

# ARAB ENVIRONMENT • 7

# FOOD SECURITY

## Challenges and Prospects

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المنتدى العربي للبيئة والتنمية  
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## Preface

*Food Security* is the seventh in the series of annual reports on the state of Arab environment produced by the Arab Forum for Environment and Development (AFED). The primary aim of AFED reports is to foster the use of science in environmental policy and decision-making. This is in line with AFED's mission "to advance prudent environmental policies and action in the Arab countries based on science and awareness."

This report highlights the need for more efficient management of the agriculture and water sectors, enhancing the prospects of food security. It comes as natural addition to the sequence, after: *Arab Environment - Future Challenges* (2008), *Impact of Climate Change on Arab Countries* (2009), *Water - Sustainable Management of a Scarce Resource* (2010), *Green Economy in a Changing Arab World* (2011), *Survival Options - Ecological Footprint of Arab Countries* (2012), and *Sustainable Energy* (2013).

Food security is of great concern to Arab countries. They have been pursuing a target of higher food self-sufficiency rate, but achieving this goal remained beyond reach. With limited cultivable land and scarce water resources, Arab countries did not use their agricultural endowments effectively and efficiently. Lack of appropriate agricultural policies and practices diminished the bio-capacity of resources to regenerate their services and threatened agricultural sustainability.

The food crisis and the unprecedented spike in food prices in recent years, coupled with export restrictions imposed by some food producing countries, reignited the call to ensure reliable sources for food import-dependent countries like the Arab countries. This report attempts to address issues such as: to what extent can available agricultural resources at country and regional levels meet demand for food in the Arab world? What are the prospects for food self-sufficiency, taking into consideration the growing population and the impact of climate change on land and water resources? And, ultimately, what other options do the Arab countries have to ensure food security?

This AFED report, produced by a group of leading experts, is the result of collaborative work, in cooperation with regional and international organizations, universities and research centers. Over 200 researchers and specialists contributed to the work. Various consultation meetings were held to discuss drafts, culminating in a regional meeting hosted by the Kuwait Fund for Arab Economic Development (KFAED), where 40 experts from 14 countries and 21 institutions reviewed the drafts with the authors.

One novel feature of the report is a set of maps showing water and land resources in the Arab region, produced in cooperation with the International Center for Agricultural Research in Dry Areas (ICARDA) based on the most recent data. Beyond showing the availability of resources per country, they point out obvious routes of regional cooperation, based on the variation in natural endowment. Those maps were initially proposed by AFED senior adviser Dr. Mostafa Kamal Tolba, who thought it was essential to identify locations of water and land resources, to see where they overlap and to pinpoint potential regional cooperation spots.

Although the Arab region is a net importer of food, with dwindling natural resources and ever increasing population, this report concludes with a positive note. It asserts that the gloomy situation of food production can be reversed through a combination of measures, mainly increasing land productivity and irrigation efficiency, which are now far below the world average in most Arab countries. It is imperative to combine those measures with serious regional cooperation that explores comparative advantages, in a region characterized by stark variations in ecological footprint, natural resources and income. Achieving this, while still maintaining biodiversity and healthy environmental systems, would also require a radical shift in consumption patterns.

What this report prescribes might sound like unrealistic, and in best cases overly optimistic, in a region passing through existential turmoil. However, after conflicts and wars are over, people will still need sufficient resources to eat, drink and breathe. In order to pursue sustainable wellbeing for all residents in the region, attention should be directed to achieve more regional economic integration, and to promote inter-Arab trade free of barriers, where the free flow of goods, capital and people works to the benefit of all countries.

AFED wishes to thank all those who made this report possible, especially our institutional partners: Environment Agency – Abu Dhabi (EAD), Arab Fund for Economic and Social Development (AFESD), Kuwait Fund for Arab Economic Development (KFAED), Islamic Development Bank (IDB), Kuwait Foundation for the Advancement of Science (KFAS), International Center for Agricultural Research in Dry Areas (ICARDA), Economic and Social Commission for West Asia (UN-ESCWA), Food and Agriculture Organization (FAO), and all corporate, academic and media partners who supported this endeavor.

Special thanks are due to the co-editors, Dr. Abdul-Karim Sadik and Dr. Mahmoud El-Solh, and all authors and experts who contributed to the contents and appraised the drafts.

AFED hopes that its report on Food Security will help Arab countries adopt the right policies and commit to long-term investments, in order to secure sustainable supply of food to meet ever-growing needs.

