FINAL REPORT

First Regional Training Workshop
"Launching Workshop of the Regional Water Scarcity Initiative"

2 - 4 June 2013, Cairo – Egypt

Food and Agriculture Organization of the United Nations
Regional Office for the Near East & North Africa
CONTENT

1 INTRODUCTION

1.1 Background

1.2 Organization of the Workshop

2 SESSION 1: Introduction to the initiative

2.1 Welcoming words

2.2 Presentation of the new FAO Strategic framework by Mr. P. Steduto

2.3 Presentation of the Regional Water Scarcity initiative by M. Bazza

2.4 Brief presentation of the main components of the programme

2.5 Discussions/comments by the country teams

3 SESSION 2: Knowledge gap analysis

3.1 Presentation on the findings of the knowledge gap analysis by A. Bullock

3.2 General discussions

3.3 Introduction to the working groups

3.4 Group work: Findings and feedbacks

3.4.1 WG1 report (Morocco, Mauritania, Tunisia)

3.4.2 WG2 report (Morocco, Tunisia, Mauritania, Egypt)

3.4.3 WG3 report (Jordan, Syria, Lebanon, Palestine, Egypt)

3.4.4 WG4 report (Yemen, Oman, Qatar, Saudi Arabia)

4 SESSION 3: Water Auditing and Accounting

4.1 Presentation of coping with water scarcity – FAO Action framework by J-M. Faures

4.2 Presentation of water auditing and accounting by J. Hoogeveen

4.3 Group work: Findings and feedbacks

4.3.1 WG1 report (Morocco, Tunisia, Mauritania)

4.3.2 WG2 (Morocco, Tunisia, Algeria)

4.3.3 WG3 report (Jordan, Syria, Lebanon, Palestine, Egypt)

4.3.4 WG4 report (Yemen, Oman, Qatar, Saudi Arabia)

5 SESSION 4: Food supply curve

5.1 Presentation on the application of a cost curve approach in coping with water scarcity by J-M. Faures

5.2 Presentation on Food supply cost curve conceptual theory by R. Roson

5.2.1 Oman comments on Roson’ presentation

5.3 Breakout Groups: Applying the cost curve approach, value added, needs and requirements
5.4 Group work: Findings and feedbacks ................................................................. 26

6 SESSION 5: Planning and implementation for Country and Regional Assessment ........... 27

6.1 Development of country-level plans ........................................................................... 27

6.2 Feedback from working group: Country plans results ............................................... 27

6.2.1 Egypt ............................................................................................................. 27

6.2.2 Morocco & Mauritania ..................................................................................... 28

6.2.3 Tunisia & Algeria ............................................................................................. 28

6.2.4 Oman ............................................................................................................. 28

6.2.5 Jordan ............................................................................................................. 29

6.2.6 Yemen ........................................................................................................... 29

6.2.7 Palestine ....................................................................................................... 29

6.2.8 Syria .............................................................................................................. 29

6.3 Presentation of the UN-DESA/ ESCWA drought project by S. Ereikat...................... 29

6.4 Presentation of FAO’s work on drought preparedness and follow-up to HMNDP by M. Bazza 30

7 CONCLUSION ........................................................................................................... 30

8 ANNEX 1: COUNTRY ACTION PLANS ................................................................ 32

8.1 EGYPT ACTION PLAN ...................................................................................... 32

8.2 MOROCCO AND MAURITANIA ACTION PLAN ........................................... 34

8.3 TUNISIA AND ALGERIA ACTION PLAN ......................................................... 36

8.4 OMAN ACTION PLAN ...................................................................................... 37

8.5 JORDAN ACTION PLAN .................................................................................. 37

8.6 YEMEN ACTION PLAN .................................................................................... 40

8.7 PALESTINE ACTION PLAN .............................................................................. 41

8.8 SYRIA ACTION PLAN ..................................................................................... 41

9 ANNEX 2: LIST OF PARTICIPATING COUNTRIES AND ORGANISATIONS ......... 42
1 INTRODUCTION

1.1 Background

The Near East and North Africa Region (NENA) faces the challenge of addressing a wide range of complex and intertwined issues associated with the management of natural resources, particularly land and water, and to securing food supply for a growing population. To address these challenges, FAO has launched a regional Initiative on Water Scarcity in the Near East. The overall goal of the initiative is to support Member Countries in streamlining priority areas of action in agriculture water management that can significantly contribute to boosting agriculture productivity, improving food security and sustaining water resources, by highlighting the specific areas that require action and building partnerships to move the process forward.

The initiative will inject fresh thinking into the process of finding sustainable solutions to water scarcity and food security problems through facilitating the implementation of cost-effective water investments and management practices.

FAO support will be three fold: i) the analysis of national food supply options through a cost curve approach ii) The country assessment focusing on evidence-based findings, and analysis of the causes of successes and failures of past experiences; iii) brief national water audits.

The initiative will have two major outcomes:

- a Regional Collaborative Strategy on sustainable agriculture water management for increasing the level of food security, and
- a Regional Partnership to support countries in the implementation of the collaborative strategy. The findings and recommendations will be presented for endorsement to the 32nd FAO Regional Conference for the Near East in February 2014.

1.2 Organization of the Workshop

The launching workshop of the “Regional Water Scarcity Initiative” was held in Cairo, Egypt, from 2 to 4 June 2013. This workshop is the starting point for a process that will include activities to be undertaken at country level. It aimed to launch the activities of the initiative, establish a regional partnership between the focal points and provide information and guidance as to how to undertake the national assessments/water audits. It will also provide the methodological approach to build a food supply cost curve.

National multidisciplinary teams (NMDT) are being established in each country to support and implement the initiative. Focal points from these NMDT are invited to attend the launching workshop and, as a follow-up, to convene meetings of the multidisciplinary teams in their respective countries in order to convey the outputs of the workshop and to launch the national assessment process. During the meeting, country focal points are expected to provide inputs on behalf of the NMDT to adapt the assessment framework to their countries amend and approve the methodology and provide inputs into the decision making tools that FAO is proposing to use in this initiative.
FAO will encourage the establishment of a network of focal points for exchange of experiences throughout the project implementation and the workshop will offer the opportunity for a first contact and extensive exchange.

**Objectives of the launching workshop:**
1. Presentation and launch of the Water Scarcity Initiative;
2. Discussion and agreement on the national assessment framework, including
   a. Water account and water audits
   b. Food supply cost curve
   c. Knowledge gap analysis
3. Agreement on the steps till final delivery
4. Establishment of a network of focal points for exchange of experiences throughout the project implementation.

**Expected actions from the participants:**
- To analyse and discuss the regional gap analysis;
- To discuss the national assessment framework and adapt it to the country’s context and needs;
- To learn about the food supply cost curve and advice on the availability of data and expertise;
- To work on a plan for implementation of the initiative at national level;
- To agree on future steps till the end of the project including the technical assistance needs

The workshop was attended by 70 participants, including 28 officials from 12 member countries and 13 representatives of 5 international organizations active in the field of agriculture and land and water in the Near East region: UNDP, ESCWA, IFAD, UN-DESA, AFDB, IDRC, IWMI, ICARDA, UNESCO, AWC, national research centers, Sultan Qaboos University, Oman, DRC (Egypt), NRC (Please refer to the participant list in ANNEX 2)

The workshop will be followed by the NENA Land and Water Days event (16-19 September 2013) that will give insight on specific technical issues of concern to guide and inform policy making.

2  **SESSION 1: Introduction to the initiative**

The Session was chaired by the Assistant Director General and Regional Representative (ADG/RR) of the Regional Office for the Near East and North Africa (NENA), Mr. Abdessalam OuldAhmed and reported by A. Belloum and M. Bhatti.

2.1  **Welcoming words**

Mr. Abdessalam OuldAhmed welcomed the participants to the launching workshop of the Regional Water Scarcity Initiative in the NENA region and thanked them for attending this important workshop.

He highlighted the challenge of addressing a wide range of complex and intertwined issues related to securing food supply in the NENA region for a growing population and the associated management of natural resources, particularly land and water. To address these challenges, FAO has launched this regional “Initiative on Water Scarcity in the Near East”. He stated that the goal of the initiative was to support member countries in identifying and streamlining policies and best
practices, in agriculture water management and beyond that can significantly contribute to boosting agriculture productivity, improving food security and sustaining water resources. The initiative will identify critical areas that require action, assist in the formulation of a regional collaborative strategy and build broad partnerships to support its implementation.

He reminded participants that the initiative will enhance cooperation between member countries and between countries and international and regional partners associated with the initiative. It will focus on the policies, investments, approaches and practices that are necessary to ensure sustainable intensification of agricultural production under water scarcity conditions and utilizes innovative assessment methodologies to analyse the costs associated with options to ensure national food supply, in combination with the accounting of the availability and use of fresh water resources.

He highlighted that the launching workshop was the starting point for a process that will include activities to be undertaken at country level, such as national assessments based on i) a water accounting/water auditing, ii) An analysis of national food supply options through a cost curve approach and iii) A knowledge gap analysis, focusing on evidence-based findings, of the causes of successes or failures of past policies, strategies and programmes dealing with water management for agriculture.

He reminded participants about the objectives of the workshop and expected actions from the participants. As key outcome of this initiative, he hoped that, a practical regional collaborative strategy on sustainable agriculture water management for increasing the level of food security in the NENA Region endorsed by Member Countries and partners will be prepared and implemented in close collaboration with the partner countries.

2.2 Presentation of the new FAO Strategic framework by Mr. P. Steduto

Mr. P. Steduto presented the FAO Vision, Goal and Strategic Objectives (SOs) while highlighted in detail the Strategic Objective 2 (SO2). He also conveyed a message from the SO2 Coordinator as he was unable to participate. He informed the participants that the FAO’s Strategic Objectives will lead to its Medium Term Programme (MTP) 2014-17 and its Programme of Work and Budget as FAO has reduced its overall number of Strategic Objectives from 11 to 5 as below:

- **SO1**: Eradicate hunger, food insecurity and malnutrition
- **SO2**: Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner
- **SO3**: Reduce rural poverty
- **SO4**: Enable more inclusive and efficient agricultural and food systems at local, national and international levels
- **SO5**: Increase the resilience of livelihoods to threats and crises

In preparation for the next Biennium 2014-2015, and is MTP 2014-2017, FAO is piloting each of the five Strategic Objectives. In line with particular regional priorities, Strategic Objectives are running pilot initiatives among which, two are underSO2. The pilot initiatives are namely:

- **Strategic Objective 1**: “Hunger free Latin America and Caribbean”
- **Strategic Objective 2**:
  - “Rice-based production systems in Asia”,
  - “Regional Initiative on Water Scarcity in the Near East”
- **Strategic Objective 3**: “Rural poverty in Africa”
• Strategic Objective 4: “Agrarian structures in Europe and Central Asia”
• Strategic Objective 5: “Resilience in the Sahel and the Horn of Africa.

