Arab Water Council

3rd Arab Water Forum

Final Report

Cover Picture:
A painting by Artist Araby Araby Mohammed winning the first place in the cultural contest organized along

3RD ARAB WATER FORUM

"Together towards a Secure Arab Water"

09-11 December 2014
Cairo, Egypt

FINAL REPORT

Prepared by:
Dr. Shaden Abdel-Gawad

Edited by:
Dr. Safwat Abdel-Dayem

Cairo, 15 February 2015

Acknowledgements

The success of the 3rd Arab Water Forum is attributed to the support and cooperation of many organizations and individuals who tirelessly worked over many months with the Arab Water Council and the Organizing Committee to bring the Forum to what it was. Many names should be mentioned and words of thanks will not be enough to reward them for their great effort. All sponsors, session conveners and speakers were behind making the forum true success. Success was evident not just by the great number of participants or the many sessions organized, but also by the quality of presentations and contributions made.

The preparation of this report was not possible without the outstanding work and dedication of the session rapporteurs who carefully and successfully captured the highlights of each session. Special thanks goes to the exceptional work of Eng. Tahani Sileet and Dr. Amel Azab in collecting, and synthesizing the individual session reports into messages, recommendations and implementation roadmaps.

Members of the organizing committee who carried the burden of the forum organization deserve to be congratulated for the fine work they did. Their professionalism in implementing the task at the highest world standards is remarkable.

Finally, the leadership and guidance of H.E. Dr. Mahmoud Abu-Zeid, the President of the Arab Water Council, and Dr. Hussein El-Atfy, the Secretary General remain the true drivers for the successful organization of the forum.

Executive Summary

The Arab region faces a diversity of water challenges linked with water scarcity and droughts, rapid population growth, conflicts on shared water resources, climatic conditions, poverty, environmental pollution and ecosystem degradation, unbalanced economic affordability and food supply and gender inequalities, which are aggravated by poor governance.

In 2013, the Arab countries accounted for:

- 5% of the world's population with 400 million inhabitants
- 1% of the world's water resources
- 65% of its fresh water resources originate from outside the region
- 18 out of 22 Arab countries suffer water scarcity and 8 countries have less than an average of 200 m3 per capita per year
- 87% of land area is arid or semi-arid
- 83 million with no access to drinking water
- 96 million with no access to sanitation
- Agriculture accounts for 85% of water withdrawals
- 50% of the world's desalination capacity

While governments, national and international organizations and various stakeholders made a large number of efforts to respond to such challenges, further and better-coordinated actions are needed to achieve water security in the region. Achieving water security means achieving security in many other domains, such as food and energy.

The 3rd Arab Water Forum was organized under the theme **"Together towards a Secure Arab Water Future"** which focuses on the Future as well as on **Regional Cooperation.** Four hundred participants from 38 countries around the world convened in Cairo on December 9-11, 2014 to discuss three sub-themes:

1. **Integrated Water Resources Management: Achievements & Constraints,**
2. **Actions for Sustainable Development of Water Resources and Water Services, and**
3. **Arab Integration for Food Security under Water Scarcity.**

The 3rd AWF has provided an overview on key water challenges and critical issues. It has also discussed strategies, solutions, actions and elaborated case studies presenting good practices and success stories in response to several water challenges related to the three sub-themes of the forum.

Integrated Water Resources Management: Achievements & Constraints

Managing Arab water under uncertain conditions and with increasing demands for food security, socio-economic development, human safety and regional peace calls for policies that are robust and flexible. Robust so that they are not dealing with only the immediate crises but are addressing the long-term sustainability in an integrated manner. Flexible so that actions could be modified based on the new information and knowledge generated by science. These policies have to provide "no-regret" solutions to the immediate problems.

Since the evolution of **Integrated Water Resources Management (IWRM)** as a globally renowned and accepted water management approach, proper water assessment covering all resources and areas of development has emerged as its inseparable companion. Hence, the **"State of the Arab Water"** is of utmost relevance as it addresses the broad extent of water throughout all human development sectors and caters all planning, research and decision making managerial needs. The "2012 State of the Arab Water Report" launched by AWC & CEDARE shows interesting findings for shaping the future water related policies of the region. It should be a continuous process for the preparation of the 2015 State of the Arab Water Report. The "2012 State of the Water Report from North African countries" namely Algeria, Egypt, Libya, Mauritania and Tunisia should be

expanded to cover all Arab countries. The well-defined indicators that cover various water-related issues such as availability, usage, land use change, energy, services, etc, should be embraced and supported to prepare 2015 State of the Arab Water Report.

Climate change adds an additional risk factor for water resources management and water services provision. Climate change is likely to make the region more susceptible to extreme hydrological events, recurrent droughts, increased temperatures, shorten growing seasons, reduced crop yield and sea level rise. So far, responses to climate change in the Arab region are only done in reaction to emergencies. Given the high complexity and multidisciplinary nature of climate change, it is important to rely on science-based analyses and projections of climate change scenarios to formulate policy at regional and sub-regional levels. National policies should evolve from crisis management to risk management.

Strengthening the national capacities for effectively accessing and using finance available at the global level can contribute to increasing resilience of the Arab region to climate change. The newly established Green Climate Fund offers many opportunities for adaptation and mitigation projects. However, access to funds requires what is termed "climate readiness" and Arab countries should be well advised to build the necessary capacities to apply and handle these funds.

The variety of initiatives, information, modeling capacity, assessment tools around climate change impacts on water, agriculture, land as well as socio-economic vulnerability, that are being produced by the region should be regionally harmonized and made accessible to different stakeholders, practitioners and ministries. The different efforts made by a number of multi-lateral institutions and organizations across the region, through establishing networks around their relationships and projects or in launching different knowledge hubs, must be captured, streamlined and consolidated in a sustainable, flexible and user-friendly regional platform. The Arab Water Council (AWC) is entrusted to build this portal of climate change information system.

Shared water plays an important and pivotal role in the overall Arab water security. More than 65% of the Arab surface water originates from outside the Arab region political borders through major rivers like the Nile, Tigris, Euphrates and Senegal. Accordingly, sharing the water of these rivers is subject to political conflicts as most of these rivers are still without clear agreements that organize the water shares. If no clear agreements have reached with the upstream countries, these rivers will remain a threat to the stability in the Arab World, especially in light of the evolution of water uses in the upstream countries and the exacerbation of negative impacts to downstream counties. Conflicts over shared river basins and aquifers in the region are exacerbated due to poor management, lack of information and absence of tradeoffs that add more complexity to the issue.

Shared water resources must be seen as a tool for cooperation and peace, and for promoting equitable allocation of water resources and their benefits. Regional cooperation in a trans-boundary context is considered a key solution towards achieving water security. Good political will and respect of international law principles, promoting win-win and no-harm solutions and fair tradeoffs are key for cooperation and successful management of shared water resources among Arab countries and other riparian states.

The intention is to build trust among riparian countries, which in turn lead to concrete solutions for water within the transboundary context. Countries need new mechanisms for conflict resolution, new ways to involve civil society, and new metrics to describe water balances at basin level including blue and green water.

The region depends significantly on **groundwater resources**, and increasingly on non-renewable groundwater supplies, to meet their growing water demands in different countries. High water stresses caused by scarcity of surface water resources in the region are met with varying degrees of depletion and mining of aquifer systems. Thus, many groundwater resources in the Arab region

are at risk of being exhausted through over-pumping. This has been proved by continuous water level declines and degradation of water quality due to salinization.

Groundwater needs to be carefully managed and properly governed if its use is to be sustained for future generations. This implies the need of political will in implementing strict governance measures in areas where agriculture is the main user for the livelihood of rather poor rural populations. There is a need for clear identification and addressing the major factors explaining the lack of implementation of groundwater policies on the ground in the Arab region to ensure better governance.

The water resources in the Arab region are often mismanaged due to inadequate **knowledge and capacity**. Better scientific understanding of water problems and knowledge-based approaches to manage water resources in an integrated manner, coupled with capacity building and technology transfer can bring efficient solutions to those water problems faced by the region and improve water use efficiency.

The gap between **research and practice** needs to be closed. Researchers should take the lead, reaching out to policy makers and planners at all levels, helping them build their own capacity and working to understand and address the real needs.

Actions for Sustainable Development of Water Resources and Water Services

Moving from **MDGs** to **SDGs** needs to be adopted nationally and regionally by 2015 and to be merged in the national development plans of the Arab countries. Regional institutions and funding agencies should make efforts to strengthen the capacities of the Arab countries based on national and community based dialogues and consultations. They need to secure financial resources to achieve the SDGs. A mechanism could be put in place by League of Arab States (LAS) to monitor this process in the region.

Irrespective of how water will be captured in the **SDGs**, it is essential that the Arab region examine the broader role of water and water management in sustainable development as well as in climate negotiations and risk reduction.

Water-Energy-Food nexus identifies where these sectors intersect. Focusing on the nexus between scarce resources in the Arab region is the only route to sustainable supply of water, food and energy. The nexus between water and energy is among the most important inter-dependencies in Arab countries, where socio-economic development relies on the sustainable provision of these two resources. Together, water and energy are required for irrigation and energy is vital to desalination. Many opportunities for improving human and political securities can be achieved through the nexus approach.

Understanding the nexus will allow decision makers to develop appropriate policies, strategies, and investments. They will need to explore and exploit synergies, and to identify trade-offs among the development goals related to water, energy and food security. Moreover, a nexus perspective increases the understanding of the interdependencies across these three sectors and influences policies in other areas of concern, such as climate change and environment.

Public-Private Partnership (PPP) in water and wastewater sectors has proven to be extremely beneficial in saving costs of capital investments, improving O&M efficiency and energy saving as well as improving service provision. Creation of better enabling environment for PPP in Arab countries by improving the governance environment is essential to attract the private sector to water and sanitation projects. The cooperation between private and public sector for the implementation of urban and rural wastewater management through Built-Operate-Transfer (BOT) models are encouraged. The PPP is among the pillars to fill-in the gap in making huge infrastructure investments. It has a great economic value in building water and wastewater, energy and telecommunications infrastructures.

Water governance should be improved to include appropriate legal and regulatory tools, efficient institutional management, enforcement bodies, and stakeholders' involvement. Coordination of water policies with other sectoral policies and insuring equity, transparency, accountability and rule of law are essential for good water governance.

Water Ethics, Integrity, Transparency and Accountability in the Water Sector, is receiving high attention. There is a need a comprehensive approach to the reform of the water sector to provide a robust and applicable anti-corruption framework in the Arab region. Promoting transparency of the decision-making process would discourage corruption.

Investment needs in the region in water sector are significant. National financial resources as well as bilateral and multilateral funding are needed, which would also demonstrate south-south solidarity and international cooperation in the region. Realistic cost recovery is an indispensable tool for financial sustainability of water services. All investments should take into account that water is a scarce natural resource and a public good essential for life and all economical and social activities. Therefore, water tariffs should be differentiated reflecting local conditions and affordability considerations.

Arab Integration for Food Security under Water Scarcity

The Arab region is far from having enough water to grow sufficient basic food crops (mainly cereals) for its steadily growing population. The obsession of self-sufficiency that was predominant in the 70s is no longer rational or possible. Food demand will increase by three folds in 2050. Meanwhile, available conventional water resources are expected to diminish. Agricultural share of total fresh water is expected to decline from 85% in 2000 to about 53% in 2050. Thus, food security will increasingly depend on food imports. In fact, the region has been importing more and more food to meet its national needs.

Agricultural productivity, when increased, increases food availability without using new water resources. Thus, it is imperative to increase agricultural productivity for the sake of increasing the share of local production in food security. Although agricultural production and productivity have significantly increased by an average of 2% over the period 1984-2004, food deficit is expected to reach 63.5 billion US$ in 2030. Potential to increase productivity of both rainfed and irrigated agricultural systems should be fully exploited.

However, strategic planning for optimal allocation of water resources should remain an important factor. Increase of agricultural water use efficiency through technological and management means provides opportunity for increasing food security without being a threat to water security. It is important to notice that increasing water productivity may or may not result in higher economic or social benefits. Therefore, more emphasis should go into economic studies that incorporate water productivity in its many dimensions, consider the return flow issue, and adopt a multi-input and multi-output framework.

In light of existing and further expected water deficit, use of **non-conventional water** such as agricultural water reuse, treated wastewater, brackish water, rainwater harvesting and desalinated water have become irreplaceable strategic options to the Arab world. These sources can fill part of the gap between supply and demand for agricultural production. AWC and partners are recently developing guidelines for brackish water use for agricultural production in the NENA region. This will help farmers to sustainably use such type of water in agricultural production. The guidelines should be finalized in a user-friendly manner. Standards and guidelines of wastewater reuse are vital and have to be revised frequently and take into account the specific conditions in each country. Ecological, economical and health risks of wastewater reuse should be carefully considered.

Regional cooperation and integration emerged in all discussions as inseparable factor in realizing food and water securities. There is an urgent need of collective measures for adopting enhanced water use efficiency methods in irrigation and financing policies to come forward at national scale. Political initiatives, technical cooperation and trade relations may contribute to equitable allocation of water on the regional scale. The region must foster south-south cooperation to realize food security, develop knowledge platform and build capacities through exchange of experiences and information.

Regional cooperation is the engine for water and food security. The Arab region can become a model for innovative thinking, planning and implementation through regional cooperation, e.g. support Arab agricultural integration, electrical grid interconnections and power pools, sustainable land investments and knowledge and technology sharing between Arab states. Each country has its comparative advantages when these are put together, great benefit could be harvested.

The region should adopt fast track measures to strengthen or establish regional and international organizations that can help in finding solutions to the challenges of food security under water scarcity conditions. The measures include the establishment of a global organization to protect water scarce countries from rapidly increasing food prices, an Arab food basket unifying the efforts in negotiating food prices, a sort of Arab Union for wheat production and a regional mechanism for food and water security.

Regional cooperation must go beyond national boundaries through basin approach for shared water management. Strong cooperation can be assured by basin level governing institutions, work programs, joint monitoring and wide stakeholders participation based on legal agreements and institutional arrangements.

High Level Panel on Future of Arab Water

The High Level Panel on "Future of Arab Water" organized by AWC gave the message that all encompassing cooperation in technical, economical and political terms is the key to overcome the challenges of water security.

The region has already developed (i) Arab Water Security Strategy, and (ii) Sustainable Arab Agricultural Development Strategy. However there is an urgent need to strengthen and intensify a regional collaborative implementation effort based on a strategic partnership. Key areas for regional collaboration could include agricultural water productivity, groundwater productivity, climate change adaptation, intraregional investments, market information and food stocks.

Arab Regional Inputs to the 7th World Water Forum

Four regional thematic priorities have been selected by the Arab Water Ministers Council (AWMC) of the League of Arab States (LAS) as regional inputs to the 7th World Water Forum to be held on April 12-17, 2015 in Korea. These regional themes are:

- Water for Food (theme 2.1)[1]
- Water for Cities and Energy (theme 2.2)
- SMART Implementation of IWRM (theme 3.4)
- Transboundary Water (theme 4.3)

The outcome of the AWF3 presented in this report provides an overview of the regional challenges, threats and opportunities related to water and food security. It also offered solutions, recommendations and priority actions. This outcome will represent the bulk of the content and serves the design of the Arab regional sessions in the WWF7.

1 Theme number in the WWF7 Thematic Framework

CONTENTS

List of Figures

The source of all figures in this report is the power point presentations used by the speakers.

LIST OF ABBREVIATIONS & ACRONYMS

ACCWaM	Adaptation to climate change in the water sector in the MENA region
ACSAD	Arab Center for the Studies of Arid Zones and Dry Lands
ACWA	Association of Clear Water Administration
ACWUA	Arab Countries Water Utilities Association
AGEDI	Abu Dhabi Global Environmental Data Initiative
AWC	Arab Water Council
AWF3	Third Arab Water Forum
AWSS	Arab Strategy for Water Security
BOG	Board of Governors / AWC
BOT	Built-Operate-Transfer
CCA	Climate Change Adaptation
CEDARE	Center for Environment and Development for the Arab Region and Europe
CNRS	The National Council for Scientific Research (CNRS-Lebanon)
COFW-LAS	Center of Water Studies- League of Arab States
CRTS	Royal Center for Remote Sensing, Morocco
CS	Civil Society
DRR	Disaster Risk Reduction,
EoE	Eye on Earth
ESCWA	The United Nations Economic and Social Commission for Western Asia
ET	Evapo-transpiration
EU	European Union
EU WFD	European Union Water Framework Directive
FAO	The Food and Agriculture Organization
GCC	Gulf Cooperation Council
GEF	Global Environmental Facility
GEO	Group on Earth Observations
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit
GL	Guidelines
GW	Ground Water
GWP	Global Water Partnership
GWP-Med	Global Water Partnership- Mediterranean
IAEA	International Atomic energy Authority
ICARDA	International Center for Agricultural Research in the Dry Area
ICBA	The International Center for Biosaline Agriculture
ICZM	Integrated Coastal Zone Management
IFAD	International Fund for Agricultural Development
IHP	International Hydrological Program
ISARM	Internationally Shared Aquifer Resources Management

IUCN	International Union for Conservation of Nature
IUCN R-KNOW	IUCN Regional Knowledge Network
IWMI	The International Water Management Institute
IWRM	Integrated Water Resources Management
LAS	League of Arab States
M&E	Monitoring and Evaluation
MAWRED	Modeling and monitoring agriculture and water resources development
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MEWINA	Monitoring and Evaluation of Water in North Africa
NAE	National Accrediting Entity
NASA	National Aeronautics and Space Administration
NDA	National Designated Authorities
NENA	Near East and North Africa
NGO's	Non Governmental Organizations
NIE	National Implementing Entity
NSAS	Nubian Sandstone Aquifer System
NWRC	National Water Research Center
NWSAS	North Western Sahara Aquifer System
PEWM	Public Engagement Project
PMU	Project Management Unit
PPP	Public Private Partnership
RAED	Arab Network for Environment & Development
RCIWRM	Regional Coordination Program on the use of Space Technologies for IWRM
RICCAR	Regional Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability
RS	Remote Sensing
RWSI	Regional Water Scarcity Initiative
SADA	Shared Aquifer Diagnostic Analysis
SAP	Strategic Action Program
SDGs	Strategic Development Goals
SIWI	Stockholm International Water Institute
SMHI	Meteorological and Hydrological Institute
SOW	State of the Water
SWOT	Strength-Weakness-Opportunity-Threat
TBA	Trans-Boundary Aquifers
UN	United Nations
UNDP	United Nation Development Program
UNEP	United Nation Environmental Program
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNGA	United Nations General Assembly

UNISDR	The United Nations Office for Disaster Risk Reduction,
USAID	United States Agency for International Development
WB	World bank
WFP	World Food Programme
WRM	Water Resources Management
WWC	World Water Council
WWF7	Seventh World Water Forum

Overview of the Forum Organization

The 3rd Arab Water Forum was held in Cairo from 9 to 11 December 2014. It was organized by the Arab Water Council (AWC) under the auspices of the League of the Arab States (LAS) and the Ministry of Water Resources and Irrigation (MWRI) in Egypt. The slogan and main theme of the Forum was **"Together Towards a Secure Arab Water Future"**. It focused on the **Future** and on **Regional Cooperation**. The Forum brought together about four hundred participants from 38 countries around the world including Arab and International Leaders, Present and Former Ministers and Country representatives, Heads of National, Regional and International Organizations as well as experts, scientists, practitioners and members of the civil society.

The Arab Water Forum is a tri-annual multi-stakeholders event of the water sector in the Arab region, which is a great opportunity to make an impact on water policies, strategies and actions that can turn water challenges into opportunities to help achieve water security in the Arab region. Achieving water security means achieving security in many other domains, such as food and energy. This is because water is the common thread uniting all human activities and the natural environment.

The 3rd Arab Water Forum's main theme was addressed through 30 sessions organized under three sub-themes, namely: **(i) Integrated Water Resources Management: Achievements and Constraints, (ii) Actions for Sustainable Development of Water Resources and Water Services, and (iii) Arab Integration for Food Security under Water Scarcity**. In addition to the technical sessions, six side events, an Arab Water Expo and a Fine Art Gallery took place during the Forum.

