

# Climate Action and a Green, Resilient and Inclusive Recovery

## *Opportunities for groundwater management*

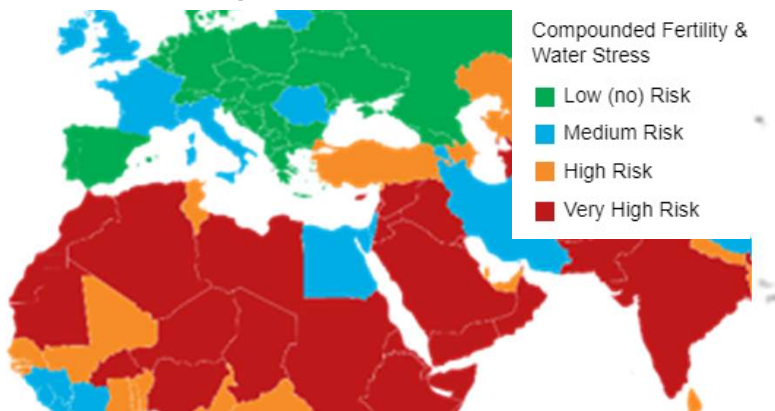


**Ayat Soliman**, Regional Director for Sustainable Development, MENA region, the World Bank

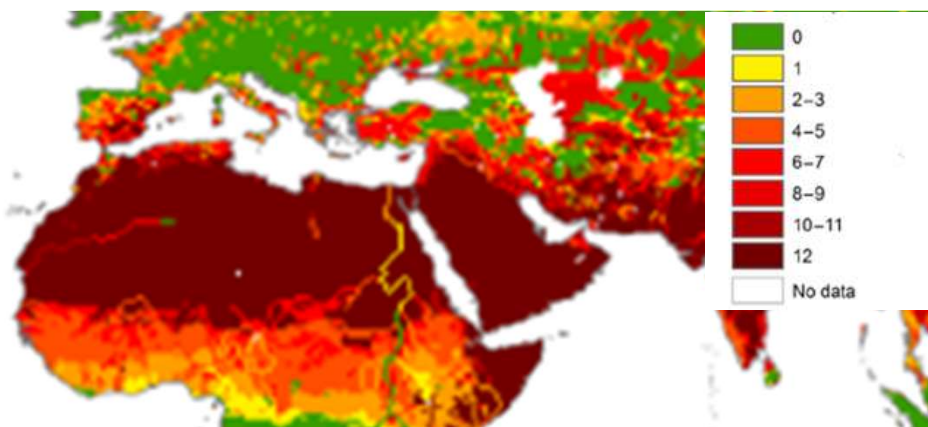


# Water Security in the MENA Region

Per capita Water Availability and Future Population Growth, 2050



Number of months in which water scarcity is > 100%



**High population growth**, expected to double by 2050



60% of the region's population lives in areas with **high or very high surface water stress** vs. 35% global average. High reliance on transboundary waters