He further elaborated the ‘Regional Initiative on Water Scarcity in Middle East and North Africa’ which is a pilot initiative of FAO’s new Strategic Objective 2 aiming to ‘Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner’. The principal focus of the MENA study, as one of two pilots during 2013, is the improvement of food security through water.

He explained that the ‘logic’ of the overall pilot is aimed at achieving impact at scale in increased food production and availability in the region. The delivery of that impact is to be through a Regional Initiative, founded on a Regional Strategy to be prepared by the end of 2013 and through Partnerships. The preparation of that Strategy is to be informed by National Assessments in a number of countries. Those National Assessments are to have taken account of:

• An assessment of various options to increase their food supply
• Assessment of costs for food supply options
• Brief water audit
• Emerging challenges to cope with water scarcity
• Assessment of past experiences, failures and successes as a learning process
• Constraints and solutions for effective water management

Those intervention options would then form the basis for the Regional Initiative from 2014-15 onwards whereby FAO would work with partners in response to country and regional demands to implement that strategy.

Those National Assessments, to be conducted during mid-2013, should be supported by the introduction of ‘Food Supply Cost Curves’ and by a review of the state-of-the-art, lessons learned and gap analysis.

2.3 Presentation of the Regional Water Scarcity initiative by M. Bazza

M. Bazza briefed the participants on the overall goal of the Initiative which is to support Member Countries in streamlining priority areas of action in the field of agriculture water management that can significantly contribute to boosting agriculture productivity, improving food security and sustaining water resources, and to highlight these areas to partners active in the field of agriculture water in the region for collaboration. The key outcome is a regional assistance strategy on sustainable agriculture water management for increasing the level of food security in the NENA Region endorsed by Member Countries and partners. He presented the background activities undertaken so far on the Regional Water Scarcity Initiative in detail and described the 3 main pillars of the initiative. He further informed that a series of National Assessments will be performed, based on the three pillars narrated below:

A water accounting/water auditing that will review the country’s water resources, their use and the potential for improvement in efficient use of water for agriculture; combined with a review of the policy and institutional environment that sustain water resources management;

An analysis of national food supply options through a cost curve approach that reviews agricultural water management options in terms of costs and expected benefits; and a knowledge gap analysis, focusing on evidence-based findings, of the causes of successes or
failures of past policies, strategies and programmes dealing with water management for agriculture.

He further elaborated the process for the formulation of the assistance strategy. After conducting a regional gap analysis of relevant work on agriculture water implemented in the region over the past 10-15 years, and based on guidelines for country assessment prepared in advance, selected country assessment reports will be prepared. The findings of these country assessments and relevant data for the other countries, collected from FAO, partners and the countries themselves, will be analyzed with the view to select a number of themes considered as representative of the most efficient instruments for food production increase and food security improvement in relation to water scarcity. These themes will become the heart of the strategy in the NENA countries which will be implemented starting in 2014.

A draft of the regional assistance strategy on agriculture water management for increasing the level food security in the NENA region, providing the priority areas of action and implementation framework, will be prepared and submitted for discussion and adoption to a regional forum, attended by official delegates of Member Countries and the partners who take part to the assessment.

The expected outputs related to outcome will include:

- The knowledge gap analysis will consist of an in-depth analysis and summarized an overview of the current stand of knowledge from past work on agriculture water management in the region. The report will also distill the areas to be covered by the country assessment and provide guidance for the assessment process.
- The country reports will capture and synthesize the results of the assessment, focusing on evidence-based findings, and analyze the causes of successes and failures of past experiences. It will also give feasible recommendations regarding the conditions needed to up-scale successes within countries, to lift the constraints behind failures and to promote experience exchange within the region. Country assessment reports will be presented at national stakeholder meetings for discussion and validation. An outline for the country reports will be prepared prior to the start of the assessment.
- The regional report will capture the regional dimension of the assessment, building on country reports and integrating existing data and information for the other countries, collected from reliable sources including the countries themselves, FAO and other partners. The regional report will also draw on and benefit from the outcome of the Near East Land and Water Days, an event focused on experiences of land and water projects in the region.
- A draft regional assistance strategy on sustainable agriculture water management for increasing the level of food security in the NENA Region endorsed by countries and partners at a high-level regional forum.

The draft strategy will build upon the findings of the knowledge gap analysis and the assessments reports, to highlight the assessment themes and related recommendations, focusing on those whose implementation requires support by FAO and other concerned organizations. The strategy will also include baseline indicators for its implementation, starting in 2014. The draft strategy will be presented at a regional high-level policy forum for discussion and endorsement by Member Countries and Partners. Elaborated terms of reference and an outline of the strategy will be elaborated and agreed prior to the start of its preparation.

A group of partners formed to support countries in the implementation of the assistance strategy alongside with FAO. Core partners for the Initiative will be identified in the course of its implementation. Member of this new partnership will be involved in the consultative process.
leading to the elaboration of the regional strategy, particularly for contributing knowledge
materials they have and participating to the planned consultative dialogues. They will also
endorse the strategy and take part to its implementation as donors, support providers and other
stakeholders. The strategy will also be shared with the other partners active in the field of water
resources in the region but not present at the forum for better coordination and potential
synergies.

2.4 Brief presentation of the main components of the programme

Brief presentations by the speakers were given on the main components of the programme that
took place during the 3 days.
- Andy Bullock presented the regional gap analysis
- Mohammed Bazza presented the country gap analysis
- Jippe Hoogeveen presented the water auditing/accounting,
- Robert Roson presented the food supply cost curve and,
- Finally Chifa Tekaya briefly explained to the participants the status of implementation
  and expected deliverables of the initiative and the workshop

This brief session was followed by 35 min of general discussion on the initiative and the expectations
from participants.

2.5 Discussions/comments by the country teams

Most of the countries started their comments with expressing their thanks and appreciation to
FAO for the Regional Water Scarcity Initiative considering its high importance and relevance in
relation to food security in the region.

The Egyptian Representative thanked FAO for addressing the highly important and relevant
subject of Water Scarcity in the NENA region through this initiative and welcomed all the
participants to Egypt. He further highlighted the importance of the subject in relation to food
security. He said that most countries in the region import food. He also expressed concerns
about Egypt’s food security under a reduced Nile water share with new dams coming up in up-
stream countries. He hoped that the initiative will in the process bring tangible solutions to water
issues in the region solutions.

UNESCO: highlighted the existence of the Arab water strategy endorsed by the 23 Arab Ministers
in December 2012, that should be considered as of within the work of the initiative to find
synergies

Sultanate of Oman: This is an excellent opportunity offered by FAO that facilitate the discussion
of this important issue and to learn potential skills for the efficient management of scarce
resources. It does that while taking into account the specificities of each country’s culture in
integral approach. The initiative also addresses the impacts of climate change, especially
drought.

Mauritania: Two representative of Mauritania addressed the participants. While both of them
wished the success of this important initiative, the first emphasized the importance of food
security, and the dimension of sustainability in services and productivity. He also expressed the
need for preserving groundwater resources are required with emphasis on its role in agriculture.
The second Mauritanian speaker emphasized the management of renewable natural resources
(surface and groundwater), harvesting rainwater and benefiting from the exchange of experiences between different regions.

**Tunisia:** Tunisia has experienced that after the revolution while the society was claiming for more rights, people took the freedom to access water supply by illegal means and the Ministry could not fully control the digging of wells for instance (????). The FAO Initiative gives more opportunities to solve the water problem and there is need to discuss with partners for their support.

The representatives raised a few issues related to agriculture and water scarcity in the region that require clear answers and innovative solutions. The main questions are: i) what has changed in the recent years that have made this region so vulnerable to Food Security issues? ii) What are the issues of concern with respect to potential future food prices surge similar to 2007-2008 crises? iii) Are there any other tools and indicators? The notion of virtual water and the accuracy of assessing such water given the lack of data and information as well as the complexity of water related multidisciplinary influences should be properly addressed. Finally the farmers’ behavior is a factor to take into consideration. The second speaker of Morocco insisted on water management at the watershed level, focusing on the impacts of climate change on communities and the implementation of integrated water resources management (IWRM).

**Algeria:** The proposed FAO WS initiative coincides with the reforms in the country, through improved services, participation of public and private sector in water management, and reuse of non-conventional water.

**Yemen:** Water scarcity in Yemen is evident where 90% of water is used in Agriculture. Strategies for Water and Agriculture sectors have been developed and are being implemented. Food Security means that we produce sufficiently and sustain our water resources especially the groundwater. This WSI is highly relevant and important for Yemen.

**Palestine:** The representative expressed his wish that Palestine becomes a full member of FAO Initiative. He explained that water scarcity in Palestine is directly related to the occupation. The water quality is key concern especially salinity. The initiative should focus on non-conventional water, climate change and homogenizing strategies and adaptation to the current context.

**Syria:** The non-conventional water is under the control of the Ministry of Water Resources which gives Syria a value that has always recorded a deficit of nearly $ 2 billion m3 per year. The delegate expressed the wish that we come out with practical and executable solutions to cope with water scarcity in the region.

**Saudi Arabia:** The speaker defines food security as the ability to provide food and not necessarily cultivate the land. Efforts may be made to limit the crops that are consuming a lot of water and encourage the reuse of treated wastewater after tertiary treatment.

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**SESSION 2: Knowledge gap analysis**

This session was chaired by Mr Moujahed Achouri. Rapporteurs were Tunisia, Algeria and Mauritania. The Secretariat was held by M. Bazza and A. Fadlmawala.
3.1 Presentation on the findings of the knowledge gap analysis by A. Bullock

A. Bullock presented his findings from a regional gap analysis of the interface between water and food security. Within the context of the overall study’s ‘Logic Framework’ of identifying preliminary gaps and providing guidance to National Assessments, this Initial Review has focused on the published findings of several of the principal actors who have been supporting NENA countries to achieve impact at-scale through water within agriculture with the region’s national partners, namely the World Bank, African Development Bank, IFAD and FAO, as well as politically-connected entities including the Arab Water Council and the World Economic Forum, and strategic ‘think-tank’ type organizations including IFPRI and research institutions including the CG-system – all potential partners in the future Regional Initiative.