The **Opening Ceremony** of the Forum included the speeches of Dr. Mahmoud Abu-Zeid, President of AWC, Dr. Hosam Moghazy, Minister of Water Resources and Irrigation-Egypt, Dr. Adel El-Beltagy, Minster of Agriculture and Land Reclamation-Egypt, Ambassador Shahira Wahbi, Representative of the League of Arab States, Mr. Benedito Braga, President of World Water Council, Ms. Haleh Bridi, Regional Programs and Partnership Director-World Bank, Mr. Al-Sadik Al-Mahdy, Former Prime Minister-Sudan, Dr. Adnan Badran, Former Prime Minister-Jordan, and Prince Khalid Bin Sultan, Chairman of Prince Sultan Bin Abdulaziz International Water Prize and Honorary President of AWC. Their speeches highlighted several solutions to the major water issues in the Arab Region such as *regional cooperation on water and food security, adoption of Water-Food-Energy Nexus approach, institutional strengthening and capacity building, raising awareness, developing water infrastructure, research and development in water desalination technologies, demand management, climate change adaptation, increase water efficiency and water productivity, adopt new irrigation technologies, civil society and stakeholders involvement and fairness and justice in transboundary water management.*

A **High Level Panel** was organized on the first day of the Forum by the AWC under the title **"The Future of Arab Water Security"** with the aim to synthesize the view points of political Arab leaders on water-related issuess and stimulate political will towards taking actions regarding regional water challenges. Arab Ministers of Water, Environment, Agriculture and Energy led the interactive discussions together with senior staff of International Organizations. The meeting sent a strong message about the political will to implement actions towards water and food security.

Three **Training Workshops** were convened back-to-back with the Forum by regional and international organizations on: (1) Climate change mainstreaming, proofing and international climate finance, (2) Developing

and using new data on crops/water and climate change, and (3) Advancing hydro diplomacy skills for shared water resources negotiations.

The **Arab Water Expo** organized along the side of the forum provided a platform for water companies and water institutions to present their technical activities and solutions related to water. A **Fine Art Gallery** complemented the Forum debates, to give an opportunity to artists from all ages and gender to demonstrate the importance of water in our lives.

The Forum's presentations, deliberations and discussions helped in building a shared vision of the major solutions, recommendations, and proposed actions concerning the water issues in the Arab Region in an attempt to draw up a road map to face the present and future challenges.

This report presents in Chapter 1 the outcome of the forum sessions in the order they were presented during the three days of the forum. Chapter 2 summarizes the different messages, recommendations and implementation roadmaps as relevant to the three themes of the forum. Chapter 3 focuses on how the outcome of the 3rd AWF serves the input of the Arab region to the 7th World Water Forum in terms of messages, action plans and road map and meanwhile link to the objectives of both the Arab Water Security Strategy and the Arab Agricultural Development Strategy.

All power point presentations of the thematic sessions are available on the forum's website[1] They offer important sets of data and information supporting the themes and issues covered by the forum

companies and water institutions to present their technical activities and solutions related to water. A Fine Art Gallery complemented the Forum debates, to give an opportunity to artists from all ages and gender to demonstrate the importance of water in our lives.
The Forum's presentations, deliberations and discussions helped in building a shared vision of the major solutions, recommendations, and proposed actions concerning the water issues in the Arab Region in an attempt to draw up a road map to face the present and future challenges.
This report presents in Chapter 1 the outcome of the forum sessions in the order they were presented during the three days of the forum. Chapter 2 summarizes the different messages, recommendations and implementation roadmaps as relevant to the three themes of the forum. Chapter 3 focuses on how the outcome of the 3rd AWF serves the input of the Arab region to the 7th World Water Forum in terms of messages, action plans and road map and meanwhile link to the objectives of both the Arab Water Security Strategy and the Arab Agricultural Development Strategy.

All power point presentations of the thematic sessions are available on the forum's website[2] They offer important sets of data and information supporting the themes and issues covered by the forum

2http://www.arabwatercouncil.org/3rd AWF/documents.html

High Level Panel

A High Level Panel on "Future of Arab Water Security" was organized by the AWC on the first day of the Forum with the aim of mapping the priorities, solutions and action plans for making the water future of the region more secure and sustainable. The Panel was moderated by Dr. Hussein Al-Atfy, the Secretary General of AWC and Former Minister of Water Resources and Irrigation of Egypt. Arab Ministers and leaders of Water, Environment, Agriculture and Energy Institutions led an interactive discussion together with the Senior Staff of International Organizations.

The High Level Panel was a special opportunity to learn from the water leaders in the region and their development partners about their vision and strategy for water security, food security and sustainable development.

Distinguished panelists gave their views about the following five water related issues:

- **Water and Sustainable Development** by H.E. Adnan Badran, Former Prime Minister of Jordan
- **Water and Climate Change** by H.E. Seif Eldin Hamad, Former Minister of Water Resources of Sudan
- **Transboundary Water** by H.E. Mohsen Al-Shammry, Minister of Water Resources of Iraq
- **Water and Food** by H.E. Kamal Ali, Former Minister of Water Resources of Sudan
- **Non-Conventional Water Resources** by Eng. Issa Al-Kuwari, President of General Electricity & Water Corporation, Qatar

Deliberations and discussions by the participants and their development partners were centered on those five priority issues.

The following statements reflect the outcomes of the deliberations of the water leaders, science, business and development partners.

- Water resources management should promote coordination, consolidation and integration. Integration must involve all sectors relying on water.
- "Nexus" perspective integrating water, energy, agriculture, ecosystem and other sectors should be adopted. In this case, trade-offs will be identified, synergies seized and resources used more efficiently.
- For transboundary watersheds and aquifers which constitute two thirds of the water resources in the region, cooperation must go beyond national boundaries through basin approach in management of shared water. Strong cooperation can be assured by basin level governing institutions, work programs, joint monitoring and wide stakeholders participation based on legal agreements and institutional arrangements.
- Most of the impacts of climate change are reflected in the water cycle. Climate change adaptation and mitigation needs to be specifically and urgently addressed in the national water strategies and plans. Adequate monitoring, data sharing, improved forecasting capabilities, no-regret investments and risk-sharing mechanisms would contribute to a more water secure region.
- In light of existing and further expected water deficit, use of non-conventional water such as agricultural water reuse, treated wastewater, groundwater utilization, rainwater harvesting and desalinated water have become irreplaceable strategic options to the Arab world.
- Advancing well functioning IWRM practices in managing irrigation systems is necessary for assuring food security.
- Attaining the MDG and SDG targets on water and sanitation require innovative, equitable, inclusive and sustainable financing mechanisms at all levels especially for the poor populations in rural areas.

- The active participation of the private sector in potable water supply, sanitation and utilization of non-conventional water is strongly recommended due to its ability to reach newest technologies in a competitive environment. The need for scientific research, capacity building, standardized data collection, data sharing and development of regional databases.

- The regional strategies on "Arab Water Security" and Sustainable Arab Agricultural Development" should be supportive to the national strategies in the Arab states and complementary to their efforts toward achieving secure and sustainable water region.

- The Arab region should make use of its comparative advantages represented in its natural resources, human resources, financial resources, knowledge, information and technology to achieve water and food security.

- Cooperation with riparian countries should be geared to long-term goals. Political will and trust building is indispensible for successful cooperation process.

- Ultimately, if Arab countries invest into water, they are investing in peace.

THIRD ARAB WATER FORUM
December 9-11, 2014, Cairo – Egypt
Program At-A-Glance

Days	Morning Session				Afternoon Session		
Tuesday Dec 9		REGISTRATION (will remain open for the Period of the Forum)					
		10:30-12:30	12:30- 13:30		14:30-16:00		16:30-18:00
		Opening Ceremony	Opening of Arab Water Expo and Fine Art Gallery		State of the Water Reports in North Africa & the Arab Region (CEDARE, African Water Facility, AWC,MEWINA)		Decentralized Water Governance: Policies, Legislation and Institutional Arrangements (UNDP)
					Arab Region Participation in the 7th World Water Forum (LAS, AWC)		Gender Mainstreaming in Integrated Water Resources Management (UNESCO)
					UN Partnerships for Transboundary Aquifer Governance: Global Strategies and Regional Programming (UNDP, SIWI, UNESCO, UNEP, IAEA)		Impact of Water and Environmental Sustainability on Coastal Cities (Alexandira University , Alexandria Water Company)
					Water- Energy- Food Nexus (C.I.H.E.A.M.- I.A.M. Bari)		Shared Water Resources in the Arab Region: Emerging Conflicts & Perspectives for Resolution (AWC, CEDARE, ESCWA)
	9:30-11:30	Coffee Break (11:30-12:00)	12:00-13:30	Lunch Break (13:30-14:30)	14:30-16:00	Coffee Break (16:00-16:30)	16:30-18:00
Wednesday Dec 10	MAKING THE FUTURE OF ARAB WATER SECURE AND SUSTAINABLE		(WS-Part1): Integration of Space Technology and RS for Water Management (WB, AWC, NASA, USAID)		(WS-Part 2): Integration of Space Technology and RS for Water Management (WB, AWC, NASA, USAID)		(WS- Part 3): Integration of Space Technology and RS for Water Management (WB, AWC, NASA, USAID)
			Climate Change Assessment and Adaptation in the Arab Region (LAS, UN-ESCWA, FAO, GIZ)		Mainstreaming Climate Change Adaptation, Proofing and Finance in National Water Policy (GIZ, AWC)		Climate Change Adaptation and Risk Resilience: Building Regional Knowledge Networks (UNDP)
			From Research to Implementation (NWRC)		(TS-Part 1) Groundwater Governance (FAO, IWMI, UNESCO)		(TS-Part 2) Groundwater Governance (FAO, IWMI, UNESCO)
			Civil Society and Media Engagement in Climate Change Adaptation in the Water Sector in MENA Region (GIZ, AWC)		(TS-Part 1): The Regional Initiative on Water Scarcity (FAO, LAS, Egypt MALR)		(TS-Part 2): The Regional Initiative on Water Scarcity (FAO, LAS, Egypt MALR)
					Making Water Ethics Relevant to Water Management (Water-Culture Institute, UNESCO-IHP, Botin Foundation, GIZ)		Integrity, Transparency and Accountability in the Water Sector (UNDP)
Thursday Dec 11	ARAB INTEGRATION FOR FOOD SECURITY UNDER WATER SCARCITY		(WS-Part 1): Guidelines for Brackish Water Use for Agriclture Production in the NENA Region (AWC, FAO, LAS, ACSAD, CIHEAM, ICBA)		(WS-Part 2): Guidelines for Brackish Water Use for Agriclture Production in the NENA Region (AWC, FAO, LAS, ACSAD, CIHEAM, ICBA)		Conclusions, Recommendations and Closing
			(TS-Part 1): Improving Agricultural Water Productivity to Enhance Food Security Under Increasing Water Scarcity in the Arab Region (ICARDA, FAO, WB)		(TS-Part 2): Improving Agricultural Water Productivity to Enhance Food Security Under Increasing Water Scarcity in the Arab Region (ICARDA, FAO, WB)		
			From MDGs to SDGs in the Arab Region (CEDARE, ESCWA, EWP, GWP-Med)				

CHAPTER I
THEMATIC SESSIONS

DAY1:

In addition to the opening ceremony, the first day of the Forum included 8 technical sessions discussing important topics under the theme: ***Integrated Water Resources Management: Achievements & Constraints***. Several topics were covered including: *The State of the Water Reporting in the Arab Region, the Arab Region Participation in the 7th World Water Forum, UN Partnerships for Transboundary Aquifer Governance, Water-Food-Energy Nexus, Decentralized Water Governance, Gender mainstreaming in the IWRM, Impact of Water and Environmental Sustainability on Coastal Cities, and Shared Water Resources*.

Following is a brief of the sessions held in the first day of the Forum: the sessions' topics and conveners, an overview of the sessions, the most important discussions took place during each session, the main messages captured from the discussions, the proposed solutions, and the recommendations and implementation road map deduced from the deliberations.

1- State of the Water Reports in North Africa & the Arab Region

Conveners: CEDARE, African Water Facility, AWC, MEWINA Project

Overview: In order to improve knowledge on water-related indicators used for State of the Water (SOW) reporting, and to highlight the importance of regular State of the Water (SOW) reporting at the national, basin and regional levels, the State of the Water Reports from North African Arab Countries, the 2012 Arab State of the Water Report and the anticipated 2015 Arab State of the Water Report Indicators were presented in order to introduce systematic methodologies for water resources assessment, monitoring and evaluation of the water sector and state of the water reporting.

Two keynote speakers Dr. Akissa Bahry, African Water Facility Coordinator and H.E. Dr. Mahmoud Abu-Zeid, President of the Arab Water Council, opened the session. They highlighted the importance of regular reporting and M&E in the water sector in the Arab region. The opening remarks were followed by 7 presentations from the Regional Director of the MEWINA project on the "North Africa 2012 State of the Water Report" and the national coordinators and M&E experts in the North African Countries participating in the project (Algeria, Egypt, Libya, Mauretania and Tunisia).

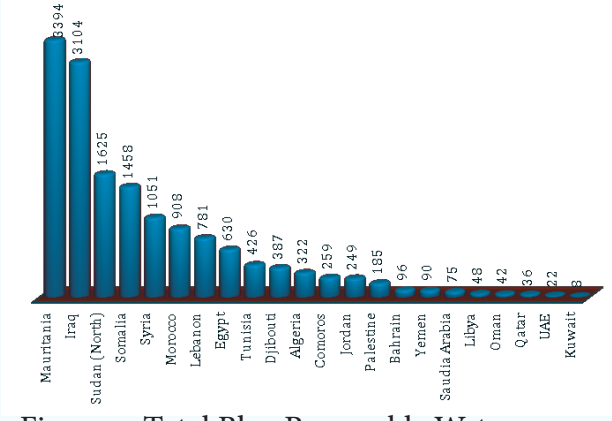


Figure 1: Total Blue Renewable Water Resources Per Capita (CM/capita)

A focus on the challenges faced by each country and on the importance of updated, sound, accurate and harmonized data and indicators in the region was highlighted in order to provide decision makers with reliable information regarding the present and future state of the water aiming for better future plans to face the region's water scarcity and to make a SWOT analysis of the water sector in each country.

The indicators focusing on the relation between water and ecosystem, the finance, agriculture, energy, economy, public health, climate, trade and socio-economics were presented. The discussions confirmed the importance of water evaluation and assessment, and the development of M&E reporting systems in order to have sound future plans to face the danger of water

scarcity based on reliable knowledgeable information.

A special session will be held in the Arab Water Week in Amman aiming to discuss the outcomes of the AWF3 held in Cairo as another milestone in the preparation process of the WWF7.

Main message from the discussions

- North African Countries made considerable efforts at different levels, for planning, mobilization, treatment, reuse and management of water resources but there is a lot that still needs to be done in order to overcome the regions' present and future water challenges in one of the most arid regions in the world.

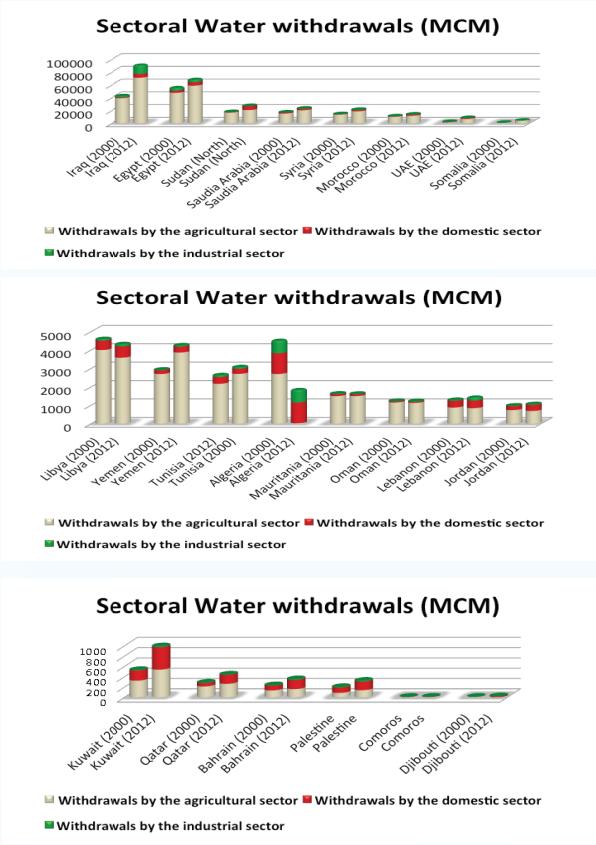


Figure 2: Evolution of Sectoral Water Allocation (2000- 2012) in Arab Countries

Proposed actionable solutions

- Continue and intensify efforts in the coming decades to improve the knowledge base and optimize the management and protection of water resources, institutional strengthening and capacity building, the implementation of an action plan to better monitor, evaluate and report the water sector, establish a regular State of the Water (SOW) reporting mechanism at the national, basin and regional levels, improve some advanced techniques in M&E in the water sector.

Recommendation and implementation roadmap

- The 15 presented categories of indicators by the MEWINA (Monitoring and Evaluation for Water in North Africa) Project used in the preparation of the State of the Water Reports in North Africa should be embraced to prepare the 3rd Arab State of the Water Report.

- The MEWINA mechanism for preparing the State of the Water Reports in North Africa should be expanded to cover the rest of the Arab countries.

- The 2nd Arab State of the Water Report prepared by the AWC & CEDARE should be a continuous process and the preparation of the 3rd Arab State of the Water Report should start and should be associated with a capacity building program in water accounting, reporting, monitoring and evaluation of the water sector.

2- Arab Region Participation in the WWF7

Conveners: LAS, AWC

Overview: Out of the 16 themes of the 7th World Water Forum [1], the Arab Water Ministers Council of the League of Arab States selected 4 regional thematic priorities that will be subject of the Arab region's focus for participation in the forum:

1 WWF7 will be held on 12-17 April 2015 in Daegu-Geongbuk, Korea.

1. Water for Food
2. SMART Implementation IWRM
3. Water for Cities and Energy
4. Transboundary Water

They also assigned the responsibility for coordinating and preparing the regional contributions to AWC (priority 1 & 2), ACSAD and ACWUA (priority 3) and The Center for Arab Water Studies (priority 4) as focal points.

In the process of the Arab region preparation for participation in the WWF7, the AWF3 has been considered a main milestone. The session shed more light on the WWF7 organization and its processes.

After a short opening by the Session's Chair, Dr. Hussein El Atfy, the Secretary General of the AWC, three presentations followed: (1) Dr. Hammou Lamrani, Regional Arab Region Coordinator, Technical Secretariat of the Arab Water Ministers Council. He presented "The Arab Countries Priorities and Preparations for the 7th WWF, (2) Mr. Beneditto Braga The President of the World Water Council, who presented a "General Overview of the 7th World Water Forum Processes and Organization ", and[2] (3) Mr. Torkil Jønch, Co-Chair of the Regional Process who presented "Organization and Linkages of the Regional and Thematic Process".

Main Message from the Discussions

- The importance of Conveying a call from the Arab region to the World in the WWF7 (April 2015) regarding the present and future challenges and risks facing the Arab region and the need for immediate national, regional and international support to overcome these challenges

- There is a crucial need for a good formulation of relevant and practical projects' and programs' proposals on the technical, environmental social and economic aspects in order to influence the decision makers and to attract fund raising.

Proposed actionable solutions

- Linkage between thematic and regional processes is strongly stressed.

Recommendation and implementation roadmap

- The outcome of AWF3 and Amman's water week will provide a good milestone for the WWF7.

3. Transboundary Aquifer Governance

Conveners: UNDP, SIWI, UNESCO, UNEP, IAEA

Overview: The session, hosted by UNDP, brought together partners from sister-UN agencies and national and international partners to review the status, trends, challenges and solutions for improving joint management of transboundary aquifers.

The session included an overview of global efforts to improve the management of shared aquifer systems through recent UN General Assembly adoption of the Law of Transboundary Aquifers and UNESCO-IHP's Internationally Shared Aquifer Resources Management (ISARM) project. The session also looked at the lessons learned and future directions arising from the UNDP/IAEA/GEF project on "Integrated Management of the Shared Nubian Sandstone Aquifer System (NSAS)" and the UNEP/OSS/GEF project "North-Western Sahara Aquifer System (NWSAS)". As two of the UN's flagship initiatives on transboundary management of shared aquifers, both in the Arab region, these projects hold important lessons for the future.

The session included 8 presentations by representatives of the following organizations: UNDP Regional Centre in Cairo, UNESCO/IHP, Transboundary Water Management SIWI, IAEA Technical Cooperation Department,

2 http://eng.worldwaterforum7.org/introduce/program/overview.asp

Nubian Aquifer Programme from Egypt and Sudan, Palestinian Water Authority, IWRM and the Gaza Coastal Aquifer and finally the representative of UNEP/GEF North West Sahara Aquifer Programme.

