

Regional Strategic Roadmap Middle East and North Africa

2024–2030

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Photography

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Acronyms and Abbreviations

AI	Artificial Intelligence
ESG	Environmental, social and governance
GCC	Gulf Cooperation Council
IFI	International financial institution
IWMI	International Water Management Institute
MELIA	Monitoring, Evaluation, Learning, and Impact Assessment
MENA	Middle East and North Africa
ML	Machine learning
Nbs	Nature-based solutions
NCWR	Non-Conventional Water Resources
NGO	Nongovernmental organization
R&D	Research and development
R4D	Research for development
RCP	Representative Concentration Pathway
SMEs	Small and medium-sized enterprises
UAE	United Arab Emirates
WA+	Water Accounting Plus
WEFE	Water–Energy–Food–Ecosystem (nexus)
WFP	World Food Programme

Foreword by the Regional Representative

The Middle East and North Africa (MENA) is a region of striking contrasts—and enormous potential. With a population of approximately 741.7 million in 2024, the MENA region's cities, rural areas, and value chains represent one of the world's most dynamic demand centers for food, jobs, and services. Agriculture remains central to livelihoods and social stability—whether irrigated high-value horticulture, rainfed and agropastoral systems, or rapidly growing agri-processing and trade corridors. This potential can translate into growth and prosperity, but only if we protect the resource base that underpins it: water, soils, ecosystems, and the institutions that manage them.

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Our strategic intent is clear: help the MENA region move from managing scarcity to governing resilience, with evidence, institutions, and investments that protect livelihoods and enable growth.

At the same time, the region's development challenges are intensifying. Climate change is already disrupting the water cycle through rising temperatures, shifting precipitation patterns, and higher evapotranspiration—placing increasing pressure on agricultural productivity,

water infrastructure, and food security in an already arid region. Water scarcity is becoming structural: average annual water availability in MENA stood at about 480 m³ per person in 2023—the lowest globally and far below the water-scarcity benchmark. The World Bank warns that by the end of this decade water availability per capita will fall below the absolute scarcity threshold and that by 2050 the region may require an additional 25 billion m³ of water per year to meet its needs. Population growth, migration, and rapid urbanization strain already stressed systems, while socioeconomic and geopolitical instability—inequality, gender gaps, and limited decent jobs—amplify fragility; youth unemployment, for example, remained critically high at 24.4% in 2023.

These pressures are compounded by persistent technology and knowledge divide. Many countries are still catching up in adopting climate-smart and digitally enabled approaches, while key knowledge gaps remain in terms of water resources, agriculture, desertification, and coastal zones—driven by limited monitoring, restricted access to data, weak data-sharing mechanisms, and fragmented coordination platforms. In this context, research-for-development is not a luxury; it is the engine that turns uncertainty into actionable choices, helping decision-makers prioritize investments, de-risk reforms, and scale solutions that work under real constraints.



IWMI is positioned to support this transition by operating as a regional “bridge” between science, policy, and implementation—co-designing solutions with governments, utilities, basin agencies, farmers, the private sector, international financial institutions, and civil society, and translating evidence into practical tools (dashboards, models, early warning systems), investment narratives, and scalable delivery pathways. Our agenda in MENA is therefore organized around 10 mutually reinforcing priorities: (1) advancing water-climate systems knowledge; (2) strengthening inclusive, multiscale governance and transboundary cooperation; (3) building climate information systems for extremes; (4) enabling inclusive and financially viable water services and investment models; (5) closing water-food-land-ecosystem data gaps with transparent data governance; (6) supporting anticipatory action and recovery in fragile and conflict-affected contexts; (7) integrating energy security within the water-energy-food-ecosystem (WEFE) nexus; (8) scaling conservation irrigation and performance monitoring; (9) expanding nonconventional

water resources with regulatory innovation and social inclusion; and (10) ensuring multidirectional knowledge transfer to all stakeholders.

Our strategic intent is clear: help the MENA region move from managing scarcity to governing resilience, with evidence, institutions, and investments that protect livelihoods and enable growth. We do so with the conviction that, with the right partnerships and research pathways, the region can become a global reference for achieving more prosperity per drop, even within a changing climate.



Dr. Youssef Brouziyne

Regional Representative - Middle East and North Africa



1. Context

1.1 Introduction

The Middle East and North Africa (MENA) is the world's most water-scarce region. Across much of the region, annual precipitation does not exceed 500 mm per year and often stays below 200 mm per year outside the Mediterranean zones and parts of South Sudan. This scarcity combines limited physical water availability with high demand, resulting in high to extremely high levels of water stress across most countries—conditions that become even more acute when variability is taken into account. Interannual surface water variability in the region is estimated to be approximately 15% higher than the global average, and in Gulf countries, may exceed 75%.

Water scarcity is further exacerbated by high evaporation rates and the overuse of water resources. In parts of the Mashriq and Nile regions, surface-water abstraction has reached unsustainable levels, altering flow regimes in key river systems in countries such as Egypt, Iraq, and the Syrian Arab Republic.

A defining feature of the region is the high importance of transboundary waters: around 60% of total surface water is shared across national borders, and every country in the region shares at least one aquifer with its neighbors. Major shared river systems include the Nile, Tigris–Euphrates, and Jordan–Yarmouk, alongside transboundary aquifers such as the Nubian Sandstone, Northwestern Sahara, and Disi.

Water quality is an additional concern in MENA, with major regional water bodies (apart from the Nile) facing nutrient and pollution loads, as well as risks of eutrophication. Over-abstraction can also worsen quality through contaminant concentration and saltwater intrusion.

