



Status of INTEGRATED WATER RESOURCES MANAGEMENT (IWRM) PLANS in the Arab Region



December 2005

Table of Contents

Preface.....	iv
Foreward.....	v
Preamble	vi
Acknowledgements	vii
Arab Water Council (AWC).....	vii
Contributors.....	vii
Collaborators	vii
United Nations Development Programme (UNDP).....	viii
Contributors.....	viii
Collaborators	viii
Abbreviations and Acronyms.....	ix
Conversions	xi
1.0 EXECUTIVE SUMMARY.....	1
2.0 INTRODUCTION	8
2.1 Purpose of the Report	8
2.2 Integrated Water Resources Management (IWRM).....	9
2.2.1 Strategy, Policy, and Plan	10
2.2.2 IWRM Plan/Policy/strategy Principles	11
2.2.3 Guidelines for Preparing IWRM Plans	12
2.3 The MDGs & WSSD Targets	13
2.4 Report Organization	15
3.0 STATUS of IWRM PLANS in the ARAB COUNTRIES.....	16
3.1 The current status of IWRM plans in the Arab Region	16
3.1.1 Algeria	16
3.1.2 Bahrain	18
3.1.3 Comoros	19
3.1.4 Djibouti	20
3.1.5 Egypt	21
3.1.6 Iraq	23
3.1.7 Jordan	24
3.1.8 Kuwait.....	26
3.1.9 Lebanon.....	26
3.1.10 Libya	28
3.1.11 Mauritania	28
3.1.12 Morocco.....	29
3.1.13 Oman	30
3.1.14 Palestine.....	31
3.1.15 Qatar	32
3.1.16 Kingdom of Saudi Arabia	33
3.1.17 Somalia	34
3.1.18 Sudan	34
3.1.19 Syria	35
3.1.20 Tunisia	37
3.1.21 UAE	38
3.1.22 Yemen.....	39
3.2 Potential Partners / Donors Assisting the Water Sector.....	40
4.0 POTENTIAL KNOWLEDGE HUBS for IWRM in the ARAB REGION.....	44
4.1 ACSAD (www.acsad.org).....	44

4.2 AQUASTAT (http://www.fao.org/ag/agl/aglw/aquastat/water_res)	44
4.3 Awarenet	44
4.4 AWC (www.arabwatercouncil.org)	45
4.5 Cap-Net (www.cap-net.org)	45
4.6 CEDARE (www.cedare.org).....	46
4.7 DDC/UNDP (www.surf-as.org/DDC/DDC.html).....	47
4.8 EMWIS (www.emwis.org).....	47
4.9 ESCWA (www.escwa.org.lb).....	48
4.10 EWP (www.egyptianwaterpartnership.org)	48
4.11 FAO (www.fao.org)	50
4.12 GWP-Med (www.gwpmed.org)	50
4.13 ICARDA (www.icarda.org)	51
4.14 IDRC (www.idrc.ca/waterdemand/)	51
4.15 IIED	52
4.16 IRC-InterWater (www.irc.nl/interwater)	52
4.17 IUCN (www.iucn.org)	52
4.18 IWRC (www.iwlearn.net)	52
4.19 MEDRC (www.medrc.org)	52
4.20 METAP (www.metap.org)	53
4.21 NBCBN-RE (www.nbcbn.com).....	53
4.22 NWRC (www.nawqam.org).....	54
4.23 UNESCO water portal (www.unesco.org)	54
4.24 UNEP (www.unep.org)	54
5.0 UNDP ROLE in the ARAB WATER SECTOR	55
5.1 Introduction	55
5.2 Potential for UNDP Support in Developing National IWRM plans	56
5.3 IWRM Capacity Development Needs for the UNDP	56
6.0 ARAB WATER COUNCIL ROLE in the WATER SECTOR	59
6.1 Objectives	59
6.2 AWC Activities.....	60
6.3 AWC Principles	61
7.0 STRATEGIC ENTRY-POINTS for UNDP/AWC SUPPORT in the ARAB WATER SECTOR.....	62
7.1 Common Interest Goals & Targets	62
7.2 Potential Regional Cooperation & Identified Gaps.....	63
7.2.1 Institutional Strengthening of the Arab Water Council	64
7.2.2 IWRM Plans Development Program	65
7.2.3 IWRM Plans Implementation Program	65
7.2.4 Regional Program for Water MDGs in the Arab Region	66
7.2.5 IWRM Capacity Building Program for Governments & Civil Societies	66
7.2.6 IWRM Capacity Building Programs for UNDP COs.....	67
7.2.7 Arab Water Facility.....	67
7.2.8 State of the Water Report in the Arab Region.....	67
8.0 REFERENCES.....	68

