



**Food and Agriculture  
Organization of the  
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# **Towards a Regional Collaborative Strategy on Sustainable Agricultural Water Management and Food Security in the Near East and North Africa Region**

## **Executive Summary**

**Main Report, Second Edition, 2015**



### Introduction

The Near East and North Africa (NENA) Region is naturally exposed to severe shortage of water and will be exposed in the coming decades to an unprecedented severe escalation of water scarcity due to several drivers, including: demographic growth; tendency to increase food self-sufficiency to reduce vulnerability to import and price volatility; urbanization expansion; industrialization; energy demand; overall socio-economic development. Over-exploitation of groundwater has been alarming while per capita fresh water availability has decreased by 23% over the last forty years and will probably decrease by another 50% by 2050. This trend will be further exacerbated by the projected population growth and the negative impact of climate change, drought and the considerable degradation of water quality. The relevance of transboundary water resources in the Region will add considerable strain.

Agriculture, which consumes already more than 85% of available fresh water resources, will be facing strong challenges keeping its current water share for contributing to food security and the rural economy.

Although farmers in the region have developed water resource more extensively and efficiently than anywhere else in the world, all these mounting and interconnected factors require a transformational change that breaks from past policies and embraces an integrated water resources management approach providing the elements for an economically, socially and environmentally sustainable agriculture.

To address this change, FAO has launched the Regional Initiative on Water Scarcity, providing as first output a *Regional Collaborative Strategy on Sustainable Agricultural Water Management in the Near East and North Africa Region*. The Regional Collaborative Strategy represents a framework to assist countries in identifying and streamlining policies, governance and practice that can sustainably improve agricultural productivity and food security in the region. Governance reforms, economic, institutional and technical options and innovative implementation modalities will be identified to tackle the challenges of more efficient and sustainable agricultural water use in the context of ever-growing water resources scarcity.

### FAO's Regional Initiative on Water Scarcity in the Near East and North Africa

The NENA Region faces the challenges of addressing a wide range of complex and intertwined issues associated with the management of natural resources, particularly land and water. To address these challenges, FAO has launched a Regional Initiative on Water Scarcity in NENA (WSI) in 2013. Based on FAO's publication *Coping with Water Scarcity: an Action Framework for Agriculture and Food Security*, the WSI Initiative is designed to inject innovation into the process of finding sustainable solutions to water scarcity and food security problems through promoting the implementation of cost-effective water investments and management practices. The WSI Initiative is being carried out on a partnership basis among member countries and between countries and international and regional partners. The WSI has two major initial outputs: (i) a Regional Collaborative Strategy; and (ii) a Regional Partnership to support countries in the implementation of the Collaborative Strategy.

During 2013/2014, FAO prepared the *Regional Collaborative Strategy on Sustainable Agricultural Water Management*. The Regional Collaborative Strategy seeks: finding structured mechanisms addressing problems related to water for Agriculture in NENA Countries; to identify systematically information gaps and key problems in water for Agriculture; to highlight the need for strengthening knowledge, cooperation and coordination amongst stakeholders at local, National and Regional levels; to document options for filling the information and knowledge gaps and for addressing the key problems; to support and complement existing Regional Initiatives such as the *Arab Water Security Strategy 2010-30*, the *Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region* (RICCAR), the *Arab Strategy for Sustainable Agricultural Development*, the *Arab Disaster Risk Reduction Strategy*, etc.

The Regional Collaborative Strategy was presented at the FAO *Land and Water Days* in Amman in December 2013 and endorsed at the FAO Regional Conference for NENA in February 2014.

This Note summarizes the Regional Collaborative Strategy and the initial steps being taken to implement it.

### **Water and agriculture in NENA: an overview**

NENA is a very water-poor Region, with the average annual precipitation estimated at 150 mm and water resources per capita just one sixth of the world average. Countries in the region have developed a higher proportion of their available water resources and have constructed more water storage per capita than any other region in the world. Nonetheless, four countries have access to very significant water resources that flow largely from outside their boundaries – Egypt, Sudan, Iraq, Syria – and Iran has significant internal resources. All NENA countries have embraced the spirit of integrated water resources management to varying degrees and have introduced basin planning to improve inter-sectoral allocation efficiency. Agriculture is far and away the biggest user of water in the region, but now demand from other sectors is rising fast.