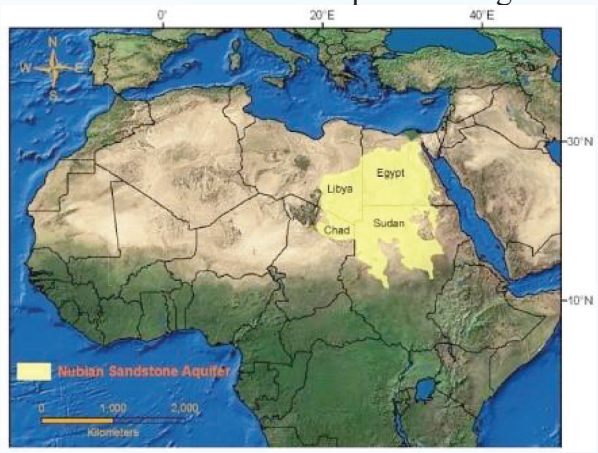


Figure 3: The Nubian Sandstone Aquifer System (NSAS), one of the largest aquifers in the world Area more than 2.6M Sq. km. belonging to Chad, Egypt, Libya and Sudan.

Joint action on the management of transboundary aquifers is indispensable to ensure cooperation and benefit sharing of the limited available ground water resources. The presentations tackled several issues including the status of water resources in the Arab region given the lack of water security which is threatening the future generations, the multi-agency efforts led by the UNESCO-IHP to initiate inventories and promote studies on transboundary aquifers, the achievements and results of the Nubian project from both the Sudanese and the Egyptian perspectives, the NWSAS project, and the Palestinian experience in managing, sustainably using and developing water resources in Gaza strip on the long term.

Discussions focused on the knowledge gap on the status of transboundary aquifers, the potential impacts of climate change on the groundwater resources and the international laws addressing the management of transboundary aquifers.

Main message from the discussions

- The status of water resources in the Arab region is threatening the future generations especially under the potential impact of climate change, the decline of available water resources, the rising population trends, and the exponentially increasing gap between water supply and demand.
- Concerted efforts of different regional and international organizations should be focused on improving water governance and the active involvement of the relevant stakeholders in the management proces.
- The UN sustainable development agenda emphasizing on better water management includes the water governance programme in Arab states that is endorsed by eleven Arab countries within three years.
- Water must be 'kept out of politics' in Gaza Strip. The predicted costs for fresh water in Gaza are at the edge of affordability.

Proposed actionable solutions

- Documentation of the worldwide successful transboundary aquifer governance partnerships is very important in enhancing the capacities of the Arab institutions and minimizing the risks in vulnerable Arab water systems.
- Joint action on the management of transboundary aquifers is indispensable to ensure cooperation and benefit sharing of the limited available ground water resources.
- Stakeholders' involvement and confidence building, raising awareness for decision makers, implementers, users and the general public of the importance of the shared aquifer through media, leaflets, training, publications and education, and the improvement of the understanding of the impact of climate change on the socioeconomic situation are key elements in transboundary aquifers management.
- Country involvement is considered an essential element in transboundary aquifers given the need to improve data availability, and to achieve mutual recognition of their shared nature.
- Enhancing the performance of the integrated management system in transboundary aquifers is based on the development of more precise data, with a particular focus on

the risk zones , taking into account socio-economic, ecological and environmental data in additional to the involvement of national institutional partners from respective counties.

- Promoting transition of regional cooperation from "joint assessment" to "joint management". However, lessons learned from the development of regional cooperation over the NSAS could help guiding cooperation over similar transboundary aquifer systems.
- In Gaza strip, cross-subsidies are recommended, and several possibilities exist in this regard. Depending on the availability of electrical energy, the early STLV desalination plant should be backed-up by generators. Gas-fired electricity generation will hopefully support the later regional desalination.
- Updated data collection and processing, monitoring and evaluation, following a strategic management plan and joint management of shared aquifers are essential for a cooperative and sustainable management of transboundary aquifers. Moreover, constant monitoring of aquifers is crucial to prevent their depletion.
- Finally, stakeholders' involvement in the management process, concerting the efforts of the different regional and international organizations, constant monitoring of shared aquifers and the preparation of a set of legal rules to follow regarding transboundary aquifers are key solutions in transboundary aquifers' management.
- Recommendation and implementation roadmap
- Prepare a comprehensive guide to simplify the system and make projections to the future (UNESCO).
- In order to have a legal framework, a joint authority and expertise from UNESCO are needed. This will also help in accessing data and constant monitoring of climate change.
- Plan to organize a national workshop to discuss water issues, to propose new regulations and to produce new plans for groundwater management.

4. Water-Energy-Food Nexus

Conveners: CIHEAM –IAM Bari

Overview: The Water-Energy-Water nexus receives growing attention due to its wide-reaching implications on life on earth. Food, water and energy consumption impact both directly and indirectly the ecosystem and natural resources. Elements of the water-energy-food nexus are interrelated and its unbalance may have clear consequences on public health, economy and environment. Accordingly, the main objective of the session is to build a common understanding of the nexus and to discuss current and future policies in the Arab countries that link water-energy-food in national planning.

The session included keynote remarks by Claudio Bogliotti (CIHEAM) and 4 presentations about understanding the nexus, nexus initiatives for the Arab region and the cooperation and knowledge sharing for its implementation, the state of water-energy-food nexus in the Arab countries, and fostering the development and application of the water-food-energy nexus agenda in the Mediterranean.

The major issues tackled in the session included the nexus definition, its dimensions, approach and perspective, its challenges and opportunities, its relation with Climate change; the current Nexus Policies and Institutions in Arab Countries.

Main message from the discussions

- Based on the current trends in population growth and their associated water, food, and energy demands in the Arab region, water security, energy security and food security are inextricably linked and actions in one area have strong impacts on the others. Hence, a nexus approach that integrates management and governance across these three sectors can improve security issues

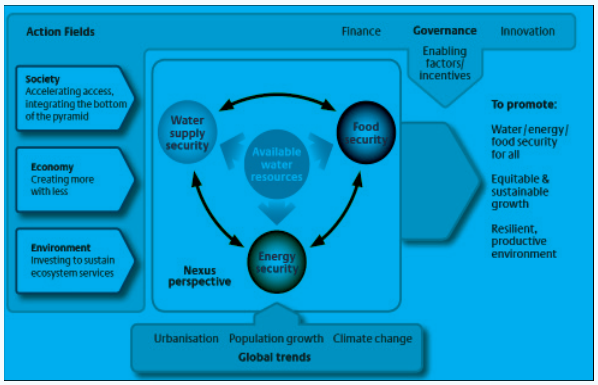


Figure 4: The Nexus Approach

- A proper understanding of the nexus will allow decision makers to develop appropriate policies, strategies, and investments to explore and exploit synergies, and to identify trade-offs among the development goals related to water, energy and food security. Moreover, a nexus perspective increases the understanding of the interdependencies across these three sectors and influences policies in other areas of concern, such as climate change and environment.
- The water energy nexus is considered among the most important inter-dependencies in the Arab countries although it has not yet been fully addressed or considered in the planning and management in many Arab countries. However, with increasing water scarcity, many Arab countries have started to realize the growing importance of the nexus both in terms of problem definition and in searching for trans-disciplinary and trans-sectoral solutions.
- The water-food linkage represents another important and vital nexus in the Arab countries. Under the current unstable food security, the ability for the Arab countries to feed their growing population is severely challenged by competition over increasingly limited water resource.
- Most governments have separate authorities, policies and plans to address water, energy, and agricultural food production issues. Scientific research and experts are also clustered into energy, water and land use experts with limited interaction. The nexus approach recognizes water, energy and food inter-linkage.
- Many nexus problems have win-win solutions, but some do not. In fact, amid increasing resource scarcity, policymakers are likely to face many trade-offs that require making value judgments. There is great potential for efficiency improvements and waste reduction.

Proposed actionable solutions

- Research institutes and universities need to be encouraged to direct their programs towards understanding the nexus and their interdependencies and inter-linkages. Moreover, scientific research on the nexus needs to be associated with the future impacts of climate change. Meanwhile, a policy to address national food security is needed to improve agricultural production, maximize water productivity, and rely on virtual water trade in food imports.
- Arab food security could be achieved through regional agricultural integration that combines the relative comparative advantages of all of the Arab countries, such as land and water resources, human resources, and financial resources. Joint agricultural projects could be implemented towards achieving food security for the region as a whole.
- Special attention should be paid to renewable and environmentally safe energy sources, of which the most important is solar, which can have enormous potential.

5.Decentralized Water Governance

Convener: UNDP

Overview: The potential for more sustainable, efficient water use through decentralized water governance and localized solutions to water access, use, and demand management, and the policy frameworks that can support them were discussed as well as the best-practices, experiences and constraints around different community-public-private partnerships for better water efficiency, in addition to policies, regulations and reforms that can support sustainable, flexible IWRM

at the local level. The contribution of local management, integrated decision-making and financial processes towards balancing local sectorial demands (i.e. household, municipal, agricultural, industrial) was addressed. Additionally, the potential for alternative, non-conventional water supply (i.e. grey water reuse and water harvesting) was explored showing how these yet scalable techniques and methods might increase the availability and financial viability of clean water for communities at the local level, and support participatory decision-making around water. The objective was to gain a deeper understanding of IWRM at the local and community levels from a range of countries in the region, and how decisions at the level of national policy

Decentralization tends to be successful when the central government is stable, solvent and committed to transferring both responsibilities and resources, when local authorities are able to assume these responsibilities and when there is effective participation by poor people and by a well-organized civil society".

can support these local processes.

The keynote Speaker, Mrs. Maysoon Al Zu'bi, former Secretary General of the Ministry of Water, Jordan delivered remarks on" Decentralized Water Governance" followed by 4 presentations delivered by representatives from different organizations: Institute of Graduate Studies and Research- Alexandria University, GWP-Med, International Union for the Conservation of Nature, Land and Human to Advocate for Progress (LHAP), and Water and Environment Center-Sana'a University. The presentations discussed the following topics: Economic Valuation of Water Resources, Governance & Financing for the Mediterranean Water Sector, Regional SEARCH (Social, Ecological & Agricultural Resilience in the Face of Climate Change) Programme, Community-based, sustainable water solutions (Jordan), and Rainwater harvesting techniques for water supply in rural areas (Yemen).

Main message from the discussions

- There is a considerable urgency to decentralize the management of shared water resources in the Arab region with a focus on local institutions' need to share power with other local actors and transfer their political and administrative functions to more efficient agencies through PPPs. Example: the Jordanian experience.
- The challenges faced to narrow the gap between water supply and demand are limiting the options available for the water decision-makers to reach water efficiency.
- Water's real value should guide water governance and management to the most economically, socially and environmentally efficient options.
- Effective water governance is vital for sustainable development in the Arab region where water security requires appreciating water's proper value including social and environmental as well as economic.
- The three-year regional project "SEARCH" main outcome includes the development of a guiding toolkit for increasing climate change resilience with full participation of policy makers and stakeholders.
- The importance of the role of the private sector in the water resources management was discussed and the three-year project entitled "Governance and financing for the Mediterranean water sector" implemented by the UNESCO and GWP-Med in seven pilot Arab countries is officially launched in 2013.
- An overview of the rainwater harvesting techniques for drinking water in rural areas in Yemen was also introduced as an alternative to overcome present water challenge with a focus on the importance on the usefulness of the traditional knowledge of the ancient Yemenites in water harvesting techniques.

Proposed actionable solutions

- A variety of organizations, private firms, financially autonomous entities, and community organizations, may contribute to decentralizing water delivery functions.

Decentralization can be implemented on many levels including political, administrative, in co-management and community levels. When new user-interfaces or management approaches have been introduced, local technicians and caretakers need to be trained for the proper operation of the new infrastructure and on-hands training is essential.

- The private sector plays a substantive and complementary role in the water resources management. Moreover, a multi-stakeholder, multi-level platform to discuss the challenges and opportunities available for each country and at the regional level can be very fruitful to enhance water governance. Stakeholders' involvement is also critical in the planning process from its early stages, raising awareness about the conditions of vulnerability and the best interests of the community.
- Water security requires appreciating water's proper value including social and environmental as well as financial costs.
- A water policy dialogue will be carried out in Palestine, upon the country's request in 2015 as well as another regional conference by the end of the coming year.

6.Gender Mainstreaming in IWRM

Convener: UNESCO Cairo Office

Overview: Most of the Arab countries fall under the lower end of the water availability list. Water scarcity in the Arab region is expected to increase in the future especially in the field of agriculture. According to the water security strategy of the Arab region as approved by the Arab Water Ministerial Council, the region needs to secure 550 billion m3 of water in the year 2025 excluding climate change impacts. The agriculture sector consumes about 80% of the available water resources with estimated 60% waste/loss in surface irrigation system. In Rural areas, women and youth are highly involved in the Agriculture sector. It is highly needed to promote integrated water resources management (IWRM) at rural areas including agriculture, sanitation and water reuse. Accordingly, this activity aims at enhancing knowledge and exchanging experience on Gender issues in IWRM application in rural areas of the Arab region through exchanging best practices and raising awareness on the importance of public participation in water resources management. It is highly important to involve interested NGOs/ civil society association working in the field of water resources management and gender issues at rural areas. The main objectives are to:

- Discuss and document women role in the implementation of IWRM at rural areas in the Arab region including agriculture, sanitation and water reuse.
- Outline lessons learnt highlighting possible advocacy policy advises on best practices on Gender Mainstreaming taking into consideration the possible involvement and participation of civil society

Case studies from Jordan, Sudan, Morocco and Egypt were presented focusing on the importance of Gender mainstreaming in IWRM. The presentations from Egypt and Morocco discussed the results of questionnaires about "water, women and decision making" while the two other presentations described the challenges and solutions needed to promote Gender mainstreaming in the IWRM

Main message from the discussions

- There is an effective awareness about the interest of Gender mainstreaming at the decision makers' level; but in spite of laws, regulations and measures taken regarding gender equity and mainstreaming, different countries and cultural levels have different views and perceptions regarding Gender mainstreaming in IWRM.
- The political situation in each country has a considerable impact on the efforts exerted and progress achieved in Gender mainstreaming in IWRM (Case of Sudan division and Syrian refugees in Jordan putting extra pressure on the already very limited water resources).

- Discussions focused on the means to promote the gender culture in the Arab Region under the various limitations like illiteracy especially between woman, and the traditions, which sometimes stand against gender equity.

Proposed actionable solutions

- Develop women's capacities in water management through improving literacy and establishing training programs as well as public awareness.
- Strengthen and activate the implementation of laws and measures against gender discrimination in the Arab region.
- Consider strengthening gender integration among the axes of North-South cooperation.
- Consider gender issues in the policies and strategies of WRM as well as in projects' conception and management.
- Strengthen the role of civil society in involving women in the decision making process in the water users' associations as well as in ministries and water organizations.
- Promote the activities generating income for women in order to ensure their autonomy and gradual integration in the development process.

7.Impact of Water and Environmental Sustainability on Coastal Cities

Convener: Faculty of Engineering, Alexandria University

Overview: Coastal Cities share the same distinct characteristics and features, which mutually interact with marine environment, climate, construction and water resources management. Challenges that face coastal cities are sea level rise, marine pollution, extreme weather events, quality of constructions, availability of potable water, and many other challenges. Throughout the session, light was shed on the challenges that face coastal cities, and the strategies that are being implemented to face them efficiently. In the last part of this session, the vision and master plan was presented towards the implementation of the SDGs and Alexandria 2030.

The impact of water sustainability on coastal cities and the challenges facing the water sector in the coastal cities taking "Alexandria" as a case study was presented, where Alexandria faces both water quantity and quality challenges due to leakage in water networks, illegal access to water from water connections losses reach 35% of the total available water in addition to the need of water quality improvement. Thus, the challenge is the need of an urgent plan to reduce the water loss in this area. If we have better management of water quantity losses, there won't be any need to construct new water stations, the water will be sufficient for our demand.

The most important challenges due to the environmental changes in Alexandria were addressed including: sea level rise phenomenon due to climate change, temperature increase which represents an urgent challenge to be solved. This phenomenon will adversely affect the coastal life causing marine degradation and harbor pollution.

Main Message from the Discussions

- Water quantity and quality challenges in Alexandria are due to the leakage in water networks, pipelines and reservoirs and illegal abstractions from networks (about 35% of total water in the network) which urge the development of a rapid plan to reduce the water losses and to improve water quality. Sea level rise due to climate change is also considered as a serious challenge since it will have a negative impact on water quality, agriculture, population distribution, economy and land use in addition to marine and harbor pollution.
- Increasing population density adds extra stress on the available water resources threatening their sufficiency for future generations in addition to the storm surges, which affect the coastline and geography.
- Research and development on new and more economic technologies on desalination should be investigated to enable a wider use of this unconventional water resource.

Proposed actionable solutions

- Regarding non-conventional water resources, some measures are proposed as solutions to the ongoing challenges faced by coastal cities in general and Alexandria in particular: treatment of domestic and industrial wastewater before mixing with agriculture drainage water for reuse, application of zero liquid-discharge process. Moreover, the implementation of non-conventional techniques (like reverse osmosis using membrane or biological wastewater treatment(may also be used. The use of Nanotechnology and the (EDR-RO) membrane and solar energy may contribute to a wider desalination process.
- Groins, offshore submerged breakwaters and other shore protection structures can be used to absorb the huge energy of the waves coming from the storm surges.

Recommendation and implementation roadmap

- Integration and coordination of efforts exerted for coastal protection against climate change impact, sea level rise, water quality deterioration, among different governmental and nongovernmental responsible entities by adopting flexible designs of projects in addition to the formulation and execution of a strategic plan for environmental protection and adopt new desalination technologies.
- A framework for proactive, systematic and effective management and surveillance of drinking water supplies based on a preventive risk-based approach.
- Coastal areas development should be addressed by enhancing synergies between IWRM policies coordinated with those of Integrated Coastal Zone Management (ICZM).

8.Shared Water Resources

Conveners: AWC, CEDARE, ESCWA

The competitive uses and prevalence of river basins and aquifers that extend across boundaries engender political tensions between communities, stakeholders and countries. More than 60% of MENA's water supply flows across international borders and creates the urgent need for an environment of close cooperation, data sharing and equitable appropriation of available water in riparian zones.

Overview: Shared water plays an important and pivotal role in the overall Arab water security since more than 65% of the Arab water is transboundary and originates from outside the Arab region. The session aims at sharing and improving knowledge and experience on the latest institutional, legal and technical mechanisms in transboundary water resources management , presenting the latest information on the state of shared water resources in the and emerging cases of conflicts on shared water resources, discussing potential win-win solutions and conflict resolution mechanisms on shared water resources, and the state of art on regional, international and basin level legal frameworks governing shared water resources in the Arab region. The session included 4 presentations and a dialogue. Presentations were delivered by representatives from CEDARE, ESCWA, Center of Water Studies and Arab Water Security (COFWS-LAS) and ACSAD on "Criteria for sharing Water Resources", "Inventory of Shared Water Resources in Western Asia", and "Arab Shared Water Resources Convention. A dialogue on: "The Nile River basin: The Renaissance Dam" between Dr. Alaa Yassin, Ministry of Water Resources & Irrigation (MWRI), Egypt, and Dr. Seif Eldin Hamad Ministry of Water Resources & Electricity (MWRE), Sudan, presentation on "The Euphrates/Tigris River Basins: Upstream Dams", Eng. May Abd Elgabar Youssef, Ministry of Water Resources (MoWR), Iraq, Dr. Wael Seif, ACSAD, Syria were presented.

Main message from the discussions

- The river basin approach, which involves the consideration of green water is a fair approach to address shared water allocations.
- The "Inventory of Shared Water Resources in Western Asia" prepared by ESCWA focused on some important findings: There are more water resources in western Asia than commonly known, Water quality and allocation dominate the discourse on shared water resources, Water quality shouldn't be neglected, lack of access to data, Cooperation over shared basins does exist, Groundwater is often overlooked, Some of the groundwater resources are already depleting.
- Conflict over shared aquifers and river basins in the region and worldwide is due to poor management, lack of information, and absence of tradeoffs.
- The Arab Water Convention on Shared Water could be the answer to Arab concerns since it strongly supports cooperation and ensures mutual support between Arab states in case of conflict with a non-Arab state over shared water resources.
- In shared water resources, good political will and respect of international law principles, win-win and no harm solutions, fair trade offs, are the key for cooperation.
- Conflicts on shared river basins occur mainly on upstream-downstream impact especially on the evaluation of downstream impact on upstream Dams' construction (ex. Grand Ethiopian Renaissance Dam).