He presented a provisional framework to guide ‘water and food security’ assessments at the country level that embraced the following issues, confirming their relevance to the food security challenge:

- Agriculture/Irrigation policies and investments
  Water governance in general (accountability, participation, etc.) and its impact on agriculture
- Integrated approach to agriculture water management in agriculture (allocation, pollution control)
- Water laws and related regulations
- Irrigation water tariff/ water services cost recovery
- Decentralized management of water resources
- Irrigation management transfer
- Irrigation modernization focusing on technological transfer to localized irrigation
- Water conservation and management under rain-fed conditions

Observing some significant progress had been made but that there was valuable work yet to be conducted at the interface between water and food security in the region, Dr. Bullock identified three principal gaps:

**First, Gap 1:** There is a general weakness in scaling-up from many successful but isolated case studies to a level that could achieve impact at-scale. Dr. Bullock reported that there have been many successful water management interventions across the region, but often disconnected from delivering food security at-scale. Technologies and water management interventions can make a stronger contribution to food security, but only if scaled-up. In search of prioritizing the most effective water technology options to overcome water shortage, World Bank/Future Water have progressed application at national level in numerous NENA countries of the cost curve approaches to nine different technology-focused options within the three broad categories of:

- increasing productivity,
- expanding supply and
- reducing demand.

The findings across the region have indicated that a mix of approaches is required and that these are country-specific in their relative contribution. Overall, that study has concluded with a MENA regional annual cost to overcome water shortage in 2050 of approx. US$100 billion per annum, ranging between 27 billion and 212 billion depending on different climate scenarios. However, a key finding may be that while cheaper options identified by the cost-curve approach may be introduced first, that study has concluded that cheaper options alone might not be sufficient to overcome water shortage completely. Therefore, even the more
expensive options will be required to bridge the water ‘gap’. Thus, while there will be good reasons for implementation of prioritized lowest cost/highest impact interventions, such interventions can only be expected to make a partial contribution and to fall short of resolving the water/food security challenges. By implication that all technology options will anyway be required, orientations lean as much towards relative practicalities of implementation and uptake by farmers as a basis for prioritization, than costs and impact alone.

**Second, Gap 2:** Most of the (dis)incentives to water inefficiency lie outside of the water domain. The necessary multi-disciplinarily has not yet been mobilised. “At present, several interrelated policies and rigidities in many MENA economies reduce employment opportunities outside agriculture and discourage farmers from diversifying into other crops. This leaves large populations farming—and using water—inefficiently” – such that part of the solution lies in diversifying (re-)employment opportunities outside of agriculture. In response to several main findings that solutions to many water issues lie outside of the water arena (including decentralisation, pricing, incentives and disincentives etc), Dr. Bullock reported that many of the recent regional analyses have called for much greater emphasis on political economy analyses and ‘whole of Government approaches’ that could begin to unlock long-standing water inefficiencies and challenges.

**Third, Gap 3:** There is an absence of explicit food security strategies, for now and the future, to guide water interventions in light of different (blend of) pathways available to countries. He indicated that there is not one sole development pathway to food security (which embraces both national food security/sovereignty and household food and nutrition security). Four generalized pathways have been identified, including domestic production, commercial imports (financed by earned foreign exchange revenues, themselves generated by export-oriented agriculture), food aid and more recently the directly sourcing of food requirements from overseas (including by the leveraging of including leveraging hydrocarbon resources with reciprocal food security agreements and diversifying overseas investments). He observed that economic and social drivers for jobs, employment, income and export earnings, inter alia, are all influential upon water use and interconnected with food security, not just among the rural agricultural population but also among the urban-based non-agricultural populations. Thus, food security (at national or household scales) is not the sole aspirational outcome from water use and management. He reported that the overall goal of for countries in the region is to secure sustained agricultural growth, reduce poverty and improve food security, as agreed at the Arab Economic Summit in Kuwait in 2009. This overall goal places diverse drivers onto water. Unless countries can make more explicit their intended outcomes from agriculture, and resolve the trade-offs between them at a political level, water development will continue to lack the obvious opportunities to align with the economic and social outcomes aspired by Governments and their citizens.

### 3.2 General discussions

IDRC explained that they did political economy and ended up with more questions than answers.

**Saudi Arabia.** There is a challenge to increase food production especially for countries that have limited water resources. Food security can be ensured in different ways, not only through production increase.
Andy Bullock: The challenges outside the water sector are hardest to tackle. The MDTs in countries are expected to help unlock this challenge. Reforms in water must be part of other government reforms. Another difficulty resides in the fact that political economy is country-specific and this makes it difficult to draw communalities of regional dimension. As regards the potential of water to increase food production the answers depends on the findings of working groups and country assessments.

Algeria: How can we reply to questions that involves different partners? How can we reply without the others being involved?

Morocco: The macro-economic framework impacts sectorial policies. The idea is what story line and opportunities agricultural water management offer within existing political economies. At the same time, issues beyond the water sector should be flagged up.

Morocco: Political economies are driven by social problems in countries.

3.3 Introduction to the working groups

Countries were broken down into 4 working groups:
- WG1: Morocco, Tunisia, Algeria
- WG2: Morocco, Tunisia, Mauritania, Egypt
- WG3: Jordan, Syria, Lebanon, Palestine, Egypt
- WG4: Yemen, Oman, Qatar, Saudi Arabia

For each of the three main clusters:
- Food security at scale
- Water’s contribution to food security outcomes (especially drivers outside the water domain)
- Within agricultural water

The questions to be discussed were:
- Q1: What are your countries’ experiences on the particular issues?
- Q2: What bottleneck and constraints have been encountered?
- Q3: What opportunities can be envisaged for future action?

3.4 Group work: Findings and feedbacks

3.4.1 WG1 report (Morocco, Mauritania, Tunisia)

Food Security

Morocco: There is no explicit strategy on food security; however, food security constitutes main pillars of other strategies such as Agriculture, the National initiative for human development, etc.

Algeria: The same situation applies for Algeria where food strategy is embedded into the strategies of sectors such Agriculture, water, etc.

Mauritania: The food security strategy is based on production (agriculture), water resources mobilization, etc., in a manner similar to Algeria and Morocco. The difference is that in Mauritania there is an institution in charge of food security (Commissariat) which has a coordination role under normal situations and execution in case of emergency.

Tunisia: Country in mutation phase, but there is continuity of production (wheat, milk, etc.) and importation to fill the gap.
In sum, food security holds high priority in all four countries but rather than being expressed in a strategy it is based on agriculture and water for production and on imports for filling gaps.

**Goals of Agricultural Development**
- Food security
- Employment
- Exports (in the case of Morocco and Tunisia)
- Household revenue increase and poverty reduction
- Contribution to integrated rural development
- Limiting migration from rural to urban areas
- Contribution to GDP

**Market Pull on Agricultural Commodities**

The largest share of production is determined by local demand/markets, except for a few products that are exported in the case of Algeria (dates and vegetables), Morocco (citrus and vegetables) and Tunisia (dates).

**Impacts of Imports**

Fixation of the minimum selling price for wheat in Algeria, Morocco and Tunisia. Importation only to fill deficit gaps. Subsidies for seeds, water, preferential credits to encourage production. The total cost of productions is likely higher than that of imports, when local production impacts such as employment creation are not considered.

**Food Losses and Wastes**

There are important losses throughout the chain, from production at the field to consumption. The losses of perishable products (fruits and vegetables) are much higher than those of products that can be stored such as cereals. The role of the state in guiding farmers regarding demand forecasts, the products that can potentially be exported, etc. is extremely low or nonexistent. The losses of all products result in the losses of large amounts of water.

**Water’s Contribution to Food Security Outcomes** (drivers outside the water sector)

Opportunities for food security increase and availability still exist; they include production systems and crops that require less water (demonstrations, promotion, encouragement), commercial exchanges between neighboring countries (integration and complementarity, etc.)

**Farmers/Producers and their Social/Economic Connections**
- Organizations/aggregations of small farmers for production, export, transformation offer opportunities
- Associations of water users associations
- Etc.

**Within Agriculture Water**

Improving national water demand management for all sectors is primordial. It comprises efficiency increase for which a potential still exists, the adoption of water productivity optimization instead of yield maximization, continuous water availability for localized
irrigation (instead of water rotation), water quality protection and water transfers, to cite only these.

3.4.2 **WG2 report (Morocco, Tunisia, Mauritania, Egypt)**

**Food security at scale**

- In the past: focus on food self-sufficiency
- Today: strategic agricultural products are encouraged through incentives, national support programmes, etc.
- Morocco/Tunisia/Mauritania: Recently the value of water resources are being considered in the calculations of export/import balance (i.e. virtual water)
- On the other hand, recent increase in price and volatility of staple food raise concerns about exposure to markets
- Losses and wastes:
  - Important losses and wastes
  - Cultural dimension
  - There is also recycling (that reduces the losses)
- Subsidies need to be re-designed: on food, energy and water
  - Target the poor rather than the product (bread): Cash transfer, access to services... Instead of subsidized bread, energy, etc...
- Risk management on cost of main commodities
  - Import : how to stabilize import bill
  - Storage(silos)

**Water contribution to food security**

- Productivity gaps in agriculture still very high
  - Tunisia: wheat 1 t/ha
- Move from water supply management to water demand management, then water allocation
- Progresses still needed in improving efficiency in irrigation
- Tradable water rights (water markets): discussed, conditions are not there for implementation
- Question: should agriculture continue to take most of the water? role of agriculture in economic, social and ‘water’ terms
- Change approach to water users associations in relation with water cost recovery. Link water to energy bill (Tunisia)
- Institutional water issues
  - As water becomes scarcer, there is a need for more coordination among sectors

**Opportunities/issues**

- Groundwater governance (Tunisia, Morocco): very difficult. Involve stakeholders
- Revise water law. Reconsider how it can be enforced? Empower local institutions?
- Climate change: an additional burden
- Environment and linkage with water
- Research on low water consuming varieties and irrigation techniques

3.4.3 **WG3 report (Jordan, Syria, Lebanon, Palestine, Egypt)**
Group 3:

