Impact of Water Policy on Food Security- Jordan Case Study

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Introduction

- Jordan is an arid to semi-arid country with total population of 9.5 million (Department of Statistics, 2017).
- The country has a total land area of 88,780 km^2 (World Bank, 2016).
- Jordan is considered as a water poor country due to shortage in the supply of water. Water scarcity threatens development of Jordan.

Introduction Cont.

- Precipitation is very low and it ranges from 30 to 600 mm annually (UNESCO, 2012).

- The variable and low of rainfall with the high rate of evaporation and droughts all contributing to low water resource reliability and availability.

- The average consumers share of water was less than 140 cubic meter per year.

Water resources

- Jordan's water resources:
  - Conventional water resources (Ground and Surface) (80%).
  - Non-Conventional water resources (desalination and wastewater reuse) (20%).

Water resources Cont.

- Ground water accounts for about 54% of water supply in Jordan from 12 groundwater basins.

- Surface water form about 37% of the total water supply which is developed through 15 water basins distributed all over the country.

Water Policy

- The new water strategy for 2016-2025, suggested a better price regime that could reflect water conservation and optimization and higher productivity.
- Water exchange policy would help in the reallocation of water to users, and seek a balance between water uses that create higher value products per unit of water, and maintain food security.
- Drinking water quality in Jordan is governed by Jordanian Standard 286 of 2008, which is based on the world health organization drinking water guidelines.

Climate Change

- 1. Overall, climate change could result in a variety of impacts on agriculture. Some of these effects are biophysical, some are ecological, and some are economic, including:

  - a- A shift in climate and agricultural zones towards the poles.
  - b- Changes in production patterns due to higher temperatures,
  - c- A boost in agricultural productivity due to increased carbon dioxide in the atmosphere,
  - d- Changing precipitation patterns,
  - e- Increased vulnerability of the landless and the poor,

Climate Change Cont.

- 2. Direct impacts of climate change over the next years will be on agriculture and food systems. Climate change will diversely affect food security and small farmers in poor countries.

- 3. Desertification trends are worsening with the impacts of climate variability, coupled with ineffective macroeconomic policies, which have been unable to stimulate appropriate investments in groundwater conservation, natural resource management and agricultural infrastructure.

Climate Change Cont.

- In 2008, the food crises in Jordan, Morocco, Niger and Yemen lead to social unrest and riots which adversely impact political and economic stability and affecting investment and economic growth.

Climate Change and Food Security

- According to FAO, "Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life".
- Many studies considered the balance between food import and export in assessing the impact of climate change on food security.
- Food security was assessed in terms of self-sufficiency degree (SSD) for the main food items. The SSD was based on the ability to meet consumption needs from own food production rather than from food imports.
- Without adaptation plans and measures, the country will suffer from severe reduction in cultivated area and crop production and subsequent reduction in the self-sufficiency degree of food.

Water Policy to Manage Drought in Jordan

- Jordan has no clear policy that might have led to a sustainable solution to the water problem giving the increasing constraints on the resources.

- Due to externalities, Government has focused on income growth objectives rather than policy objectives, income distribution, and environmental concerns.

Water Policy to Manage Drought in Jordan Cont.

- To increases agriculture production and meet the demand of a growing population, development of water resources has been limited during the past 3 decades to:
  - a- building hydraulic structures in the public sector,
  - b- exploiting of groundwater in the private,

Case- Studies of Using ICT Modeling in Water Management in Jordan

- **1. ICT in Water Monitoring and Water Dissipation.**
  - Jordan University of Science and Technology is managing a program titled "ICT in Water Monitoring and Water Dissipation".
    - **The goals of the Program are as follows:**

1) support training and applied research in the area of ICT and other activities to improve water policy decisions and management effectiveness in the MENA region;

2) increase regional information sharing;

3) increase regional collaboration; and

4) support the development of the MENA partners in the equipment and infrastructure of ICT.

Case- Studies of Using ICT Modeling in Water Management in Jordan Cont.

- **2. King Abdullah Canal (KAC)**
  - The King Abdullah Canal represents a significant source of water for the country; however, its quality and quantity is dependent on the neighboring countries, as most of the water originates from either Palestine or Syria.
  - The main water source for (KAC) is the Yarmouk River , additional water flows from Wadi Al-Arab and from the Zarqa River, and its reservoir behind King Talal Dam.
  - During the past three years, water in the (KAC) has had severe taste and odor problems when it reached the Zai drinking water treatment facility near Amman. Eutrophication is the likely source of these problems. Eutrophication is caused by excessive nutrient loading to bodies of water and associated planktonic and/or periphytic algal blooms.

Case- Studies of Using ICT Modeling in Water Management in Jordan Cont.

- **2. King Abdullah Canal (KAC)**
  - Evaluation of the extent and cause of eutrophication was investigated by conducting **simulation modeling,** to predict future water quality changes in the canal under various water management conditions.
  - The Results were focused on reuse of treated wastewater in the North regions for irrigation practices; raising the efficiency in the irrigation practices.

Case- Studies of Using ICT Modeling in Water Management in Jordan Cont.

- **3. The Southern Jordan Valley Irrigation Management**
  - A study was conducted to analysis of trade—offs among the use of different water resources in Southern Jordan Valley and to estimate the optimal allocation of water in order to investigate the efficiency of JVA policies.
  - The analysis used a computer software, it found that the spring-season policy was not effective since the main crop produced in the Southern is banana.
  - The study suggests changing the current cropping pattern to one that can come close to the highest agricultural income, while reducing water consumption.

Recommendations

- At the decision maker level, the development of water resources to increase supply is a top priority. At the user level, adaptation measures are focused at managing the demand by increasing water use efficiency and the adoption of appropriate cropping patterns that consume less water and produce more food.

- Promote integrated drought/climate monitoring in parallel with a comprehensive decision support system.

- National policies should promote uptake of modern inputs to increase agricultural productivity/production to achieve food security.

Recommendations Cont.

- It should be recognized that a water policy or plan is only as good as the information and ideas that go into its creation. So, government should be aware in choosing the best alternatives possible for gathering information and feedback during the planning process.

- Develop adaptation planning and promote environmental awareness campaign to deal with prolonged weather events.

Thank you For your Attention