Preface

There is no doubt that the Arab Region is facing the most challenging water resources conditions in the world. The per capita share of renewable water resources is currently under 500 m³/capita/year in about 70% of the Arab countries. These severe conditions have led many countries in the region to fossil groundwater exploitation, and sea water desalination, which eventually translates into high water development costs and adverse impacts on the environment. More than 65% of the renewable water resources are transboundary and originate outside of the region. About 50 million people lack access to safe drinking water and about 80 million people lack access to proper sanitation in the Arab Region. To achieve the Millennium Development Goals (MDGs) of reducing by half the percentage of people without access to safe drinking water and proper sanitation by 2015, the Arab Region will need to provide drinking water services to about 83 million more people, and will need to provide sanitation services to about 96 million people, leaving another 83 million people without access to drinking water services and 96 million people without access to proper sanitation services. Threats of water pollution in the region can pose substantial constraints in rendering the scarce available water resources out of reach.

Noting the impacts of these challenges on human health, economic development, environment, and social conditions makes it therefore important to follow the Integrated Water Resources Management (IWRM) approach. It urges people to think collectively with all stakeholders involved, and prioritize the issues, assess all available water resources to utilize them in an integrated manner understanding their interactions, highlighting the importance of conjunctive use and recycling.

Several countries in the region have realized the importance of IWRM and started implementing the concept. The newly born Arab Water Council (AWC) has identified its main objective as implementing IWRM and therefore herein joining hands with the UNDP and CEDARE to assess the status of developing IWRM plans in the Arab Region, and therefore assessing the status of achieving the 2005 IWRM plans target of the World Summit for Sustainable Development in Johannesburg. We look forward to a regional strategic partnership on IWRM in the region. This report has identified some key strategic entry points that could be acted upon through this partnership. We look forward to the continuous support of the UNDP and potentially other partners in realizing IWRM in the region.

Mahmoud Abu-Zeid

**Minister of Water Resources & Irrigation, Egypt
Chairman, Arab Water Council Founding Committee**

Foreward

Sharing of Integrated Water Resources Management (IWRM) visions and actions among Arab countries is a major step towards joint efforts to achieve the WSSD 2005 national IWRM plans development target.

When launched in April 2004, we all envisioned the Arab Water Council (AWC), as a strong mechanism for exchange of experience and knowledge on water resources issues and challenges. Today, we have a major challenge and that is to meet the expectations of our Heads of States and the general public who gave their governments in Johannesburg 2002, the mandate of achieving, among other goals, the 2005 IWRM target. CEDARE in its capacity as the Arab Water Council Interim Technical Secretariat was honored to undertake this desk review in cooperation with the United Nations Development Programme (UNDP). The valuable information we received from the Arab Ministries of Water who are members of the Arab Water Council provided the backbone of the review. Sharing this information on the current status of IWRM plans will set the stage for organized efforts in developing and implementing these plans.

This review compiles the available documentation in the Arab countries that constitutes national plans, water policies, or strategies towards the development of IWRM plans. This review also presents recommended knowledge hubs and active potential partners that can assist in IWRM plans development. It suggests several alternatives to bridge any knowledge or capacity development gaps in the field of IWRM. These alternatives can be considered as strategic entry points for regional cooperation on challenging water resources issues in the region.

I look forward to the development of strong and productive partnerships for the achievement of the Arab World's collective legitimate aspirations and the sustainable management of our scarce – albeit precious – water resources.