**Water productivity** in the region is only about half the world's average

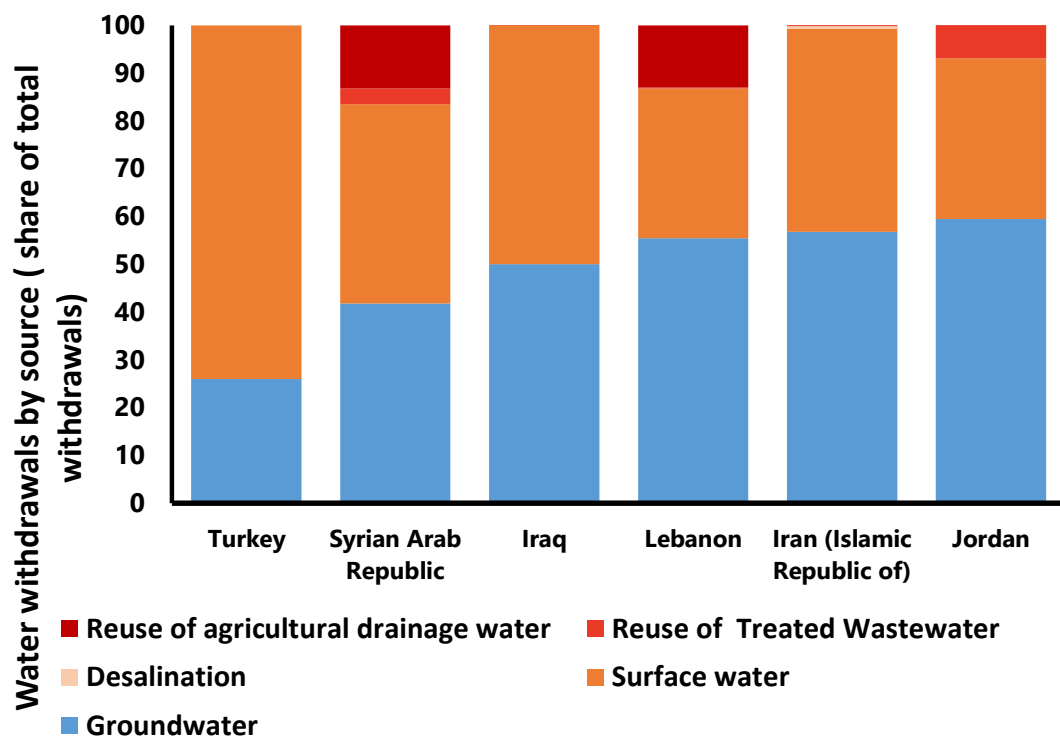


Global hotspot of unsustainable water use. In some countries, more than 50% of current water withdrawals exceed what is naturally available