1.2 Overall context

1.2.1 Water and land resources

The agriculture sector is central to most MENA economies and remains the largest consumer of freshwater, accounting for more than 80% of total water use. However, the region's land base is constrained: only about one-third is agricultural land (cropland and pastures) and of that, only about 5% is arable. About 40% of cropped area requires irrigation, and soils used for farming are often severely degraded, with productivity reductions estimated at 30–35% in some settings; degradation affects both rainfed systems (wind/water erosion) and irrigated systems (salinity/sodicity linked to poor irrigation management practices).

1.2.2 Agriculture and food trade

Agricultural production is characterized by the dominance of cereals, which account for approximately 60% of harvested land but contribute only about 15% of the total value of agricultural production. Horticultural products, such as citrus, fruits, vegetables, and tree nuts, occupy less than 20% of harvested land yet generate around 40% of the sector's total value, reflecting their higher economic returns and water productivity.

The region is a major importer of food commodities: it is described as the largest global importer of cereals and a significant importer of meats and fish, vegetable oils, oilseeds, sugar, and sweeteners.

Farm structure and risk considerations shape production choices. Small farms are common and tend not to specialize; they may have comparative advantage in labor-intensive horticulture but face constraints in adopting new technology and accessing investment, and are often risk-averse given the higher input costs and volatility associated with horticulture.

1.2.3 Environment and climate change

Much of the MENA region is characterized by arid and semi-arid climates, with the Sahara Desert covering vast areas of North Africa. Recent years have seen recurrent hazards—including heat waves, droughts, floods, cyclones, sandstorms, and dust storms—becoming more frequent and more severe, with widespread social and economic consequences. Among these hazards, drought is considered the most prevalent, with severe impacts on livelihoods and food security through loss of harvest and livestock and widespread risks of malnutrition.

There is relatively little known about the evolution of climate across MENA compared with other regions, but available studies point to significant warming trends, reductions in cold days, and strong interannual precipitation variability without a clear trend. Projections indicate temperature increases under both moderate (RCP¹ 4.5) and high-emission (RCP 8.5) scenarios by mid- and end-century, with higher increases expected in the broader Sahara and East Africa, including Morocco and Mauritania. Projected precipitation changes vary considerably, though reductions are suggested in many areas, including coastal zones around the Atlas Mountains and the upper Tigris–Euphrates by the end of the century.

These changes are expected to increase pressures on water resources and agrifood systems. Projections suggest significant increases in surface-water stress for Iraq, Lebanon, Jordan, Israel, Syria, and Morocco, and stress increases driven by combined climate and socioeconomic changes for countries such as Algeria, Egypt, and Yemen. Anticipated impacts on agriculture include cropland shifts, shortened wheat growing periods, and yield decreases under warming scenarios.

1.2.4 Gender and social inclusion

Gender inequalities remain a significant challenge across much of the MENA region, where cultural norms and practices can limit women's access to and control over productive resources, including land and property, and constrain their participation in local decision-making processes. With approximately 23% of employed women in the region working in the agriculture sector, depending on farming and natural resources for their livelihoods, women are highly exposed to climate shocks.

The region also experiences high levels of displacement due to both conflict and climate shocks. Large numbers of refugees and internally displaced persons reside in urban host communities, placing additional pressure on vulnerable groups—particularly women and girls.

Climate change and gender inequality are mutually reinforcing. Climate impacts disproportionately affect women and girls because they are often responsible for securing food, water, and energy while having fewer resources than men. Addressing climate resilience and gender equality together is therefore essential for reducing vulnerability, strengthening adaptive capacity, and ensuring that climate responses are both effective and inclusive.

1.3 Development challenges

A central development challenge in the MENA region is pursuing sustainable pathways to water security that anticipate and manage increasing scarcity and water-related risks under climate change, budget constraints, and widespread fragility and conflict. These pathways must ensure affordable water services and strengthen resilience to extreme scarcity, contamination, floods, and droughts.

Water insecurity is linked to macroeconomic and societal risk: countries that fail to achieve water security forgo potential growth, increase vulnerability to hydrological shocks, and may worsen their social and political fragility. Climate-related water scarcity is projected to reduce gross domestic product by 6–14% in some countries by 2050.

Key amplifiers of risk include weak forecasting and warning systems, inadequate stormwater and flood management, limited irrigation infrastructure, and insufficient storage in underground reservoirs and aquifers. Failures in the provision of basic services and hazard mitigation can erode government legitimacy.

¹ In climate science, RCP stands for Representative Concentration Pathway. RCPs are standard scenarios used by researchers to project how future greenhouse gas concentrations, land use, and radiative forcing will shape global climate change through the year 2100 and beyond.

Governance, service-delivery, and data constraints reinforce physical water scarcity. Unsustainable water use and resource depletion are often linked to weak governance and regulatory frameworks. Political collaboration mechanisms are needed in complex contexts, including the management of shared waters. Therefore, strengthening the governance of water resources and services is fundamental.

Many utilities are not financially viable due to high operation and maintenance costs, low tariff structures, and high subsidies. This undermines service quality and expansion, and in some cases, subsidies disproportionately benefit high-income groups rather than the most vulnerable populations.

Decision-making is constrained by gaps in transparent and comprehensive data collection and assessment tools, including those for agricultural water-use monitoring, hydrological monitoring, and disaster early warning.

Conflict has damaged infrastructure, weakened institutions, and disrupted information systems, delaying progress. Interventions and approaches must be designed to function effectively in fragile contexts and, where appropriate, engage non-traditional partners such as nongovernmental organizations (NGOs) and water vendors.

