Water reuse in Morocco: challenges and opportunities

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October 28th, 2024

Who we are

IWRI @ UM6P SINCE 2019

- To rethink and adapt **research** and **innovation** to new **sustainable** paradigms to meet ongoing and future challenges related to water and climate in **Morocco** and **Africa**
- To deliver **quality-oriented research-based** learning programs, capacity building, and services
- To act as an **African Water Hub** through strategic **cooperation** and **partnerships**

Integrated Water Ressources Management

Water Resources Assessment: supply, use, distribution,
Water Related Hazards,
coastal zone management

Advanced Water Technologies

Water Treatment & Reuse
Desalination Engineering
Innovative Water Saving Technologies

Hydroinformatics

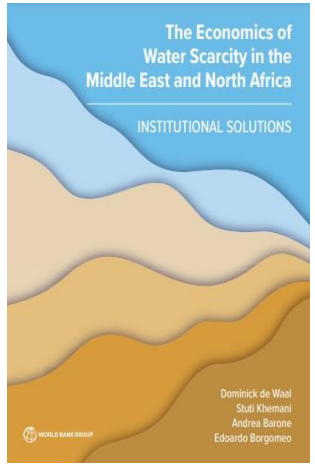
Physical and mathematical modeling & simulation
Risk analysis & reliability assessment
Hybrid modelling for water and climate issue

Climate Change & Adaptation

Hydroclimatology
Adaptation strategies
Climate Services

MENA is world's most stressed region!

- Water stress → annual water supplies drop below 1,700 m^3 (0.45 Mgal) per person.
- < 1,000 m^3 (0.26 Mgal) per person, water scarcity
- < 500 m^3 (0.13 Mgal) per person "absolute" water scarcity.



Apr 2023:

The new "absolute water scarce" countries in the region are Iraq, Syria, Egypt, Iran, and **Morocco**

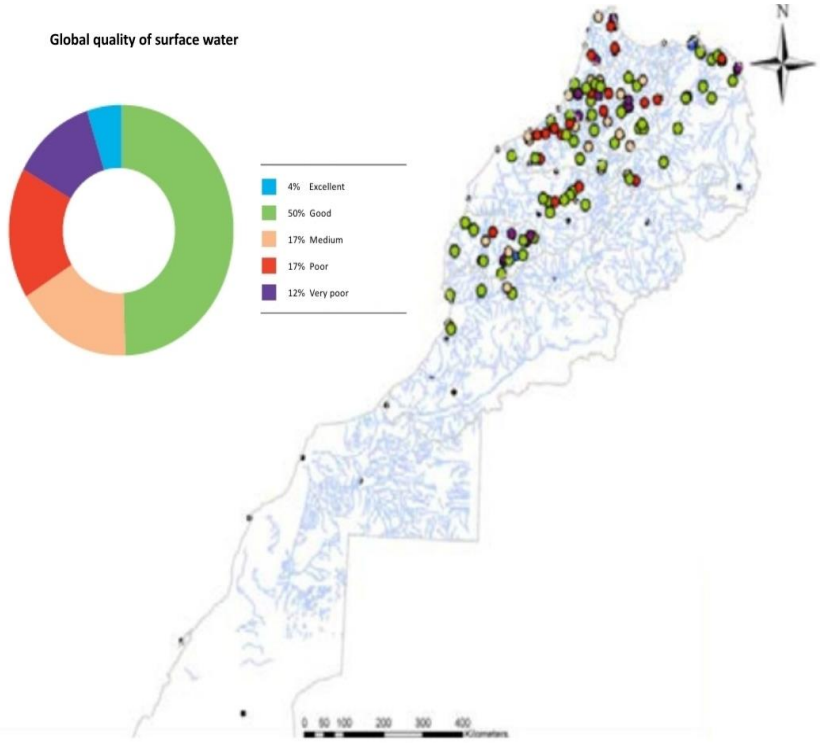
→ increasing the supply of nonconventional water is an emerging area of R&D, policy debate and investment

Water quality challenges/opportunities in Morocco

- The annual volume of **urban wastewater** discharged into the natural environment is estimated at 870 Mm^3 in 2020, and 1.04 Bm^3 in 2030.
  → huge potential for water reclamation for the Agri sector

- **Industrial wastewater** production in Morocco is approximately 970 Mm^3 per year
  → great potential for water treatment and reuse in the industrial sector

- **Agriculture** (75-80% freshwater use) is also a source of pollution, mainly due to the extensive use of pesticides and fertilizers.
  → urgent need to rationalize the use, develop nature-based solutions to reclaim water and protect the exposed ecosystem (soil and aquifers), and promote the safe reuse of treated WW.