Agriculture is an important sector in almost all the countries of the region. Rainfed farming, largely growing cereals, provides livelihoods for nearly two thirds of the agricultural population region-wide, and rainfed farmers face particular challenges of unpredictable rainfall and low productivity. Because of the generally arid climate, there is a high level of development of water resources for irrigation and relatively high levels of performance in agricultural water management. Irrigated agriculture is market-oriented and commercialized, responding to fast-growing demand from urban and export markets for higher value products. However, shortfalls persist in irrigation efficiency and in crop water productivity. Groundwater has become a significant source of agricultural water across the region, and it has been the basis for the rapid growth of new agricultural economies in the Arabian Peninsula. However, every country is now experiencing the challenge of groundwater depletion. Climate change is likely to bring higher temperatures during the growing season, lower and less predictable precipitation, and more droughts, accentuating the already severe water scarcity and increasing the demand for irrigation water.

### **Raising agricultural productivity further through water management**

All NENA countries are seeking ways to further increase incomes and employment in agriculture and to reduce rural poverty. Water is the binding constraint in agriculture throughout the region and as water resources are already over-allocated and demand is rising from other sectors, improving productivity from existing water must be the principal path to agricultural growth, especially gains in water use efficiency and crop water productivity in both rainfed and irrigated systems. The last 25 years have witnessed a strong average growth rate of 2% per annum in agricultural value added, attributable to more intensive irrigation systems and to an increase in irrigated production of higher value crops. The pathway to sustaining agricultural growth whilst using less water is through further improvements in agricultural water management – ‘more income for less drop.’

### **Towards a strategy: options for change and regional collaboration**

NENA countries have recognized that water scarcity will further increase and that available resources for agriculture must be managed ever more efficiently and sustainably. This involves actions both at the overall level of water resources management, to put in place the institutions and instruments that will allocate water to agriculture and provide the institutional and incentive framework for efficient and sustainable water management at the sectoral and local level to ensure that water allocated to agriculture is used efficiently and productively.

## Focus and implementation of the Regional Collaborative Strategy

The Regional Collaborative Strategy is designed to focus on policies, investments, technologies and practices that are necessary to ensure sustainable intensification of agricultural production under water scarce conditions. Implementation of the Collaborative Strategy builds on the numerous existing initiatives in partnership with the many national, regional and international bodies already engaged. It is providing an agricultural water lens to the 2012 *Arab Strategy for Water Security and its action plan*.

## Scope for regional collaboration to improve management of NENA's water resources for agriculture

The Regional Collaborative Strategy reviews NENA experience with policies and institutions for managing water resources for agriculture, highlights options for improvement, and suggest areas where stakeholders – countries, national, regional and international agencies, farmers, the private sector – can work together to develop pathways to improved performance.

### Governance and institutions

NENA countries have had considerable experience in setting up institutions and adopting policies to implement best practices in water sector governance and institutional development. There is nonetheless scope in many countries to further improve accountability, strengthen capacity for regulation, improve the investment planning process, reinforce participatory approaches, and further reduce the fiscal burden. Here regional learning and technical cooperation could assist.

### IWRM and the basin approach

Integrated water resources management (IWRM), including the basin approach, has been adopted to varying extents and with varying effectiveness in the countries of the region. Generalization of IWRM and the basin approach, further decentralisation to the basin level, and an increase in accountability would help improve allocative efficiency and agricultural productivity. A key challenge is to develop institutional mechanisms for inter-sectoral water transfer. A regional review of past experience in NENA and globally, and sharing of data, information and knowledge, could help countries to build on positive experience and to generalize successful approaches (*collaboration here forms part of the plan of action for the Arab Strategy for Water Security*).