Longer-term institutional reform dynamics also shape water governance in the region. Since the 1990s, reforms have moved toward more decentralized, participatory, and cost-recovering approaches, including the transfer of certain functions to local associations and farmers, alongside modernization efforts to improve service delivery. However, past policy priorities often favored supply expansion over integrated resource management. In some cases, implementation has lagged behind legal frameworks, while preparedness for extreme events has remained limited.

Transboundary water governance presents an additional challenge. Cooperative management of shared water resources has historically received limited attention, and the absence of agreements can affect ecosystems and livelihoods and contribute to tensions. These challenges are further complicated by fragility and conflict across parts of the region.

1.4 Trends and emerging opportunities

Water management choices are shifting across the MENA region as technology options improve and become more cost-effective. Several countries have reduced non-revenue water, increased water productivity, and expanded the use of nonconventional water sources, particularly through wastewater reuse and desalination. As the costs of these technologies continue to decrease, they are broadening the range of options available for the next generation of water management.

Technology adoption and knowledge gaps remain important drivers: persistent gaps are linked to limited monitoring networks, constraints on data access and sharing for robust water accounting, and insufficient multi-stakeholder platforms and coordination.

The region's transition toward renewable energy is gaining momentum, driven by rising demand, decarbonization objectives, and the increasing cost competitiveness of renewable technologies relative to conventional technologies. The region also has potential for green hydrogen development, with opportunities projected to expand toward 2050.

Risk management and climate planning are increasingly integrated into national strategies in several countries, including through discussions focused on disaster risk reduction and early warning systems. However, common challenges persist, including fragmented institutional and regulatory frameworks, as well as gaps in data availability, contextual knowledge, and access to financial instruments.

Many countries in the region have submitted Intended Nationally Determined Contributions (INDCs) and Nationally Determined Contributions (NDCs), with some now on their third submission cycle. These commitments vary in their level of conditionality and emphasis on adaptation. While significant progress has been made in climate assessment and adaptation planning, many countries continue to require stronger institutional mandates and more effective coordination mechanisms to support implementation.

2. Achievements: Our Story of Impact

Over the last few years, the International Water Management Institute (IWMI) has increasingly combined research-for-development evidence, decision-support tools, and partnership-driven delivery across the MENA region to accelerate water security, climate resilience, and agrifood systems transformation. Grounded in basin- and national-level priorities, these efforts have been designed to support uptake by governments, regional platforms, international financial institutions (IFIs), civil society, and the private sector.



Figure 1. IWMI's footprint in the Middle East and North Africa region

2.1 Actionable basin analytics for planning and allocation

IWMI strengthened the region's evidence base through applied hydroclimatic diagnostics and basin intelligence that can be directly used for planning and allocation discussions. This work translated into an operational decision-support capability: stakeholders can consult consistent, updatable basin indicators (water balance, stress signals) to align on a shared evidence base during planning and allocation discussions.

A key example is the deployment of a Water Accounting+ (WA+) digital dashboard within the Souss-Massa Basin Agency in Morocco that translates data into actionable basin insights, including water balances and stress signals. By presenting complex datasets through an accessible dashboard, the WA+ tool strengthened practical uptake of basin analytics for interpretation and priority setting, supporting more informed discussions on trade-offs and risk.

These basin analytics were complemented by a multidimensional fragility and resilience analysis of the Bouregreg watershed in Morocco, reinforcing a risk-informed approach to basin planning that linked water dynamics with broader resilience considerations. The outcome was a stronger risk lens for basin planning—helping partners frame resilience actions and investments using water dynamics alongside broader fragility considerations, rather than treating them as separate agendas.

2.2 Regional cooperation platform and multi-stakeholder convening

A key achievement of IWMI in MENA has been reinforcing the regional enabling environment for cooperation by formalizing and expanding policy-facing partnerships and convening mechanisms. The institutional partnership with

the League of Arab States strengthened a platform for regional coordination on water-related challenges and collective action. As a result, IWMI's evidence base and convening role gained greater institutional traction, enabling shared framing of priorities and follow-up engagement across countries.

The 2024 Morocco Resilience Days served as a multi-stakeholder mechanism to accelerate climate adaptation priorities—mobilizing knowledge, partnerships, and visibility for resilience solutions and encouraging coordinated action across institutions and sectors. The convening helped convert visibility into resilience momentum by aligning stakeholders around practical adaptation priorities and creating clearer pathways for collaboration and implementation across institutions and sectors.

2.3 Drought early warning and localized climate services

IWMI advanced operational readiness for climate extremes by strengthening drought monitoring and climate services. Through the MENAdrought project, IWMI supported the enhancement of drought early warning and risk management capabilities across multiple MENA countries, helping shift drought management from reactive response toward proactive monitoring and preparedness. This outcome was achieved by developing machine learning (ML)-based early drought warning systems and collaborative Composite Drought Indices with local partners, capturing their agendas and priorities in drought management.

In Jordan, the Jahez project advanced a scalable approach for localized impact-based weather and climate information and community-level risk reduction—particularly relevant for refugee-hosting communities—connecting climate information services (early warning systems for weather extremes) to practical resilience actions and pathways for climate finance and local implementation.

2.4 Groundwater governance shift from tech to institutions

IWMI led the Groundwater Governance in the Arab World initiative to help address unsustainable groundwater over-abstraction by shifting the focus from technology alone toward governance, regulation, and stakeholder dialogue.

Working with national partners in Tunisia, Lebanon, Jordan, and the United Arab Emirates (UAE), the project assessed groundwater use and constraints and examined policy instruments that could curb depletion in practice. These assessments strengthened country-level uptake by clarifying which governance levers were feasible within existing institutional constraints, helping partners move from problem statements to practical reform options.

