

IWMI Innovation for climate change resilience and adaptation – tackling water and food security challenges in MENA

Dr. Vidhisha Samarasekara

*Strategic Program Director, Water Climate Change and Resilience
International Water Management Institute (IWMI)*



Five Wicked Water Problems

Hunger

- Hunger in the Arab region has continued to rise since 2014. In 2021, the number of undernourished people reached 54.3 million, **12.2 percent of the population** (FAO, 2022).



Poverty & Exclusion

- Across the region, **gender and urban-rural divides are significant drivers of inequality** when it comes to food and water security, reflecting major differences in income (Middle East Council on Global Affairs, 2023)

Climate Beyond 2°C

- Future projected adaptations are effective in reducing risks to a varying extent, but **effectiveness falls sharply beyond 2°C** (IPCC AR6, 2021)
- Climate change projections indicate increasing temperatures, decreasing precipitation, and increased frequency and severity of extreme events like drought, heatwaves, and flash floods (IPCC, 2023)



Deep Uncertainty

- MENA is the world's most water-scarce region, with **over 60% of the population living in areas with high water stress**, compared with 35% globally (World Bank, 2021).



Ecosystem Breakdown

- More than **half of all land and a quarter of arable land in MENA is degraded**, and 45% of the total agricultural area is exposed to salinity, soil nutrient depletion, and wind-water erosion (World Bank, 2019).
- Approximately 89% of MENA is dryland, which is characterized by unpredictable rainfall, specialized soil life, and high vulnerability to climate change (Ibid).

IWMI Strategy & Transformational Levers



Al Murunah المرونة

Goal: Increase water security in the MENA region through implementation of **Resilient Nature-Based Water Solutions (RNBWS)** in the face of climate change and land degradation.

EGYPT: Izbat al-Hamra, Beheira Governorate

Challenges

1. Water scarcity & salinity at the ends of tertiary canals
2. Low incomes & socio-economic indicators

Solutions

1. Innovative cropping systems & sustainable irrigation & warehouse infrastructure
2. Access to finance & markets



Min. of Agr. and
Land Reclamation

JORDAN: Wadi Al-Seer, Greater Amman Municipality

Challenges

1. Reduced spring flow & irrigation canal deterioration
2. Small landholdings with inefficient irrigation

Solutions

1. Spring rehabilitation & irrigation canal remediation
2. Demonstration farm and terracing



Min. of Water and
Irrigation

LEBANON: Ras Baalbeck and Qa'a, Baalbeck Governorate

Challenges

1. Flash flood & groundwater depletion
2. Inefficient irrigation practices & lack of adapted crop types

Solutions

1. NBS for flood control & groundwater recharge
2. Innovative cropping & irrigation systems



Min. of Energy and
Water

OCCUPIED PALESTINIAN TERRITORIES: Wadi Al-Fari'a, Tubas Governorate

Challenges

1. Reduced spring flow & wastewater from refugee camp
2. High input costs & weak farmer organization and capacity.

Solutions

1. Spring rehabilitation & protection/ biodiversity planting
2. Separate wastewater from fields and form Water User Assoc.



Env. Quality Authority

Pathways to Impact



RNBWS that enhance water and food security are developed and tested



Government officials, communities, and private sector actors have greater ability to adapt and deploy RNBWS across the region