## Mashreq countries rely heavily on groundwater...

Water withdrawals by source as a percentage of total withdrawals by Country

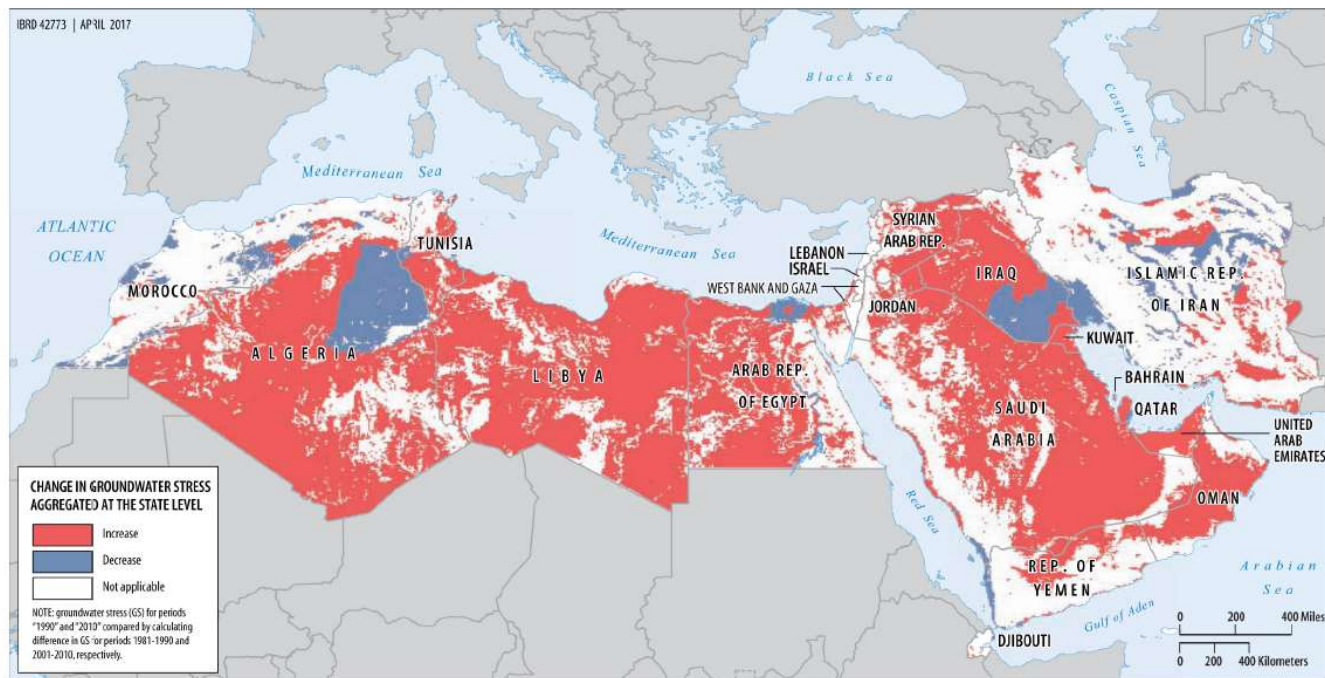


- Between 40% and 60% of total water withdrawals in the Mashreq countries come from groundwater resources, except Turkey at around 25%
- Groundwater is often used in the absence of alternative sources
- Plays a major role in irrigated agriculture and acts as a buffer during droughts
- Groundwater resources sustain livelihoods, water-related ecosystems and development opportunities for future generations.



## ...but the resource is under stress and faces sustainability issues

Change in Renewable Groundwater Stress, Middle East and North Africa, 1990–2010



Source: World Bank. 2017. *Beyond Scarcity: Water Security in the Middle East and North Africa*. MENA Development Series. World Bank, Washington, DC.

- Medium to extremely high levels of groundwater stress in the Mashreq and Gulf countries.
- Groundwater stress increased between 1990-2010, due to agricultural expansion and increased access to technology like tube well pumps
- Deteriorating quality of groundwater contributes to water stress
- High water subsidies and weak monitoring and enforcement mechanisms undermine incentives for efficient water use. They encourage overexploitation and in many countries perpetuate a pattern of low-value uses.

# Projected Physical Risks of Climate Change Deepen Water Challenges

## Change in temperature

- Increase of 1.7 °C–2.6 °C for mid-century and 3.2 °C–4.8 °C towards end-century (RCP 8.5) – (UNESCWA)

- The annual number of hot days with **high thermal discomfort** is expected to increase in several cities, including Damascus, Baghdad, and Tehran

## Change in Precipitation

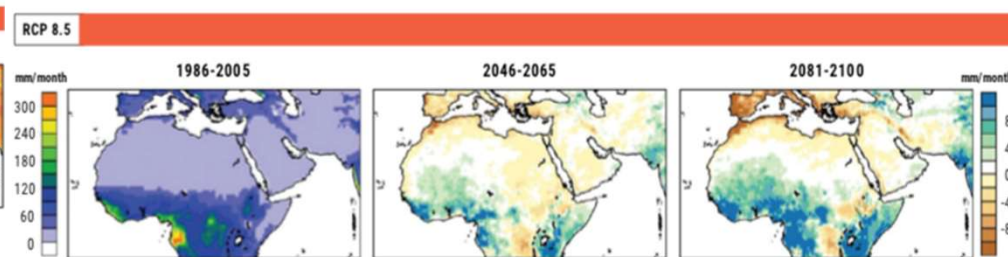
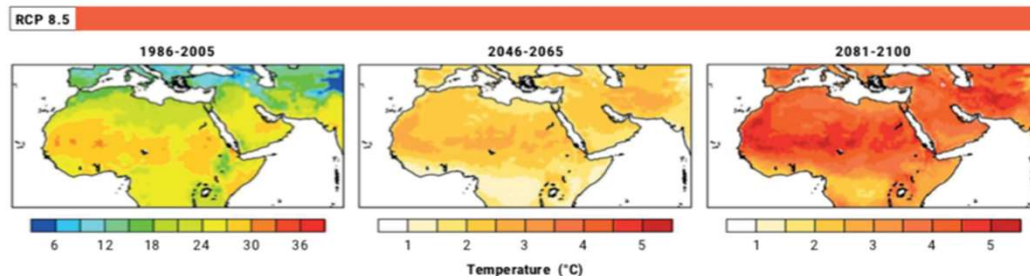
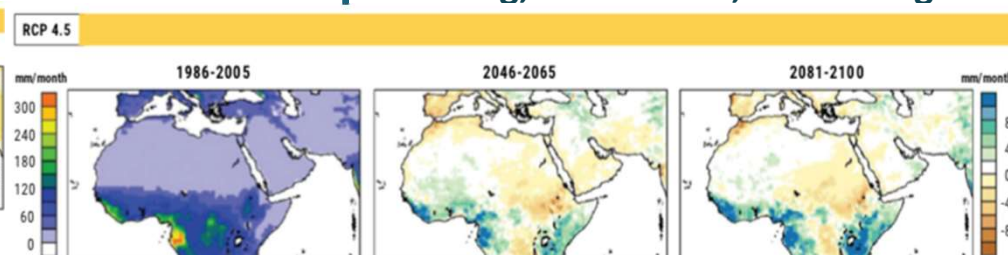
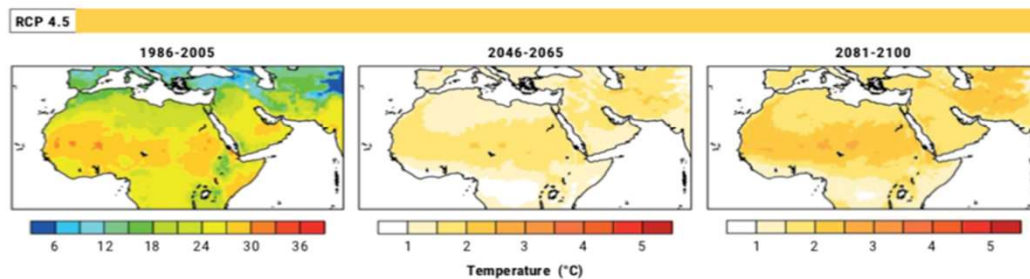
By the end of the century:  
- Precipitation is **expected to decrease by 10-20% in Mashreq**