Nadia Makram Ebeid

**Executive Director, CEDARE
Centre for Environment & Development for the Arab Region & Europe**

Preamble

There is no single resource so essential to sustaining life and livelihoods than water. The Arab world suffers from an increasing scarcity of usable water resources and is considered one of the most water stressed regions in the world. This stark reality was captured in our widely read Arab Human Development Report 2002, which has elaborated the elements of a water strategy to underscore the need for a more integrated approach to management of water resources rather than the existing fragmentation of water affairs management. At the Millennium Summit in September 2000, world leaders committed themselves to achieving the Millennium Development Goals (MDGs) which set clear, numerical, time-bound targets for making real progress, by 2015 in tackling the most pressing issues developing countries face. For water, they set a target to cut by half the proportion of people without access to safe drinking water and basic sanitation by the year 2015. These global efforts were further reinforced and concretized in 2002 during the World Summit for Sustainable Development (WSSD), when countries adopted the Johannesburg Plan of Implementation which set a target for countries to develop Integrated Water Resources Management (IWRM) and Water efficiency plans by 2005. UNDP contributes to the achievement of these goals through global, regional and country level programmes that provide countries with access to the knowledge, skills and the resources they need. In the area of water, UNDP has therefore articulated an integrated strategy to support countries address their water management challenges. Capacity development and Integrated Water Resources Management (IWRM) practices are two of the approaches employed by UNDP to meet the water and sanitation targets of the MDGs and WSSD.

At the regional level, UNDP is committed to supporting countries to achieve the 2005 WSSD target and within this context, has partnered with the recently established Arab Water Council (AWC) through its Interim Technical Secretariat, the Centre for Environment and Development for the Arab Region and Europe (CEDARE), to carry out this review of the status of IWRM plans in the Arab Region and the capacity development needs of countries to implement them. This review is therefore the important first step in formulating a regional programme for capacity development in the water sector in the Arab Region. We look forward to the implementation of this regional water programme in partnership with the AWC and CEDARE hoping that other partners that are already engaged in similar efforts in the region will join in. Effective coordination and mobilization of partners will make the Arab states one of the first regions of the world to work collectively to achieve the water-related WSSD and MDG targets. I am confident that the recommended set of strategic entry points highlighted in this report will pave the way for a more rational and sustainable use of our precious water resources.

Rima Khalaf Hunaidi

Assistant Administrator and Regional Director, Bureau for Arab States

vi

Acknowledgements

Arab Water Council (AWC)

Contributors

H.E. Dr. Mahmoud Abu-Zeid
Chairman of AWC Founding Committee

Dr. Khaled AbuZeid
Senior Water Resources Specialist
CEDARE / AWC Interim Technical Secretariat

Dr. Sameh Afifi
Water Resources Consultant

Collaborators

Algeria

Mr. Selimi Khallaf
Ministry of Water Resources

Comoros Islands

H.E. Mr. Mohamed Abdoul Hamid
Ministry of Rural Development, Fishing
Handicraft and Environment

Djibouti

Mr. Kamel Dawoud Ali
Ministry of Agriculture, Animal Breeding
and Fishing

Egypt

H.E. Dr. Mahmoud Abu-Zeid
Ministry of Water Resources and Irrigation

Iraq

Dr. Abdel Gabbar Rasheed Al-Zobeidy
Center of International Water Studies

Jordan

Eng. Akram Geneidy
Ministry of Water and Irrigation

Kingdom of Bahrain

H.E. Dr. Mohamed Ali Ben Sheikh Mansour
Al-Setry
Ministry of Municipalities and Agriculture