The project generated a structured body of actionable outputs—country reports, case studies, policy white papers, and regional syntheses—to inform decision-making and reform pathways. Packaged as decision-ready knowledge products, these outputs improved adoption by giving policymakers and technical agencies concrete reference materials to compare options, prioritize actions, and justify reforms. It also convened regional dialogue among policy and technical stakeholders to jointly address governance barriers and advance more coordinated management responses. The regional dialogue accelerated convergence on shared barriers and workable approaches, strengthening coordination and increasing the likelihood of follow-through on governance actions across countries.

2.5 Government-aligned resilience decision pathways

IWMI's achievements include strengthening decision pathways that can be adopted by governments and aligned with national visions and investment processes. In Egypt, IWMI supported momentum around the Water Resilience Tracker (WRT) approach through contributions to structured dialogue and co-design processes.

These efforts helped stakeholders articulate and monitor resilience priorities, while providing a framework to guide stakeholder engagement and investment planning in the water sector. This co-design strengthened institutional buy-in by making resilience priorities measurable and usable, helping move from broad resilience narratives toward trackable priorities that can inform engagement and investment planning.

2.6 Water reuse governance standards and scaling pathways

A distinct area of high-impact achievement has been the advancement of enabling conditions for water reuse—combining standards, policy framing, and implementable recommendations. This directly improved adoption readiness by clarifying what safe reuse looks like in practice and what institutional conditions are needed to scale it responsibly.

In Lebanon, IWMI supported the launch of a national water reuse standard, strengthening the governance framework for treated wastewater reuse and clarifying pathways for safer implementation. The standard reduced ambiguity for implementers and regulators, improving the likelihood that treated wastewater reuse can move from pilots to safer, more consistent implementation.

At the regional level, IWMI helped consolidate evidence into an actionable policy-oriented report on expanding safe water reuse in MENA. The report elevates practical recommendations around the enabling conditions—including governance and implementation conditions—needed to scale reuse responsibly. The outcome is a more concrete, policy-relevant package that stakeholders can use to remove bottlenecks and accelerate responsible scaling.

2.7 AI-enabled reuse opportunity mapping and adoption support

IWMI advanced the use of digital innovation for mapping, diagnosing, and scaling wastewater reuse opportunities. Moving beyond policy framing, IWMI strengthened the applied analytics needed to accelerate reuse at scale. In the e-ReWater MENA project, IWMI applied artificial intelligence (AI) and remote sensing approaches to identify wastewater treatment assets and inform national planning around reuse potential in countries such as Egypt, UAE, and Kingdom of Saudi Arabia.

By providing a replicable, analytics-driven method for asset identification and opportunity screening, IWMI's work improved the ability of planners and investors to target reuse “hotspots” and build clearer pipelines for implementation. This was reinforced through dedicated tailored capacity development programs on AI-enabled water reuse (workshops, learning and exchange), helping build technical confidence and strengthening adoption pathways for analytics-driven reuse planning across stakeholders. The final outcome was increased user confidence and practical capacity to interpret and apply the analytics, helping bridge the gap between data products and planning decisions.

2.8 Scaling irrigation efficiency through innovation and modernization

IWMI's work also strengthened practical delivery pathways for water efficiency and irrigation-related innovation. In Jordan, the Water Innovation and Technologies (WIT) and Water Efficiency and Conservation (WEC) projects supported national ambitions to optimize water use and strengthen governance capacity through incentive-based modernization approaches.

These initiatives increased programmatic readiness to implement efficiency measures by combining incentives, governance capacity, and modernization approaches that can be scaled. Complementing public-sector programs, IWMI advanced private-sector innovation acceleration models, helping de-risk and accelerate the deployment of relevant technologies in high-need contexts, including refugee-hosting communities. This expanded the range of available solutions for improving irrigation efficiency, service delivery, and scalable impact.



2.9 Salinity management roadmap and cross-sector policy coherence

Recognizing that water security in MENA is inseparable from land productivity and salinity pressures, IWMI contributed to strengthening national evidence and action pathways focused on salt-affected agriculture.

In Egypt, IWMI co-developed a national roadmap for maintaining productivity in salt-affected agricultural areas, providing a national reference framework for managing salinity risks while sustaining agricultural yields and livelihoods. The roadmap supported practical uptake by offering a shared reference that could guide extension, programming, and investment choices in salinity-affected areas. This was complemented by the Food–Land–Water policy coherence work in Egypt, which promoted coherence across sectors as a practical lever to reduce fragmentation and improve the effectiveness of policies and investments affecting water, agriculture, and land.

2.10 Nature-based solutions delivery platform with gender-transformative resilience

IWMI advanced integrated resilience programming that links water security with ecosystem-based solutions and inclusion outcomes. The Al Murunah project, supported by the Foreign, Commonwealth & Development Office (FCDO), established a multi-country platform integrating nature-based solutions for water and agricultural water management across Egypt, Jordan, Palestine, and Lebanon, strengthening scalable delivery pathways for climate resilience. The platform approach improved scalability by supporting replication, learning, and coordinated implementation across multiple contexts. Building on this foundation, Al Murunah+ introduced an explicitly gender-transformative layer, advancing equitable participation and benefits within climate-smart solutions and resilience interventions, helping ensure that adaptation pathways address both climate risk and structural inequities. The outcome is resilience programming that is not only climate-smart and scalable, but also more equitable—improving the durability and legitimacy of adaptation actions through inclusive benefit-sharing.