- **increasing precipitation trends in other areas**, such as the south-eastern Arabian Peninsula

Sea level rise by an average of 0.36m in a 1.5°C world and 0.6m in a 4°C world, causing salt water to flow into aquifers.

Environmental degradation costs could increase by a factor of 10 in Lebanon and Iraq, up to 1.8% of GDP by 2050. Sectors of fisheries and agriculture, public health, and tourism are particularly vulnerable.

As a result, the region will experience loss of land, degradation of ecosystems, coastal erosion, drought, flood, stress on groundwater, salinization of aquifers, increase of climate-induced disasters including flash flooding, heat waves, storm surges



Mean changes in annual temperature for mid- and end-century

Mean changes in annual precipitation (mm/month) for mid- and end- century

# Climate Change as a Threat Multiplier - Inclusion as a Cross-Cutting Lens

## Livelihoods

Smallholder farmers and women are hit hard by loss of agricultural productivity. Increasingly frequent natural disasters jeopardize lives and livelihoods.



## Hunger multipliers

Affects all four dimensions of food security: availability, access, stability, and utilization of food. Exposure to price volatility on global markets in import-dependent countries.

## Vulnerable groups

Could push millions of people below the poverty line by 2030. Increases exposure of women and girls to climate-related hazards and gender-based violence (GBV).



## Emerging health issues

Emerging pests, vector-borne disease, and zoonosis. Compounds WASH-related disease. Heat stress can be lethal to urban poor and elderly.

## Fragility, Conflict and Violence

Amplifies the root causes of FCV. One in five people already living within 60 km of conflict. Region is home to a quarter of forcibly displaced people (16.3 million in 2016).



## Migration flows

Expected to increase both (rural-urban) sub-national and international migration. Sea level rise could displace millions of people along the densely populated coasts).



**Tracking climate impacts on livelihoods and wellbeing: crucial to low-carbon development and resilience.**

A Green, Resilient and Inclusive  
approach to Recovery

## **The WHY?**

**A business-as-usual recovery package  
will not be enough to address complex  
and simultaneous challenges**

- The GRI framework provides options to strengthen existing programs, maximize short term impact, job creation and fast implementation, while ensuring long term sustainability and avoiding lock-ins on costly stranded assets

- A flexible framework allows multiple responses that adapt to large variation of challenges in the region

**GRI is not a slogan, it's a better way  
to recover!!**

A Green, Resilient and Inclusive approach to Recovery

## The WHAT?

**GREEN** – environmental, socioeconomic, and financial Sustainability. Efficiency in the use of resources is at the core of green development

**RESILIENT** – preparing for, mitigating, and adapting to face multiple risks

**INCLUSIVE** - Ensuring no one is left behind can reduce disparities in opportunities and outcomes and help excluded groups to realize a fair share of benefits.

