

## Scientists Unite To Combat Water Scarcity; Solutions Yield More Crop Per Drop In Drylands

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As rapidly increasing water scarcity threatens to aggravate the effects of climate change on agriculture in the dry areas of the Middle East and other developing countries, scientists launched this week an ambitious seven-country project, which offers new hope for farmers in the face of acute and growing water shortages.

Gathering in Amman, Jordan, for a global conference on food security and climate change in dry areas, experts reported that improved irrigation techniques in rainfed cropping will allow farmers to more than double their wheat yields using only one-third the water they would use with full irrigation; the new methods have been shown to boost farmers' yields up to five-fold over those crops which relied on rainfall only. Such innovative strategies could provide a much-needed lift to livelihoods in dry areas in the developing world, home to almost 25 percent of the world's population.

Regions most affected by drought and water scarcity are also disproportionately challenged by high population growth, climatic unreliability, frequent droughts, and widespread poverty, the experts said, citing figures from the Food and Agriculture Organization (FAO) of the United Nations.

"In some countries in the region, per capita water availability has dropped to as little as 170 cubic meters per year, well below the internationally recognized water scarcity standard of 1000 cubic meters," said Dr. Mahmoud Solh, Director General of the Aleppo-based International Center for Agricultural Research in the Dry Areas (ICARDA). "There is a direct relationship between access to water and access to food and feed security. Unless we form a united front that responds effectively to water scarcity in agriculture and to the impacts of climate change, the future food security, economic development, and social stability of the entire region will be put in jeopardy."

Seven Middle Eastern countries - Egypt, Iraq, Jordan, Lebanon, Palestine, Syria and Yemen - will work jointly to improve water management in agriculture as part of a 10-year effort called the Water and Livelihoods Initiative (WLI), which is being funded through the US Agency for International Development (USAID) and led by ICARDA, which is supported by the Consultative Group on International Agricultural Research (CGIAR). The WLI will focus on improving rural livelihoods through sustainable land and water management in three agro-systems - irrigated agriculture, rainfed agriculture and rangelands.

"Rainfed areas account for 80 percent of the world's farmland," said Dr. Theib Oweis, a researcher with ICARDA. "If dryland countries are to achieve food security in the face of climate change, it's especially urgent that they unlock the potential of rainfed agriculture through efficient practices like supplemental irrigation and water harvesting."

Research conducted by ICARDA and its partners has shown that supplemental irrigation - using only a third of the amount of water required for full irrigation - can boost water productivity to as high as 2.5 kilograms of wheat grain per cubic meter of water, compared to 0.5 kilograms under strictly rainfed conditions and 1 kilogram under full irrigation.

In Morocco, for example, the early planting with supplemental irrigation has been shown to double wheat yields and water productivity and to help the wheat crop escape late-season drought and heat stress. "In addition to increasing yields, supplemental irrigation provides a buffer against drought during the growing season," added Dr. Oweis. "Combine this with water harvesting, and you have a winning solution."

Research on water harvesting in the Jordan steppe, or badia, has demonstrated dramatically how 50 percent of rainfall runoff can be harvested and used to grow useful vegetation cover for rangelands and to reverse desertification. Other ICARDA research in Syria has resulted in the development of a rapid and efficient method for using modern geographical information systems, or GIS, to select appropriate locations for water harvesting from among thousands of possibilities.

According to Dr. Oweis, WLI offers a grand opportunity to rethink agricultural water management across the Middle East. A major challenge, he explains, is to shift from the conventional focus on "land productivity," which usually ignores the amount of water used, to a new concern with "water productivity," that is, the "biophysical, economic, social and environmental returns from a unit volume of water used."

Starting with US\$1 million from USAID, each of the countries taking part in the new initiative will begin implementing its own proposal for improving water and land management linked under the combined initiative. The consortium of countries will receive technical backstopping from ICARDA, together with two other CGIAR Centers - the International Food Policy Research Institute (IFPRI) and **International Water Management Institute (IWMI)** - as well as from a number of US universities.

"Innovations in water management must be broadly based and bring together the various strands of agricultural and natural resource management research, the adoption and adaptation of findings by farmers, and the development of policy," Dr. Solh said.

In order for this research to succeed, Dr. Solh said, countries of the Middle East and other dryland regions must discard the inappropriate policies of the past on water and land use and leave behind fragmented research on agriculture and natural resource management. Rather, they must embrace new collaborative approaches that strengthen human capacity and extend across national boundaries.

"The Water and Livelihoods Initiative," he said, "is a big step in the right direction."

For information about the International Conference on Food Security and Climate Change in Dry Areas, please visit: <http://bit.ly/4SK3ex>.

For information about the Water and Livelihoods Project, please visit: <http://www.icarda.org/WLI>.

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