**5,100,000**
V. Strengthen Planning, Monitoring and Evaluation	
- Drought Risk Assessment to establish the basis for the development of a Drought Early Warning System (DEWS)	100,000
- Pilots on monitoring of ground water level	100,000
- Creation of Water and wastewater vulnerability maps	250,000
- Participatory climate research, evaluation, and innovation in water sector	100,000
Sub- Total of Priority V	**550,000**
VI. Support in capacity development and awareness of water sector players	
- Development of educational manual on Water Scarcity and Climate change	50,000
- Training of relevant stakeholders	200,000

- Youth and adolescent engagement on water scarcity and climate change including - Conduct Participatory Action Research (PAR)	150,000
- SBCC on water scarcity and climate change	100,000
Sub- Total of Priority VI	**500,000**
Total	**6,400,000**

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For More Information:

Cristina Brugiolo | Deputy Representative, UNICEF Libya| Tel: +216 93237510| Email: cbrugiolo@unicef.org

Mohammed Almjadleh| WASH Specialist | Tel: +218 910018542| Email: malmjadleh@unicef.org

Camilla Reyes Pante | Partnerships Specialist; Mobile: + 216 28854083 | Email: cpante@unicef.org

United Nations Children's Fund (UNICEF) | Libya Office