Fostering jobs and economic activity is at the core of a GRI approach  
Digital technologies as cross-cutting theme to leverage growth and inclusion



## Addressing climate change is key for a GRI recovery

### Four Transformation Areas for a Climate-Smart Future in MNA



I. Food Systems,  
Water Security and  
Resilient Natural  
Capital



II. Energy Transition  
and Low Carbon  
Mobility



III. Climate-Smart  
Cities and Resilient  
Coastal Economies



IV. Sustainable Finance  
and Whole of  
Government Approach



*Cross cutting issues*

**Inclusion/Just transition – Governance – Fragility, Conflict & Violence –  
Private Sector Investment - Migration – Digital technologies &  
innovation, Regional integration**

# Examples of interventions for a green, inclusive and resilient recovery



# GRI – Implementing Key Reforms for GRI Recovery

Examples from Colombia, Morocco, India, Vietnam, and Mozambique



## Green growth

- Law for participatory ground water management, adoption of advanced irrigation and water saving guidelines.
- Develop a regulatory framework for the promotion of clean energy transportation.
- Renewable Energy Feed in Tariff (REFIT) mechanism to encourage private sector investment to boost medium term energy supply and access from renewables
- Establish operating standards for landfills



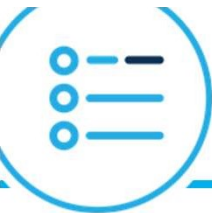
## Resilience

- Inter-government agreement for the provision of agrometeorological information to the agricultural sector.
- Adoption of a national inventory of human settlements located in areas prone to landslides and floods.
- Adoption of the National Coastal Zone Management Plan.
- Establish an institutional unit to ensure post-flood reconstruction and rehabilitation of roads and bridges