2.11 Scaling ESG-compliant water–energy–food innovations via SME acceleration

Through the Water and Energy for food (WE4F) Regional Innovation Hub for MENA, IWMI contributed its nexus research-for-development (R4D) perspective to help scale mid- to later-stage enterprises delivering “more food with less water and energy”. The initiative combined technical support with investment-matching opportunities while complying with strict environmental, social, and governance (ESG) and inclusion requirements. Across the program, 60 small and medium-sized enterprises (SMEs), including 18 women-led/managed SMEs, received tailored technical assistance and milestone-based cash grants to scale water- and/or energy-saving innovations for food production across Egypt, Jordan, Lebanon, Gaza/West Bank, Morocco, Tunisia, and Iraq.

Together, these achievements illustrate a consistent trajectory: moving from diagnostics to adoption through evidence-to-action research, strengthening policy and institutional enabling environments, scaling climate and water information services, and building partnership ecosystems capable of delivering measurable resilience and water security outcomes across MENA.

3. Strategic Priorities

3.1 Strategic framing and alignment process

For 2024–2030, strategic research and development (R&D) priorities in MENA were identified based on regional needs and context, while also leveraging IWMI’s competitive advantages in the region and the availability of institute-level resources, both existing and planned. This prioritization was further informed by learnings generated through the Transformative Futures for Water Security (TFWS) initiative in the Middle East and North Africa and refined through iterative consultations within IWMI’s MENA team and engagement with key partners to enrich and co-develop the roadmap. The list of partners consulted included governments of strategic countries in MENA, national and regional research and development agencies and think tanks, private sector representatives, and academia and research institutes, in addition to NGOs and donors. These priorities were then aligned with IWMI’s research strategy and translated into specific R&D actions by area and country, implemented through appropriate research and support capacities and long-term partnerships.

3.2 Strategic priority areas

3.2.1 Climate–water intelligence for resilience and growth

This strategic priority area focuses on developing a decision-grade understanding of surface water and groundwater dynamics under climate change, using hydrological, hydrogeological, and hydroclimatic assessments that translate uncertainty into actionable options for planning, sustainable investment, and hazard mitigation. This includes strengthening observation, modelling, and data science techniques (AI/ML) so that countries can diagnose risks such as depletion, salinization, seawater intrusion, and shifting variability patterns. It also emphasizes transparent, inclusive data governance and practical decision-support products such as dashboards and models that can be used by ministries, basin agencies, utilities, IFIs, and the private sector.

3.2.2 Inclusive governance, policy coherence, and transboundary cooperation

This priority area aims to advance inclusive and multiscale water–climate governance across local, national, and regional scales by pairing rigorous analysis with practical tools and dialogue processes that strengthen coordination, accountability, and policy coherence. A specific focus is placed on transboundary cooperation and international water governance, recognizing shared rivers and aquifers and the region’s complex political and security context. This priority also embeds gender and social inclusion into governance practice, supported by gender-responsive data and information, and promotes multi-stakeholder platforms that reduce fragmentation and improve joint decision-making.

3.2.3 Preparedness for climate extremes, early warning, and resilience in fragile contexts

A priority for IWMI is to strengthen preparedness for droughts, heat waves, floods, and compound shocks through climate information systems, early warning, and risk-informed decision support, paired with policy, institutional, socioeconomic, and finance innovations that enable anticipatory action. A defining element is ensuring that approaches remain workable in fragile and conflict-affected settings, supporting recovery pathways that rebuild water, food, land, ecosystem, and community systems. This includes an explicit focus on vulnerable groups—such as refugees, migrants, women, youth, and low-income communities—so that resilience gains are equitable and sustained.

3.2.4 Sustainable, inclusive water services and nonconventional water resources scaling

This strategic area focuses on enabling financially viable and inclusive water services and investment models that reflect the region’s social, cultural, and economic realities, using cost–benefit analysis, economic valuation, and participatory finance innovations to improve service quality, affordability, and sustainability. In parallel, it seeks to accelerate the uptake of nonconventional water resources, such as treated wastewater and drainage water reuse, desalination, and usage of harvested water, by strengthening the enabling environment through policy and regulatory frameworks, institutional arrangements, technical narratives, safeguards, and capacity building. This priority explicitly integrates gender and social inclusion and recognizes a prominent role for the private sector in delivery and scaling.

3.2.5 WEFE nexus transformation and climate-smart agricultural water management

IWMI prioritizes the development and scaling of integrated solutions across water–energy–food–ecosystems (WEFE) that improve productivity and resilience from farm to basin to national scale. This includes better integration of energy security within water and food systems (and ecosystem preservation) through institutional, financial, technical, and socio-economic solutions aligned with adaptation and mitigation goals. A core implementation stream is climate-smart agricultural water management: introducing and scaling conservation irrigation technologies and practices, strengthening irrigation performance monitoring, and enabling adoption pathways that reflect socio-economic and environmental determinants—supported by partnerships and private-sector engagement where relevant.

3.3 Target population and audience

Primary audiences include policymakers, users, academia, civil society, IFIs, and the private sector. Priority populations and constituencies reflected in the regional priorities and context include farming communities, particularly smallholders; vulnerable groups in fragile and conflict-affected settings, including refugees and migrants; women and girls, including those engaged in agriculture and from displaced populations; utilities and water service providers; and technical operators across the water value chain, including technicians, jurists, and legislators.