### Subsidiarity, decentralization and participation

Across NENA, water user associations (WUAs) and community natural resource management have been adopted, largely successfully, as a mechanism for engaging local stakeholders in responsible water management. Second generation issues include how to genuinely empower local stakeholders and how to organize relations amongst stakeholders including women and young. Next steps on empowering WUAs and farmer organizations need to be evidence-based, grounded in an understanding of their role in the value chain and of their potential and limitations in specific contexts. Approaches in subsidiarity, decentralization and participation could benefit from a region-wide assessment of WUAs and subsequent regional technical cooperation to develop ways to further empower WUAs and strengthen their capacity. More broadly, regarding community-based natural resource management, a review of regional experience and best practice and constraints, together with cross-country exchanges and development of guidelines, could help in strengthening institutions for local-level natural resource management.

### Supply side management

Supply side management could bring some extra water for agriculture from reservoirs and non-conventional sources, although this will require scrupulous planning and management. There are also risks to the existing supply that will need active management. Transboundary issues need to be addressed through a patient and flexible strategy, set within political realities. Climate change is a major threat to the resource and needs strategic responses to limit its negative impacts on agricultural production. Groundwater is a bountiful resource but overuse has led to widespread depletion. Technical and economic measures can help manage demand but institutional measures are needed to develop groundwater governance for sustainability. Options include rights and regulatory approaches, adjusting incentives, decentralized management, and education.

There are several ways in which regional collaboration could help NENA countries act on the supply-side drivers of scarcity:

- To maximize economic use of treated wastewater, and other non-conventional water resources as brackish water, a region-wide exchange of experience could help to establish best practice and guidelines; and regional or bilateral cooperation programmes could help with benchmarking, capacity building, applying standards and regulatory frameworks etc.
- Ways to optimize benefits from transboundary resources at the basin scale form a priority topic for the region (*collaboration here forms part of the plan of action for the Arab Strategy for Water Security*).
- Regarding climate change, there is scope for regional collaboration on modelling and monitoring, and for regional technical cooperation on preparation of adaptation strategies and on research and technology development (*collaboration here also forms part of the plan of action for the Arab Strategy for Water Security*).
- Establishing a governance framework for groundwater could benefit from region-wide sharing of data, information and knowledge, as well as from a review of experience across the region and in other regions.

### Demand management

Over recent decades, all NENA countries have actively implemented demand management measures. However, in almost all countries, there is scope for further evidence-based adjustments founded on a better understanding of the relationship between the incentive framework, the use of resources, and the impact on farming households (incomes, food security etc.). A region-wide review of the components of incentive structures and development of best practices could help NENA countries to establish an incentive framework for promoting water use efficiency and water productivity in agriculture. A regional focus on awareness raising could also help win consensus on the framework.

### **Scope for regional collaboration to improve water use efficiency and crop water productivity**

The Regional Collaborative Strategy reviews NENA experience with the whole range of agricultural water management systems and asks the questions: *How efficient really is agricultural water management in NENA, how can productivity be boosted – and how can gender responsive good practice be shared and built on?*

### Efficiency and productivity

Overall, water use efficiency and crop water productivity are relatively high in NENA, as expected in so arid a region. There is, nonetheless, considerable scope for further increases which could be catalysed by basic research, applied and adaptive research, and farming systems research, together with benchmarking, monitoring and evaluation and technology transfer to increase efficiency and productivity. This agenda would benefit from a regional approach, working through a partnership of international, regional and national research agencies.

### Surface irrigation

NENA performance on surface irrigation is at the higher end of the global range but can be raised further by improving the flexibility, equity and reliability of water service, by in-field intensification to raise crop water productivity, and by further modernization of both infrastructure and institutional arrangements.

Increasing water efficiency and closing the yield gap in surface irrigation requires irrigation modernization, which would benefit from: a regional process to share data, information and knowledge on modernization and best practices; regional technical cooperation on methodologies, benchmarking, capacity building etc.; and regional alignment on planning tools and development of regional centres of excellence in their application, for example using FAO's MASSCOTE tool. NENA countries will also need to factor the implications of the rising cost of energy into planning and operations, and this could be helped by a regional collaborative review of the implications of the water-food-energy nexus.

### Pressurized irrigation

Pressurized irrigation with proper management has proved efficient and profitable, although costs and risks are relatively high. Governments could help farmers, particularly poorer ones, to overcome barriers to entry and to manage risks. A regional programme of research and development, capacity building, and technical cooperation could help countries design programmes to increase efficiency and productivity, and to reduce barriers to entry and help farmers manage price risk. In view of the widespread depletion of groundwater due to over-use largely for pressurized irrigation, cooperation on this topic needs to be linked to consideration of how to strengthen groundwater governance.