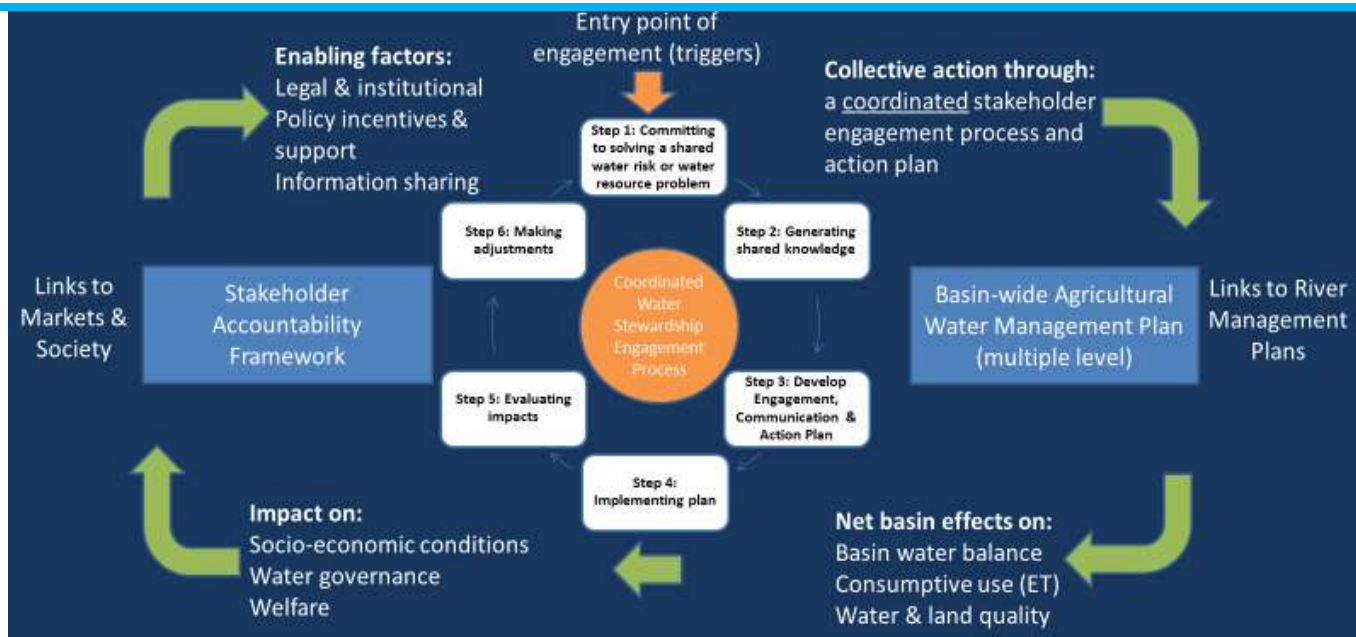
## Inclusion

- Legal framework for the provision of public housing to the poorest and most vulnerable households.
- Building a system for payment for environmental services and forests for peace.
- Incentive mechanisms for climate resilient and digital agriculture in small-holder farming.
- Strengthened the coordination of information platforms to improve land use planning.



# Agricultural Water Stewardship for green, resilient and inclusive groundwater management

Water Stewardship in Agriculture Concept



- Agricultural-water stewardship and climate-smart agriculture increases water productivity, by encouraging people to collectively respond to water resource challenges
- Reduce food loss and waste (often at 30-50%) thereby decrease (virtual) water losses
- Adopting water-smart practices conserves water resources, and helps farmers adapt to climate change
- Coupling water savings measures with on-farm improvements can increase yields and slow increases in water withdrawals for agriculture



# Integrated lens for a GRI groundwater management

## The Morocco Case

For Morocco, water scarcity represents the most pressing challenge to socio-economic and human development at large



Sharp water availability (per capita) drop

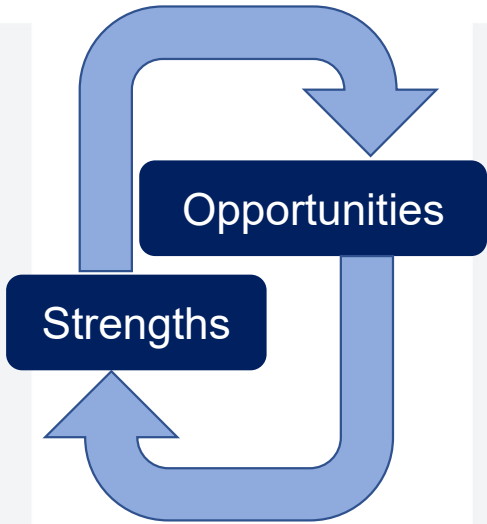


Overexploitation of groundwater resources



Agriculture heavily reliant on groundwater and development model relies heavily on agriculture sector

- Institutional and legal frameworks that consider the preservation of the Groundwater resources (Basin Agencies, Water law)
- Development of managerial tool called "Contrat de nappe" that aims to engage all stakeholders to efficiently use GW
- Conception of a national mutualized sanitation plan (PNAM) that contribute to increase wastewater collection and treatment
- Development and implementation of the "advanced regionalization" policy which will allow better water resources management at local level