November 2014

**Najib Saab**  
*Secretary General*  
*Arab Forum for Environment and Development (AFED)*

## EXECUTIVE SUMMARY

**FOOD SECURITY IN ARAB COUNTRIES  
CHALLENGES AND PROSPECTS****2014 ANNUAL REPORT OF THE ARAB FORUM FOR ENVIRONMENT & DEVELOPMENT (AFED)**

In their quest to enhance food self-sufficiency, Arab countries face serious challenges emanating from a backdrop of constraining factors, including aridity, limited cultivable land, scarce water resources and serious implications of climate change. Weak policies, insufficient investment in science and technology and agricultural development have contributed to the impoverished state of agricultural resources and to their inefficient use and low productivity. Population growth, rising demand for food, degradation of natural resources, and conversion of farmland to urban uses pose further challenges to the enhancement of the food security goal in the Arab region. The food deficit is underscored by a self-sufficiency ratio of about 46 percent in cereals, 37 percent in sugar, and 54 percent in fats and oil.

Food and water are inextricably linked. The Arab region faces the dilemma of water scarcity, reflected in the fact that the annual renewable water resources per capita are less than 850 m<sup>3</sup>, compared to a world average of about 6000 m<sup>3</sup>. This regional average masks the widely varying levels among countries, of which 13 are classified in the severely water scarce category, at less than 500 m<sup>3</sup> per capita. The situation is so alarming in six of these countries, with availability of renewable water less than 100 m<sup>3</sup> per capita, that this report has created a special “exceptionally scarce” category for them.

Water scarcity in the Arab region is accentuated by the utilization of about 85 percent of total water withdrawals for the agriculture sector, which is characterized by low irrigation efficiency and crop productivity. Immense pressure has been exerted on the scarce water resources, including non-renewable groundwater, as reflected in the high rates of water withdrawals for agriculture, averaging about 630 percent of total renewable water resources in Gulf Cooperation Council (GCC) countries, reaching about 2,460 percent in Kuwait. According to FAO, countries are in a critical condition if they use more than 40 percent of their renewable water resources for agriculture and could be defined as water-stressed if they extract more than 20 percent of these resources. Based on this definition 19 Arab countries could be defined as water-stressed, because their current abstraction rates from their renewable water resources for agriculture greatly overshoot the defined limits.

Improving the state of food security in Arab countries through domestic production, under limited cultivable land, highly stressed and dwindling water resources, coupled with an impoverished bio-capacity of agricultural resources, is a challenging task. Nevertheless, considerable prospects do exist for enhancing the food self-sufficiency ratio through adoption of the right policies and improved agricultural technologies, and setting up an integrated food value chain capable of

ensuring food security built on the pillars of availability, accessibility, utilization and stability of food.

Improving the self-sufficiency aspect of food security requires an all-inclusive regionally integrated approach, recognizing the interdependence of the food-water-energy nexus, and a new paradigm of agricultural sustainability, based on economic, social, and environmental considerations. Within this framework, a number of options can be identified to enhance the food self-sufficiency ratio, particularly through the efficient utilization of available agricultural resources, in addition to livestock and fisheries resources. These options include the following:

**Improving Irrigation Efficiency:** Producing more agricultural outputs with less water is an option of significant importance for enhancing food security in water-scarce countries. It depends on the right type of canals used to deliver water to the field, more efficient irrigation methods, such as sprinkler and drip irrigation, raised broad-bed planting and the level of farmer organization and discipline.

Average irrigation efficiency in 19 Arab countries is below 46 percent. It is estimated that raising this figure to 70 percent would save about 50 billion m<sup>3</sup> of water annually. With an irrigation requirement of 1,500 m<sup>3</sup> of water per ton of cereals, this would be enough to produce over 30 million tons, equivalent to 45 percent of cereal imports with a value of about US\$11.25 billion at 2011 import prices.

**Boosting Crop Productivity:** Crop productivity in the Arab region is generally low, particularly that of staple cereals, averaging about 1,133 kg/ha in five major cereal producers (Algeria, Iraq, Morocco, Sudan, and Syria), compared to a world average of about 3,619 kg/ha. Ongoing research by the International Center for Agricultural Research in the Dry Areas (ICARDA) has shown considerable increases in wheat yield at demonstration fields versus farmers' fields in both irrigated and rain-fed systems in countries such as Egypt, Morocco, Sudan, Syria, and Tunisia. For example, raised-bed planting in Egypt resulted in a 30 percent increase in grain yield, 25 percent saving in irrigation water, and 72 percent in water use efficiency.

It is critically important to improve crop productivity in rain-fed areas, which constitute over 75 percent of the cultivated area in the Arab region. FAO and ICARDA refer to various forms of rain-water harvesting including in situ water conservation, flood irrigation, and storage for supplementary irrigation. Work

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