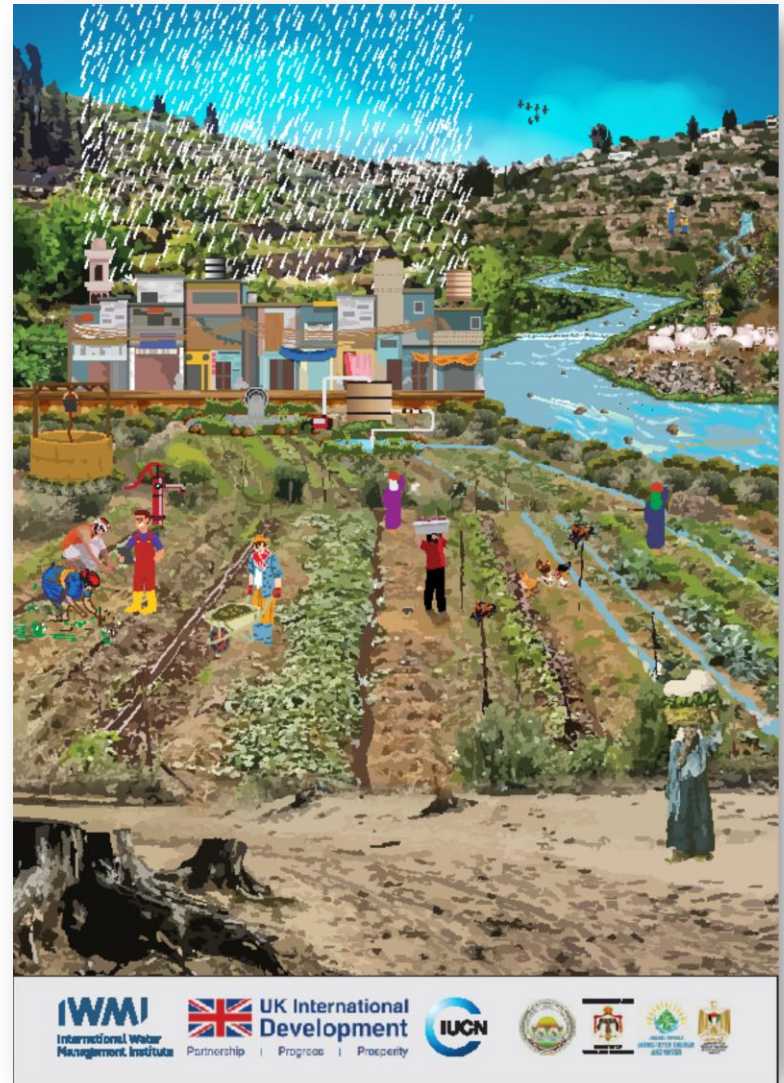
Policy and economic contexts are more supportive for scaling RNBWS



Regional dimensions and knowledge sharing are enhanced



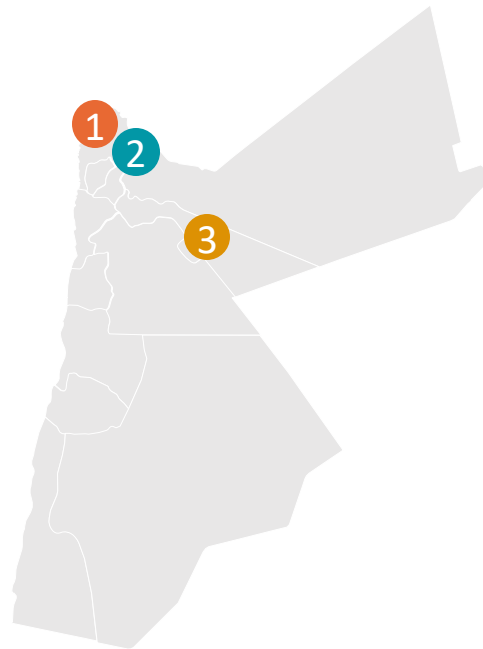
Building out gender social norms transformation components



Expanding the Application of RNBWS in the MENA Region

PROJECT 1 | JORDAN

Jahez (Ready): Building climate resilience through integrated action on **weather & climate information systems, disaster risk reduction & nature-based solutions**.



1 Irbid

Refugee popⁿ: majority Syrian refugees disbursed with host popⁿ
Host community: Irbid City
Watershed: Wadi El-Arab

2 Ramtha

Refugee popⁿ: majority Syrian refugees disbursed with host popⁿ
Host community: Ramtha City
Watershed: Ramtha watershed, Yarmouk Basin

3 Azraq

Refugee popⁿ: Syrian camp
Host community: Azraq town
Watershed: Azraq watershed

PROJECT 2 | IRAQ

UK collaboration on **sand and dust storm (SDS) modelling and mitigation** in Southern Iraq.

Approach

- SDS predictive modelling & impact-based warnings.
- Piloting NBS interventions to address SDS causes and impacts.
- Building technical and coordination capacity of partners.
- Application of a fragility, conflict, and migration lens.