Proposed actionable solutions

- Joint management of transboundary river basins and aquifers and adoption of the river basin approach can promote cooperation instead of conflicts among riparian countries and avail the possibility to share the benefits of these resources.
- Adopt the Regional Convention on Shared Water in the Arab Region after agreement of Arab Countries.
- Respect the principles of International Water Law and undertake further negotiation to solve conflicts over shared water resources under the principles of win-win and no harm.

DAY 2:

The Second day of the Forum included a plenary session and 14 technical sessions discussing important topics under the theme: **Actions for Sustainable Development of Water Resources and Water Services.** Several topics were covered including: Integration of Space Technology and Remote Sensing for Water Management (3 parts), Climate Change Assessment and Adaptation in the Arab Region, From Research to Implementation, Civil Society and Media Engagement in Climate Change Adaptation in Water Sector in the MENA Region, Mainstreaming Climate Change Adaptation, Proofing and Finance in National Water Policy, Groundwater Governance (2 parts), The Regional Initiative on Water Scarcity (2 parts), Making Water Ethics Relevant to Water Management, Climate Change Adaptation and Risk Resilience: Building Regional Knowledge Networks, and Integrity, Transparency and Accountability in the Water Sector.

MENA region is the most water scarce region in the world although the consumption rate in some countries reaches 2000

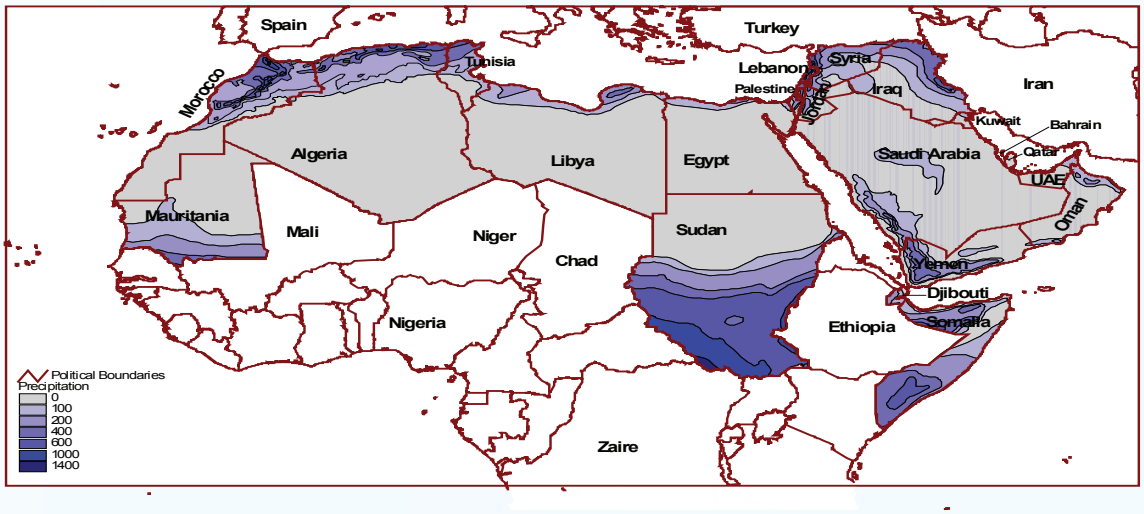


Figure 5: Precipitation Pattern reflecting aridity dominant in the Arab region[1]

1Map includes South of Sudan which has been separated from the North and consequently from the Arab region

The following section gives a brief overview of the sessions, the most important discussions that took place during each session, the main messages captured from the discussions, the proposed solutions, and the recommendations and implementation road map deduced from the deliberations.

Plenary Session: Making the Future of Arab Water Secure and Sustainable

Convener: AWC

Overview: In this plenary session, distinguished keynote speakers focused on the state of water management globally and locally to meet the multiple challenges facing the water sector; addressed the inter-linkages between water, energy and food (the Nexus); and presented the achievements made so far to ensure access, sustainability and security for all. The tools and mechanisms in-place or being developed by the Arab countries individually and collectively for sustainable water resources management and efficient provision of water services were discussed. The session moderator Prof. Abdin Salih, Director UNESCO Cairo Office addressed the different challenges and constraints facing the Arab region: Water pollution, exceeding water demand, low irrigation efficiency, agriculture production efficiency, domestic water use efficiency, Climate change impacts and limited knowledge base on mitigation and adaptation measures, Transboundary waters (dominance of water sharing than benefits sharing concepts), Capacity development and institutional setup/ institutional reform, and Governance, strategies and action plans.

Three keynote speeches were given in this session by: Dr. Shantha, Water Economics Expert-World Bank, Dr. Holger Hoff, Stockholm Environment Institute (SEI), and Dr. Walid Abdulrahman, Executive Chairman, Miahona. Three main important issues were discussed and clarified and a set of future proposed solutions were recommended. The first important issue is the water pricing where three paradoxes are seen in the MENA region:

- Mena region is the most water scarce region in the world although the consumption rate in some countries reaches 2000 m3/capita/ year
- Agricultural productivity is extremely low although agriculture sector is the major water user.
- subsidizing water use at different stages where maximum subsidies do not equal maximum cost of production (inflating cost of water)

The importance of the Nexus (water, food and energy) as a second issue was highlighted where the nexus approach for the Arab region takes into consideration the current situation that shows (limited land and water), impacts of climate change causing unsustainable energy. The nexus approach is about improving policy coherence and developing synergies between sectors through inter-linkages for integrated management of natural resources. The nexus principles were highlighted to include: integrated management, generated benefit and reduced negative externalities. The third important tool for future water security was the public private partnerships for the Arab region. The current status for the water and wastewater development in the GCC countries applying the PPP was presented. It was emphasized that PPP is an effective tool to enhance the domestic and sanitation needs in arid and semiarid regions. The PPP is among the main pillars to develop and support the global gap in huge infrastructures investments, and it has maximum economic value in energy, telecommunications and water and sewage infrastructures.

Main Message from the Discussions

- Water pricing is a solution for secure and sustainable water resources in the Arab region.
- Mainstreaming Nexus approach in the management planning and strategies development is a must to ensure human security and sustainability.
- PPP application is an effective tool to enhance domestic and sanitation needs in Arab region.

Proposed actionable solutions

- Water pricing should be implemented for operational and maintenance cost recovery.
- Applying subsidies reforms for both urban and agriculture water uses.
- Subsidies reforms are needed to ensure the support to the poor, and there is a need to accompany subsidies reform with cash transfer to the poor.
- Innovative thinking is needed for future water resources development and water security (water smart-land use planning, energy smart-irrigation planning)

Recommendation and implementation roadmap

- Proper procedures, regulations and clear strong governance systems should be developed to encourage the PPP initiatives in the Arab region
- Enhancing Arab countries cooperation to support Arab agricultural integration, electrical grid interconnections, knowledge and technology sharing between Arab states
- Develop a UN organization for protection and control of food trade and food prices

1.Integration of Space Technology and Remote Sensing for Water Management

Conveners: AWC, WB, NASA, USAID

Use of Remote Sensing technology in water resources management applications can enhance knowledge and help in improving national and regional strategies

Overview: This session was composed of three parts focusing on the latest remote sensing technologies used in water resources management and their applications in several projects in the Arab Region. The aim of the session was to share the knowledge and experience of the use of this technology in defining national and regional strategies. The session included three keynote speeches by Dr. Kamal Ouda, Project Leader for MENA Work, USAID and Ms. Qun Li, Task Team Leader, World Bank. Eleven presentations were given from different representatives of research institutes including; Earth Sciences Division, NASA, AWC, CRTS, CNRS, ICBA, Centre National de la Cartographieet de la Télédétection.

The discussions emphasized the role of researchers to take the lead, reaching out to policy-makers, planners and practitioners at all levels, helping them build their own capacity, and working to understand and address their needs. These interactions should be viewed as a true collaboration, with learning in both directions. Exploring several opportunities of coordination between regional ongoing and planned programs in the region is a very important step to maximize the benefits and help in linking the latest scientific Researches in MENA.

Main Message from the Discussions

- Enhancing the use of RS and advanced technologies in improving water resources management, food security and adaption to climate change.
- Development of Regional Knowledge Centers to enhance capacity and to resolve local and regional specific issues.
- Proposed actionable solutions
- Change of behavior and taking new technology from research to real operational levels
- Exchanging of best practices and lessons learned among different countries in IWRM and remote sensing applications.
- Collaboration in close partnership in order to build capacity in MENA countries and to establish a reliable routine to proper ET measurements at three different scales (regional, national and local)
- Investigating how to turn all RS models to more user-friendly applications that can benefit the end-users.

Recommendation and implementation roadmap

- AWC/WB to explore regional opportunities for coordination between ongoing regional remote sensing programs to maintain sustainability and to ensure knowledge transfer
- The gap between research and practice needs to be closed. Researchers should take the lead, reaching out to policy-makers, planners and practitioners at all levels, helping them build their own capacity, and working to understand and address the real needs.
- Engagement of different stakeholders and end-users must be key component in all-future regional projects.

2.Climate Change Assessment and Adaptation in the Arab Region

Conveners: ESCWA, GIZ, FAO, LAS, ACSAD

Overview: The session included keynote speeches from Ambassador ShahiraWahbi (LAS), Dr. Carol Chouchani Cherfane (ESCWA), Dr. Matthias Bartels (GIZ) and Dr. Pasquale Steduto (FAO). Four presentations were given from development partners; Swedish Meteorological and Hydrological Institute (SMHI), ACSAD, FAO and ESCWA, focusing on the Regional Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability (RICCAR) and the contributions of the Arab countries involved and each development partner. The session focused on water resources and food security within the framework of climate change impact assessment in the Arab region. It presented various modeling outputs and methodologies, as well as review relevant adaptation measures to make the "green" sectors (agriculture, forestry, etc.) more resilient to the new climatic conditions. It also presented a quantitative estimate of major-crops yields using "AQUACROP" a tool for impact assessment on agricultural crops in response to changes in water availability under various climate scenarios". Dr. Mohamed Nour El-Din presented a case study from Ain Shams University, Egypt on CCA strategies in Egypt and guidelines for mainstreaming.

The overall results of the Regional Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability (RICCAR), including regional climate change projections and hydrological modeling outputs for the Arab Region covering future time horizons, and relate those findings to adaptation solutions specifically focused on the agricultural sector. This included a review of the major agro-ecological zones which are the dominant users of water in the region and represent the basic systems for food security, rural livelihoods and natural resources sustainability.

The partners and contributors to RICCAR provided several examples of assessment tools that have proved to be efficient to support climate change impact assessment and adaptation in the Arab region, particularly with regards to water resources, agricultural productivity, food security and socio-economic vulnerability. In addition there was a presentation on the regional knowledge hub for awareness raising and information dissemination through technical materials, information access (website, databases, etc..) .

The session succeeded to create more awareness of the impact of climate change on the Arab region and specifically with respect to the agricultural sector and better understanding of the extent of the impact of climate change in relevant agro-ecological zones in Arab countries. It also highlighted the improved knowledge of advanced methodologies to assess the impact of climate change on water resources and agriculture and on adaptation responses.

Main Message from the Discussions

- RICCAR: provide platform to stakeholders for assessing and informing responses to CC impacts on freshwater resources. Eleven partner organizations and 3 expert institutions working on modeling part.

- This project is a successful result of a collaborative effort done with the support of GIZ, ACSAD, ESCWA, FAO and SMHI. The partnership is supported by LAS and is done within the Regional Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability (RICCAR)
- The multidisciplinary aspects involving notably the human factor as part of the socio economic analysis is a key in climate change assessment.

Proposed actionable solutions

- Given the high complexity and multidisciplinary nature of climate change: it is necessary to bring together coordination to couple expertise and cooperate in order to achieve added value knowledge and integrate complementing tools to improve regional and local mapping for the Arab region
- It is important to rely on sciences based results and projections of climate change scenarios to formulate adequate policy at regional and sub regional levels using integrated Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability
- It is important to note that the successful implementation of the FAO's RWSI (Thematic Session 7) in which CC impact on water resources and agriculture is a major focus area of it be supported by the Arab region. The active support will lead to a Regional Collaborative Strategy and Partnerships among the NENA countries to create a broad consensus and ownership on the water reform agenda in the region in terms of both policies and governance.

Recommendations and implementation roadmap

a. RICCAR and RWSI are already under implementation, and will continue to benefit all the MENA region
b. Committed partners for specific activities:
   i. ESCWA – main coordinator - raising awareness and knowledge hub
   ii. SMHI: integrated impact assessment
   iii. GIZ : (sector impact assessment through ACCWAM) + integrated vulnerability mapping
   iv. ACSAD - Integrated mapping
   v. FAO – in charge of integrating the Aquacrop component (green sector impact assessments)

3.From Research to Implementation

Convener: National Water Research Center (NWRC)

Overview: This session included six presentations focusing on the role of NWRC and its affiliated institutes and their contributions to water research activities on national and regional levels. The session gave an overview about the National Water Research Center of Egypt (NWRC), its 12 institutes and its research facilities including modern central laboratory & a number of specialized laboratories, national water quality monitoring network and engineered wetland station. The mission of NWRC was highlighted including the provision of knowledge and expertise to the worldwide decision makers.

Presentations from five research institutes with diverse expertise including, Drainage Research Institute, Coastal Research Institute, Hydraulics Research Institute, Water Resources Research Institute and Channel Maintenance Research Institute were given. The discussions focused on the "Implemented Water Quality Monitoring networks and programs" "which were designed for assessing the water resources quality of Nile water, ground water and drainage water. The activities of effective early warning systems capable of detecting flood threats and activating advance mitigation measures were also presented. In addition to the important issue about climate change & SLR (Sea level rise) where it was shown that there are 2 scenarios expected concerning this matter, either the temperature rises by 1.8oC by the end of the 21st century which will cause a 1% drowning

of the Delta or a temperature rise of 4oC which might cause a 3% drowning of the Delta and a SLR of 72 cm in Alexandria & 144 cm in Port Said, in Egypt. The different methods of aquatic weed management including manual, mechanical, biological & physical methods were presented by CMRI, where the Egyptian experience was presented in the development of these methods and the collaboration with other countries in channel maintenance programs for the aquatic weeds such as Iraq and Uganda-Lake Kyoga. The Session collectively presented the progress of NWRC activities and researches to transfer the research outputs and outcomes to implemented future projects and engineering solutions for the current problems.

Main Message from the Discussions

- The link between research centers and the governmental organization responsible for execution is needed for research results implementation.

Proposed actionable solutions

- The research implementation concept should be emphasized and elaborated to cover all research activities of the developing countries.
- Adopt appropriate technology transfer programs to improve and promote research performance.
- Strengthen the link between applied research and executing agencies.

Recommendation and implementation roadmap

- Applied research has to adopt a multidisciplinary approach to link different sectors and consider cross cutting issues such as climate change.
- SLR is an urgent threat to Delta areas, thus necessary adaptation measures should be taken.

4.Civil Society and Media Engagement in Climate Change Adaptation in Water Sector in the MENA Region

Conveners: GIZ, AWC

Overview: Given the rapid population growth and urbanization, pressure to allocate more water for drinking water supply and sanitation is expected to increase. Therefore, adaptation to climate change is inevitable. As it is a major challenge for societies it can be tackled by including all relevant stakeholders. Climate change as a major threat to water security in the MENA region has been addressed in the Arab Strategy for Water Security AWSS (2010-2030). The AWSS calls for: an increased level of civil society and private sector participation in water resources management, and an increased education and awareness on the importance of water resources and their conservation. This session aimed at discussing the possibilities to develop a roadmap for strengthening the role of civil society (CS) on National and regional levels. This can be done through improved dialogue and exchange on national and regional levels between CSOs and decision-makers involved in water resources management and strengthened role of CSOs to contribute to the implementation of national and regional water strategies (AWSS 2010-2030).

This can be achieved through strengthening of the existing civil society networks such as AWC's, RAED's and CEDARE's networks.

The session included two keynote speeches from Dr. Hussein Al-Atfy Secretary General, AWC and Dr. Abdalla Droubi, GIZ, and five presentations from Egyptian Environmental Affairs Agency, Parliamentarian, Government of Jordan, Consultant for Public Policies Reforms & Strengthening Civil Society, Morocco and Arab Institute of Lebanon and GIZ development representatives. The discussion focused on: the need to study the role of the NGO's, the media, their capabilities, and how to help them, means to improve dialogue and strengthen the CSO's to contribute in climate change and identifying the Available constraints; sustainable fund,

capacity, and legislations. It was also stressed by keynote speakers on the CSO's to protect the water resources and to increase the role of CSO's in Arab Region.

Main Message from the Discussions

- Increase the role of CSO's in Arab Region. All governmental laws must be issued in cooperation with CSO's.
- Establish specialized media to avoid mixing politics with environmental issues.
- Provide internal fund to ensure transparency plus the external fund.
- Children and youth are the real hope; though, we have to make them love their lands and countries.

Proposed actionable solutions

- CSO's must become qualified and there must be cooperation between private sector and CSO's to avoid funding problems.
- Establishing a department in each university to teach "environmental communication".
- All the society is responsible for the environment.
- Media must be a real partner with CSO's.
- There must be a specialized media to avoid mixing politics with environmental issues.
- Establish electronic sites that are devoted for sustainable development.
- Provide internal fund to ensure transparency plus the external fund.

Recommendation and implementation roadmap

- There was a recommendation from GIZ for a road map to work on the way forward on how to enhance the role of CSO's and Media Engagement in Climate Change Adaptation in Water Sector in the MENA Region, where;
  - Phase I: 2015 finalization of project document and submission for funding.
  - Phase II: 2016-2018 implementation.

5.Mainstreaming Climate Change Adaptation, Proofing and Finance in National Water Policy

Conveners: GIZ, AWC

Overview: The session aimed at presenting the GIZ Regional Programme: "Adaptation to climate change in the water sector in the MENA region" ACCWaM which focuses on capacity development at all relevant levels (regional water policy, national water sectors, implementation of measures at local level) with the objective to foster capacity to a better adaptation of national strategies, plans and projects in the water sector to regional climate change scenario in MENA region.

The consideration of climate change impacts already at the planning stage is a key to boosting adaptive capacity. Climate proofing water investment is also one of the tools for incorporating climate change into planning procedures at national, sectoral, and project level. Strengthening also national capacities for effectively accessing and using climate finance available at global level can also contribute to increase resilience of the Arab region to climate change. The objective of the session was to present the outputs of the training activities conducted in the three countries of ACCWaM project (Egypt, Jordan and Lebanon) regarding mainstreaming of climate change adaptation in the national water policy and to discuss the next steps for 2015 and beyond.

Main Message from the Discussions

- Climate change is perceived by most policy makers as a distant threat
- Responses to climate change in the Arab region are not yet systematic and only come in reaction to emergencies (floods, disaster)
- The meaning of 'climate readiness' is the readiness of countries to have: a) National Designated Authorities (NDA) b) NAE (National Accrediting Entity) and c) NIE (National Implementing Entity, but there is an implementation gap and very few countries in the Arab region, as well as the world, are not ready and prepared although

international funds are available for 'climate readiness'.

- AWC proposes to establish a regional PMU in the AWC to deal with mainstreaming and to offer training and technical assistance to develop a target number of projects for the country's portfolio, as spin-offs to the ACCWaM programme. This portfolio can then be used to access the international funds to ensure sustainability beyond ACCWaM.

Proposed actionable solutions

- ACCWaM project ensured the three new methodologies to be
- applied for climate change adaptation (mainstreaming, proofing and finance) by Arab countries with the examples of Egypt, Jordan and Lebanon).