IWMI’s strategic roadmap for MENA prioritizes countries through three complementary “delivery geographies.” First, fragile and conflict-affected settings—Iraq, Palestine, Sudan, Syria, Yemen (and crisis-affected Lebanon)—where the emphasis is on preparedness for climate extremes, humanitarian–development linkages, and crisis-to-recovery pathways that protect livelihoods and essential water/food systems for the most vulnerable groups. Second, stable and reform-oriented systems—Morocco, Tunisia, Egypt, Jordan (and where relevant, Lebanon)—where IWMI can more systematically institutionalize decision-support mechanisms (e.g., basin diagnostics, climate services), strengthen governance and data systems, and accelerate investment-ready solutions in irrigation modernization, groundwater management, and non-conventional water usage. Third, the Gulf Cooperation Council (GCC) bloc—Kingdom of Saudi Arabia, United Arab Emirates, Qatar, Kuwait, Bahrain, and the Sultanate of Oman—as a hub for scaling innovation and finance around the WEFE nexus, energy–water integration, and advanced non-conventional water options (reuse/desalination), while also serving as a regional convening and partnership platform to diffuse proven approaches across MENA.

4. Implementation Roadmap

This roadmap will be implemented through a selective, partnership-based and highly contextual approach, linking IWMI's research and development work to practical delivery pathways at country and regional levels across MENA (Table 1). In a region marked by acute water stress, climate shocks, fragility, transboundary dependencies, and uneven institutional capacities, implementation will rely on long-term engagement with governments, regional platforms, academia, the private sector, and development partners, while adapting modalities to each thematic area and geography. The approach combines applied research, policy support, tool development, piloting, capacity strengthening, and knowledge uptake. Risks are managed through phased delivery, strong partner alignment, context-sensitive programming, and embedded monitoring, learning, and adaptive management to ensure implementation remains credible, relevant, and scalable.

Table 1. Implementation Roadmap: Middle East and North Africa

Expected outcomes	Key activities/ interventions	Countries/ Geographic areas	Partners	Delivery method and timeline ²
Priority 1: Climate–water intelligence for resilience and growth				
Evidence-based assessments of multi-sector trade-offs, sustainability impacts, and groundwater recharge inform water infrastructure planning and resource allocation decisions.	- Hydrological/hydrogeological/hydroclimatic assessments; - Strengthened monitoring of hydrological variables to inform decisions and risk management; - Modeling and data visualization to address complex phenomena (e.g., recharge, salinization, seawater intrusion)	Region-wide priority countries: Morocco, Tunisia, Egypt, Iraq, Palestine, Jordan, Lebanon, Sudan, and Gulf Cooperation Council (GCC) members states/ United Arab Emirates (UAE) Algeria, Libya, Syria, and Yemen (as partnerships mature)	Government ministries for agriculture, water, and environment; universities; regional development partners; international partners operating across the Middle East and North Africa (MENA) region	Delivered through long-term partnerships and required research/support capacities 2028–2029
Agricultural water productivity and farmer livelihoods are improved through scalable innovations in irrigated and rainfed agriculture.	- Observation, modeling, and data science techniques/Artificial Intelligence (AI); - Transparent and comprehensive data collection mechanisms and assessment tools (including agricultural water-use monitoring); - Hydrological monitoring to inform decisions and early warning	Region-wide across delivery platforms: Morocco, Tunisia, Egypt, Iraq, Palestine, Jordan, Lebanon, Sudan, and GCC members states Algeria, Libya, Syria, and Yemen (as partnerships are built)	Government ministries for agriculture, water, and environment; universities; think tanks/policy centers; regional development partners; private sector where data systems and services are co-developed	Delivered through long-term partnerships and tool development (models/dashboards) 2027–2028

² Timelines shown are indicative and may be revised as funding and implementation arrangements are confirmed.

Table 1 (continued)

Expected outcomes	Key activities/ interventions	Countries/ Geographic areas	Partners	Delivery method and timeline
Water systems contribute to climate mitigation through adoption of low-emission, climate-adaptive technologies and practices.	- Developing tools and knowledge to account for energy implications in planning and investment; - Improving models and data to support scholars, decision-makers, and communities	Region-wide, with relevance in countries with water- and energy-intensive systems, such as Morocco, Egypt, Jordan, GCC members states, and Iraq	Government ministries for agriculture, water, and environment; energy-sector stakeholders where applicable; universities; private sector actors (irrigation/solar power)	Delivery through partnerships with required capacities and long-term engagement 2028–2029
Evidence-based assessments of multi-sector trade-offs, sustainability impacts, and groundwater recharge inform water infrastructure planning and resource allocation decisions.				
Priority 2: Inclusive governance, policy coherence, and transboundary cooperation				
Decision-making processes in water management explicitly incorporate diverse knowledge systems, cultural values, and stakeholder perspectives.	- Deploying models/dashboards for policy dialogue; - Promoting continued dialogue and transparent policies; - Building integrity and robust tendering capacities across the water value chain	Transboundary-focused delivery across shared basins/aquifers in Egypt, Iraq, Jordan, Lebanon, Palestine, and Sudan Countries relying on surface water systems	Government ministries for agriculture, water, and environment; universities; Water Diplomacy Center; League of Arab States; Arab Organization for Agricultural Development (AOAD); Arab Water Council; Arab Countries Water Utilities Association (ACWUA); International financial institutions (IFIs); policy centers and think tanks	Research-for-development (R4D) co-delivery with ministries and regional platforms; governance analytics and decision tools; targeted capacity building and policy support 2028–2029

Table 1 (continued)