(Moroccan Ministry of Water, 2016)

IWRI's R&D on wastewater treatment & **reuse** and seawater **desalination** is of strategic importance to Morocco to enable the **full valorization of unconventional water** resources to meet surging demand from urban, industrial and agricultural sectors, under a **changing climate**

National plan for wastewater reuse in Morocco (2018)

- **1st stage**: investing in the WW treatment infrastructure (renovation and extension projects) → 95% collection of urban wastewaters nationwide by 2040
- **2nd stage**: increasing the volume of reused WW to 100 Mm^3/year by 2025.
- **3rd stage**: By 2030, reclaiming 325 Mm^3/year of treated WW

https://www.environnement.gov.ma/

→ Mostly used to irrigate parks, golf courses, etc. and for selected industrial applications.

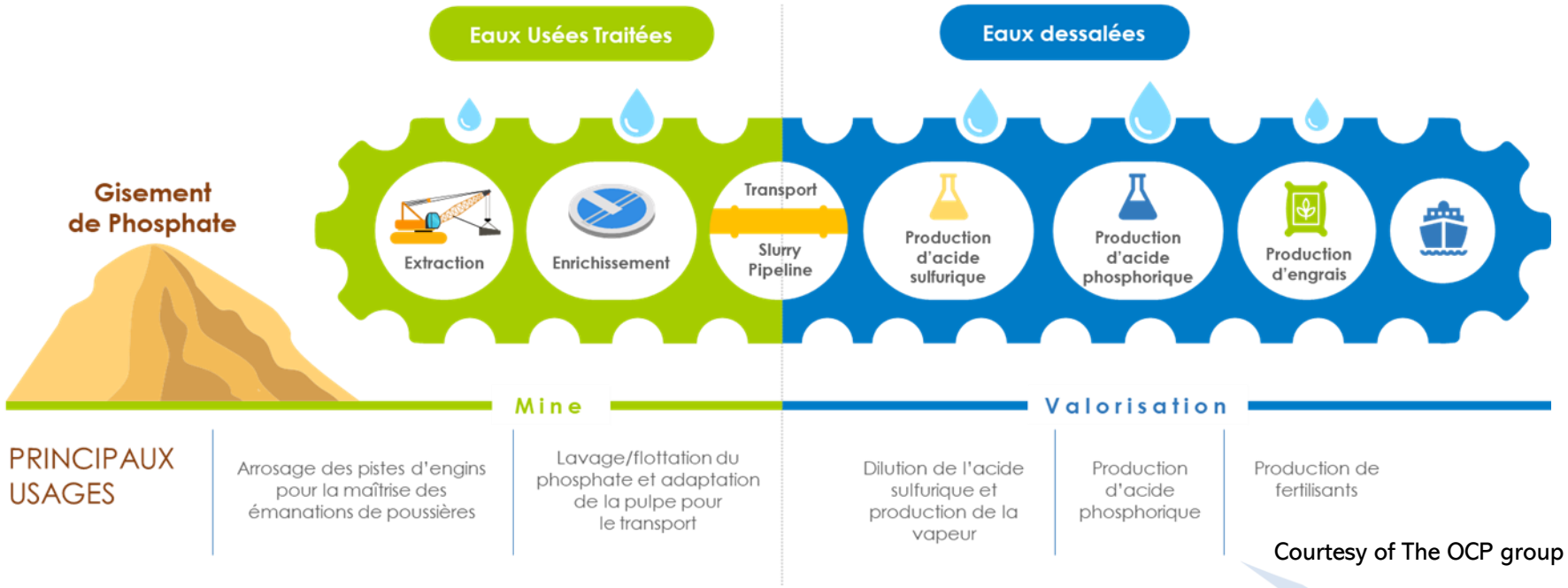
→ Very limited reuse in agriculture (35 Mm^3/year ~ 10%)

→ No reuse for aquifers recharge

E.g. The reuse of treated WW to irrigate green spaces in Rabat has saved ~ 4 Mm^3/year of freshwater [2022], equivalent to the drinking water supply for two small cities (25000 inhabitants, each)

Fulfilling its own water needs using **nonconventional water (31% in 2022, entirely by 2026 ~ 160 Mm^3/y)**, including **seawater desalination** and **wastewater reuse.** The ambitious plan includes establishing **7 WWTPs**, **3 desalination plants**, and **4 solar power plants**

How to "circulate" water throughout OCP's value chain?



Courtesy of The OCP group

OCP group's water strategy

A network of 7 WWTPs to dedicated to provide treated wastewater for reuse in the phosphate enrichment process, and other usages, as an alternative to the freshwater sources.

→ Benefits: reuse of 15 Mm^3/Y of urban wastewater

The Group built the world's longest **phosphate-slurry pipeline** (187 km) for a more efficient mean to transport enriched phosphates to its downstream processing units at Jorf Lasfar

→ **Benefits:** massive annual savings of around 90% in logistical costs, 3 Mm^3 of water, and 930K tons of CO_2 emissions


THANK YOU!