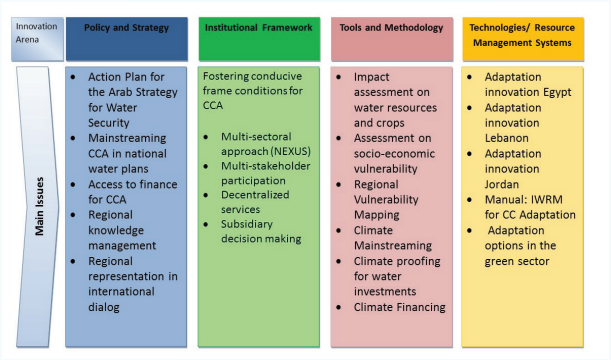


Figure 6: Adaptation to Climate Change in the Water Sector, the MENA Region (ACCWaM)

- Construction of a portal or a platform gathering all climate change projects in the Arab region showing funding organizations and outputs from these projects
- Cooperation and coordination is needed in order to not repeat the work and reduce the redundancy of data
- Building a user friendly interface allowing easy access to climate change data
- Mainstreaming of Climate Change at the levels of a) water policy and b) water projects and infrastructure is an urgent need
- The newly-established Green Climate Fund offers many opportunities for adaptation (and mitigation) projects. However, to access funds requires what is termed 'readiness' and countries are well advised to build the necessary capacities to apply and handle these funds.
- Importance of inclusive and participatory approaches (community, NGOs, stakeholders and media), the need for team work and coordination; the need to develop a specific project which includes:
  - Climate Proofing of the project
  - Climate Financing to support Project Implementation
  - Mainstream the successful project to a policy level

Recommendation and implementation roadmap

- Stressing on the "importance of linkages between sectors (NEXUS), and that there should be new innovative methods to cope with climate change rather than the traditional methods.
- The AWC is committed to support the region in meeting the goals for water sustainability and to act as a Regional Coordinator to support the countries in meeting their goals.
- ACCWaM plans for 2015 and beyond are under construction and will be based on the results of 2014.

6.Groundwater Governance

Conveners: IWMI, FAO, UNESCO

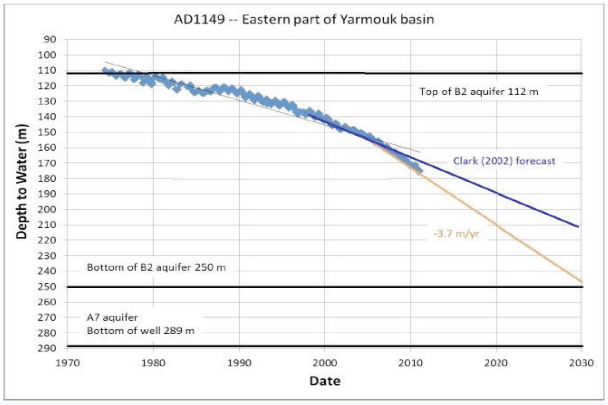
Overview: The session was divided into two parts and included five presentations on Challenges affecting the groundwater in Arab world, Groundwater governance in Jordan, GW governance in Yemen, Understanding Abu Dhabi GW governance, and GW governance in Morocco. The main scope was to emphasize on the regulation and control of groundwater use as a vexing issue worldwide and in the NENA region in particular. The growing reliance on unsustainable use of groundwater for cities, industries and food production poses severe challenges to both users and managers of the resource. Water professionals need to come up with a straightforward assessment of the many failures registered in the attempt to curb

or reduce groundwater use. The target was to illustrate and discuss the many contextual factors that severely constrain the effectiveness of public policies as well as self-management. The main challenges facing groundwater use in the NENA region were addressed. A detailed explanation was given on the diversity of aquifers, groundwater users, and policy tools available to tackle the problem of groundwater over abstraction; and emphasizes that while many countries have passed standard laws with many of the good management practices promoted at the global level, very few are able to implement them, different case studies and examples from the Arab countries were highlighted.

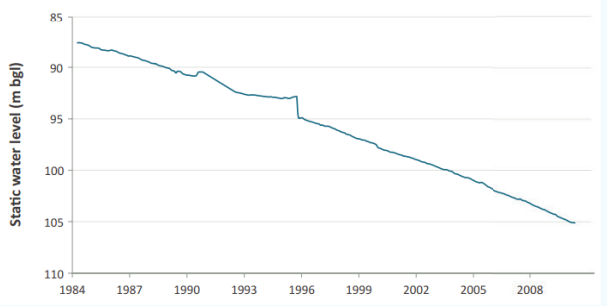
The critical situation in Jordan, where an estimated 7000 wells abstract water resulting in a drawdown of all aquifers in the country (except two in the Far East) was presented showing the measures that have been taken to 1) control the expansion of wells, 2) control the abstraction in existing wells, but also identifying several loopholes that make it possible to evade most of these regulations. Challenges to management practices are divided into practical, external, policy contradictions, and political will.

The situation in Yemen is extremely bleak, as abstraction from the three aquifers located in the most populated areas is six times the estimated recharge. Policies and strategies have been established but most of them did not receive any consideration, with the exception of the National Water Sector Strategy and Investment program, 2004. Comparing formal water governance in reality on the ground, it was illustrated that the lack of enforcement and the continued negative impacts observed in the country.

The situation in the United Arab Emirates, most particularly Abu Dhabi, showed that even though the country has adopted strict licensing of wells, advanced technologies such as hydroponics, and is working on a water budget which should make it compulsory for any sectoral use increase to be transferred from another sector, most of the groundwater used goes to forestry.



(a) Ram aquifer, Saudi Arabia



(b) Yarmouk basin, Jordan

Figure 7: Over-pumping of Groundwater Aquifers in (a) Saudi Arabia, (b) Jordan

The situation in Morocco emphasizes the critical state of the three major aquifers (Souss, Haouz, Saiss) in the country, and the loopholes by which much of the regulation can be evaded. Special emphasis is given on the contradiction between the agricultural policy of the Plan MarocVert (Green Morocco), which incentivizes the expansion and intensification of groundwater-based agriculture, against the efforts that are made to control and reduce groundwater use. The case of the Souss-Massa is presented as an example of a solution based on a 'aquifer contract' negotiated by the different parties. Although signed five or six years ago, this contract has however not been implemented on the ground.

It is believed that change eventually occurs when the situation gets really dramatic, as may be shown by the recent measures announced in Jordan. It is also stressed that coordination between ministries is very difficult at the higher level, and maybe easier at the local level.

Main Message from the Discussions

- The lack of political will in implementing strict measures is explained by the difficulty to take action in areas where agriculture is the main livelihood of rather poor population, and also because of the interests of powerful people that are using groundwater.
- Illustrate the diversity of policy tools available for groundwater management
- Clear identification of the major factors explaining the lack of implementation of groundwater policies on the ground

Proposed actionable solutions

- To avoid sectoral conflicts, water managers at the country and basin levels should be empowered
- The lack of political will in implementing regulations should not be only deplored; causes should be identified and acted upon
- Recommendation and implementation roadmap
- Many standard policy recommendations are inapplicable; the power of the state should not be overestimated and co-management solution should be sought.

7.The Regional Initiative on Water Scarcity

Conveners: FAO, LAS, MALR

Overview: The session was divided into two parts and it introduced the FAO's Regional Water Scarcity Initiative (RWSI) that was launched in 2013 following the Land and Water Days. Nine presentations were given on the main topics; The Progress of the Regional Water Scarcity Initiative, the Initial Results and Outcomes at Regional Level with examples from pilot countries: Morocco, Egypt, Jordan, Oman, Tunisia and Yemen. Key presentation from the FAO on the Way Forward was given in addition to the views on how to accelerate delivery.

The session debated the status and progress of the Regional Initiative on Water Scarcity in supporting the NENA countries in responding to the risk of exposure to unsustainable development if significant improvements in agriculture water strategies, policies, governance and technologies are not timely implemented. Based on the experience of the first year of activity of the Regional Initiative, a brainstorming on the way forward is discussed. RWSI will support countries of the region in identifying, developing and implementing:

- Evidence based policy decisions,
- Best management practices
- Sound governance and institutions
- Cost effective water investments

The innovation about introducing this initiative is to provide a transformational change, to stop moving incrementally but have something more fundamental in terms of change. The following are the introduced innovations;

1. Regional collaborative strategy among the countries of the region (we know how much knowledge and capacity there is in the region, the collaborative strategy will leverage it)
2. A strategic partnership to generate a critical mass of capacity to get impact at scale (we identify the most value added partners to undertake the job) and tailored around targeted objectives
3. Stimulate the forward looking ways of visioning future trajectories of development for strategic planning of water allocation through scenario analysis
4. Evidence based approaches adding quantitative and qualitative info
5. Involve the farmers as full partners of soil and water. Also looking at different genders perspective and youth.
6. Involvement of private sector (notably at food value chain and technology)
7. Effective synergies in innovation and learning (exchange of solutions, practitioners as main actors: farmers)
8. Inclusive approach is a part of their strategy

The focus area of work for the RWSI:

- Strategic planning and policies
- Governance reform at all levels
- Improving the performance of agriculture and water productivity
- Use of non-conventional water resources
- Climate change and drought
- Sustainability
- The use of benchmarking, monitoring and reporting of water productivity and efficiency

Initial analytical framework:

- Water accounting; having a quantitative measure of water supply, demand and actual use by various users
- Food supply cost curve, to analyze possible alternative options and assess financial costs and related requirements so that trade-offs are made transparent to decision makers
- Gap analysis; to investigate policies, governance architectures and institutional arrangements and performance of agricultural water management.

The following issues were highlighted under the RWSI: typical alternative options for the food supply cost curve analysis include: reduction of losses along the food chain, area expansion under irrigation, water harvesting under rainfed agriculture, sustainable agricultural intensification of existing land and trade. More than 22 actions were activated in the past 1.5 years in which more than $20 M were mobilized. Although the FAO's RWSI has a multidisciplinary team consisting of about 50 members, there is a need to accelerate the delivery and share and implement the best practices.

Main Message from the Discussions

- The initiative provides solutions which are relevant for strategic planning and in addressing major questions on food security under water scarcity. However, these solutions may imply significant trade-offs. In brief, there might not be simple solution, but only smart choices.
- Several solutions are available to deal with food security under water scarcity.
- We should keep away from the myth of self-sufficiency, but rather look at a sustainable and optimal self-reliance. Regional integration of food security is needed.

Proposed actionable solutions

- Need for innovative collaborative approach including all countries of the region.
- Develop a knowledge platform of better practices for agriculture and for water resources management.
- Include the full cost (environmental, social and shadow price, "opportunity price") for the whole assessment of suitable options to improve food security under water scarcity. Similarly, we need to consider the downstream value chain in the cost-benefit analysis.
- We need to focus on regional integration to address water scarcity. Together we are having better options than addressing common problems in each individual country. Fortunately, there is a will to collaborate.
- We should always look at the sustainability of the solutions. Farmers are the ultimate managers of water and land resources. Policies should provide better education and understanding of farmers needs rather than concentrate on cultivating lands.
- Comparative advantage of each country is how we could collaborate and find solutions.
- Stay away from self-sufficiency issue; it has been proven that self- sufficiency will not happen in the region. Set the limits for sustainability with what you have and maximize productivity and efficiency of natural resources.
- Focus on water consumption; there is a need for a water accounting framework solid enough to show evidence of all the situations that are in need to adopt/not adopt certain measures. It is a wrong assumption to equate efficiency to water saving (e.g. if you are becoming more efficient but you

increase the irrigated areas then you are not going to save water, you will just reallocate it and therefore all efforts to save water will be lost). Water saved through irrigation efficiency is just re-allocated to other users within the agricultural sector. Water accounting will help to answer the questions "where was water gong when irrigation was inefficient" and "where is water going with higher irrigation efficiency?"

- We have not one solution but a set of solutions that can be presented as good examples of strategic planning and approaches to address some issues of food security under water scarcity situation. Four countries analytical exercises, which will present some practical real cases, will be available for the WWF7 for learning and building on.
- No simple solutions, only smart choices.

Recommendation and implementation roadmap

Near Future:

- Set the bases for a regional collaborative strategy among the countries of the region (we know how much knowledge and capacity there is in the region, the collaborative strategy will leverage it).
- A strategic partnership to generate a critical mass of capacity to get impact at scale (we identify the most value added partners to undertake the job) and tailored around targeted objectives.
- Next Steps:
- Need to accelerate delivery through a solid regional collaborative and the knowledge platform.

8.Making Water Ethics Relevant to Water Management

Conveners: Water- Culture Institute, UNESCO-IHP, Botin Foundation, GIZ

Overview: Water ethics are the values "serve as standards" to guide not only action but also judgment, choice, attitude, evaluation argument and rationalization". Ethics influence how we use water and set polices, and makes investment. Water Ethics are important because of challenges facing us especially in the Arab region. We are running out of water, water ecosystems are collapsing, biodiversity losses, people are suffering, loss of cultural traditions, civil society are not involved in decision making. Therefore there is a need to understand the role that can be played by bringing water ethics into focus. Dimensions of water ethics include: environmental ethics, social ethics, governance ethics, and economical ethics. The session highlighted the water ethics charter and its different stages and implementations;

- Dublin Principals for IWRM (1992)
- EU Water Framework Directive (2001)
- UN Declaration on Rights of Indigenous People (2007)
- UN Human Right to Water (2010)
- Water Stewardship" Standard" (2013)
- Recommendation from 2012 World Forum in Marseille.
- Builds on UNESCO program on water ethics (1997-2004)
- Charter Concept.

The content of the charter will provide a moral basis for water management decisions and bring ethical thinking into the public sphere and political agenda. Businesses, cities, and other organizations who endorse the Charter would commit to uphold principles. The aim is to shift the discourse of water policy towards a shared ethics of sustainable ecosystems and human wellbeing. The Charter is in the early stages of development. The current draft is posted on the website of the Water Ethics Network (waterethics.org) where you are invited to post comments. We anticipate that the final Charter will address four key dimensions: Environmental, Governance, Socio-Cultural, and Economic. The outlines for a Water Ethics Charter include: Introduction, Environmental issues, Economical issues, Social principles, Cultural and spiritual principles and other issues.

An example was given form Egypt, where Egypt has approved a new report of

transparency and water management as a step towards mainstreaming water ethics into water management. A set of assumptions for sustainable water resources management was introduced. In Arab countries, Islam teaches a wide array of ethical principles to improve water protection, conservation, and sanitation. Following wisdom can be drawn from Holy Qur'an, Hadith, and Islamic thought. Islamic water ethics such as:

- Protection and conservation of water are clearly stated and given a sacred priority.
- Water is freely available as a common good but under the strict condition that water should not be used in excess or wasted.
- Water accessibility is given special attention by stressing the importance of social justice and equity amongst water users.
- Ownership by private and state entities is allowed when knowledge, work and direct investment (added-value) lead to the improvement of water quality and availability.
- Water services and utilities are entitled to full cost recovery in their mission (collection, treatment, distribution) to protect water resources, human health and the environment.
- Tariff schemes must rely on fairness and equity among users.
- Participation of all sectors of society is needed.
- This charter will be addressed to communities. Every country (or community) has its own way of using water. Though, each country will have its own code. The charter will be an important tool for water management.

Main Message from the Discussions

- Follow up the Charter draft on the website of the Water Ethics Network.
- Analyze and evaluate the Charter draft.

Proposed actionable solutions

- It is absolutely necessary that the cultural approach is to actualize water use and management ethics.
- Five ideas for actualizing water ethics in Islamic communities:

1. Capacity building.
2. Learn from best ethical practices.
3. Using dialogue.
4. Raising awareness of water stakeholders.
5. Special program for education youth and students in schools and libraries.

Recommendation and implementation roadmap

- Each country (or community) will have its own water ethics code depending on its way of consuming water.
- Water should not be privatized, but it must be for everyone.

9.Climate Change Adaptation and Risk Resilience: Building Regional Knowledge Networks

Conveners: UNDP, LAS

Overview: This session aimed to establish a better understanding among stakeholders of different data, information and knowledge initiatives in the Arab region and ways they can support governance and management capabilities within the water scarcity, food security and socio-economic vulnerability nexus. Nine presentations were given in the session. In line with the objectives of the session outlined the organization's/institution's work on producing, using, analyzing, sharing and networking around climate change adaptation and disaster risk reduction information, data and modeling.

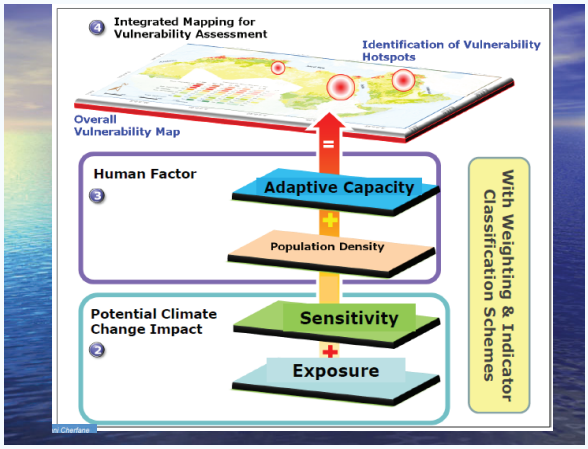


Figure 8: Integrated Vulnerability Assessment of Climate Change in the Arab Region.

The RICCAR (Regional Initiative for the Assessment of Climate Change Impacts on Water Resources and Socio-Economic Vulnerability in the Arab Region) programme, including its Arab Knowledge Hub component, was presented as explained in earlier session.

The United Nations Office for Disaster Risk Reduction, UNISDR presented the UN Office for DRR for Arab States and it is mandated to be focal point for coordination of DRR and to ensure synergies among the disaster reduction activities of the UN system and regional orgs and activities in socioeconomic and human fields. UNISDR's objectives are to: coordinate international efforts to report to the Hyogo Framework; inform through practical tools like country profiles, assessment reports and best practices; to advocate for greater investment in DRR (including climate change adaptation, education on DRR and increased gender participation in the decision making process); and to campaign around Their coordinating partners include LAS, national governments through the Hyogo Framework, local government engaged through campaigns. A briefing on 2nd Arab Conference on Disaster Risk Reduction in conjunction with LAS included 400 participants including ministers, mayors, governors, CSOs, intergovernmental organizations, youth, etc., where they discussed recommendations for post 2015 framework on DRR, progress on the Hyogo Protocol, etc. Issues raised at the conference included: climate change impacts leading to more extreme weather events; risks to food security; the role of science and technology in DRR and how the International Science and Tech. Advisory Group on DRR can promote networking among Arab researchers; the contribution of youth to the dialogue; and women a change agents for DRR and resilience.

Recommendations from the 2nd Arab Conference on DRR were highlighted as below:

- Science and research must be accessible and communicated appropriately to the public to raise awareness
- Disaster risk reduction and climate change stakeholders should recognize the direct and indirect consequences of disasters in terms of how shocks and stresses often interface with and exacerbate socio-economic instability and reinforce negative development trends
- Risk governance must become the new norm and priority for national authorities, including related investments in institutional capacity
- CC and DRR do not only belong to one sector, integration and coordination efforts within and across sectors is therefore a key factor in identifying key strategic issues and devise innovative solutions that bring together different relevant actors.
- Science and technology in particular, partnership should be established across multidisciplinary/multi sectoral DRR/ DRM activities in academia, science and technology in region, with partnership formed to support an international science advisory mechanism
- Build a LAS and Technology Network to facilitate partnership with support of IRDR and others

The International Center for Biosaline Agriculture, ICBA highlighted it's work in partnership to deliver agricultural and water scarcity solutions in marginal environments. ICBA's strategic objectives include: improving the generation and dissemination of knowledge; expanding food and bioenergy solutions; facilitating competitive agri-business enterprises; and increasing partnerships. Their

climate adaptation activities involve alternative crops/ water efficiency/ alternative water supply. They assess water resource availability, variability and impact through modeling and GIS. They provide support to decision makers.

ICBA is creating a platform to share data in MENA in partnership with USAID and NASA. Through MAWRED (Modeling and monitoring agriculture and water resources development) they are combining the modeling of CC impacts (down to 1 meter) with work of adaptation on the ground to identify the most vulnerable impacts in Egypt, Yemen, Lebanon, Senegal and Mauritania, as well as predicting impacts on crop production through evapo-transpiratoin stress index through models. Additionally they are producing national crop surveys.

