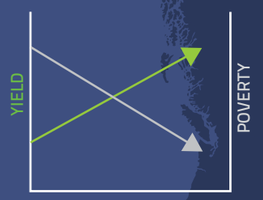
Food and Agriculture Organization of the United Nations

EMERGING PRACTICES FROM AGRICULTURAL WATER MANAGEMENT IN AFRICA AND THE NEAR EAST

Sharing best practices for improved Agricultural Water Management using project findings from **seven thematic areas**: water productivity, water efficiency, water harvesting, conjunctive use of surface and groundwater, technology, water accounting and solar energy for irrigation.

Water Productivity

Three quarters of the additional food we need for our growing population could be met by increasing the productivity of low-yield farming systems, probably up to 80% of the productivity that high-yield farming systems obtain from comparable land



Increasing productivity in the agriculture sector is one of the most effective ways to fight poverty and stimulate socio-economic development. **For every 10% increase in farm yield, there has been an estimated 7% reduction in poverty in Africa**

In **Morocco**, supplemental irrigation - applied to high yielding varieties combined with nitrogen fertilization - multiplies water productivity by 2.5 in a dry seasons and by 1.6 in wet seasons. Supplemental irrigation improves water productivity by 15 % in average at farmer's plots

Solar energy for irrigation

Solar water pumps have a **near zero marginal cost of operation**, thus raising concerns of water over-withdrawal

With 96% of desert land, a high frequency of clear sky days and solar radiations ranging from 2000 kW/h in the north up to 2600 kW/h (m^2/year) in the south, **Egypt** is one of the most potential countries in the MENA region for solar energy

Water Harvesting

In regions where crops are entirely rainfed, **a 50% reduction in seasonal rainfall may result in total crop failure**

In agriculture, rainwater harvesting has demonstrated **the potential of doubling food production**. By concentrating runoff in winter and during storms, water harvesting structures can increase the amount of supplemental irrigation available per unit of cropping area – thereby increasing and stabilizing production

In **Jordan**, in any given year, half of potentially cultivable land is left fallow because of fluctuating and unevenly distributed rainfall. That rain which does fall is mostly lost in evaporation and unutilized runoff (which in turn often causes erosion) – leaving frequent dry periods during the growing season

There are around 370 existing, under construction or planned for construction water harvesting structures in Jordan

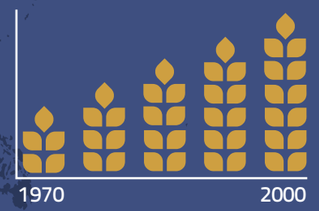
Water accounting and auditing

Good policy requires **good data**. Water accounting is an indispensable tool, particularly in water-scarce areas, to conduct coherent assessments of water resources availability

Conflicts for surface water around reservoirs and rivers, and in densely populated areas are arising in **Burkina Faso**. Means of accounting of water and the identification of alternative sources for different uses could help addressing these conflicts

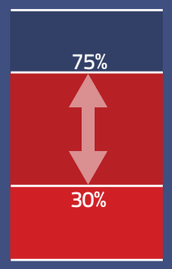
Conjunctive use of surface and groundwater

Groundwater is crucial for the livelihoods and food security of 1.2–1.5 billion rural households in the poorer regions of Africa and Asia. It proved to be a critical input for securing improved crop yields and enabling the **250%** increase in food production achieved during the 'green revolution' of 1970-2000



The percentage of cultivated land that is irrigated has seen an increasing trend in **Jordan** – from 30% in the early 1990s, to around 40% from 2008 onwards. This increase in irrigation is founded on increasingly unsustainable groundwater abstraction: the majority of irrigated land (around 56% at the latest agricultural census) uses water sourced from wells. 10 out of the 12 groundwater basins are over-exploited

Technology



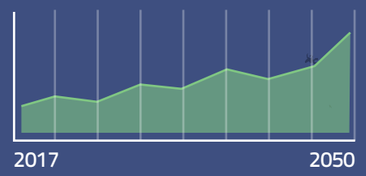
Although investment in agricultural R&D continues to be one of the most productive investments, with rates of return between **30 and 75%**, yet, it has been neglected in most low income countries. Globally, modern technologies have only been applied to about **3%** of the land under irrigation.

In **Uganda**, there is a need for an appropriate decentralized hydrological data management approach to foster evidence-based policy and decision-making in water resources management

Water Efficiency

Water-use efficiency improvements **are instrumental** to bridge the projected 40% gap between demand and supply and mitigate water scarcities by 2030

Without improved efficiency measures, agricultural water consumption is expected to increase by **20%** globally by 2050



Farmers in **Uganda** are facing large yield gaps for major rainfed and irrigated crops. The obtained yields are greatly less than the yields obtained on controlled stations

Inefficient use of water for crop production depletes aquifers, reduces river flows, degrades wildlife habitats, and has caused **salinization of 20%** of the global irrigated land area

Between 1990 and 2004, the annual rate of efficiency improvement in agricultural water use, in rainfed and irrigated areas, was only **1%**. Compared with other infrastructure, such as in information and communication technology where consumers have come to expect **exponential rates of annual improvements** in processing speed and data storage efficiency, water is conservative

Key to projects (see map in center of page)

- ● Reduce vulnerability in the context of water scarcity and increasing food and energy demand/ Jordan
- ▲ Coping with water scarcity – the role of agriculture/Phase III: Strengthening national capacities/ Jordan, Lebanon, Egypt
- ■ Strengthening agricultural water efficiency and productivity on the African and Global level/ Burkina Faso, Morocco, Uganda
- ★ Technical audit of farm-level Irrigation Modernization Project (FIMP) in Egypt