### Rainfed farming systems

Rainfed agriculture is the predominant farming system in NENA. New technology, investment and institutional adaptation are needed to raise productivity and to help farmers adapt to climate change. Synergy and joint work across the region in research, exchange of gender responsive best practice, mutual farmer visits etc. could provide a full focus on technology and institutions for improved productivity.

### Watershed management and water management in dry and degraded lands

Watershed management has been relatively successful in the region and across the world when approaches have been participatory and conservation techniques have been profitable to farmers. Experience in NENA and elsewhere has shown that in the dry and degraded lands, water is the vital input for forestry, for livelihoods and for anti-desertification. Successful models have been tested, but the challenge is scaling up. For watershed management, a regional review and establishment of gender responsive best practices from the region and globally could help countries to build on experience and develop second generation programmes. Regarding water and forestry, regional collaboration for sharing of data, information and knowledge, establishment of best practices and R4D (?) could help with programmes to develop forests and trees on degraded lands, around cities, and for anti-desertification.

### Drainage and drainage water reuse

Drainage has been the poor relation to irrigation, yet Egypt and other NENA countries have demonstrated that both drainage and reuse of drainage water can be low cost ways to boost productivity. Programmes for drainage and drainage water reuse could be helped by regional collaboration for sharing of data, information and knowledge on drainage and reuse; establishment of best practices; benchmarking; capacity building; and regional technical cooperation.

## **Themes for regional approaches and cooperation on agricultural water management**

The discussion above identified a number of themes and objectives where regional collaboration could contribute to improving management of NENA's water resources for agriculture and help to improve water use efficiency and crop water productivity. This collaboration might cover in particular: sharing of data, information and knowledge exchange on agriculture water management; gender responsive best practices in governance and institution building; benchmarking; research for development; capacity development; technical cooperation; and awareness-raising. Themes where collaboration could make a real contribution are summarized in the two tables below: Table 1 summarizes the scope for regional collaboration to improve management of NENA's water resources for agriculture. Table 2 provides a synoptic view of options for regional collaboration to improve water use efficiency and crop water productivity through agricultural water management.

Table 1: Scope for regional collaboration to improve management of NENA's water resources for agriculture

Theme	Next steps	Possible scope for regional collaboration
<b>Governance and institutions</b>		
	Improve efficiency and accountability	<ul style="list-style-type: none"> <li>Sharing of knowledge and gender responsive best practices</li> <li>Technical cooperation.</li> </ul>
<b>IWRM and the basin approach</b>		
	Generalization of IWRM and the basin approach to accountability for improve allocative efficiency and agricultural productivity	<i>in line and support of the plan of action for the Arab Strategy for Water Security 2030</i>
<b>Subsidiarity, decentralization, participation</b>		
<i>Empowering WUAs</i>	Empowering evidence-based WUAs and farmer in the context of value chain approach.	<ul style="list-style-type: none"> <li>Strengths and weakness guidelines for further sustainable development</li> <li>Technical cooperation, benchmarking, and capacity development</li> </ul>
<i>Community-based water management</i>	Strengthen institutions for local-level natural resource management.	<ul style="list-style-type: none"> <li>A review of regional experience and best practice and constraints</li> <li>Cross-country exchanges and guidelines</li> </ul>
<b>Acting on the supply-side drivers of scarcity</b>		
<i>Use of brackish and treated waste waters</i>	Promote the safe use of brackish water and treated wastewater resources	<ul style="list-style-type: none"> <li>Exchange of experience to establish gender responsive best practice and guidelines</li> <li>Bilateral and regional cooperation in applying standards and regulatory frameworks etc.</li> </ul>
<i>Transboundary</i>	Optimize benefits from transboundary resources at the basin scale	Transboundary forms part of the plan of action for the Arab Strategy for Water Security
<i>Climate change</i>	Priorities are modelling and monitoring, preparation of adaptation strategies and technology development	<i>Collaboration forms part of the plan of action for the Arab Strategy for Water Security.</i>
<i>Groundwater sustainability</i>	Options include water rights and regulation, adjusting incentives, decentralized management, and education	<ul style="list-style-type: none"> <li>Region-wide sharing of data, information and knowledge</li> <li>Review of experience across the region and in other regions</li> </ul>
<b>Demand management options and the incentive framework</b>		
	Evidence-based adjustments founded on a better understanding of the relationship between the incentive framework, the use of resources, and the impact on farming households (incomes, food security etc.)	<ul style="list-style-type: none"> <li>Region-wide review of the components of incentive structures and development of best practices</li> <li>Regional focus on awareness raising</li> </ul>