The AWC also presented its role and activities in climate change. They have a number of regional initiatives, and in addition to bringing stakeholders together for forums like the Arab Water Forum, they developed with LAS the Strategy for Water Security in the Arab Region (2010-2030). The AWC has many ongoing activities, many through partnership with a range of institutions and organizations, on a number of regional projects: with FAO on their Water Scarcity Initiative to meet the challenges on water security and sustainability, as well as guidelines for brackish water use in agriculture (9 countries); CC resilience initiative with ESCWA; the regional Coordination Program (RCIWRM) on the use of space technology in IWRM (5 Countries); the Public Engagement Project (PEWM) for building capacity of stakeholders to engage society in water management to support governance in the Arab region (6 Countries); the State of the Water Report in the Arab Region Program with CEDARE; Adaptation to Climate Change in the Water Sector in the MENA Region (ACCWaM) with GIZ; The Arab Water Academy, "center of excellence" for executive education in water; the King Mohamed VI International Water Studies and Research Center. In particular the Regional Coordination Program on the use of Space Technologies for IWRM (RCIWRM) has a major knowledge networking component and launched a portal in 2014. The AWC would be interested to link this portal to a regional knowledge hub to integrate results and share the latest research in remote sensing for CC adaptation and drought management. AWC emphasized that the challenges and lessons at the regional level for water security and ensuring resilience include: natural, human and financial resources not being efficiently used; that a new vision of regional cooperation is needed for sharing on a win-win basis; the need to improve motivation of the private sector, public engagement, media and civil society to be involved in water management and agriculture sector; need closer cooperation around capacity building in MENA to establish a reliable routine for proper measurements at the local, national and regional levels; lastly, more political will is required.

AGEDI and the Eye on Earth Initiative presented the CC adaptation programme and Water Security Initiative under AGEDI, which was established by the UAE at the World Summit on Sustainable Development in 2002 with the goal to facilitate access to quality environmental data that equips policy-makers with actionable, timely information to inform and guide critical decisions. In the sub-region of the Arabian Peninsula countries, AGEDI has 12 sub-projects across 5 CC adaptation thematic areas: socioeconomic systems; regional climate modeling; ecosystems; coastal zones; and water resources. They are open to feedback from the whole region on the tools and methodologies they have developed for these countries, and how they can be shared with the rest of the region. All of their data and outputs are available on their portal.

AGEDI also facilitates, in partnership with the Eye on Earth Alliance members: GEO, IUCN, WRI & UNEP, Eye on Earth Summit. Preparations for EoE include a number of “special initiatives (SI)”. These initiatives are voluntary group/network of experts that meet regularly online to advance a set of outcomes through their own projects and through

collaboration and networking. Of particular relevance are the Water Security SI and Disaster Management SI. AGEDI hosted a Regional Network/ Coordination Meeting on Water Data and Knowledge Sharing, Monitoring and Assessment of Water Quality in Coordination with UNEP-GEMS/Water and Eye on Water Security/R-KNOW (IUCN-RWA & CEDARE). This increased communication and sharing of information and experiences amongst members of the networks in the region and internationally by creating synergies and joint actions in how to continue cultivating co-operation.

CEDARE/IUCN R-KNOW project was presented, which includes 4 thematic areas: water governance, water and CC, water-energy-food security nexus; and innovative and sustainable technologies. The network is governed by a leading knowledge center, as well as NGOs and the private sector. It includes Jordan, Egypt, Lebanon, Morocco, and Palestine. They highlight lessons learned, case studies, and awareness methods. Their aim is to open new partnerships, accommodate new emerging themes, and upscale successes in the sector to influence policy.

World Food Programme (WFP) focuses on food security and nutrition but with direct operational focus, serving 80 million people globally. However they have evolved from food 'aid' to food 'assistance', and sustainable impact. Now 15-20 million people are supported through reducing disaster risk, building productive assets, and developing livelihoods as 60% are affected by flood, drought and storms and conflict, and most people experience multiple risks at once. In the Arab region, they have gone from assisting about 7 million to 18million largely due to conflict (including a large number of IDPs).

WFP acts as a user of information (including CC services), but also translate and provide information into services. For example they have a food securit monitoring tool to prioritize interventions; integrated context analysis; and climate risk analysis on climate vulnerability information to inform policy and strategy as well as their own operational decisions and design of programmes. We need to understand more about how this impacts economic decisions by individuals to program around social vulnerability properly and to advise different people on decisions that can support livelihoods under climatic and economic change.

Main Message from the Discussions

- The variety of initiatives, information, data, and modeling around climate change impacts on water, agriculture, land, as well as socioeconomic vulnerability assessment tools, that are being produced by and about the region should be regionally harmonized, up dated, and made universally accessible to different stakeholders, practitioners and ministries.
- The different efforts made by a number of multilateral institutions and organizations across the region that have begun to achieve this through establishing networks around their partnerships and project work, or in launching different knowledge hubs, should be captured, streamlined, and consolidated in a sustainable, flexible and user-friendly platform.

Proposed actionable solutions

- There are many questions still to be addressed regarding the operation, structure, and different target groups for a centralized regional knowledge hub around cc adaptation and disaster risk management, and the best way to integrate the strengths and existing contributions of different institutions, as well as the needs of different stakeholders.
- The next step should be to concretize some of the above suggestions and outcomes of the session through an inter-institutional meeting under the auspices of LAS, to confirm the outcomes of ongoing efforts to establish hubs and to decide if there is a way forward for creating a sustainable central mechanism and structure with LAS technical secretariat for the region, or if

existing structures could be used, supported and sustained.

Recommendation and implementation roadmap

- In support of the above process, UNDP suggests a meeting early in 2015 to agree between the institutions present for this session, as well as their network partners, on an Advisory Board.
- CCA and DRR UNDP Arab Climate Resilience Initiative/LAS:
  - A roundtable of key institutions and agencies across the region that will join to consolidate and determine actions and communication (this could happen through combining existing platforms)
  - Science, technology and applied research exchange and networking.
  - An information platform that includes many layers of data for different applications coming from a range of institutions and platforms in the region and globally. (layers could include: ET, Soil Moisture, Floods, Dust Storms, Land Degradation, Meteorological Drought, Agricultural Drought, Land Cover
- A commitment from AWC to organize between all organizations for making this portal of climate change data and to organize a meeting gathering all funding organizations and the different data network owners to represent their vision how to build this portal of climate change information system.

10.Integrity , Transparency and Accountability in the Water Sector

Convener: UNDP

Overview: The session focused on the complexity of the water sector, including subsectors like sanitation, drinking water, irrigation, hydropower, etc. and engages with a wide range of stakeholders from small to large operators, construction firms, consulting firms, municipal leaders, national politicians, regulators, local and international civil society groups and associations, farmers, civil servants and the staff of utility providers. Tackling issues of integrity, transparency and accountability across these subsectors and between these stakeholder requires in depth sector-specific knowledge of risks, incentives, and socioeconomic pressures, while also an acknowledgement that many of these governance gaps are also cross-sectoral in nature and in impact, and that strengthening governance processes at the sectoral level may improve the functioning of broader, cross-sectoral governance and decision-making processes.

The session included six presentations and was initiated with an emphasis on the role of integrity for a good governance of the water sector in the Arab region that is resistant to corruption. To encounter the corruption risks, the International Union for Conservation of Nature (IUCN) developed the TAP tool to foster transparency, accountability and participation in the management of water resources. In addition, the ACWUA, in coordination with the GIZ, provided a number of solutions to build the capacities of water professionals and decision-makers of diverse management and operational levels and increase their awareness of the benefits of TAP on water integrity. Another partnership with SIWI will be undertaken on the strategic level, tailored specifically for the Middle East and North Africa region to foster in 2015, the ACWUA will host the IWA Development Congress and Exhibition in the Dead Sea which will include a special session on the water integrity.

More details were given about the water integrity capacity building programme for MENA, supported by the SIWI and implemented in five Arab countries (Jordan, Lebanon, Morocco, Palestine, Tunisia) during the period of 2014-2017.The programme has disparate and multi-level objectives ranging from the regional level – to increase dialogue and advocacy on how integrity, transparency, accountability and corruption can be addressed in water resource management drawing on experiences at the basin-level to the country and local levels to increase knowledge among water officials and

improve tools to facilitate the information flow and communication channels between decision-makers at different governance levels. The programme will target multi-level groups and different water stakeholders. The programme started by assessing the water integrity risks and capacity needs through different means to inform development of training materials. The training material was adapted accordingly and a pool of trainers was recruited and trained. By 2015, the training workshops will take place in partnership with a national coordinator from each partner organization.

Several examples on ongoing activities were presented such as the development of the water integrity capacity building programme in Lebanon, a project, funded by the IDRC and the DFID, aiming to promote water integrity in Morocco through a participative approach, the role of the social contract center, established by the Information and Decision Support Center in partnership with the UNDP in Egypt was highlighted to provide advisory, monitoring and coordination services to the government and work closely with the civil society. The social contract between the state and the citizen needs to be reformulated, based on the principles of transparency, integrity and accountability to enforce the rule of law and foster integrity in the water sector. In this regard, Egypt launched a new anti-corruption strategy on the international anti-corruption day with integrated reforms underway in all fields. Another issue on the plural and multi-faceted aspects of corruption in the Arab region was discussed. A number of indicators portraying the corruption trends in the Arab region were presented. According to the Corruption perceptions index for 2014, eleven Arab countries witnessed a progress in their struggle against corruption compared to the year 2013, while three are among the bottom ten countries. In the water sector, the infrastructure projects are the most vulnerable to corrupt practices. The World Bank estimates a loss of 20 to 40% of the sector finances due to these dishonest manners.

Main Message from the Discussions

- A comprehensive approach to the reform of the water sector is vital to provide a robust and applicable anti-corruption framework.
- Promoting integrity is a key starting step.
- Promoting transparency of the decision-making process would discourage the officials of the water sector to be involved in corrupt transactions.

Proposed actionable solutions

- Drafting of new laws with operational decrees
- Establishing national anti-corruption committees
- Building mechanisms to monitor and evaluate anti-corruption measures and integrity initiatives.
- Procurement systems in the sector to be built on transparency, merit and objectivity.
- Transparent and merit civil servants system (Recruitment, capacity building, remuneration of officials in the sector).
- Regulating conflict of interest.
- Awareness of integrity and anti-corruption approaches among the water sector stakeholders.

Recommendation and implementation roadmap

- To raise awareness around the concepts of integrity, transparency, and accountability as a framework for strengthening overall general public administration and governance reform processes.
- Perform National Water Integrity workshops

DAY 3:

The third day of the Forum included a plenary session on **"Arab Integration for Food Security under Water Scarcity"** and five sessions on "Guidelines for Brackish Water Use for Agriculture Production in the NENA Region" (2 parts), Improving Agricultural Water Productivity to Enhance Food Security under Increasing Water Scarcity in the Arab Region" (2 parts) and "From MDGs to SDGs in the Arab Region".

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996)

Plenary Session: Arab Integration for Food Security under Water Scarcity

Convener: AWC

Overview: Distinguished speakers and leaders of international and national organizations shared their visions and views on the issue of food security in the Arab Region. The session could help understand where the world and the region stand now and to where it is heading in the future with respect to feeding its population. The speakers brought to the meeting outstanding knowledge about the challenges of producing more food for growing populations under increasing water scarcity. They highlighted the linkages between water, energy, food and the environment including climate change. The plenary session was moderated by Dr. Ayman Abu-Hadid, Former Minister of Agriculture, Egypt with three presentations on "Achieving Food Security under Water Scarcity in the Arab Region" by Dr. Tarek Al-Zedjali, Director-General, Arab Organization for Agriculture Development, "A Collaborative Strategy to Address Water Scarcity and Food Security in the Arab Region: What It Takes, by Dr. AbdessalamOuld Ahmed, Assistant Director General and Regional Representative for the Near East and North Africa, FAO and "Enhancing Food Security in the Arab World with Increasing Water Scarcity" by Dr. Theib Oweis, Program Director of Integrated Water and Land Management (IWLM), ICARDA.

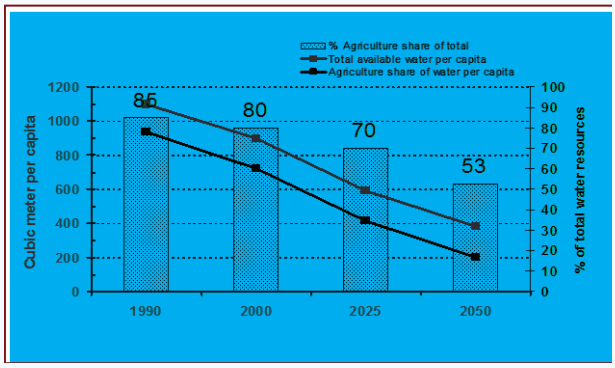


Figure 9: Trend of Agriculture Water Share Decline in North Africa

Main message from the discussions

- The Arab region is the largest food importer in the world since the available water resources are not sufficient to fulfill the food gap and realize food security in the region. Meanwhile, there is a need to differentiate between food security and self-sufficiency.
- Many successful Arab initiatives exist to improve water productivity with tangible achievements towards improved food security by implementing good practices including agricultural investment (inside and outside the Arab region).

Proposed actionable solutions

- Develop rainwater harvesting projects and rehabilitate infrastructure to ensure water losses exploitation in the region and improve water productivity.
- Build sustainable food systems and improve fish farming
- Nurture South-South cooperation to realize food security and to develop knowledge platform and build capacities through exchange of experience and information.

Recommendation and implementation roadmap

- Change cropping pattern and introduce less water consumptive and higher economic-value crops in order to maximize the value of water for agriculture. The FAO Regional Water Scarcity Initiative has adopted Food Supply Cost Curve as a tool for best cropping pattern.
- Adopt fast track measures to establish a set of regional organizations that can help in finding solutions to the challenges of food security and water scarcity conditions. The measures include the establishment of a global organization to protect Arab people from rapidly increasing food prices, an Arab food basket unifying the efforts in order to better negotiate on food prices, a sort of Arab Union for wheat production and a regional mechanism for food and water security.
- Furthermore, as a first step, there is a need to immediately strengthen/implement regional collaborative strategy and a strategic partnership. The strategy needs to consider key common venues to include agricultural water productivity, groundwater productivity, climate change and drought management, interregional investment and value chain development, market information, food stock, and coordinated efforts and position at the WTO and international fora.

1. Guidelines for Brackish Water Use for Agricultural Production in the NENA Region

Conveners: AWC, FAO, LAS, ACSAD, CIHEAM, ICBA

Overview: Water scarcity challenges facing the NENA region are common and need to be looked at in a holistic view. One of the anticipated major actions to face this challenge is to use marginal water, including brackish surface and groundwater in agriculture. Different types of brackish water reuse exist (drainage water, groundwater and wastewater) and are considered one of the important non-conventional water applications nowadays. However, numerous constraints face brackish water use in agricultural production, such as the increase in soil salinity, yield reductions and high cost of agricultural inputs. On the other hand, brackish water could be looked at as an opportunity for irrigation, whether directly, or it could be desalinated or mixed with treated wastewater. Collecting Good Agricultural Practices (GAPs) and research results on brackish water use from pilot countries in the NENA region(Algeria, Egypt, Iraq, Iran, Jordan, KSA, Morocco, Tunisia and Yemen) , with the aim of developing guidelines for the safe use of this water is therefore highly recommended.

- In accordance with the FAO Regional Water Scarcity Initiative, and within the framework of LAS Arab Water Security Strategy, a letter of agreement between FAO and AWC was signed for provision of "Guidelines for brackish water use for agriculture production in NENA".
- The main development objectives of this letter of agreement are: 1) to support member countries for adapting national programs and policies to turning brackish water into resources; 2) to contribute to developing the capacity of member countries on related fields as crop management, water management, chemical management, agricultural practices and alternate land use while using brackish water; 3) to update information and data on brackish water and good agricultural practices; 4) to develop guidelines for brackish water use for agricultural production.

The main implemented activities are:

- Collect Good Agricultural Practices (GAPs) and research results on brackish water use from pilot countries in the NENA region.
- Consult national focal points from the pilot countries, as well as international focal points as appropriate.
- Identify of and communicate with focal points in the pilot countries for data compilation.
- Organize the first Regional Workshop in May 26 - 27, 2014 at Doha, Qatar for

determining GAPs on brackish water use.

- Organize the 2nd Regional Workshop that was held on December 11, 2014, and consisted of two special technical sessions presented the zero draft of the proposed guidelines to be approved by the National and International Consultants and participants of the workshop.

Main message from the discussions

- The GL need to be finalized: List of symbols and units, list of parameters and definitions in addition to some information need to be reviewed.
- GL is a very important tool to be applied in the NENA region countries to succeed in efficiently using of brackish water in irrigation and get a good crop production and enhance the farm income.
- Treated wastewater could be included in the GL where there are many success stories of using this water in cultivation in many countries.

Proposed actionable solutions

- The draft GL will be in the final from after 3 months after considering the comments and advices of the experts.
- The final version of the GL will be sent to the different member countries to be reviewed.

Recommendation and implementation roadmap

- Organize a final workshop to adopt the final Guidelines and train stakeholders on the sound use of brackish water.
- Design DSS to the final version of the Brackish water GL in NENA region to be a user-friendly tool.
- Prepare a booklet to the farmers written in their own language (Arabic and French) to help the farmers to apply the brackish water GL in NENA region countries successfully and to get the best crop production.

2.Improving Agricultural Water Productivity to Enhance Food Security

Conveners: ICARDA, FAO, WB

Overview: Water scarcity issues were addressed as a constraint to enhance food security in the Arab countries. Improving agricultural water productivity as an alternative to increasing food supply was discussed. The concept of agricultural water productivity, the means of improving related approaches for benchmarking and monitoring were highlighted. Furthermore, the challenges associated with implementation were reviewed along with recommendations.

The session focused on the water use in the main strategic crops such as cereals, legumes and cash crops that can increase farmer's income in addition to food availability in the Arab countries linking experience from other countries of similar environments. Furthermore, the session presented remote sensing methods to monitor water agricultural productivity. The session included the following components: 1) Water resources to agriculture and its current productivity; 2) Water needs to satisfy food security in the Arab countries; 3) The concept of water productivity and latest knowledge in developing the concept; 4) Means of improving water productivity; 5) Investment needed to enhance water use and food security; 6) Policies required to create enabling environment for improving water productivity in the Arab countries.

The session was compounded in two parts and included a key presentation on "Water Productivity Concepts and Means of Improvements" by Dr. Wim Bastiaanssen, one presentation by a representative from Academy of Science-China, and two presentations from the World Bank. The presentations tackled the following topics: "Remote Sensing-a Valuable Tool for Water Management: A case study from China", "Agricultural Water Productivity and Beyond: Some Insights from Economics", " Remote Sensing and Water Productivity Monitoring". Comments were delivered by panelists from FAO, ICARDA, MOALR,

WB, IFAD, AWC and IRESA on the major components of the topic.

Main message from the discussions

- Water productivity improvements can effectively address food insecurity and poverty alleviation. Also, water productivity improvements are important to attain the Millennium Development Goal on hunger (MDG 1)
- Management practices that increase agricultural yields also improve water productivity including the continuum from rainfed to partially and fully irrigated farming systems.
- Water productivity gains are realized (if not mainly) by non-water management interventions and they can secure water resources for other landscape uses and ecosystem services
- Targeted policy actions can support integrated water and land management for improved water productivity.

Proposed actionable solutions

- Increasing water productivity and closing the yield gap in irrigated agriculture. This requires irrigation modernization and benchmarking in addition to farmers' involvement in the decision-making process.
- Managing the water supply through reuse and recycling of non-conventional water resources.
- Increasing resilience to climate change;
- Improving water productivity and water management in major agricultural systems (rainfed and irrigated).
- Building sustainability with focus on ground water pollution and soil salinity; benchmarking, monitoring and reporting on water use efficiency and productivity.
- Fill-in the yield gap through sustainable agricultural intensification of production systems and transition from traditional to modern irrigation systems.

Recommendation and implementation roadmap

- Agriculture water productivity and food security can be significantly improved in the region. Priority areas for action focus on:
  - Use benchmarking and monitoring of crop water productivity, in conjunction with land productivity (yield), as an effective indicator for evidence-based decision-making.
  - The components of effective incentive structures for agricultural water use that drive farmer behavior and reduce water consumption. Public and institutional awareness building is of high significance.
- ICARDA's research programs: Biodiversity and crop genetic improvement; Integration water and land management; Sustainable intensification of production systems; social, economic and policy research.

3.From MDGs to SDGs in the Arab Region

Conveners: CEDARE, GWP-Med, ESCWA, Egyptian Water Partnership

Overview: The session provided an update on MDGs related initiatives such as MDG+, Water Supply and sanitation indicators and the newly developed SDG's related to the water sector. the key addressed issues were; Monitoring water related MDG Goal 7 in the Arab region by WHO/UNICEF Joint Monitoring Programme sub-regionally and nationally (i.e. access to drinking water and sanitation), Least developing countries (LDC) are lacking behind in achieving the goals in the Region, 3 out of 4 people don't have access to basin sanitation in rural areas in LDC.