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<th></th>
<th>Egypt</th>
<th>Jordan</th>
<th>Palestine</th>
<th>Syria</th>
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<tbody>
<tr>
<td><strong>Food Security outcomes at scale:</strong></td>
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<tr>
<td>National food</td>
<td>Part of National development plan to reduce poverty: food self-sufficiency contribute to food security</td>
<td>Part of National development plan to reduce poverty (reduction by ½ million)</td>
<td>NDP divided into sectors. Strategy for agricultural sector, include different sectors</td>
<td>- Part of National development plan Agricultural plan for food sufficiently focus on sustainability in certain products (wheat, etc.)</td>
<td>National agricultural plan/ Working on inter-ministerial community for food security</td>
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<td>security Vision</td>
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<tr>
<td>Goals of</td>
<td>Reduce imports and increase production</td>
<td>High value products / increase rate of return of irrigated areas:</td>
<td>Food secure people</td>
<td>Self sufficiency in Wheat</td>
<td>80% of food imported-want to limit import</td>
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<td>agricultural</td>
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<tr>
<td>Market pull on</td>
<td>Investments in new land and food farms/</td>
<td>High value products</td>
<td>Cash crops in Palestine for export (flowers, fruits)/</td>
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<tr>
<td>agricultural</td>
<td>Fish farming in Egypt</td>
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<td>commodities</td>
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<tr>
<td>Bringing</td>
<td>New subject-need new institution/steering committee for agriculture (</td>
<td></td>
<td>Ministry of water and energy lead most of the work- lack of good coordination</td>
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<td>Lack of policy</td>
<td>Lack of policy for food security</td>
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<td>producers</td>
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<td>Regional food</td>
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<td>security program</td>
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<td>Water contributions to water security</td>
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<td>Opportunities</td>
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<td>Increasing food</td>
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<tr>
<td>productions</td>
<td>Water scarcity is a big issue. No chance to increase irrigated</td>
<td>Priorities in Jordan: agriculture is low priority</td>
<td>Occupation is a main issue.. Irrigated</td>
<td>High committee for water use determine</td>
<td>Farmers encouraged to increase efficiency/</td>
</tr>
</tbody>
</table>
area.. yet there are plans to increase wheat production. New lands demands more water. Problem in water management.. cannot increase water efficiency (cannot compete with other sector (drinking).. agriculture need to rely on treated wastewater )

agriculture is receiving big interest depending on GW.. Focus on treated water to reduce import from Israel

priorities: drinking, industrial and tourism, last is agriculture (gap: every increase on the expense of agriculture- increase production per hectar..)

| Donors interference/ influence | Pressure not to subsidize |
| Water management need to be consolidated (lack of coordination) | Lack of coordination between water and agriculture (water quality and quantity). |
| Farmers support mechanism/ financial support | Financial support is not within an agricultural strategy. Specific to certain products |

### Regional gap analysis

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<th>Egypt</th>
<th>Jordan</th>
<th>Palestine</th>
<th>Syria</th>
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<table>
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<tr>
<th>Natural resource management (is it water focus)</th>
<th>Relevant to all countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political economy response</td>
<td>Need to focus on institutions. .. Lack of coordination between policy makers.. Stay at the pilot level (not scaling up).. Cannot make big changes in political economy.. The political situation and countries politics affects the regional collaboration.</td>
</tr>
<tr>
<td>Drivers from agricultural outcome</td>
<td>Low outcome of agriculture.. Not a strong driver..</td>
</tr>
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</table>

3.4.4 **WG4 report (Yemen, Oman, Qatar, Saudi Arabia)**
The discussion started by stating clearly whether “food security” was of high priority for all participants. The answer was unanimously yes (actually a big yes). Similarly, a correct water management under water scarcity was considered extremely relevant.

A series of comments/responses to Q1 were provided initially on the food security issue. It was indicated that under the new challenges of soaring food prices and their volatility, food security was addressed in a non-conventional way: trade but also outsourcing through bilateral agreements were clearly mentioned. This was particularly the case for KSA. Internally, KSA is concerned about ground water abstraction. They have laws to limit groundwater use but have difficulties to control it. Interestingly, the initial idea of irrigating wheat was abandoned, but now they irrigate alfalfa for dairy farming. They have 24 Million animals to feed.

However, Yemen highlighted that the situation would not be the same for non-oil producing countries as the financial constraints would have not allowed exploring such alternatives. For Yemen, the internal production plays an important role; not only for mitigating food security but also because the rural population is significant as compared to other countries in the gulf region (agro-pastoralism is still important). For instance, the low productivity in rain-fed farming should be addressed. The ground water management remains an unresolved problem and difficult to control. Concerning irrigated agriculture, fresh vegetables and fruits remain the main land use. Yemen indicated that they have good experience in surface irrigation but much less in ground water management. There is a demand for “modernization” of irrigation systems towards localized and better scheduling of irrigation.

Oman uses its cultivated areas as about 50% as palm dates and 50% as vegetables (mostly) and fruits. They indicated that the local production and consumption of cereals assumes an important aspect of their population’s nutrition. Furthermore, to improve the financial aspects of cereal imports they are trying to exploit the potential offered by the export of fresh vegetables as they are trying to respond to the seasonal market demand of other countries. Their specialization in advanced agriculture seems to have a good value for the agricultural water management and way to address (at least in part) food security. This is mostly valid for fresh vegetables but does not apply to palm dates as they have not very good quality variety and are not competitive for export. The main use of palm dates is for internal human consumption.

Qatar indicated that only 25% of their farmers are actually highly productive (?). Production is mainly palm dates and vegetables. Their main concern is also in terms of sustainability of the water abstraction, much higher than the recharge (250 Million m3 abstraction per year, against estimated 81 Million m3 recharge per year).

When looking at the wastewater management, the situation was the following:
- Yemen – very low treatment
- KSA – fully treated and reused
- Oman – mostly treated but owned by the utility that looks after cost recovery (charging the farmers if they want to use it)
- Qatar – fully treated and mostly reused
The nexus water-energy was touched upon (mostly by Oman) as their low-quality oil requires a large quantity of water to abstract oil (similar situation seems to be present in Kuwait). Implications for ground water pollution are relevant.

Q2 and Q3 were discussed somewhat jointly.

Yemen indicated that technology transfer of modern irrigation systems is a constraint along with the revision of cultivar choices. Supplementary irrigation in rain-fed farming would help a lot in increasing productivity.

KSA indicated that the main constraint is the control of ground water. As opportunity, they see technology (e.g., green-house powered by solar panels) as main option to save water and still produce fresh vegetables.

Oman also indicated that the control of ground water abstraction is for them the main constraint. The farmer owns the well and they follow the marked demand (no full consideration for sustainability of abstraction). Therefore, institutions and governance are seen as constraints, in the present status, and as opportunities for the improvement of groundwater management if enhanced in the future. These aspects should be part of the country assessment (also included in the water auditing). Oman’s agriculture makes large use of labors. However, these have limited skills and therefore do not allow a good performance in terms of management.

In synthesis, financial constraints, technology and institutions are seen as the constraints/opportunity for improving water security and in part contribute to food security (especially through nutrition). In terms of food security, trade and bilateral agreements with other producing countries is the main approach used by the countries present in the working group.

4 **SESSION 3: Water Auditing and Accounting**

This session was chaired by Pasquale Steduto. Rapporteurs were Jordan, KSA and Yemen. The Secretariat was held by A. Belloum and M. Bhatti.

4.1 **Presentation of coping with water scarcity – FAO Action framework by J-M. Faures**

This presentation has attracted much interest and has received a number of aspects related to a better definition of water scarcity and most importantly, how to measure and possible policy options and management, but the main purpose of this action is the evaluation and combination of options and food supply through the presentation of the method of cost curves and represents a dynamic model and what principles of action and the result of all this loss reduction and improving water productivity.

Countries questions covered several aspects, including taking into account the specificity of each country, how to introduce in the calculations environmental aspects, and that FAO has a clear idea about the implementation of this initiative and some concerns the real cost of water.
The responses focused on the possibility of this dynamic model, through its eight concepts could be adapted to each context and country, and understand the concept of watershed, especially its management and impacts. But the most important thing is how to meet the demand of the power link between water and food security on the one part and water and human development on the other part.

4.2 **Presentation of water auditing and accounting by J. Hoogeveen**

This presentation is of importance and is an extension of the first conference. In defining supply and demand, the available volume, use and quality as well as the institutional aspects and environmental considerations, it is possible to audit the water through the cost curve of availability, which is a fundamental part of the planning. The complete proposed framework consists of four pillars: databases, supply, use of water and its assessment and water sources and policies complemented by an analysis of scenarios followed by a discussion with partners to know the impacts.

4.3 **Group work: Findings and feedbacks**

The water accounting approach aims at capturing the elements of the country’s water situation with regard to availability, use (in terms of efficiency and value) and therefore offers a basis for assessing production and productivity gap. The water audit includes also institutional mapping and policy analysis to assess water governance effectiveness. All elements are inputs for scenarios to investigate the implications of policy decisions on future food supply and its consequences for the water situation.

Questions to be discussed by the groups were:
- What according to you are the most useful elements of the water audit/ accounting to address the water and food security question in your countries?
- What information is available and accessible in your country to develop the water audit and accounting, and what information will not be easily accessible?

4.3.1 **WG1 report (Morocco, Tunisia, Mauritania)**

**Answers to question 1**

- Data on water supply and use is a decision-making tool for planning and hence its importance
- There is a certain uncertainty associated with the available data with varying levels according to the context, the type of date, etc.
- There is a multitude of institutions involved in data collection, treatment, management, archiving, etc., often with limited coordination and consultations resulting in data that differ from one ministerial department to another.
- In certain countries, the different ministerial departments have well defined mandates and responsibilities for data collection and availability to users who at times have to pay for its acquisition
- In certain cases, politics exert e influence on the type of information made and the results made available to the public. For instance, it may not possible to indicate aquifers that are over-exploited.
- One of the recommendation stemming from the initiative on water scarcity should be o establish a committee that defines the attributions and responsibilities regarding data collection and management
• As regards the initiative per se, national multidisciplinary teams should agree who the concerned parties are and which one of them would coordinate
• The data available in countries is good enough for planning purposes, except in Mauritania for groundwater for which no data is being measured or estimated
• However, the available data on water use remains too global particularly for groundwater

Answers to question II

Morocco: A hydrological network exist since the 1950s and even before for a few stations, however there is a problem with updating the network so that data is made available to users when they need it, not later as it is often the case. The adoption of remote measurement is underway and this will make the availability of more rapid. As we go from national level to regional and local levels, both the availability and the reliability of data decrease in all countries. For groundwater, data is generated through modeling or estimates on the occasion of the preparation of regional water resources plans, but not annually. The estimates and measurements of availability and use are made at the level of large irrigation schemes but not in the rest of the country. The silting of dams and soil losses at the level of river basins are estimated by the Forestry Department.

Algeria: Meteorological data is available but users have to pay to access it. Surface water data is measured, whereas groundwater data is estimated. Bulletins on when to provide supplementary irrigation to cereals are developed by the ministry of agriculture and disseminated to regional directorates for alerting farmers. The amounts of groundwater that can be extracted are restricted in theory but not all farmers abide by the imposed limits.