WAPOR



Ministry of Foreign Affairs of the
Netherlands



IWMI

Using satellite data and AI to enhance water and crop productivity across scales.

Drought monitoring:

Sudan, Mali, Pakistan

Irrigation advisory services:

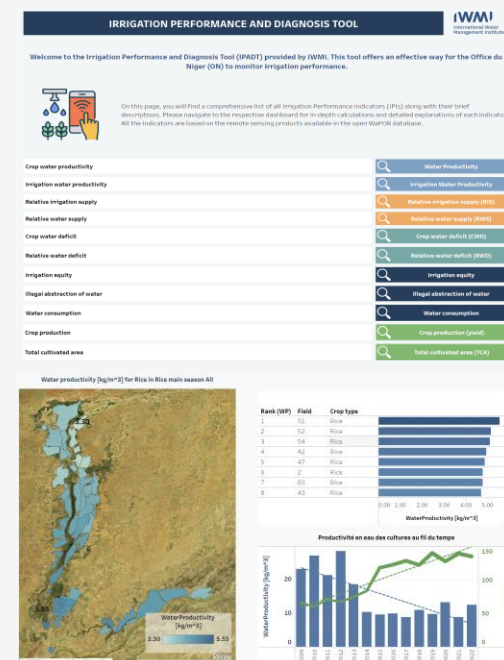
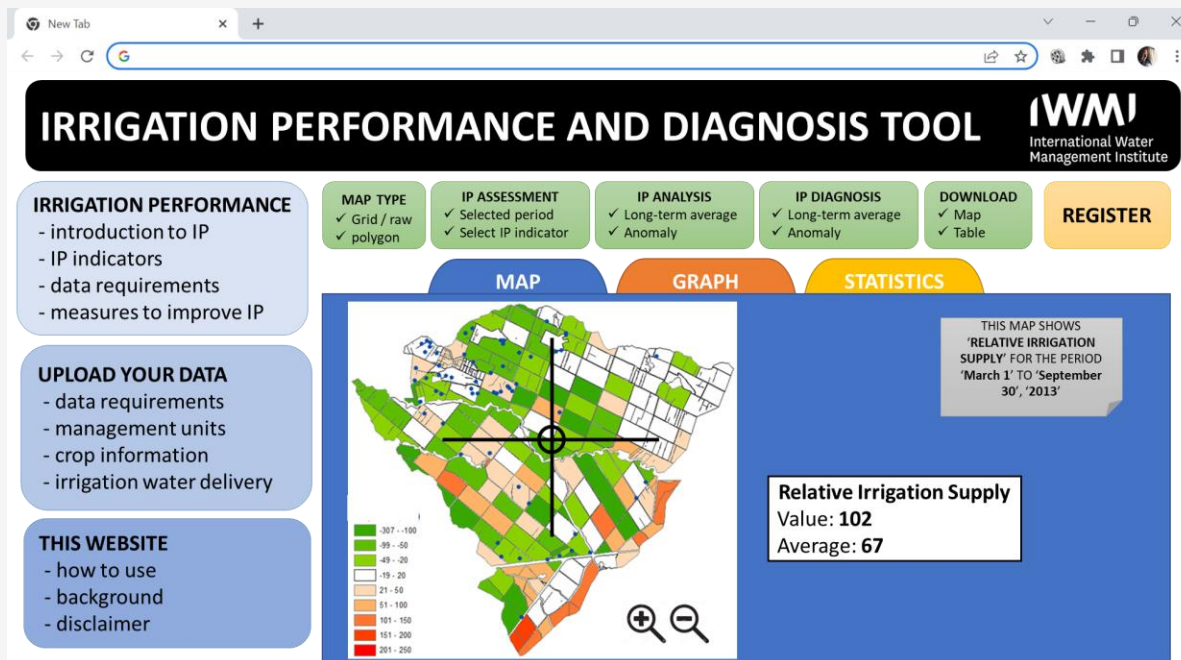
Tunisia, Algeria, Palestine; Egypt

Irrigation performance:

Mali, Jordan, Mozambique, Ethiopia, Iraq

Water resources management:

Kenya



Conclusion - Increasing Water Security in the MENA Region

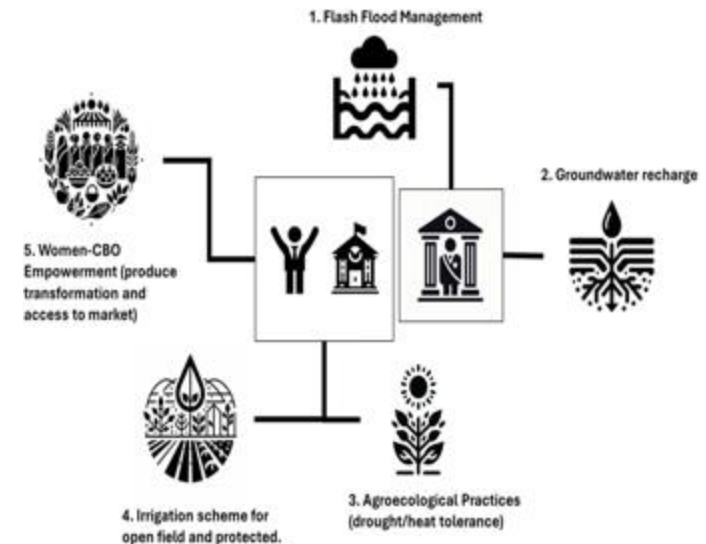
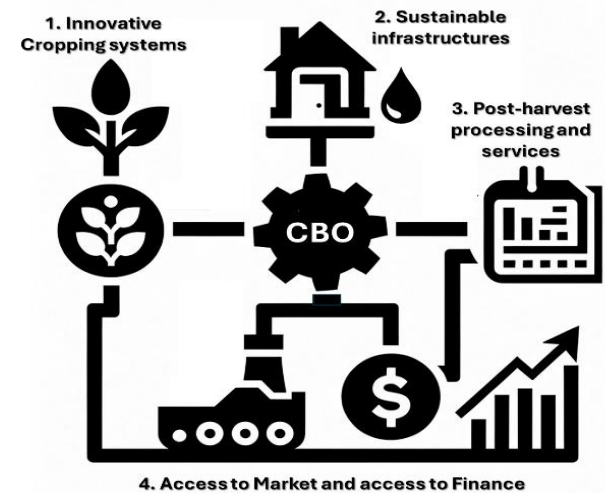
Resilient Nature-Based Water Solutions

Application contexts

- Rural to urban continuum
- Range of agroecological and socio-economic environments
- From vulnerable to conflict-affected areas and refugee-hosting communities

Implementation approaches

- Localized co-development
- Market mechanisms and business cases for scaling
- Building awareness, capacity, and networks at regional, national, and local levels
- Gender and youth at the fore
- Robust evidence base across the socio-ecological spectrum and climate rationale



Water Security for Food Security

Demand led knowledge broker

- Strongly aligned with NDCs of MENA countries
- Collaborate with governments and other stakeholders to integrate NBS into their implementation plans
- Translate ideas about NBS into bankable, actionable projects on the ground

To bolster water security for food security

- Address critical water security issues through innovative NBS
- Implement NBS to mitigate the impacts of natural disasters, enhancing community resilience
- Work across agroecological zones and types of communities to develop context-specific solutions



No Water, No Farmers, No Food
بدون ماء، لا مزارعون ولا طعام

Thank you
شكراً

EXTRA SLIDES TO CONSIDER
OR DRAW CONTENT FROM

OUR ROLE AS IWMI IN THE MENA REGION

- IWMI leads efforts to design and implement cutting-edge NBS tailored to the unique environmental and socio-economic contexts of the MENA region.
- We develop pilot NBS projects that can be scaled up to create larger impacts across the region.
- Our work helps translate NBS policy documents into practical, actionable projects on the ground.

RELEVANCE FOR NATIONALLY DETERMINED CONTRIBUTIONS (NDCS) IN ARAB STATES

- Our projects are closely aligned with the NDCs of MENA countries, supporting their climate adaptation and mitigation goals.
- We work with governments to integrate NBS into national policies and frameworks, ensuring long-term sustainability.
- Through pilot projects, we aim to demonstrate tangible impacts that can be showcased in national and international forums, such as COP events.