The road from MDG's to SDG's was highlighted where "Sustainable Development Goals" for the post 2015 development agenda (17 SDGs and 169 targets proposed by Open Working Group on SDG's. SDG 6 is explicitly on Water and Sanitation with 8 targets. There are 6 other SDG's with 8 targets reference to water related issues. The SDG-6 ensures availability and sustainable management of water and sanitation for all. It is noted that Water energy nexus is

missing in SDGs.

Main Message from the Discussions

- The following issues are to be taken into consideration: Inclusion of shared water resources and ecosystems in SDGs, negotiations of the SDGs will run through the year 2015, there are many processes feeding into the post 2015 Development agenda, national consultations were conducted within and external to UN system, need for inter-linkages with other sectors like energy, there is a need to align targets of the SDGs with the national plans and they should have clarity even in terminology, to continue the work on indicators, data collection and reporting. MDG+ indicators have the potential to be linked to SDG's.
- oNational consultations outcomes in Egypt have led to a long list of challenges related to water, institutions, IWRM implementation, public participation, governance, effective technologies, etc.
- There is a need to provide some clarification on the SDGs' targets for sanitation and health, to develop accountability, implementation and partnerships and need to secure political and commitments within the SDG's framework.
- Water quality management should be given a high priority since there is a lack of monitoring and enforcement rules.
- Economic, social and environmental risks from related water events need to be identified.

Proposed actionable solutions

- Infrastructure, new technology and financing as well as monitoring and evaluation are needed in the SDG's framework to be highlighted during negotiation in 2015.
- There is a need to strengthen the national focal points to collect data on indicators for MDG+ in the designed tables and forms presented.
- SDG's need to be mainstreamed in national plans when they developed in the water sector.

Recommendation and implementation roadmap

- Moving from MDG's to SDG's need to be adopted regionally and nationally by 2015 and to be merged in the national development plans. Efforts should be made by regional institutions and funding agencies to strengthen the capacities of countries based on national and community based dialogues and consultation but need to secure financial resources needed to achieve this target. A mechanism should be made by e.g. LAS to monitor this process in the Arab countries.

CHAPTER 2
Outcome of the Forum

This chapter summarizes the different messages, recommendations and implementation roadmaps emerged from the thematic sessions as relevant to the three themes of the forum.

Theme I: Integrated Water Resources Management: Achievements and Constraints

Key Policy Messages of the 3rd AWF

State of the water reporting in the Arab Region: Although North African Countries made considerable efforts at different levels, for planning, mobilization, transfer, treatment, reuse and water resources management, available data shows that a lot still needs to be done in order to overcome the regions' present and future water challenges in one of the most arid regions in the world. Reporting on the state of water needs to be a continuous process to help decision-makers and managers improve the performance of the water sector and move towards water security.

Arab Region Participation in the WWF7: It is of great importance to convey a message from the Arab region to the World in the WWF7 (April 2015) regarding the present and future challenges and risks facing the Arab region and the need for immediate national, regional and international support to overcome these challenges. It should be an important opportunity to interact with other regions of the world to exchange experience and learn from success stories.

Governance of Transboundary Water: Water scarcity is threatening the future generations in the Arab region especially under the potential impact of climate change, the decline per capita of available water resources, the pressure of development needs and the gap between water supply and demand. Water quality deterioration and conflicts emerging over shared aquifers and river basins in the region and worldwide due to poor management, lack of information, and absence of tradeoffs add more complexity to the issue. Accordingly, many voices expressed the dire need for considering water value in decision making and the importance of adopting new and innovative approaches like the water integrity, water ethics, water-food energy nexus. These new values, approaches technologies constitute and provide a better knowledge and understanding of the interdependencies and inter-linkages of the complex world of water management. The river basin approach, which involves the consideration of green water, is introduced as a fair approach to address shared water allocation.

Conflicts on shared river basins occur mainly on upstream-downstream impact regarding water allocation and quality. Good political will and respect of international law principles, win-win and no harm solutions, fair trade-offs, improved governance of water resources and active involvement of the relevant stakeholders in the management process are the key for cooperation and successful management of shared water resources.

The Arab Water Convention on Shared Water could be the answer to the Arab concerns since it strongly supports cooperation and ensures mutual understanding between Arab states in case of conflict with a non-Arab state over shared water resources.

Water-Energy-Food Nexus: A proper understanding of the nexus will allow decision makers to develop appropriate policies, strategies, and investments to explore and exploit synergies, and to identify trade-offs among the development goals related to water, energy and food security. Moreover, a nexus perspective increases the understanding of the interdependencies across these three sectors and influences policies in other areas of concern, such as climate change and environment.

Decentralized Water Governance: There is an urgency of decentralizing the management of water resources in the Arab countries with a focus on local institutions' need of governments to share power with other local actors and transfer their political and administrative

functions to more efficient agencies at lower levels. Effective water governance is vital for sustainable development in the Arab region.

Gender Mainstreaming in IWRM: Progress in addressing the gender issue is notable, however, in spite of laws, regulations and measures taken, gender equity and mainstreaming, some countries and cultural levels still have different views and perceptions. Gender Mainstreaming in IWRM remains an issue until clear and balanced understanding prevails. Governments, knowledge centers and civil actors need to work for making more progress.

Impact of Water and Environmental Sustainability on Coastal Cities: Challenges that face coastal cities are sea level rise, marine pollution, extreme weather events, infrastructure quality, availability of potable water, and many other challenges. The treatment of domestic and industrial wastewater and reuse for agriculture are important protective measures. In industrial drainage water, the zero liquid-discharge process can be applied as a solution. Moreover, the implementation of non-conventional techniques for treatment (like reverse membrane or biological methods(may also be used. The use of new technologies as Nanotechnology and the (EDR-RO) membrane and the use of solar energy may contribute to a wider and efficient desalination process.

Recommendations and Road Map

- The MEWINA mechanism and indicators used for preparing the 2012 State of the Water Reports in North Africa should be expanded to cover the rest of the Arab countries to prepare the 3rd Arab State of the Water Report.
- The Regional Convention on Shared Water in the Arab Region should be adopted after agreement of the Arab States.
- The principles of International Water Law should be respected. Further negotiation should be undertaken to solve conflicts over shared water resources under the principles of win-win and no harm.
- Stakeholders' involvement, constant monitoring of shared aquifers and the preparation of a set of legal rules should be considered in the management process of. In this regard, it is recommended to prepare a comprehensive guide to help in planning and implementing future projects.
- Research institutes and universities need to be encouraged to direct their programs towards understanding the Water-Food-Energy nexus and their interdependencies and inter-linkages to define tradeoffs that insure the security of the three systems.
- The private sector plays a substantive and complementary role in water resources management along with forming a multi-stakeholder, multi-level platform to discuss the challenges and opportunities available for each country and at the regional level. This can help enhancing water governance and taking the water value into consideration at policy formulation and decision-making.
- Decentralization can be implemented on many levels including political, administrative, and community levels in co-management of water resources and water services. When new user-interfaces or management approaches are introduced, local technicians and caretakers need to be trained for the proper operation of the water systems. On-hands training is essential.
- Developing women's capacities in water management through improving literacy and establishing appropriate training as well as public awareness programs.
- Strengthening and activating the implementation of laws and measures against gender discrimination in the Arab region.
- Integration and coordination of efforts exerted for coastal protection against climate change impact, sea level rise, water quality deterioration, is an essential need.

Theme II: Actions for Sustainable Development of Water Resources and Water Services

Key Policy Messages of the 3rd AWF

Water pricing is considered a key solution for secure and sustainable water resources in the Arab region. It should be implemented for cost recovery of operation and maintenance. Targeted subsidies for both urban and agriculture water should be considered with water pricing. Targeted subsidies are needed to ensure support to the poor. Cash transfer may is one form of subsidies to support the poor.

Public Private Partnerships in the Arab region is a very important and effective tool to enhance domestic and sanitation needs in Arab region. Innovative thinking is needed for future water resources development. Water security could be achieved through adopting innovative financing initiatives including different PPP modalities associated with attractive investment environment and effective regulatory framework.

Enhancing the use of remote sensing and advanced technologies in improving water resources management, crop mapping, agricultural productivity and adaption to climate change. There is an urgent need to build capacity for using remote sensing in the Arab countries. Development of Regional Knowledge Centers is seen as an essential need to enhance local and regional capacity to resolve water management issues. AWC can play pivotal role in future collaboration and close partnership in building RS capacity in the Arab countries.

Climate change adaptation, resilience and mainstreaming: climate change and its impact on the water resources are considered a threat to the Arab water security. Therefore many issues concerning climate change in the Arab region should be integrated in regional and national policies. Climate change assessment and adaptation, and engagement of the civil society in the adaptation policies are key future aspects in the Arab region. Given the high complexity and multidisciplinary nature of climate change, coordination and cooperation is a must to achieve value added knowledge and to integrate complementary tools that could improve regional and local mapping for the Arab regions' problems and solutions. Mainstreaming of Climate Change at the levels of water policy, water projects and infrastructure is an urgent need. The variety of initiatives, information, data, assessment and modeling tools for climate change produced by and about the region should be regionally harmonized, updated, and made universally accessible to different stakeholders, practitioners and ministries. The different efforts and initiatives made by a number of multilateral institutions and organizations across the region began to achieve this through establishing networks around their partnerships and project work. Knowledge hubs should be established, streamlined, and consolidated in a sustainable, flexible and user-friendly platform.

Groundwater Governance in the Arab Region: Groundwater is certainly one of the most important sources of water supply in the Arab region. The region depends significantly on groundwater resources, which in big part is non-renewable, to meet their growing water demands. High water stresses in the region are met with varying degrees of depletion and mining of aquifer systems. Thus, many groundwater resources are at risk of being exhausted through over-pumping. This has been proved by continuous water level declines and degradation of water quality due to salinization. Groundwater needs to be carefully managed and governed if its use is to be sustained for future generations. This implies the need of political will in implementing strict governance measures. There is a need for in-depth analyses to identify the major factors behind the failure to implement sound groundwater policies on the ground in the Arab region to ensure better governance.

The Regional Initiative on Water Scarcity is a leading initiative to support water and food security in the region. The initiative provides solutions, which can be strategic in planning

and in addressing key questions related to food security under water scarcity. There is a need to focus on regional integration. The innovation about introducing this initiative is to provide a transformational change rather than incremental change. Relevant characteristics of the initiative include: regional collaborative strategy among the countries of the region; a strategic partnership to generate a critical mass of capacity to achieve impact at scale; involvement of private sector; and effective synergies in innovation and learning.

Water Ethics, Integrity, Transparency and Accountability in the Water Sector, was given high attention in the forum and there is a need to focus on these issues. A comprehensive approach to the reform of the water sector to provide a robust and applicable anti-corruption framework in the Arab region is vital. Promoting transparency of the decision-making process would discourage the officials of the water sector to be involved in corrupt transactions.

From MDGs to SDGs in the Arab Region: Negotiations of the SDGs will run through the year 2015. There are many processes feeding into the post 2015 Development agenda. National consultations were conducted within and outside the UN system. Inclusion of shared water resources and ecosystems have to be taken into consideration in the SDGs. There is need for inter-linkages with other sectors like energy, align targets of with the national plans, to continue the work on indicators, data collection and reporting. MDG+ indicators developed by ESCWA and ACSAD have the potential to be linked to SDG's.

Recommendations and Road Map

- Proper procedures, regulations and clear strong governance systems should be developed to encourage the PPP initiatives in the Arab region.
- Engagement of different stakeholders and end-users is a key component in all-future regional projects.
- Enhance the Arab countries cooperation through Arab agricultural integration, electrical grid interconnections, knowledge and technology sharing between Arab states.
- AWC and WB will explore regional opportunities for coordination between ongoing regional remote sensing programs to maintain sustainability and to ensure knowledge transfer
- The gap between research and practice needs to be closed. Researchers should take the lead, reaching out to policy-makers, planners and practitioners at all levels, helping them build their own capacity, and working to understand and address the real needs.
- The project RICCAR is already under implementation, and will continue to benefit all the MENA region, committed partners for specific activities:
  - ESCWA – main coordinator - raising awareness and knowledge hub
  - SMHI: integrated impact assessment
  - GIZ : (sector impact assessment through ACCWAM) + integrated vulnerability mapping
  - ACSAD - Integrated mapping
  - FAO – in charge of integrating a crop modeling component (AquaCrop) for the green sector impact assessments.

- Applied research to solve a wide range of water related issues has to take a multidisciplinary approach to link different sectors and consider cross cutting issues such as climate change.
- Sea level rise (SLR) is an urgent threat to Delta areas, thus necessary adaptation measures should be taken.
- There was a recommendation from GIZ for a road map to work on the way forward on how to enhance the role of CSO'S and Media Engagement in Climate Change Adaptation in Water Sector in the MENA Region, where;
  - Phase I: 2015 finalization of project document and submission for funding
  - Phase II: 2016-2018 implementation

- Stressing on the "importance of linkages between sectors (NEXUS), and that there should be new innovative methods to cope with climate change rather than the traditional methods.
- The AWC is committed to support the region in meeting the goals for water sustainability and to act as a Regional Coordinator to support the countries in meeting their goals.
- Governance risk must become the new norm and priority for national authorities, including related investments in institutional capacity.
- CC and DRR do not only belong to one sector, integration and coordination efforts within and across sectors is therefore a key factor in identifying key strategic issues and devise innovative solutions that bring together different relevant actors.
- Science and research must be accessible and communicated appropriately to the public to raise awareness on different threats facing the water sector in the Arab region.
- On science and technology in particular, partnership should be established across multidisciplinary/multi sectoral DRR/ DRM activities in academia, science and technology in region, with partnership formed to support an international science advisory mechanism.
- A commitment from AWC to coordinate between all organizations for developing the portal of climate change data and to organize a meeting gathering all funding organizations and the different data network owners to include their vision on how to develop this portal.
- Raise awareness around the concepts of integrity, transparency, and accountability as a framework for strengthening overall general public administration and governance reform processes.
- Moving from MDG's to SDG's needed to be adopted regionally and nationally by 2015 and to be merged in the national development plans. Regional institutions and funding agencies should make efforts to strengthen the capacities of countries based on national and community dialogues and consultation. Financial resources are needed to achieve this target. LAS should consider establishing a mechanism to monitor this process in the Arab countries.

Theme III: Arab Integration for Food Security under Water Scarcity

Key Policy Messages of the 3rd AWF

Arab Integration for Food Security: The Arab region is the largest food importer in the world since the available water resources are not sufficient to fill the food gap and realize food security taking into account the difference between food security and self-sufficiency. On the other hand, many successful Arab initiatives exist to improve irrigation efficiency. Those initiatives accomplished tangible achievements to ensure food security.

Guidelines for Brackish Water Use for Agricultural Production in the NENA Region: The Guidelines for Brackish Water Use for Agricultural Production in the NENA Region is a very important tool for sustainability in the NENA region countries. Brackish water can be used in irrigation to enhance crop production and increase farmers' income. Treated wastewater could be included in the GL where there are many success stories of using this low quality water in cultivation in many countries.

Improving Agricultural Water Productivity to Enhance Food Security: Water productivity improvement is important to attain the Millennium Development Goal on hunger (MDG 1). This improvement may be realized through implementing management practices that increase agricultural yields including the continuum from rainfed to partially and fully irrigated farming systems. Targeted policy actions can support integrated water and land management for improved water productivity.

Recommendations and Road Map

- A policy to address national food security is needed to improve agricultural production, maximize water productivity, and rely on virtual water trade in food imports.

- Joint agricultural projects could be implemented towards achieving food security for the region as a whole.
- Rainwater harvesting projects and rehabilitate infrastructure to be implemented in order to increase water availability and reduce water losses in the region.
- Change cropping pattern and introduce less water consumption and higher economic value crops in order to maximize the value of water in agriculture.
- Adopt fast track measures to establish a set of organizations that can help in finding solutions to the challenges of food security under water scarcity conditions. Examples: a Global Organization to protect Arab countries from rapidly increasing food prices, an Arab Food Basket to secure supplies, unified efforts in negotiating food prices, an Arab Union for wheat production and a Regional Mechanism for food security.
- Final version of the brackish water is proposed to be a user-friendly tool in addition to the preparation of a booklet to help the farmers to apply the guidelines successfully. Development of a Decision Support System (DSS) for the GL in NENA region will be useful
- The established Regional Initiative on Water Scarcity in the NENA by FAO should include priority areas for action that focus on: strengthening regional cooperation; use of non-conventional water resources; supporting farmers in applying best practices and standards; institutional strengthening, and public awareness.

CHAPTER 3
Arab Regional Inputs to the 7th World Water Forum

This chapter focuses on how the outcome of the 3rd AWF in terms of messages, action plans and road map serve the input of the Arab region to the 7th World Forum and meanwhile link to the objectives of both the Arab Water Security Strategy and the Arab Agricultural Development Strategy.

The Arab countries extend over a geographical area between the Gulf and the Atlantic Ocean in North Africa and West Asia. It is one of the driest regions of the world characterized by arid and semi-arid climate. Rainfall is rare and sporadic. Groundwater aquifers are mostly non-renewable. About two thirds of the water resources are shared with neighboring countries and often subject to political disputes. Rise of temperature and recurrent cycles of droughts announces that climate change is announcing its presence. Increase of population from about 400 millions currently to about 500 millions by the year 2030 will make the per capita share falls bellow an average of less than 500 m3 per year. Nevertheless, the current share for some countries in the region is about 150 m3 per year. Many citizens lack adequate access to clean water and safe sanitation particularly in the rural area. Seawater desalination became a major source for freshwater particularly in the Gulf countries where 50% of the world desalination capacity exist.

Agriculture consumes about 80% of the total fresh water resources but produces less than 50% of the total food demands.

The Arab countries all have pressing economic and social development needs for which water is the indispensible ingredient. It is estimated that the water required to satisfy the increasing demands of the growing population and the development targets until the year 2030 is about 50%. Despite distinct differences in the distribution of natural resources, population, wealth, and social conditions between the Arab countries, every country has its comparative advantages that could make them able to meet the water and food challenges. Led by the League of Arab States (LAS), established in 1948, the governments of the Arab countries are working together to set policies and strategies for cooperation and integration in all political, social, economic and other aspects of mutual interest and collective benefit to their countries and people. LAS established its institutional organs represented by specialized organizations and ministerial sectoral councils. In the context of this report, reference is made to the "Sustainable Arab Agricultural Development Strategy (2005-2025)" and the "Arab Water Security Strategy (2010-2030)". Both strategies provide the basis of the current Arab joint work to achieve water and food security for the region.

Strategy for Sustainable Arab Agricultural Development (2005-2025)

The Strategy for Sustainable Arab Agricultural Development (SSAAD) was approved in March 2007 by a resolution from the Arab Summit in Riyadh and was considered as part of the Joint Strategy for Arab Economic and Social Action. The Strategy recognized water scarcity and low efficiency of water use as a main challenge facing sustainable agricultural development. It stressed on enhancing joint cooperation and improving the competitiveness of the Arab productivity. The vision and strategic objectives of the Strategy are:

1. Adoption of an integrated approach for the utilization of agricultural resources including water
2. Achieving a joint agricultural Arab agricultural policy
3. Enhancing the capacity of providing safe food
4. Achieving the sustainability of Arab agricultural resourced (land and water)
5. Achieving sustainable livelihood of rural communities.

Within the framework of the future vision and strategic objectives, main sub- programs have been identified in priority areas of action that serve the achievement of the objectives. The main programs are:

- Developing appropriate agricultural

technologies
- Encouraging investments in agriculture and agro-industry favorable agricultural environment.
- Enhancing the competitiveness of the Arab agricultural products.
- Creating favorable structure for legislations and policies
- Capacity building of human resources and institutions
- Enhancing rural productivity
- Development of appropriate management systems for agricultural and environmental resources.

Arab Water Security Strategy (2010-2030)

The Strategy is driven by the common challenges facing the Arab countries due to the accelerating changes taking place locally and globally, the matter, which requires integrating and enhancing the Arab capacity to overcome these challenges. The most significant challenge that may affect the ability of the Arab states to cope with the changes and growing needs is water with all its quantitative, qualitative, legal and administrative aspects.