**Table 2: Scope for regional collaboration to improve water use efficiency and crop water productivity through agricultural water management**

Theme	Next steps	Possible scope for regional collaboration
<b>Research, technology development and technology transfer to increase water efficiency and productivity</b>		
	Conduct basic and applied research and farming systems development and technology transfer to increase efficiency and productivity	Collaboration forms part of the Arab Strategy for Water Security
<b>Surface irrigation: increasing WUE and closing the yield gap</b>		
<i>Irrigation modernization</i>	Irrigation modernization and benchmarking which involves farmers in the decision-making process	<ul style="list-style-type: none"> <li>▪ Process to share data, information and knowledge on modernization and gender responsive best practices</li> <li>▪ Technical cooperation on methodologies, benchmarking, capacity development etc.</li> <li>▪ Alignment on the MASSCOTE planning tool and development of regional centres of excellence</li> </ul>
<i>The water-food-energy nexus</i>	Factor the implications of the rising cost of energy into planning, operations, and food security.	<ul style="list-style-type: none"> <li>▪ Review of the implications of the water-food-energy nexus and way for improved sectors' interface</li> </ul>
<b>Pressurized irrigation</b>		
	Increase system efficiency and productivity along the value chain and help farmers manage price risk.	<ul style="list-style-type: none"> <li>▪ Regional programme of research and capacity improvement for sustainable development and improved on-farm water management</li> </ul>
<b>Rainfed agriculture</b>		
	Focus on technology and institutions for improved productivity in rainfed farming systems	<ul style="list-style-type: none"> <li>▪ Synergy and joined work across the region in research, exchange of gender responsive best practice, mutual farmer visits, traveling workshops etc.</li> </ul>
<b>Watershed management and water management in drylands</b>		
<i>Watershed management</i>	Build on experience and develop second generation watershed management programmes	<ul style="list-style-type: none"> <li>▪ Regional review and establishment of gender responsive best practices</li> </ul>
<i>Water and forestry</i>	Develop forests and trees on degraded lands, around cities, and for anti-desertification	<ul style="list-style-type: none"> <li>▪ Sharing of data, information and knowledge; establishment of best practices; Research for development and technical cooperation</li> </ul>
<b>Drainage and drainage water reuse</b>		
	Programmes for drainage and drainage water reuse are a high priority in NENA, and some countries – notably Egypt – are world leaders. Next steps include understanding the challenges and options, establishment of best practices, capacity development, and investment.	<ul style="list-style-type: none"> <li>▪ Sharing of data, information and knowledge on drainage and reuse; establishment of best practices; benchmarking; capacity development and technical cooperation</li> </ul>

## Setting priorities for collaboration above the national level: five key themes

The themes presented in Tables 1 and 2 above were discussed with national representatives from 14 countries and with 12 regional and international organizations in the FAO *Land and Water Days* held in Amman in December 2013. The following criteria were used to identify a restricted number of 'high reward' topics as an initial agenda for regional collaboration:

- The topic should address issues of economic importance relevant to improving sustainable; agricultural water management and food security;
- There should be scope for evidence-based change and for benchmarking, monitoring and evaluating progress;
- There should be scope for involving farmers and building in a farmer perspective; and
- The expected benefits from cross-country collaboration at the bilateral, sub-regional and regional level should be clear and important.

Applying these criteria, the following four key themes were adopted as an entry for the Regional Collaborative Strategy:

- Groundwater sustainability
- Irrigation modernization
- Water consumption (accounting), water productivity and water saving in agriculture
- Climate change and drought management