Kingdom of Saudi Arabia

Dr. Ali Ben Saad Al-Tokhais
Ministry of Water and Electricity

Kuwait

H.E. Dr. Ahmed Al-Fahd Al-Ahmar Al-Sobah
Ministry of Energy

Lebanon

H.E. Ayoub Hemeid
Ministry of Energy and Water

Libya

Dr. Omar Salem
General Water Authority

Mauritania

H.E. Sheikh Sidi Mohamed Wild Al-Taleb
Aamar
Ministry of Hydraulics and Energy

Morocco

H.E. Abdel Kabir Zahoud
Ministry of Land Development, Water and
Environment

Palestine

Eng. Fadl Kaawash
Palestinian Water Authority

Qatar

Eng. Khaled Abdallah Al-Mansoury
Qatar General Electricity and Water
Corporation

Somalia

H.E. Eng. Abdallah Haj Ahmed Mahmoud
Ministry of Minerals and Water

Sudan

H.E. Eng. Kamal Ali
Ministry of Irrigation and Water Resources

Sultanate of Oman

H.E. Dr. Khamees Ben Mubarak Ben Eissa
Al-Alawi
Ministry of Housing and Water

Syria

Dr. Maamoun Malakany
Ministry of Irrigation

Tunisia

Mr. Noureldin Bousalem
Northern Canals and Water Pipes Company

United Arab Emirates

H.E. Dr. Said Ben Mohamed Al-Raquabany
Ministry of Agriculture and Fisheries

Yemen

Dr. Mohamed Ibrahim Al-Hamdy
Ministry of Water and Environment

United Nations Development Programme (UNDP)

Contributors

Mr. Walid Badawi

Regional Programme Manager, Regional Bureau of Arab States

Mr. Joakim Harlin

Water Governance Adviser, Energy & Environmental Group, Bureau for Development Policy

Mr. Elie Kodsí

Environmental Policy Advisor & Team Leader for Arab States – Drylands Development Centre

Collaborators

Algeria

Djahida Boukhalfa
Programme Adviser

Bahrain

Mohamed AlSharif
Programme Specialist

Djibouti

Hassan Ali
National Programme Officer

Egypt

Mohamed Bayoumi,
National Programme Officer

Jordan

Helena Naber

Kuwait

Jamal Abdullah Al-Hubail
Programme Analyst

Lebanon

Edgard Chehab
Programme Analyst

Libya

Aboubaker El-Khweldi
Programme Associate

Morocco

Khadija Belfakir-Kabbaj
Programme Adviser

Palestine

Walid Hasana

Saudi Arabia

Mayssam Tamim
Programme Coordinator

Somalia

Dirk Boberg
ARR

Sudan

Hanan Mutawkil
Programme Associate

Syria

Energy & Environment Cluster

Tunisia

Nadia Bechraoui
Programme Officer

United Arab Emirates

Samia Al Shamsi
Programme Analyst

Yemen

Fuad Ali

Abbreviations and Acronyms

ACSAD	Arab Centre for the Studies of Arid zones and Drylands
ADB	African Development Bank
ADR	Assessment of Development Results
AFESD	Arab Fund for Economic and Social Development
AGFUND	Arab Gulf Programme for United Nations Development Organizations
ANRH	Agence Nationale des Ressources Hydriques
AWARENET	Arab Integrated Water Resources Management Network
AWC	Arab Water Council
AWDR	Arab Water Development Report
bcm	Billion cubic meters
CCF	Country Cooperation Framework
CEDARE	Centre for Environment & Development for the Arab Region & Europe
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
UNDP COs	UNDP Country Offices
CWANA	Central, West Asia and North Africa
DAG	Donor-Assistance-Group
DDC	UNDP Drylands Development Centre
EC	European Commission
ECWA	Economic Commission for Western Asia
ESCWA	Economic and Social Commission for Western Asia
EIB	European Investment Bank
EMWIS	Euro-Mediterranean Water Information System
EU	European Union
EUWI	European Union Water Initiative
EWP	Egyptian Water Partnership
FAO	Food and Agricultural Organization
GEF	Global Environment Facility
GIS	Geographic Information System
GOE	Government Of Egypt
GWP	Global Water Partnership
GWP-Med	Global Water Partnership- Mediterranean
IBRD	International Bank for Reconstruction and Development
ICARDA	International Center for Agricultural Research in the Dry Areas
ICLEI	International Council for the Environment
ICT	Information and Communications Technology
IDA	International Development Association
IDDP	Integrated Drylands Development Programme
IDRC	Canadian International Development Research Center
IIED	International Institute for Environment and Development
ISDB	Islamic Development Bank
IUCN	World Conservation Union

ABBREVIATIONS and ACRONYMS (Continued)