Mauritania: Precipitation data in the irrigated area is made available; however data on surface water is not available. In rain-fed areas, only gross information is available. Water use by agriculture is only estimated.

Non-conventional water resources:

Morocco: A study to assess desalination potential, needs, uses, etc. has been carried out recently. Similarly, a national study of brackish water has been carried out.

Algeria: The amounts, locations and quality of brackish water that can potentially be used in agriculture have been studied and are known with a good precision. The same applies for treated wastewater reuse.

4.3.2 WG2 (Morocco, Tunisia, Algeria)

Water accounting = Hydrological pragmatic approach related to water balance

Water resources (water availability) <=> water uses (water demand)

<table>
<thead>
<tr>
<th>Water resources (1)</th>
<th>Water uses (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- conventional water resources (surface water, public irrigated area)</td>
<td>- public irrigated area</td>
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</tbody>
</table>
groundwater)
- non-conventional water resources
- water transfer and inter-connection
- desalination
- water uses association (GDA)
- private irrigated area
- ...

(1) Find new technology to reduce the cost of water transfer and desalination

(2) Find new techniques to improve the quality of data (GIS, remote sensing, inventory, ...)

Answers to question: “What, according to you, are the most useful element of the water audit/accounting to address the water and food security questions in our countries?”

- Rainfall amount (measurements in each region.....)
- Water balance in each Dam (storage, inflow, overflow, pumping, water use, transfer, .)
- Number of wells (pumping time ...)
- Irrigated area
- Water use directly from rivers (number of pump, irrigated area ...)
- Agriculture product delivered to market
- Water harvesting techniques (quantity of surface water harvesting)
- Rain-fed agriculture
- Green water
- Capacity of manufactory to produce mineral fresh water
- Pounded area upstream dams (in Mauritania)

Answers to question: “What information is available and accessible to develop water audit?”

- Database on water sector (public irrigated area, local and private irrigated area, ...)
- National Information System on water (SINEAU in Tunisia)
- Agriculture map in Tunisia (carte agricole)
- GIS data base
- Web site (exp BPEH)

Answers to question: “What information is not easily accessible to develop water audit?”

- Real quantity of water used at field scale (network efficiency, quantity ...)
- Irrigation/Drainage
- Expansion of irrigated area over the limit official irrigated area
- Number of wells realized without permission (irrigated area...)

4.3.3  **WG3 report (Jordan, Syria, Lebanon, Palestine, Egypt)**

**Palestine:** No water accounting as such; in some cases it is done by project.
- There are benchmarking elements of importance such as availability and use.
- Institutional sharing of responsibility is in progress
- The issue of virtual water is regarded as a political issue
**Jordan:** Environment has a strategy that includes water. Mapping was done for water harvesting with a focus on the areas of livestock. We should add the other areas (livestock, crops, all areas using water). No news in detail. Share of responsibilities between the Ministries Water Strategy 2013-2017. Accounting per quality, Annual variability.

**Egypt:** There is no water accounting as such, the following are the status of relevant aspects

- Water resources are surface, ground and waste water
- Potential of reduced Nile water share (i.e. due to climate change and upstream dams) is complicating visions and water resources plans
- Timely availability of water is an important issue
- There is a water vision 2050
- Water budgeting is based on demand and supply.
- The demand estimation should include water for aquaculture
- Aspects of water quality should be taken into consideration to promote protection efforts

Water audit: fragmented, need synergies among the stakeholders

- Water resources assessment done and regularly updated which includes treated waste water. However, the following remains to be achieved
  - Socio-economic factors have to be taken into considerations
  - A clear figure for the percentage of waste used for agriculture
  - Rehabilitation of infrastructure
  - Advanced monitoring of inputs and outputs

**4.3.4 WG4 report (Yemen, Oman, Qatar, Saudi Arabia)**

The discussion was about the most useful elements of the water audit accounting, addressing water food security

**Yemen:** A brief was given about the country water scarcity and mention that it is one of the driest areas where water index is less than 130m³/year. Water accounting is not implemented; however, the following relevant issues were mentioned.

- Incentive must remain as one of the main strategies to improve the water management and then food security.
- Incentive should go for Energy + Modern Irrigation system and introducing solar power for rural area.
- Recycling of water must be based on a clear plan

**Kuwait:** Water resources ground water, desalination and reuse of treated wastewater. Ground water and recycled water are used for irrigation. The issues of concern for the water authorities are as follows

- Securing strategic reserve for emergencies (currently the best option is artificial recharge of excess treated water
- Improve institutional management of water
- Improve demand supply in irrigation. Most important point that water is provided with very low price for domestic use therefore reducing subsidy in water must be to improve water use efficiency
• It is also important to reduce subsidies to farmers to ensure economically feasible agriculture production

**Oman:** The water resources in Oman are very limited however there is strategy for the increasing water supply through construction dams and cover domestic from desalination in addition to strategy to recycle all waste water

Elements to improve recommended:
• Institutional improvements
• Improve supply demand management
• Recycling water
• Strategy for emergencies

**Qatar:** There is government plan includes desalination (sole source of freshwater), ground water, and recycling water to manage the water in the country. The annual rainfall is estimated at only 77.8 ml/year, a very limited portion of this rainfall recharges the groundwater aquifers. Ground water significantly over utilized. The government has strategy to increase water harvesting through collecting and injecting rain water. Currently, the water authorities are injecting desalinated water in the aquifer to form a strategic reserve for emergencies. There is a need to improve water management in irrigation

**Saudi Arabia:** The water resources are ground water and desalination for drinking water. Small farmers are using inefficient irrigation methods to grow low value (however, heavily subsidized) high water consuming strategic crops (mostly wheat). Large farms, on the other hand, are using water more efficiently with pivot and drip irrigation systems

The government has plans to reduce discharge from water aquifer:
• Revisiting wheat self-sufficiency strategy
• Incentive to introduce modern irrigation system
• Water sensors to improve irrigation management
• Change from traditional irrigation to modern irrigation system for small farmers.
• Protection of groundwater quality is one of the important angles, especially where oil production is posing a threat to groundwater quality

Information to develop the water audit: Most country mentioned that they have most information required and accessible.

Others comments:
• The area is very scare in water and one of the scare countries in world therefore need more attention from FAO
• There is huge water coming from oil industries need to be given more attention to purified and may use for food production.

5 **SESSION 4: Food supply curve**

This session was chaired by Hussein El Atfy, Arab Water council. Rapporteurs were Morocco, Oman and Qatar. Secretariat was held by J. Hoogeveen and M. Bazza.
5.1 **Presentation on the application of a cost curve approach in coping with water scarcity by J.-M. Faures**

Mr. Faures started the presentation by explaining how it was necessary to link water and food supply strategies and that there were 8 options that could be considered for food supply:

- Expanding cropped area (rain-fed, irrigated)
- Increasing yields (rain-fed, irrigation)
- Increasing cropping intensity (the number of times land is cropped over a year; rain-fed, irrigated)
- Importing food
- Reducing losses in the food chain

The cost curve approach to food supply enables to assess the cost and potential of each option under various natural systems.

5.2 **Presentation on Food supply cost curve conceptual theory by R. Roson**

The idea of the Food supply cost curve was to develop a decision support system based on quantitative modeling and assessment. The proposed approach builds upon previously proposed approaches, but focused on aspects improving realism, policy usefulness and soundness of economics concepts.

The first aspect is assessing the cost of delivering water through the cost curve for incremental water availability. To close the gap between projected demand and existing supply for a particular basin, the possible solutions can be ordered on a cost curve. The cost curve’s horizontal axis measures the amount of water made available by each measure to close the supply-demand gap. In applying the cost curve in the case study countries, we estimated the net impact of each measure on water availability, taking into account return flows. The vertical axis of the cost curve measures the cost per unit of water released by each measure in the year of the cost curve. This is the annualized capital cost, plus the net operating cost.

The second aspect is applying a cost curve to food supply strategies. The concept of “food supply cost curve” is a useful tool to support decision making. Gaps in food supply can be defined as the difference between the current level of food supply and a desired or planned level food supply in the future that takes into account population growth and changes in dietary habits. A potential contribution to the domestic food supply goal can be calculated on the basis of maximum attainable yield for major crops, availability of land and water resources, and potential reduction in food losses. This cost distribution reflects the fact that early gains are easier and therefore less costly to obtain than those closer to the ultimate potential. On the “food supply cost curve”, the x-axis represents the amount of extra food that can be obtained from these different options, while the y-axis shows the costs involved per option. Each country will have its own curve, based on current level of intensification, availability of land and water, and level of losses in the food chain. The drawbacks of this approach is that 1) the demand is fixed, 2) No explicit treatment of
uncertainty, 3) What unit of measure?, 4) Imports as residual and 5) Existence of non-monetary costs, in particular related to water resources.

The Food Supply Cost Curve (FSCC), which is proposed as a part of the Regional Initiative on Water Scarcity, is a special type of supply curve. It is estimated to select economically viable investment options in food production, on the basis of an implicit cost-benefit analysis. Its key characteristics are:

- It refers to a specific region (typically a country)
- It refers to a specific future year
- It considers additional supply, over a specific baseline (e.g., current consumption levels)
- It refers to a specific crop (e.g., wheat)
- It considers a finite, discrete set of supply options, often in the form of investment projects

The selection of the crop, the future year, the number and type of investment options has to be made on the basis of the policy relevance for the country under consideration, but also on the basis of the comparability with studies conducted for other countries in the NENA region. For example, the crop may be the most consumed one; the reference year may be the one typically considered in economic planning documents, the supply options may be the ones already under debate. The supply options may include investments in land intensification, irrigation schemes, etc., but also unconventional measures like regional agreements on food trade, or investments in foreign agricultural resources.

As the FSCC only considers a limited number of supply options, it is stepwise shaped. By comparing the FSCC with both the international reference price for the crop at hand and the forecasted domestic consumption curve, it is possible to select the economically viable supply options, determining also the optimal amount of imports.

The basic framework of the FSCC can be extended to account for:

- Non-monetary costs, in particular opportunity costs of water resources. This means that the supply curve refers to optimal social supply, not private incentives.
- Uncertainty in parameters and data. Results of the model would in this case be expressed in probabilistic terms. For example, the model could compute the probability, for each investment option, of being economically viable.
- Volatility in international food prices and food security. If international prices are volatile, it is possible that domestic supply could be efficiently expanded above the levels that would otherwise be set under constancy of world prices.