Expected outcomes	Key activities/ interventions	Countries/ Geographic areas	Partners	Delivery method and timeline
Priority 3: Preparedness for climate extremes, early warning, and resilience in fragile contexts				
Risks and vulnerabilities to droughts and floods are significantly reduced through proactive adaptation and response strategies.	– Developing climate information systems; – Strengthening hydrological monitoring and early warning for water-related disasters; – Applying context-adapted disaster risk reduction mechanisms aligned with integrated approaches	Region-wide, with emphasis where extremes are critical and delivery platforms exist: Morocco, Tunisia, Egypt, Jordan, Iraq, Lebanon, Palestine, Sudan, and GCC members states	Government ministries for agriculture, water, and environment; technical agencies; universities; United Nations Office for Disaster Risk Reduction (UNDRR); World Food Programme (WFP); CARE International; OXFAM International in MENA; humanitarian actors and aid organizations where relevant	Delivery via long-term partnerships and applied tools (Agile Platform for Drought) 2029–2030
Communities affected by fragility, conflict, and migration become more resilient through conflict-sensitive and inclusive water management practices.	– Providing knowledge and tools for resilience and recovery planning; – Pursuing water security during protracted crises through engagement with non-traditional service actors (nongovernmental organizations [NGOs], water vendors) as entry points for recovery/reconstruction	Conflict-affected and fragile contexts where partnerships exist or are required: Iraq, Syria, Yemen, Palestine, Sudan (and others as relevant)	Humanitarian and aid agencies; NGOs; government entities, where functioning; regional/international partners with humanitarian-development scope	Humanitarian-development delivery pathways complemented by R4D tools and recovery programming, adapted to fragile contexts 2028–2029
Improved understanding of inequalities in water security informs more equitable water practices.				

Table 1 (continued)

Expected outcomes	Key activities/ interventions	Countries/ Geographic areas	Partners	Delivery method and timeline
Priority 4: Sustainable, inclusive water services and nonconventional water for scale				
Water pollution is measurably reduced, enhancing human health and ecosystem integrity. Income, livelihoods, and food security for women, youth, and marginalized groups are enhanced through inclusive water-related interventions.	– Cost–benefit analyses and economic valuation frameworks; – Participative financial product innovations; analyses of water and climate investment opportunities; – Addressing utility financial viability constraints that undermine quality/coverage and inclusiveness	Region-wide priority countries where utility/irrigation modernization and nonconventional water resources (NCWR) are central: Morocco, Tunisia, Egypt, Jordan, GCC members states (and others as applicable)	Ministries of water; utility actors; private sector (irrigation/solar power/farming operators); IFIs and donors; Civil society organizations	Dialogues and data-backed assessments; partnership-supported piloting and scaling; supported by upscaling management and finance/ knowledge management reinforcement 2029–2030
Circular water management practices and innovative non-conventional water technologies are widely adopted, significantly mitigating water scarcity. Water pollution is measurably reduced, enhancing human health and ecosystem integrity.	– Developing technical narratives and institutional/regulatory innovations; – Enhancing policy frameworks and creating legal/institutional enabling environments; – Technical capacity building;	Countries prioritizing NCWR scaling and regulatory strengthening: Morocco, Tunisia, Egypt, Jordan, and GCC members states (and others as relevant)	Government ministries for agriculture, water, and environment; utilities; private sector, where relevant; civil society actors supporting inclusion; IFIs and donors	Policy-to-practice research pathway: regulatory/technical narratives, capacity building, and investment readiness, delivered via long-term partnerships and required capacities 2029–2030

Table 1 (continued)

Expected outcomes	Key activities/ interventions	Countries/ Geographic areas	Partners	Delivery method and timeline
Priority 5: WEFE nexus transformation and climate-smart agricultural water management				
Nature-based solutions (NbS) are effectively scaled, improving biodiversity, ecosystems, and environmental flows. Agricultural water productivity and farmer livelihoods are improved through scalable innovations in irrigated and rainfed agriculture.	- Introducing and upscaling conservation irrigation technologies and practices; - Deploying irrigation performance monitoring solutions; - Strengthening agricultural water-use monitoring to support efficiency improvements; - Piloting and promoting NbS in relevant contexts	Priority agricultural delivery platforms in Morocco, Egypt, Jordan, Tunisia, Lebanon (and others where relevant)	Government ministries for agriculture, water, and environment; irrigation and farming operators (private sector); universities; relevant regional partners	Applied research with piloting and scaling through partnerships; supported by project coordination and upscaling management 2027-2028
Cross-cutting (applies to all priorities)				
Future water-related risks are explicitly integrated into local national and regional climate adaptation policies and investment plans, as well as emergency preparedness and humanitarian response strategies. Water management practices explicitly ensure equitable access and benefits for all community members. Youth leadership capacity and meaningful participation in water governance are systematically strengthened.	- Knowledge transfer across priorities; - Reinforced communication and knowledge management; - Monitoring, evaluation, learning, and impact assessment (MELIA) as part of delivery support	Region-wide in all priority countries	Policymakers/users; academia; civil society; IFIs; private sector	Embedded knowledge management and MELIA across all country/area R4D actions; supported by project coordination and upscaling management 2029-2030



5. Partners and Funders

The MENA office has established a diverse and robust network of partnerships with key stakeholders across the region, as well as with regional and international organizations operating at the MENA scale. These collaborations underpin the implementation of current strategic priorities. At the same time, the IWMI Regional Office for MENA is actively pursuing additional partnerships as part of a continuous effort to broaden impact, enhance complementarities, and respond to emerging regional needs. Our existing partnerships and required future priority partnerships are presented in the following sections.

5.1 Government and public-sector partners

Morocco

Established partnerships: Ministry of Agriculture, Maritime Fisheries, Rural Development and Water and Forests; Ministry of Equipment and Water; Ministry of Energy Transition and Sustainable Development; universities; and nongovernmental organizations.

Partnerships to develop: None currently identified.