The strategy was approved by the AWMC in July 2010. Its strategic objective is to achieve Arab Water Security to meet the future challenges and requirements of sustainable development. The specific objectives include among others:

1. Optimizing the use of available water resources for all purposes.
2. Providing potable water and sanitation services to meet the MDGs.
3. Protecting the ground and surface water resources against pollution and depletion.
4. Adapting with the potential impacts of climatic change on the available water resources.
5. Adopting the principles of IWRM in water policies in the Arab states.
6. Raising the efficiency of water use
7. Developing the human resources capacity for water resources development and management.
8. Protecting the Arab Water rights of the shared water resources with neighboring countries particularly in the Arab occupied territories.
9. Encouraging Arab capitals to invest in the water sector in the Arab countries.
10. Benefiting from the comparative advantages of all Arab countries in the field of water resources.
11. Adapting new technologies for water desalination, treatment and reuse
12. Strengthening the role of scientific research in the management of water resources
13. Developing conventional and non-conventional water resources.
14. Strengthening cooperation and exchanging experiences and information between the Arab countries
15. Raising the awareness of all communities with water and environmental challenges.

The strategy shall be supportive to the national strategies in the Arab states and complementary to their efforts in collaboration with the existing specialized Arab organizations, regional and international organizations and civil society organizations working in the Arab world. The implementation and funding of the strategy and its programs is the responsibility of the Arab Ministerial Water Council and its Technical Secretariat. The Arab Center for Water Studies and Security shall also undertake the tasks of coordination, preparation and implementation of projects related to Arab water rights. During the course of this strategy implementation, short, medium and long-term working programs will be adopted according to the goals and objectives of the Strategy.

The Arab Water Ministers Council (AWMC) mandated its technical secretariat to coordinate the regional participation of the Arab region in the 7th World Water Forum to be held in Korea on 12-17 April 2015. The AWMC further identified four out of the 16 themes of the 7thWWF as priority themes for the Arab region on which the Arab countries will focus its input. These four priorities are:

1. Water for Food (theme 2.1)
2. Water for Cities and Energy (themes 2.2)
3. SMART Implementation of IWRM (theme 3.4)
4. Transboundary Water (theme 4.3)

The AWMC appointed the Arab Water Council (AWC) to lead the work on themes 2.1 (Water for Food) and 3.4 (SMART IWRM). Meanwhile the Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) and the Arab Countries Water Utilities Association (ACWUA) were appointed to lead the work on themes 2.2 (Water for Cities and Energy) and Center of Arab Water Security to lead the work on theme 4.3 (Transboundary Water). The Technical Secretariat of the AWMC coordinated the overall work through established committee representing all involved organizations. In addition to the regular meetings of the committee, two important milestones have been identified as the main gateway for preparing the input to the four themes. The first is the **3rd Arab Water Forum** that was held in Cairo, Egypt on 9-12 December 2014. The second is the **3rd Arab Water Week** held at the Dead Sea, Jordan on 11-13 January 2015.

Water for Food

The dominant water related challenges are irrigation and food security. This is not surprising since agriculture accounts for more than 80% of water withdrawals in the region but produces less than 50% of the food demands. The region is the largest food importer in the world since the available water resources are insufficient to fulfill the gap for food security. Population growth, urbanization and economic growth all contribute to an increase in food demand. The need for more irrigation water is inevitable. Moreover, domestic, energy and industrial water demands are also increasing. Thus, efficiency increase or "more crop per drop" and "agricultural water productivity" principles received strong consesus during the Forum.

Food security is not only about agricultural production, but it is closely interrelated with urban water, energy, environment, finance, governance and infrastructure. There had been intense discussion about the definition of food security during the sessions under theme 3. Food security is misunderstood in the meaning of food self-sufficiency. It was clearly stated that self-sufficiency in food production at all-expense is not an indicator of food security.

Food security is not only about agricultural production, but it is closely interrelated with urban water, energy, environment, finance, governance and infrastructure.

Although well-functioning IWRM practices and advancement in irrigation systems are necessary for assuring food security, global market trends and food pricing policies should also be considered at equal weight. Arab countries should engage in food trade negotiations according to their needs.

Demands on water usage as the major input for food production is not likely to be realized to meet increasing food demand and water intensive nutritional habits. Urgent need for enhanced water efficiency methods in irrigation and financing policies come forward at national scale. Political initiatives, technical cooperation and trade relations may contribute to equitable allocation of water on the regional scale. The region must foster south-south cooperation to realize food security, develop knowledge platform and build capacities through exchange of experiences and information.

The region should adopt fast track measures to establish a set of regional organizations that can help in finding solutions to the challenges of food security under water scarcity conditions. The measures include the establishment of a global organization to protect water scarce countries from rapidly increasing food prices, an Arab food basket unifying the efforts in order to better negotiate on food prices, an Arab Union for wheat production and a regional mechanism for food security.

In light of existing and further expected water

deficit, use of non-conventional water such as agricultural water reuse, treated wastewater, brackish water, rainwater harvesting and desalinated water have become irreplaceable strategic options to the Arab world. Standards and guidelines of water reuse in agriculture are vital and have to be revised frequently and take into account the specific conditions in each country. Ecological, economical and health risks of wastewater reuse should be carefully considered.

The Arab region should make use of its comparative advantages represented in its natural resources, human resources, financial resources, knowledge and information and capitalize on the regional initiatives to achieve food security under water scarce situation.

Water for Cities and Energy

Access to water and sanitation was discussed thoroughly in the High Level Panel and in two sessions namely: "From MDGs to SDGs in the Arab Region" and "Making Water Ethics Relevant to Water Management".

Water is one of the most basic needs for survival. Over the preceding decades, the Arab region population has grown to 400 million. Today, water related problems represent one of the regions' most pressing and yet most complex issues to resolve.

Access to safe and clean water and adequate sanitation is a basic human need. 83 million people lack safe and clean drinking water; 96 million, lack sanitation and high percentage of deaths are related to unsafe water, inadequate sanitation and poor hygiene. Urgent solutions are needed to tackle this subject.
"Access to safe drinking water and sanitation" was argued from different perspectives during the High Level Panel and was considered as a basic human need.

One integral dimension of "Access to Water" issue comprises urban water services. However, providing adequate and good quality water services for urban areas is becoming more challenging due to population growth, increasing population density in urbanized areas and increasing water usage per capita.

It is expected that Arab region population living in urban areas will reach 60% by 2020. Thus, pressure over water resources is expected to become more prevalent. As a consequence, requirements for well functioning water treatment systems, use of alternative water resources, and multiple uses of water will be of utmost importance.

Most of the water supply and sanitation infrastructure in the region was built between the 60s and 80s, but not properly maintained and renovated after the 90s. As a result, leakage problems constitute a big concern with many distribution networks losing 40-70% of the water put into supply.

The High Level Panel supported the idea of private sector involvement through Built-Operate-Transfer (BOT) systems.

Capacity building among institutions through water operator exchanges in the region has crucial importance. The guidance of countries which have the capacity to construct and operate their own plants effectively could be beneficial for other countries to improve knowledge and skills for other practitioners and institutions.

Lack of appropriate sanitation was also deliberated among the participants of the High Level Panel. The PPP was supported for its ability to reach affordable technologies for wastewater treatments in a competitive environment. The coordination between private and public sector for the implementation of urban wastewater management through BOT models was encouraged.

Lack of access to basic sanitation in rural areas appears as one of the major water- related problems of the Arab region. This is mainly due to inadequate infrastructure, mismanagement of wastewater and limited financial resources allocated by governments. As expressed in the

technical sessions, there are many solutions available and on-going projects to improve sanitation status in the Arab countries. The

Water and wastewater utilities are entitled to receive full cost recovery of their functions (collection, treatment and distribution) to protect water resources, human health and the environment.

important point is to ensure sustainable, feasible and affordable designs and operation of the infrastructure.

Countries should allocate the required funds to support applied research to find sustainable wastewater treatment processes adaptable to the socioeconomic and climate conditions of the region.

In the session "Making Water Ethics Relevant to Water Management", participants stressed that water and wastewater utilities are entitled to receive full cost recovery of their functions (collection, treatment and distribution) to protect water resources, human health and the environment. Tariff schemes must also rely on fairness and equity among users.

The session on " From MDGs to SDGs in the Arab Region" provided an update on MDGs related initiatives such as MDG+, Water Supply and Sanitation Indicators and the newly developed SDGs related to water sector, and highlighted the road from MDGs to SDGs where the "Sustainable Development Goals" for the post 2015 development agenda include 17 SDGs and 169 targets. SDG-6 is explicitly on Water and Sanitation with 8 targets. The SDG-6 ensures availability and sustainable management of water and sanitation for all.
Moving from MDGs to SDGs needs to be adopted nationally and regionally by 2015 and to be merged in the national development plans. Efforts should be made by regional institutions and funding agencies to strengthen the capacities of countries based on national and community based dialogues and consultation, but this needs securing financial resources to achieve SDG-6. LAS could put in place a mechanism to monitor this process in the Arab countries.

SMART Implementation of IWRM
The role of water in development cannot be underestimated. Water is the foundation for all aspects of human and societal progress. In order to meet the quantitative and qualitative standards of water management, there is a need for implementing a well functioning IWRM approach with participation of multiple stakeholders.

Integrated Water Resources Management (IWRM) is a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the economic and social welfare in an equitable manner without compromising the sustainability of the ecosystems. IWRM takes into consideration the environmental issues, considers measures to improve human health, fosters economic growth, and promotes stakeholders participation in good governance environment.
All the sessions of the first and second days of the Forum took place with the intension of identifying the problems, opportunities and cooperation possibilities on water-related issues in the Arab region. The following recommendations were produced during the Forum. These recommendations would constitute strong basis for the preparation of the regional input ton SMART implementation of

IWRM should involve a participatory process where all actors, such as governments, NGOs, private sector, civil society and end users, are involved and work in coordination.

IWRM in o 7th World Water Forum:

- Water resources problems and their solutions should be considered as a mean to enhance cooperation between Arab countries and a key to stakeholders' participation in reaching sustainable development.
- Ensuring endorsement and adoption of

water issues by the highest political level.

- Water-related Disaster Risk Reduction (DRR) needs to be integrated into national development plans and adaptation to increasing risks from climate change should be recognized as the "highest" priority issue.
- A shift from re-active to pro-active approach is a key to manage water-related risks in the highly changing environment.
- The coastal areas development should be addressed by enhancing synergies between IWRM policies coordinated with those of Integrated Coastal Zone Management (ICZM).
- IWRM is a necessary component of the coordinated actions in the shared river basins and aquifers in the region.
- Groundwater resources are at risk of being depleted or exhausted through over-pumping. Thus, groundwater needs to be carefully managed and governed if its use is to be sustained for future generations.
- There is a need for a shift of focus from development to better management of water through utilizing non-conventional water use (e.g. reuse, desalination, rainwater harvesting, and groundwater utilization) using good practices and careful management.
- Many opportunities for improving human and political securities can be achieved through water-food-energy nexus approach.
- Balancing economic interests with environmental needs.
- Making scientific research and technology a pillar in the decision making process. Development and adoption of new technologies is needed towards sustainable use and management of water resources.
- Collecting realiable data requires collaboration between data collectors and data users. Data provision and interpretation should be demand-driven instead of supply-driven and should reflect the needs of different disciplines and different users at different levels (planning, implementation, management, M&E).
- IWRM should involve a participatory process where all actors, such as governments, NGOs, civil society, private sector and end users, are involved and work in coordination.
- Transparency should be granted and information and data exchange between countries should be the primary object for capacity building.
- Promotion of the role of private sector and enhancing the public private partnership approach.

More than 65% of the Arab surface water supplied by the major rivers originating from outside the Arab region political borders.

Transboundary Water

Shared water plays an important and pivotal role in the overall Arab water security. More than 65% of the Arab surface water supplied by the major rivers like the Nile, Tigris, Euphrates and Senegal originate from outside the Arab region political borders. Accordingly, sharing the water of these rivers is subject to political conflicts in the region as most of these rivers are still without clear agreements that organize the water shares. If no clear agreements have reached with the upstream countries, these rivers will remain a threat to the stability in the Arab World, especially in light of the evolution of water uses in the upstream countries and the exacerbation of negative impacts to downstream counties. Conflicts over shared river basins and aquifers in the region are exacerbated due to poor management, lack of information and absence of tradeoffs.

Achieving efficient water management is a difficult issue, as water does not recognize borders. Both surface and ground water flow across several official boundaries between countries, following natural courses before reaching their final destination, which make water issues very political. The transboundary basins and aquifers link populations of different countries and affect the livelihoods of hundreds

of millions of people.

Shared water resources must be seen as a tool for cooperation and peace, and for promoting equitable allocation of water resources and their benefits. During the sessions “Governance of Transboundary Water” and "Shared Water Resources in the Arab Region", it was highlighted that cooperation in a transboundary context was considered to be a key solution towards achieving more efficient integrated water resources management (IWRM). It was also urged that there is a strong need for political will in order to encourage cooperation among riparian states.

Regional cooperation in a transboundary context is considered a key solution towards achieving water security. Good political will and respect of international law principles, promoting win-win and no-harm solutions and fair tradeoffs are important elements for cooperation among Arab countries and riparian states.

During the session "Shared Water Resources”, it was discussed that political solution has to be based on technical cooperation and continue with the political framework. The intention is to build trust among riparian countries, which in turn lead to concrete solutions for water within the trans-boundary context. Countries need new mechanisms for conflict resolution, new ways to involve civil society, and new metrics to describe water balances at basin level including blue and green water.

Each case for transboundary water management has its own individual characteristics and should be treated as such.

A good example of cooperation for riparian states was stated at the session “UN Partnership for Transboundary Aquifer Governance” on Nubian Sandstone Aquifer system.

Stakeholders within the realm of transboundary waters include agencies, institutions and organizations within the river basin or aquifer. However, there were some discussions in the session “Transboundary Aquifer Governance” as to whether stakeholder representation should not be limited with geography but should consider other interests. The example of UNESCO was given as an external stakeholder that can be a catalyst for reaching agreements.

CONCLUDING RECOMMENDATIONS

State of the Arab Water

- Managing Arab water under uncertain conditions and with increasing demands for food security, socio-economic development, human safety and regional peace calls for policies that are robust and flexible.
- The "2012 State of the Arab Water Report" launched by AWC & CEDARE shows interesting findings for shaping the future water related policies of the region. It should be a continuous process for the preparation of the 2015 State of the Arab Water Report and expanded to cover all Arab countries.

Climate Change

- Given the high complexity and multidisciplinary nature of climate change, it is important to rely on science-based analyses and projections of climate change scenarios to formulate policy at regional and sub-regional levels.
- National policies including climate change should evolve from crisis management to risk management.
- Green Climate Fund offers many opportunities for adaptation and mitigation projects. Access to funds requires what is termed "climate readiness" and Arab countries should be well advised to build the necessary capacities to apply and handle these funds.
- Number of multi-lateral institutions and organizations across the region are launching different climate change knowledge hubs. The Arab Water Council (AWC) is entrusted to build this portal of climate change information system to capture, streamline and consolidate in a sustainable, flexible and user-friendly regional platform.

Shared water

- Shared water resources must be seen as a tool for cooperation and peace, and for promoting equitable allocation of water resources and their benefits. Regional cooperation in a trans-boundary context is considered a key solution towards achieving water security.
- Trust must be built among riparian countries, which can lead to concrete solutions for water within the transboundary context. Countries need new mechanisms for conflict resolution, new ways to involve civil society, and new metrics to describe water balances at basin level including blue and green water.

Groundwater Resources

- Groundwater needs to be carefully managed and properly governed if its use is to be sustained for future generations. This implies the need of political will in implementing strict governance measures.
- There is a need for clear identification of the major factors explaining the lack of implementation of groundwater policies on the ground in the Arab region to ensure better governance.

Research and Knowledge

- Better scientific understanding of water problems and knowledge-based approaches to manage water resources in an integrated manner, coupled with capacity building and technology transfer can bring efficient solutions to those water problems faced by the region and improve water use efficiency.
- Researchers should take the lead, reaching out to policy makers and planners at all levels, helping them build their own capacity and working to understand and address the real needs.

MDGs to SDGs

- A mechanism could be put in place by League of Arab States (LAS) to monitor this process in the region.
- Irrespective of how water will be captured in the SDGs, it is essential that the Arab region examine the broader role of water and water management in sustainable development as well as in climate negotiations and risk reduction.
- Attaining the MDG and SDG targets on water and sanitation require innovative, equitable, inclusive and sustainable financing mechanisms at all levels especially for the poor populations in rural areas.

Water-Energy-Food Nexus

- Understanding the nexus will allow decision makers to develop appropriate policies, strategies, and investments. They will need to explore and exploit synergies, and to identify trade-offs among the development goals related to water, energy and food security.
- "Nexus" perspective integrating water, energy, agriculture, ecosystem and other sectors should be adopted. In this case, trade-offs will be identified, synergies seized and resources used more efficiently.

Investment

- National financial resources as well as bilateral and multilateral funding are needed, which would also demonstrate south-south solidarity and international cooperation in the region.
- All investments should take into account that water in the region is a scarce resource and a public good essential for life and all economical and social activities. Therefore, water tariffs should be differentiated reflecting local conditions and affordability considerations.
- The PPP is among the pillars to fill-in the gap in making huge infrastructure investments. Creation of better enabling environment for PPP in Arab countries by improving the governance environment is essential to attract the private sector to water and sanitation projects.
- -The active participation of the private sector in potable water supply, sanitation and utilization of non-conventional water is strongly recommended due to its ability to reach newest technologies in a competitive environment.

Water governance, Ethics and Integrity

- Water governance should be improved to include appropriate legal and regulatory tools, efficient institutional management, enforcement bodies, and stakeholders' involvement.
- There is a need a comprehensive approach to the reform of the water sector to provide a robust and applicable anti-corruption framework in the Arab region.

Agricultural productivity

- It is imperative to increase agricultural productivity for the sake of increasing the share of local production in food security without using new water resources.
- Potential to increase productivity of both rainfed and irrigated agricultural systems should be fully exploited.
- Agricultural water use efficiency should be through technological and management means provides opportunity for increasing food security without being a threat to water security.
- More emphasis should go into economic studies that incorporate water productivity in its many dimensions, consider the return flow issue, and adopt a multi-input and multi-output framework.

Non-conventional Water

- Use of non-conventional water such as agricultural water reuse, treated wastewater, brackish water, rainwater harvesting and desalinated water has become irreplaceable strategic options to the Arab world. The guidelines developed by AWC and its partners should be finalized in a user-friendly manner.
- The guidelines of wastewater reuse are vital and have to be revised frequently and take into account the specific conditions in each country including the ecological, economical and health risks of wastewater reuse.

Regional cooperation and integration

- There is an urgent need of collective measures for adopting enhanced water use efficiency methods in irrigation and financing policies to come forward at national scale.
- The region must foster south-south cooperation to realize food security, develop knowledge platform and build capacities through exchange of experiences and information.
- The region should adopt fast track measures to strengthen or establish regional and international organizations that can help in finding solutions to the challenges of food security under water scarcity conditions.
- The Arab region should make use of its comparative advantages represented in its natural resources, human resources, financial resources, knowledge, information and technology to achieve water and food security.

Sponsors


National
Water
Research Center
المركز القومى لبحوث المياه


UNESCO
United Nations
Educational, Scientific and
Cultural Organization
منظمة الأمم المتحدة
للتربية والعلم والثقافة
Cairo
Office
مكتب
القاهرة


WORLD BANK GROUP


FAO
FIAT PANIS


UNDP


giz
Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH


نزرع للغد
ICBA
AGRICULTURE FOR TOMORROW


CIHEAM
IAM BARI


CEDARE
سيدارى


WFP


ESCWA


Egyptian
Water
Partnership
الشراكة المائية المصرية


1968


ICID•CIID


African Water Facility
Facilité africaine de l'eau
Mobilising Resources for Water in Africa


IWMI
International
Water Management
Institute


SIWI


ICARDA


IFAD
Investing in rural people


Global Water
Partnership


UNESCO
United Nations
ucational, Scientific and
Cultural Organization
International
Hydrological
Programme


MEWINA
مشروع التقييم والمتابعة لقطاع المياه بدول شمال أفريقيا
Monitoring and Evaluation for Water In North Africa


FUNDACIÓN
BOTÍN


IAEA
International Atomic Energy Agency


Water
Culture
.org


المنظمة العربية للتنمية الزراعية


Third Arab Water Forum
"Together Towards A Secure Arab Water Future"
9 - 11 December 2014 Cairo, Egypt


Third Arab Water Forum
"Together Towards A Secure Arab Water Future"
9 - 11 December 2014 Cairo, Egypt
skype
giz
ICBA
IFAD