The proposed framework is being developed as a sort of architectural, implementable project. Implementation can take place at various degrees, varying by country and on the availability of resources. The food supply cost curve is still a concept that has not been applied yet. It should therefore be regarded as a demonstrative, experimental initiative.

R. Roson illustrated his presentation with example of food supply cost curve building process that were put to discussions with the participants (examples available in the corresponding power point presentation)

5.2.1 Oman comments on Roson’ presentation:
Some methodological clarifications are needed. The cost estimation could be either at economic level, using economic prices or at financial level. There is also the concept of Private cost versus social cost. The second refers to the inclusion of negative and positive externalities. It is very unlikely to be able to measure these externalities. Besides, even if the externalities are there most likely there are no policy instruments implemented for internalization. Agriculture is characterized by joint production. Farmers do not produce a single product. Thus any change in water cost will have implications on the crop mix. This should be taken into consideration to be able to measure the width of the bar in the graph. In other terms some tools such as optimization techniques should be used to determine the crop mix change to be able to determine the extent of change in the selected crop. The opportunity cost of water raises some problems, fundamentally the idea to consider alternative uses of water in the urban sector. Such a cost should compare comparables. Agricultural water is not domestic water in terms of characteristics (treatment, pressurization, reliability). Thus caution should be taken here. Furthermore the thinking should be really at the margin as moving even 1% of agricultural water to urban uses is already a huge quantity which will distort the results. Considering an unreasonable opportunity cost of water will prevent any project aiming to improve food security.

The level of decision making is the farmer not a centrally planned economy

Spatial changes in a country should be taken into account. The analysis should not be at country level but should go to basin level to account for hydrological availability and mobility constraints of water.

5.3 Breakout Groups: Applying the cost curve approach, value added, needs and requirements

The cost curve is an instrument that can help assessing and comparing the different options that are available to supply food in an economically and sustainable way in a country. The following questions where given to the group work to work the application of the cost curve approach, value added, needs and requirements:

- Q1: What are in your opinion the most interesting and debated investment options that should be taken into account in building a food supply cost curve in your countries?
- Q2: What are the most critical factors (data requirements, uncertainty assessments) to practically implement a food supply cost curve in your country?
- Q3: In evaluating the options, what kind of cost element or side benefit should be taken into account in building the cost curve?

5.4 Group work: Findings and feedbacks

Discussions focused on:

- The value of the cost curve as a tool for decision support in the context of this regional initiative;
- The experience of countries in the region including Morocco or proposed approach is tested approach;
- The limitations of the approach especially in relation to social and cost types used and their level of use aspects;
- The territorial scale of application (region, sub-region, country, basin ...)
Numerous requests for clarification and additions were requested by participants;

Following discussions and exchanges of views the findings and recommendations are as follows:

- Participants stressed the importance of this instrument for decision making and the need to surround the care of creating the conditions for its proper application in particular with regard to support for national teams in terms of development of the model and its implementation;
- The proposed model is a prototype adapted to the context of each country in its development and implementation
- Teams and experts from countries in the region are expected to use based on available data and issues to be addressed;

6 **SESSION 5: Planning and implementation for Country and Regional Assessment**

This session was chaired by the ADG/RNE. Rapporteurs were Egypte, Syria and Palestine. The Secretariat was held by M. Bhatti and A. Fadl.

6.1 **Development of country-level plans**

Session 5 built on previous sessions and developed a plan for the implementation of the regional water scarcity initiative in the countries of the region, and then discussed them at sub-regional and regional levels. Groups broke by country. During group work, participants were asked to develop a country-level plan for each country. The plan should cover the period until December 2013, and suggest follow-up actions beyond that date. It should include the 3 pillars of the country assessment, namely

- The water accounting and audit
- The food supply cost curve
- The country gap analysis

The plan should also consider:

- Disciplines (Ministries, Departments) to be involved in the study
- Data and information to be collected and their sources

The Plan would develop:

- Steps for achieving the outputs of each pillar which includes among others the setting-up of national multidisciplinary team to coordinate the initiative ‘s implementation
- Preferred mechanism for implementation
- Preliminary work plan with timeline
- Resources/assistance needed

6.2 **Feedback from working group: Country plans results**

6.2.1 **Egypt**

It has been realized that the available time to implement the Water Scarcity Initiative is not enough to improve the food security situation in the region, but rather to improve the knowledge on how to improve the food security condition.
Based on the topics presented during the FAO workshop, the following activities are proposed to be included in the water scarcity plan of Egypt and each one is planned to be undertaken over a two months period:

- Country Gap Analysis:
  - Review of current status of food security and water conditions based on the available studies.
  - Identify the bottlenecks and constrains that impact food security (water, agriculture and socio-economic aspects).
- Water accounting and auditing
- Food supply cost curve (based on the available mathematical models)

Detailed action plan available under ANNEX 1 (p31-32)

6.2.2 Morocco & Mauritania
Morocco and Mauritania will establish a multi-disciplinary committee (made of ministries, local communities, professional federations, etc.) which will be responsible for the general supervision of the action plan. A selected committee will be in charge of leading the work. A facilitator will be in charge of the coordination at national level, to ensure that the parties cooperate, provide access and endorse data. A consultant will be hired to synthesize the data and develop the report. Then, a national inception workshop will be organized in June to raise awareness about the study. Necessary data will be collected in July and pilot study training sessions will take place in September. The multi-disciplinary committee will then convene end of October to discuss the results of the study.

Detailed action plan available under ANNEX 1 (page 33-34)

6.2.3 Tunisia & Algeria
Tunisia and Algeria’s mechanism for implementation will take place between June and December 2013. At the initiative of FAO, both countries will (or already have created) create a MDT. Then, a national workshop will be organized to brief the national committee. (A) consultant(s) will be hired to undertake the water accounting and audit, the food supply cost curve and the gap analysis. A training session will be organized by FAO to train NMDT on the FSCC. Validation workshops will take place to discuss the findings of the water accounting & audit and gap analysis findings. A final regional workshop will by organize in October to share the findings of the study.

Detailed action plan available under ANNEX 1 (page 35)

6.2.4 Oman
Oman will first establish a working group (between the Ministry of Agriculture, Sultan Qaboos University and the Ministry of Regional Municipalities and Water Resources) and determine the responsibilities of each part. The data collection (Food production and imports/exports, Food reserve & food strategy, National water resources supply and demand) will take place between July and September. Water-food nexus, Food supply curve and strategies, options and projects will be implemented and developed between September and October and findings will be summarized in a final report.

Detailed action plan available under ANNEX 1 (page 36)
6.2.5 **Jordan**
Between June and October 2013, Jordan will identify a range of stakeholders (Ministries, research centers, private companies, etc.) and create a working team to undertake 1) the water accounting and audit, 2) the Food supply cost curve and 3) the gap analysis. First step will be to gather necessary information to develop the gap analysis. Based on these findings, the water accounting and audit and the food supply cost curve will be undertaken. The outcomes would be then reviewed during a national workshop that will take place mid-October.

Detailed action plan available under ANNEX 1 (page 36-38)

6.2.6 **Yemen**
Yemen will first establish a multidisciplinary team (from the Ministry of Agriculture and Irrigation and the Ministry of Water and Environment) who will prepare the work plan and logical framework with cooperation of FAO experts. A coordinator and national specialists will be hired to collect data (between August and September) and undertake the studies. A workshop will then be organized with stakeholders/potential partners/local community to discuss the work plan and activities, create awareness and inform them about the project. National specialists will conduct the water accounting and audit assessment in selected sites, prepare the food cost curve and conduct the country gap analysis. A workshop will then be conducted will on the findings of the assessment and recommendations. Finally a study assessment report will be developed by end of October.

Detailed action plan available under ANNEX 1 (page 39)

6.2.7 **Palestine**
Between June and October 2013, Palestine will nominate a multi-disciplinary team in order to undertake the gap analysis, water auditing and food supply cost curve and develop the corresponding findings reports.

Detailed action plan available under ANNEX 1 (page 40)

6.2.8 **Syria**
In June 2013 Syria will identify and establish the national multi-disciplinary team. Then the water auditing, food supply cost curve and gap analysis will be performed between July and October 2013 followed by a national workshop to review the outputs and to build the capacity of the state on the subject.

Detailed action plan available under ANNEX 1 (page 40)

6.3 **Presentation of the UN-DESA/ ESCWA drought project by S. Ereikat**
Mr. Ereikat started with an introduction to Department and Division followed by Introduction to Division’s work on Capacity Building for Sustainable Development. He explained how UNDESA’s mandate was to promote and support international cooperation in the pursuit of sustained economic growth, the eradication of poverty, and sustainable development for all. It linked it to the Rio+20 main outcome documents—The Future We Want—which puts emphasis on building developing countries capacity for sustainable development. This could be done notably through enhancing the
technical, human and institutional capacities of developing countries and countries with economies in transition to implement national strategies for sustainable development. UNDESA’s capacity development activities and projects are implemented through advisory services, training workshops, guidance and training materials on methodologies, networks of expertise.

Following the commission on Sustainable Development (CSD-17) and RIO +20’s, UNDESA responded to their call for urgent action to address desertification, land degradation, drought, and water scarcity as well as disaster risk reduction. It launched the project “Strengthening national capacities to manage water scarcity and drought in West Asia and North Africa” with five pilot countries among Yemen, Tunisia, Syria, Sudan, Palestine, Morocco, Libya, Lebanon, Jordan, Egypt and Algeria. The main objective of the project is to enhance capacity building in the formulation, implementation and monitoring of proactive and preparedness drought management strategies. The project is to be implemented over a two year period (2013-2015) with the Expert Group and Inception Meeting taking place on 24-25 June 2013 in Beirut, Lebanon. The project will be done in synergy and cooperation with HMNDP outcome and FAORNE water scarcity initiative.

6.4 Presentation of FAO’s work on drought preparedness and follow-up to HMNDP by M. Bazza

Mr. Bazza started the presentation by an overview of FAO’s mandate on Achieving food security for all through advocacy, knowledge availability, partnership, collaboration and direct policy and technical support to countries. He listed FAO’s actions and achievements against droughts in the near east since 2000.

He also mentioned that the situation has worsen since 2008 (notably due to climate change and the globalization of the issue) and how FAO has intended to respond to these new challenges through 1) a Disaster Risk Reduction Framework of which Drought is an Integral Component, 2) Federating partnerships and stakeholders (Collaboration with WMO and UNCCD, partnership with the Robert B. Daugherty Water for Food Institute), 3) Capacity Development (HMNDP Follow-up Initiative on Capacity Development and Up-scaling initiative piloted in Near East to global level, jointly with WFFI / NMDC4) and 4) support to countries.