FOCUS AREAS

- Addressing critical water scarcity issues and improving water quality through innovative NBS.
- Implementing NBS to mitigate the impacts of natural disasters, enhancing community resilience.
- Working across various agroecological zones to develop context-specific solutions.
- Prioritizing the inclusion and empowerment of women and youth in project activities to ensure equitable benefits.

- Engaging local communities in the co-development of solutions to ensure ownership and sustainability.
- Developing business cases for NBS to attract investments and promote scaling. Building strong partnerships with national and international stakeholders to support scaling efforts.
- Conducting awareness campaigns to educate communities about the benefits of NBS. Providing training and capacity-building programs to equip stakeholders with the skills needed to implement and maintain NBS.

3. Iraq SDS Project Overview

Goal: Mitigate sand and dust storms (SDS) in Southern Iraq

Approach

- SDS predictive modelling and impact-based warnings.
- Piloting NBS interventions to address SDS causes and impacts
- Building technical and coordination capacity of partners.

Key Interventions

- Developing new or enhancing existing SDS predictive modelling systems and associated adaptive co-development of action-based SDS warnings in pilot communities, tailoring these for local contexts and sensitivities, with a focus on vulnerable groups
- Piloting NbS or hybrid NbS (collectively called NbS) interventions to a.) address underlying causes of SDS in source areas and/or b.) mitigate impacts of SDS
- Building the technical and coordination capacity of relevant national and local partners and stakeholders to apply action-based warning for SDS risk reduction and deploy NbS for SDS mitigation more widely
- Solidifying strategic partnerships to deliver SDS predictive modelling and NbS interventions, deliver project outcomes, and ensure community resilience.

2. Jahez (Ready) Project Overview

Climate-ready refugee hosting communities in Jordan

Goal: Build climate resilience in refugee-hosting communities in Jordan through integrated action on weather and climate information systems, disaster risk reduction, and NBS.

Site Context

- Azraq Camp and Azraq City, Zarqa Governorate
- Irbid City, Irbid Governorate
- Ramtha, Irbid Governorate

Approach

- Combining weather and climate information systems, disaster risk reduction strategies, and NBS to enhance resilience.
- Collaboration with key stakeholders, including the Royal Hashemite Court, Ministry of Environment, Ministry of Planning and International Cooperation, and local communities.
- Identifying and selecting pilot sites based on climate risks, humanitarian needs, and socio-economic conditions.

Key Interventions

- Integrated flood management
- Soil Conservation
- Climate-Resilient Crops
- Climate smart agriculture
- Sustainable urban drainage systems
- Dry basins & detention basins for groundwater infiltration
- Shelter belts, green belts, windbreaks, living fences
- Urban greening (camps and urban areas)
- Kitchen/community gardens
- Community plant nurseries
- Agroforestry
- Sustainable land use and land management

2. Jahez (Ready) Project Overview

Climate-ready refugee hosting communities in Jordan

Goal: Build climate resilience in refugee-hosting communities in Jordan through integrated action on weather and climate information systems, disaster risk reduction, and NBS.

Site Context

- Azraq Camp and Azraq City, Zarqa Governorate
- Irbid City, Irbid Governorate
- Ramtha, Irbid Governorate

Approach

- Combining weather and climate information systems, disaster risk reduction strategies, and NBS to enhance resilience.
- Collaboration with key stakeholders, including the Royal Hashemite Court, Ministry of Environment, Ministry of Planning and International Cooperation, and local communities.
- Identifying and selecting pilot sites based on climate risks, humanitarian needs, and socio-economic conditions.

Key Interventions

- Integrated flood management
- Soil Conservation
- Climate-Resilient Crops
- Climate smart agriculture
- Sustainable urban drainage systems
- Dry basins & detention basins for groundwater infiltration
- Shelter belts, green belts, windbreaks, living fences
- Urban greening (camps and urban areas)
- Kitchen/community gardens
- Community plant nurseries
- Agroforestry
- Sustainable land use and land management