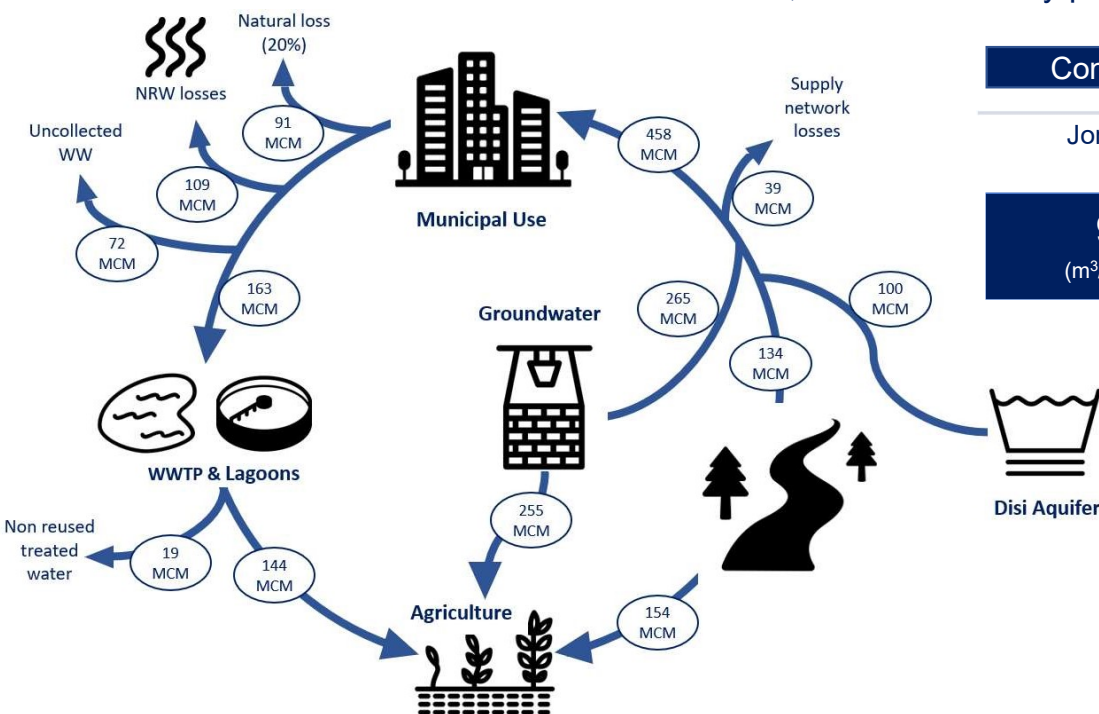
- GW considered as strategic reserves, which allows the use at first of surface water
- Renewable energy development to enhance the production of non-conventional water resources (desalination and reuse)
- Treated wastewater to be reused for artificial recharge
- Previous GW water crisis (Chtouka and Guerdane) have raised the stakeholders' awareness and should let the authorities and farmers to anticipate the issue
- On the financial aspect, Morocco should diversify financing sources beyond the state budget and transform water infrastructure into assets.



# Circular Economy principles guiding GRI development

## The Jordan case

One of the most water stressed countries in the world, Jordan is already practicing CE by re-using treated wastewater for agriculture



The circular economy in Amman, Jordan

Treated municipal wastewater is directly reused in the agriculture sector. There are many opportunities to close the loop.

### Comparison of Jordan's water scarcity situation with global benchmarks

Jordan	Absolute water Scarcity	Water Scarcity	Water Stress
97 (m <sup>3</sup> /cap/yr)	500 (m <sup>3</sup> /cap/yr)	750 (m <sup>3</sup> /cap/yr)	1000 (m <sup>3</sup> /cap/yr)

### Opportunities to enhance CE:

- Scale up wastewater reuse for ag and groundwater recharge will support water security needs and improve health and food security/food export outcomes
- Improve energy efficiency and harness energy from wastewater help to increase financial and environmental sustainability in the water sector and mitigate climate change
- Reduce leakage as the first step in enhancing water security in Amman (currently ~30%)



# Disruptive technology is essential to enable a green, inclusive and resilient development

- Technology allows us opportunities to reimagine the future
- The Mashreq region can build on, and contribute to, global good practices for sustainable groundwater management
- New options to improve data, analytics, knowledge, and learning within and across countries of the Mashreq to address these challenges
- How can we work together in the Mashreq to explore the utility of emerging technologies for groundwater management?





## KEY MESSAGES

- Groundwater is a strategic resource for the development of the Mashreq countries
- Inadequate management practices, particularly in agricultural use, are resulting in groundwater stress and unsustainable usage
- Climate change will exacerbate groundwater stress and will compound vulnerabilities across various sectors
- A Green, Inclusive and Resilient approach to recovery and development is needed to address multiple and complex challenges facing Mashreq countries today
- Disruptive technology plays a key role in enabling and applying a GRI approach to groundwater management and its development







Thank you!



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