7 CONCLUSION

The closing session was chaired by ADG/RR/RNE in the presence of Dr. Mona Mehrez, supervisor of Agricultural Foreign Relations in the Ministry of Agriculture and Land Reclamation in Egypt. The ADG/RR/RNE thanked the participants for their presence, dedication and commitment. He also expressed the appreciation of FAO to the Government of the Arab Republic of Egypt for hosting the workshop and for their support as well as to the Arab water council. He also thanked the interpreters for their dedication during the long working hours and also his colleagues from the FAO at HQ’s and in Cairo regional Office.

He expressed how the discussions that took place have led to extensive exchanges and active participation that were both prelude to future success. The following activities to be implemented were discussed and enriched:

1. water accounting/water auditing that will review the country’s water resources, their use and the potential for improvement in efficient use of water for agriculture; combined with a review of the policy and institutional environment that sustain water resources management;
2. An analysis of national food supply options through a cost curve approach that reviews agricultural water management options in terms of costs and expected benefits;
3. A knowledge gap analysis, focusing on evidence-based findings, of the causes of successes or failures of past policies, strategies and programmes dealing with water management for agriculture.

He stated that the workshop allowed to agree on a common understanding of the initiative, its ambitious scope, its importance for the region and agree on a feasibility plan of action for immediate implementation at country level.

He mentioned that several questions and clarifications were raised as well as contributions that enriched the projects’ ways if implementation:
- The value added of the water auditing and accounting was highlighted to make it a systematic and useful methodological exercise; the participants made amendments and propositions relevant to their specific context
- The gap analysis challenges highlighted at regional level were backed for most of them by the participants to be of relevance to conduct the country level assessment with paying attention to national specificities
- Water food supply cost curve incited a debate among the participants and will require additional thinking and in depth reflection

He explained that the future steps will be as follows:
- Formalising the designation of national multidisciplinary teams
- Organising first meeting of the national multidisciplinary team to convey the results of the launching workshop, finalise the plan proposal and agree on a final plan of action
- Finalise the plan of action and send it to FAO for follow-up and support
- Start the country assessment
- Training workshop on water accounting/audit and food supply cost curve
- Land and Water Days: 16-19 September 2013
- Production of country reports
- Drafting the collaborative strategy and the regional report
- Presentation of the collaborative strategy and the regional report for endorsement by member countries at a regional forum
- Endorsement of the strategy and a framework of partnerships

The Chairman declared the workshop closed at 3:30 PM on 4 June 2013.
### 8.1 EGYPT ACTION PLAN

**Preferred Mechanism for implementation:**

Establish a high committee including all ministries involved in plan implementation. Members could be the ministers or vice-ministers.

Establish a technical secretariat to help the high ministerial committee to achieve the goals. The members could be the directors of departments.

Set milestones to check the implementation progress.

Develop a clear implementation and investment plan that show who is going to do what, when and how.

#### Involved Institutions:

3. Ministry of Environment (MOE)
4. Ministry of Supply and Internal Trade
5. National Research Institutes and Universities

#### A. Country Gap Analysis *(two months)*:

- Review of current status of food security and water conditions based on the available studies.
- Identify the bottlenecks and constrains that impact food security.
- **Water:**
  - Estimate irrigation system efficiency and on-farm water use efficiency.
  - Identify water availability and sustainable water use.
  - Recalculation of crop consumptive water use and crop water requirements.
  - Study the impact of modern irrigation system on food security and improve the system’s efficiency by fertigation and chemication.
Agriculture:
- Assess the effect of applying deficit irrigation on food security.
- Assess the impact of using wide furrow (raised-bed cultivation) on food security.
- Promote cultivation of short duration crop cultivars and salt tolerant crops.
- Evaluate the advantages/disadvantages of outside-border cultivation.
- Improve agricultural services.
- Define comparative advantages of cultivating certain crops, such as cash crops and aromatic crops.

Socio-Economy:
- Estimate national food consumption.
- Determine the balance diet and define the national consumption based on it.
- Determine the levels of accessibility, utilization, and reliability.

B. Water accounting and auditing (two months)
- Assess water resources (conventional and non-conventional).
- Assess water demand (all sectors).
- Assess flow variability and demand forecasting.
- Assess water quality in all water ways.
- Develop water balance.
- Assess the financing opportunities and socio-economic aspects.
- Review the legal framework and institutional system.

C. Food supply cost curve (two months): based on the available mathematical models, the following activities are proposed to be implemented:

- Calculate food consumption based on current nutrition and the balanced nutrition for each commodity.
- Define water requirements to produce the required commodities locally and assess the incurred costs.
- Based on the current water available and water use efficiency, the water deficit and the options to fill the water gap have to be calculated.
- Evaluate other options to fill the food gap, such as import. In this aspect, all prices (local, import, export) have to be clearly defined.
- Estimate the impact of uncertainties in both food consumption and water deficit.
- Study the impact of climate change on water scarcity and food security.

Recommendations:
- The importance of transparency, good governance and involvement of all stakeholders at all planning levels.
• Defining the roles and responsibilities of all stakeholders and avoid overlapping and replications is highly recommended.
• Private sector role in achieving food security through using water saving technologies, improved on-farm water management, and cultivating outside-borders is very important.
• Reducing water losses to economic levels is very vital in achieving food security.
• Application of crops simulation models to determine management scenarios to increase productivity is very important.
• Strengthen the extension services financially and technically through training to better perform its role.
• Make use of available success stories in other countries.
• Make use of the possible support (technical and financial) of international organizations that work in the same field such as FAO, ADF, UNESCO, etc.

## 8.2 **MOROCCO AND MAURITANIA ACTION PLAN**

<table>
<thead>
<tr>
<th>1. FAO letters</th>
<th>Letters FAO recalling what has been proposed (very important).</th>
<th>June</th>
</tr>
</thead>
</table>
| 2. Establish Multi-disciplinary committee | **Mauritania**
- Ministry of Rural development
- Ministry of Environment
- Ministry of Hydraulic
- Local administrations
- Ministry of Economics (Statistics)
- Ministry of Fisheries (the delegates did not agree on that)
- Food security Commissioner
- Federations of water users and producers
- OMVS
- To be completed...

**Morocco**
- Ministry of Water and Forestry
- Ministry of Agriculture
- Department water (agencies of basins etc.)
- Ministry of Environment
- ONEP and public companies
- local communities
- Ministry of Economic Affairs (food security)
- High Planning Commission (statistics)
- Ministry of Foreign Trade
- Ministry of Finance
- Federations of water users and producers
- To be completed.... | June |
<p>| 3. Designate a Facilitator | responsible for coordination at national level, to ensure that departments cooperate, provide access and endorse data | June |
| 4. Appointment of a select committee | Will lead the work. FAO will require the establishment of these multidisciplinary teams | June |
| 5. Hire consultant | National Consultant needed for reporting, synthesize, etc.. Permanent or not? Discuss the terms of reference together with the select committee. | June |
| 5. workshop | Awareness raising national workshop | June |
| 6. data | | July |</p>
<table>
<thead>
<tr>
<th>collection</th>
<th>7. Training sessions</th>
<th>8. Data analysis</th>
<th>9. Study</th>
<th>Recommendations to FAO:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5. Pilot study training sessions (sub-regional?). National (preferred as it can involve more people) or sub-regional (?). Training is an incentive</td>
<td></td>
<td>Discussions about the results of the study</td>
<td>- Integrate upstream and downstream watersheds within the study to ensure integrated management of water resources</td>
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<td></td>
<td></td>
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<td>- All documents in English translated into at least one language</td>
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<tr>
<td></td>
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<td>- Dates to be confirmed and communicated dates well in advance for FAO intervention to ensure proper coordination of the program in the country.</td>
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<td></td>
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<td>- Regular information on the progress in other countries (web?)</td>
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<td></td>
<td>- When sending the letter with the report of the workshop, FAO should remind countries to appoint a national facilitator</td>
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<td>- The supervision of the FAO is needed throughout the study (by Internet, web?)</td>
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</table>

End Oct.
### 8.3 TUNISIA AND ALGERIA ACTION PLAN

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Creation of NMDT Initiative - FAO</td>
<td>Tunisia (already done)</td>
<td>Algeria (ongoing)</td>
<td></td>
<td></td>
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<tr>
<td>Briefing of National committee</td>
<td>National workshop (NMDT+FAO Tunisia)</td>
<td>TORs + Hiring consultant</td>
<td>Analysis &amp; Recon (by the consultant)</td>
<td>Validation workshop (NMDT+FAO+water stakeholders)</td>
<td></td>
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<tr>
<td>Water accounting and audit</td>
<td></td>
<td></td>
<td>TORs + Hiring consultant</td>
<td>Analysis &amp; Recon (by the consultant)</td>
<td>Validation workshop (NMDT+FAO+water stakeholders)</td>
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</tr>
<tr>
<td>Food supply cost curve (FSCC)</td>
<td>Training session on FSCC organized by FAO for NMDT</td>
<td>TORs + Consultant</td>
<td>Application of FSCC model Analysis &amp; Interpretation (by consultant)</td>
<td></td>
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<tr>
<td>Country gap analysis</td>
<td>TOR + consultant</td>
<td>Gap analysis (by consultant)</td>
<td>Validation workshop (NMDT + FAO + water stakeholders)</td>
<td>Initiative regional workshop by FAO</td>
<td></td>
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</tbody>
</table>
### 8.4 OMAN ACTION PLAN

<table>
<thead>
<tr>
<th></th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>15-Nov</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food production and imports/exports</strong></td>
<td>Salim +MAF</td>
<td>Salim +MAF +Exp</td>
<td>Salim +MAF +Exp</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Food reserve &amp; food strategy</strong></td>
<td>Salim +MAF +Exp</td>
<td>Salim +MAF +Exp</td>
<td>Salim +MAF +Exp</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>National water resources supply and demand</strong></td>
<td>Khalid + MRMWR</td>
<td>Khalid + MRMWR</td>
<td>Khalid + MRMWR</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water institutions and responsibilities</strong></td>
<td>Slim + Khalid</td>
<td>Salim +MAF +Exp</td>
<td>Slim + Khalid</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water-food nexus</strong></td>
<td>Slim + Salim</td>
<td>Slim + Salim</td>
<td>Slim + Salim</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strategies, options and projects</strong></td>
<td></td>
<td>S+S+K</td>
<td>S+S+K</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Food supply curve</strong></td>
<td></td>
<td></td>
<td>Slim</td>
<td>Slim</td>
<td></td>
</tr>
<tr>
<td><strong>Final Report</strong></td>
<td></td>
<td>S+S+K</td>
<td>S+S+K</td>
<td>S+S+K</td>
<td>S+S+K</td>
</tr>
</tbody>
</table>