IWRC	International Waters Resource Centre
IWRM	Integrated Water Resources Management
KFAED	Kuwait Fund for Arab Economic Development
LDC	Least Developed Country
MDGs	Millennium Development Goals
MEDRC	Middle-East Desalination Research Center
MEDTAC	Mediterranean Technical Advisory Committee
METAP	Mediterranean Environmental Technical Assistance Program
Mm ³ /y	Million cubic meter per year
NBCBN-RE	Nile Basin Capacity Building Network for River Engineering
NCC	Net Contributory Country
NGOs	Non Governmental Organizations
NWP	National Water Plan
NWRC	National Water Research Center
NWRP	National Water Resources Plan
ONEP	Office National de l'Eau Potable
PWA	Palestinian Water Authority
RBAS	Regional Bureau for Arab States
RBM	Results Based Management
RCF	Regional Cooperation Framework
RMCs	Regional Member Countries
SRF	Strategic Results Framework
TSE	Treated Sewage Effluent
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
USAID	U.S. Agency for International Development
USAID-RWI	U.S. Agency for International Development Regional Water Initiative
WB	World Bank
WRAP	Water Resources Action Program
WSSD	World Summit on Sustainable Development
WSSPS	Water Sector Strategic Planning Study
WWDR	World Water Development Report

Conversions

SYSTEM OF MEASURES

1 meter (m)	= 3.28 feet
1 hectare (ha)	= 2.47 acres
1 kilometer (km)	= 0.625 miles
1 liter	= 0.220 imperial gallons
1 cubic meter	= 220 imperial gallons

1.0 EXECUTIVE SUMMARY

- **Report Background**

Responding to the World Summit on Sustainable Development held in Johannesburg in 2002 that called for developing integrated water resources management (IWRM) and water efficiency plans for all countries by 2005, with support to developing countries; the United Nations Development Programme (UNDP) is conducting through its comprehensive programme in water governance together with the Arab Water Council (AWC) a desk review to constitute the mandatory first step(s) to further design, develop and implement such plans in the Arab region. This report constitutes the first of three targeted phases: Phase I - Desk Review on IWRM Plan; Phase II - National Consultations Process; and Phase III - Drafting of the Regional Water Programme. This report covers the status of developing IWRM plans in the Arab countries, i.e. Phase I.

- **IWRM Plans in Brief**

Integrated water resources management is a systematic process for the sustainable development, allocation and monitoring of water resources use in the context of social, economic and environmental objectives. It is different from the sector approach applied in many countries. Policies and options that guide water resources management are analyzed within an integrated framework. Its central objective is to promote efficient, equitable, and sustainable development through integrated water resources management. IWRM is built on three main governance aspects: enabling environment of appropriate policies, strategies and legislation for sustainable water resources development; forming the institutional framework to implement such policies and strategies; and creating the management instruments to enable the institutions to perform their tasks. For a country, integrating all the above elements together on a national acceptable level forms an IWRM plan.

- **Progress of IWRM Plans Development in Arab Countries**

Some Arab countries including Egypt, Jordan, and Palestine have approved national water resources plans. Other countries have developed frameworks, which contain elements of policy, in the form of strategy or master plan. But most of these policies, plans or strategies are inadequate to satisfy all the requirements for IWRM plans. In general, Arab countries are beginning to recognize the importance of an integrated approach to water management. Political will and commitment that are motivated with enough awareness and backed with sufficient capacity building are key elements that determine the capabilities of governments to formulate integrated water resources management plans by 2005 and to further implement them. Section "3" of this report presents the current status of developing IWRM plans in the Arab countries.

The following table presents the available documents for each Arab country that are perceived by their respective countries as policies, strategies, or master plans

towards an IWRM plan. The table also lists the countries that have indicated an on-going attempt to finalize a national IWRM plan.