Algeria

Partnerships to develop: Ministry of Agriculture, Rural Development and Fisheries; Ministry of Hydraulics; and universities.

Tunisia

Established partnerships: Ministry of Agriculture, Water Resources and Fisheries; and universities.

Partnerships to develop: Ministry of Environment.

Libya

Established partnerships: Ministry of Water Resources.

Partnerships to develop: Ministry of Agriculture and Livestock; Ministry of Marine Resources; Ministry of Environment; and universities.

Egypt

Established partnerships: Ministry of Agriculture and Land Reclamation; Ministry of Water Resources and Irrigation; Ministry of Environment; and universities.

Partnerships to develop: None currently identified.

Iraq

Established partnerships: Ministry of Agriculture; Ministry of Water Resources; and Ministry of Environment.

Partnerships to develop: Universities.

Palestine

Established partnerships: Ministry of Agriculture; Palestinian Water Authority; Environment Quality Authority; and universities.

Partnerships to develop: None currently identified.

Jordan

Established partnerships: Ministry of Agriculture; Ministry of Water and Irrigation; Ministry of Environment; and universities.

Partnerships to develop: None currently identified.

Lebanon

Established partnerships: Ministry of Agriculture; Ministry of Energy and Water; and universities.

Partnerships to develop: Ministry of Environment.

Syria

Established partnerships: Ministry of Energy, which is currently mandated with the principal governmental responsibilities for the water sector.

Partnerships to develop: Ministry of Agriculture and Agrarian Reform; and universities.

Sudan

Established partnership: Ministry of Agriculture and Irrigation, specifically its water-resources and irrigation functions.

Partnerships to develop: Broader engagement with the agriculture portfolio of the Ministry of Agriculture and Irrigation; Forests National Corporation; and universities.

Yemen

Established partnerships: Ministry of Water and Environment.

Partnerships to develop: Ministry of Agriculture, Irrigation and Fisheries.

Government and institutional partners in Gulf Cooperation Council (GCC) member states

Established partnerships

United Arab Emirates: Ministry of Climate Change and Environment.

Kingdom of Saudi Arabia: Ministry of Environment, Water and Agriculture.

Sultanate of Oman: Ministry of Agriculture, Fisheries and Water Resources.

GCC regional level: General Secretariat of the Gulf Cooperation Council, particularly the GCC Electrical and Water Cooperation Committee.

Bahrain: Arabian Gulf University; Ministry of Municipalities Affairs and Agriculture; Supreme Council for Environment; and Electricity and Water Authority.

Partnerships to develop

Qatar: Ministry of Municipality; Ministry of Environment and Climate Change; and universities.

Kuwait: Public Authority for Agriculture Affairs and Fish Resources; Ministry of Electricity and Water and Renewable Energy; and universities.

5.2 Regional development partners

Established partnerships

League of Arab States; Arab Organization for Agricultural Development (AOAD); Arab Water Council; Arab Countries Water Utilities Association (ACWUA); International Commission on Irrigation and Drainage (ICID) – African Regional Working Group (AFRWG); Water Diplomacy Center at Jordan University of Science and Technology; and Regional Center for Renewable Energy and Energy Efficiency (RCREEE).

Partnerships to develop

Maghreb-focused and GCC-focused regional institutions; regional think tanks; and public-policy centers.

5.3 International partners operating across the MENA region

Established partnerships

CIHEAM Bari – Mediterranean Agronomic Institute of Bari; World Food Programme (WFP); Chemonics International, Inc.; Tetra Tech; cewas Middle East; Oxfam International, including its Middle East and North Africa regional operations; International Fund for Agricultural Development (IFAD); CARE International; and United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA).

Partnerships to develop

Additional humanitarian and development agencies operating in fragile and conflict-affected MENA countries.

5.4 Private-sector partnerships

Established partnerships

Private-sector operators working in irrigation technologies, solar energy, and agricultural production in Egypt, Jordan, Morocco, Sudan, Kingdom of Saudi Arabia, and Lebanon.

Partnerships to develop

Additional private-sector companies across the MENA region, particularly in water technologies, irrigation, digital agriculture, renewable energy, agricultural production, food systems, and climate services.

5.5 Civil-society partnerships

Established partnerships

National Council for Women (NCW) in Egypt; BENAA Foundation for Sustainable Development; and Women in Water Diplomacy Network.

5.6 Donors, development agencies, and financial institutions

Established partnerships

The United States Government; Foreign, Commonwealth & Development Office (FCDO); Swedish International Development Cooperation Agency (Sida); World Bank; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (German Society for International Cooperation); and Government of the Netherlands.

Partnerships to develop

Agence Française de Développement (AFD); Japan International Cooperation Agency (JICA); Korea International Cooperation Agency (KOICA); Italian Agency for Development Cooperation (AICS); European Union; African Development Bank (ADB); Islamic Development Bank; Abu Dhabi Fund for Development (ADFD); Kuwait Fund for Arab Economic Development; Saudi Fund for Development (SFD); and Qatar Fund for Development (QFFD).



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The **International Water Management Institute (IWMI)** is an international, research-for-development organization that works with governments, civil society and the private sector to solve water problems in developing countries and scale up solutions. Through partnership, IWMI combines research on the sustainable use of water and land resources, knowledge services and products with capacity strengthening, dialogue and policy analysis to support implementation of water management solutions for agriculture, ecosystems, climate change and inclusive economic growth. Headquartered in Colombo, Sri Lanka, IWMI is a CGIAR Research Center with offices in 17 countries and a global network of scientists operating in more than 55 countries.

Vision

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Mission

Research and innovation in partnerships for collective action that advance the transformation of water systems for sustainable, just and climate resilient development.

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