### 8.5 JORDAN ACTION PLAN

<table>
<thead>
<tr>
<th><strong>1-The Water accounting and audit</strong></th>
<th><strong>Stakeholders to investigate</strong></th>
<th><strong>Studies and information required</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Water and Irrigation.</td>
<td></td>
<td>Determination of the quantities of surface water and groundwater.</td>
</tr>
<tr>
<td>Ministry of Agriculture.</td>
<td></td>
<td>The amount of rainfall</td>
</tr>
<tr>
<td>Ministry of Environment.</td>
<td></td>
<td>The amount of water the Joint International.</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td></td>
<td>Non-traditional sources of treated water.</td>
</tr>
<tr>
<td>Department of Meteorology</td>
<td></td>
<td></td>
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<tr>
<td>Department of Statistics</td>
<td></td>
<td></td>
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<tr>
<td>Water companies</td>
<td>Saltwater</td>
<td></td>
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<td>-----------------</td>
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<tr>
<td>Water Research Center and the environment</td>
<td>Drainage</td>
<td></td>
</tr>
<tr>
<td>Universities</td>
<td>Water balance and the Ministry of Water and all water users, industry, agriculture, household consumption, pool services.</td>
<td></td>
</tr>
<tr>
<td>Municipalities</td>
<td>Mapping of water falls and groundwater basins.</td>
<td></td>
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<tr>
<td></td>
<td>The efficiency of water use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Irrigated areas and types of irrigation used in each of them and farming system approach.</td>
<td></td>
</tr>
</tbody>
</table>

### 2. The Food Supply cost curve

| Ministry of Agriculture | Calculation of production inputs and returns (water, fertilizer, seed, labor, pesticides .....). |
| Ministry of Industry and Trade. | Import and export barriers. |
| Ministry of Energy and Mineral Resources | With losses after harvest Food Loss |
| Ministry of Water and Irrigation. | Identify alternatives and options as food sources. |
| Department of Statistics | |
| The private sector. | |
| Concerned farmers' associations | |

### 3 - Country gap analysis

| Ministry of Water and Irrigation | In the water losses by all means. |
| Ministry of Agriculture | The efficiency of water use (irrigation, drinking ....). |
| Water users associations | Indicators of water use for different crops and yield. |
| Farmers unions | The quality and quantity of water used in agriculture and drinking. |
Monitoring and management systems for water used for drinking, agriculture and private water treatment.

Institutional building and the multiplicity of the supervisory authorities and powers.

<table>
<thead>
<tr>
<th>Jordan ACTION PLAN</th>
<th>MONTHS Year 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identification of stakeholders and the team national</td>
<td>6 7 8 9 10 11 12</td>
</tr>
<tr>
<td>2. water and checking accounts</td>
<td></td>
</tr>
<tr>
<td>3. the cost curve for food sources</td>
<td></td>
</tr>
<tr>
<td>4. Gap analysis</td>
<td></td>
</tr>
<tr>
<td>5. national workshop to review the output (2nd week of the month)</td>
<td></td>
</tr>
</tbody>
</table>

**National aid:**
- Consultants in each of the three topics above (2, 3.4).
- Material support to all the data required, meetings, workshops, and incentives for team work.

**Recommendations to FAO:**
- Emphasis on sending a clear message to the countries of the importance of the initiative and the designation of the concerned party in the State and the person concerned and the formation of the national team.
- Benefit and to inform the concerned on the experiences of developed countries in this field.
- Building the capacity of States on the subject of the price curve for sources of food in particular.
## 8.6 Yemen Action Plan

<table>
<thead>
<tr>
<th>Activities</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established multidisciplinary team from MAI and MWE</td>
<td>x</td>
</tr>
<tr>
<td>Prepared TORs and recruited the coordinator and National specialists</td>
<td>x</td>
</tr>
<tr>
<td>Conducted the training (TOT) for the national team</td>
<td>x</td>
</tr>
<tr>
<td>Prepared work plan and logical framework with cooperation of FAO experts</td>
<td>x</td>
</tr>
<tr>
<td>x x</td>
<td></td>
</tr>
<tr>
<td>Identify the criteria for the site selection with cooperation of all stakeholders</td>
<td>x</td>
</tr>
<tr>
<td>Collected all the available data, reports, strategies, regulations and studies in the related subjects</td>
<td>x x</td>
</tr>
<tr>
<td>Collection of the data (technical, social, economical and agricultural production and water resources data, hydro-Metrological data)</td>
<td>x x</td>
</tr>
<tr>
<td>Collect the Data about crop water requirement, crop water productivity cost of the agricultural inputs crop prices water resources information, water pierces by type of the water resources, government subsidies, agrometrological data</td>
<td>x x</td>
</tr>
<tr>
<td>Organize workshop to discuss the work plan and activities as well as awareness creation and inform them about the project (MAI, MWE, AREA, EPA, NWRA, SFD, PWP, WEC, ACU, NGOs and donors)</td>
<td>x x</td>
</tr>
<tr>
<td>Select pilot sites base on the certain criteria</td>
<td>x</td>
</tr>
<tr>
<td>Conducted the water accounting and audit assessment in the selected sites</td>
<td>x</td>
</tr>
<tr>
<td>Collect the base line data and assist the water and agricultural situations in the selected sites</td>
<td>x</td>
</tr>
<tr>
<td>Prepared the questionnaire and conduct PRA and involved the concerning communities in the project areas</td>
<td>x</td>
</tr>
<tr>
<td>Prepared the food cost curve</td>
<td>x</td>
</tr>
<tr>
<td>Conducted the country gap analysis according the information and data have been collected</td>
<td>x</td>
</tr>
<tr>
<td>Conducted workshop on the findings of the assessment and recommendations</td>
<td>x</td>
</tr>
<tr>
<td>Prepared the assessment report</td>
<td>x</td>
</tr>
</tbody>
</table>
**Recommendation:**

- Immediately implement the water scarcity initiative to avoid any gap between preparation and implementation stages.
- The initiative should be followed by projects and programs.
- Development and updating of various strategies and policies such as (Drought, climate change and Non-Conventional water use strategy).

### 8.7 PALESTINE ACTION PLAN

<table>
<thead>
<tr>
<th>Nu.</th>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Nomination of the National Multidisciplinary Team</td>
<td>30 June 2013</td>
</tr>
<tr>
<td>2)</td>
<td>Gap Analysis</td>
<td>1-31 August 2013</td>
</tr>
<tr>
<td></td>
<td>Data collection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting with MoA, PWA, EQA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reporting</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Water Auditing</td>
<td>1 August – 30 Sept</td>
</tr>
<tr>
<td></td>
<td>Survey of the available information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data collection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting with MoA, PWA, EQA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reporting</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Food Supply Cost Curve</td>
<td>1 Sept – 30 October</td>
</tr>
</tbody>
</table>

### 8.8 SYRIA ACTION PLAN

<table>
<thead>
<tr>
<th>Activities</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Identification of stakeholders and the national team:</td>
<td>1-30/6/2013</td>
</tr>
<tr>
<td>- Ministry of Water Resources,</td>
<td></td>
</tr>
<tr>
<td>- Ministry of Agriculture and Agrarian Reform</td>
<td></td>
</tr>
<tr>
<td>- Ministry of State for Environmental Affairs</td>
<td></td>
</tr>
<tr>
<td>2) Water and checking accounts</td>
<td>1/8-30/9/2013</td>
</tr>
<tr>
<td>3) Cost curve for food sources</td>
<td>1/8-30/10/2013</td>
</tr>
<tr>
<td>4) Gap analysis</td>
<td>1-31/7/2013</td>
</tr>
<tr>
<td>5) national workshop</td>
<td>second week of 10/2013</td>
</tr>
</tbody>
</table>
### ANNEX 2: LIST OF PARTICIPATING COUNTRIES AND ORGANISATIONS

<table>
<thead>
<tr>
<th>Participating Countries</th>
<th>Ministries/Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>Ministry of Agriculture and Rural Development</td>
</tr>
<tr>
<td>Egypt</td>
<td>Ministry of Water Resources and Irrigation</td>
</tr>
<tr>
<td></td>
<td>Ministry of Agriculture and Land Reclamation - Water and Environment Research Institute</td>
</tr>
<tr>
<td></td>
<td>Horticulture Research Institute</td>
</tr>
<tr>
<td></td>
<td>National Researches Center (NRC)</td>
</tr>
<tr>
<td></td>
<td>Aquaculture Consultant Office (ACO)</td>
</tr>
<tr>
<td>Jordan</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td></td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>KSA</td>
<td>Ministry of Water and Electricity</td>
</tr>
<tr>
<td></td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>Mauritania</td>
<td>Ministry of Rural Development and Environment</td>
</tr>
<tr>
<td>Morocco</td>
<td>Ministry of Agriculture, Rural Development and Maritime Fisheries</td>
</tr>
<tr>
<td></td>
<td>Ministry of Energy, Mines, Water and Environment</td>
</tr>
<tr>
<td></td>
<td>Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification</td>
</tr>
<tr>
<td>Oman</td>
<td>Ministry of Agriculture and Fisheries</td>
</tr>
<tr>
<td></td>
<td>Ministry of Regional Municipalities and Water Resources</td>
</tr>
<tr>
<td></td>
<td>Sultan Qaboos University</td>
</tr>
<tr>
<td>Palestine</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>Qatar</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td>Syria</td>
<td>Ministry of Water Resources</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Ministry of Environment</td>
</tr>
<tr>
<td></td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>Organization</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>AFDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>AWC</td>
<td>Arab Water Council</td>
</tr>
<tr>
<td>DRC (Egypt)</td>
<td>Desert Research Center</td>
</tr>
<tr>
<td>ESCWA</td>
<td>United Nations Economic and Social Commission for Western Asia</td>
</tr>
<tr>
<td>FAO</td>
<td>United Nation Food &amp; Agricultural Organization</td>
</tr>
<tr>
<td>ICARDA</td>
<td>International Center for Agricultural Research in the Dry Areas</td>
</tr>
<tr>
<td>IDRC</td>
<td>International Development Research Centre:</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>IWMI</td>
<td>International Water Management Institute</td>
</tr>
<tr>
<td>UN - DESA</td>
<td>United Nations Department of Economic and Social Affairs</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
</tbody>
</table>