Country	Plans/Strategies/Policies/Documents towards IWRM	Expected Year to finalize an IWRM Plan	Status of IWRM Plans Development			
			Advanced ¹	In Progress ²	Unknown, Progress Likely ³	Unknown, Progress Unlikely ⁴
Algeria	- National Plan for Water*, 2005.	2006		X		
Bahrain	- National Strategy for Environmental Protection of Water Sector ; Bahrain Water Sector, 2003.	2006		X		
Comoros		Unknown				X
Djibouti	- Strategy for Reducing Water Poverty - Water Law - Water Action Plan for City of Djibouti	2006		X		
Egypt	- Integrated Water Resources Management Plan , World Bank, 2005. - National Water Resources Plan ; Ministry of Water Resources & Irrigation, 2004. - Main Features for the Water Policy towards Year 2017 ; Ministry of Water Resources & Irrigation, 2000.	2005	X			
Iraq	- General Scheme of Water and Land Development in Iraq* (1982, 1991).	2006		X		
Jordan	- Water Strategy & Water Policies in Jordan ; Ministry of Water & Irrigation. - The National Water Master Plan ; Ministry of Water & Irrigation, 2003.	2005	X			
Kuwait	- Development Plan for Kuwait (2001-2006) , Water Sector Objectives	2006			X	
Lebanon	- Work Plan for Ministry of Hydraulic and Electric Resources, Years 2000-2009 ; Ministry of Water and Electricity, 1999. - 10 Year Plan for Water Resources Management*, 1999	2006		X		
Libya	- National Strategy for Water Resources Management, 2000-2025 ; 1999.	Unknown		X		
Mauritania		Unknown				X
Morocco	- River Basin Water Plans , 1997. - Water Law , 1995.	2006		X		
Oman	- Water Resources Master Plan, 20 Yrs , 2003 - National Water Resources Master Plan 10 Yrs , 2000 - Water Resources Master Plan, 10 Yrs , 1989	2006		X		
Palestine	- National Water Plan (NWP) ; Palestine National Council, 2000. - Integrated Water Resources Management in Palestine*, 2003. - Investment Plan 2025*, 2004. - Water Budget*, 2004.	2005	X			
Qatar	- Master Water Resources and Agricultural Plan (MWRADP) ", 1981 - National Strategy*, on going (to be completed in 2005/2006)	2006			X	

Saudi Arabia	<ul style="list-style-type: none"> - Phase I: Water Sector Strategy and Action Plan Ministry of Water and Electricity, 2004. - Water Sector Strategy and Integrated Water Resources Management*, Ministry of Water and Electricity, 2005. - Treated Waste Water and Reuse*, Ministry of Water and Electricity, 1990. - Water Conservation Law*, Ministry of Water and Electricity, 1980. 	2005		X		
Somalia		Unknown				X
Sudan	<ul style="list-style-type: none"> - Sudan National Water Policy, Ministry of Irrigation & Water Resources, 2003. - The Master Plan for the Nile Waters in Sudan*. 	2005		X		
Syria	<ul style="list-style-type: none"> - Water Sector Analysis in Syria; Ministry of Irrigation, 2000. - Strategy of the Ministry of Irrigation*, 2001. - Water Resources in Syria, challenges in the 21st Century*, 2000. 	2006		X		
Tunisia	<ul style="list-style-type: none"> - The Long Term Strategy for the Water Sector in Tunisia; Ministry of Agriculture, 2003. 	2005	X			
UAE	<ul style="list-style-type: none"> - National Environmental Strategy – part (2) National Water Strategy *, 2000. 	2005		X		
Yemen	<ul style="list-style-type: none"> - National Water Strategy & Investment Program, Ministry of Water and Environment, 2004. - Law 23 for Year 2002 Regarding Water, Ministry of Legal Affairs, 2002. 	2005	X			

¹ Countries having national water plans, strategies, or policies that incorporate most elements and requirements of an IWRM plan. These countries have on-going committees and/or projects advancing on finalizing their IWRM plans.

² Countries having water plans, strategies, or policies (not necessarily on a national level) that require major enhancements to satisfy the requirements of an IWRM plan. These countries possess the awareness of the WSSD target for developing IWRM plans and are currently progressing to develop their own IWRM plans.

³ Countries that may not have developed national water plans, strategies, or policies. However, considering the advanced level of country awareness of WSSD target for developing IWRM plans, country water capacity, and national economical standard, these countries are likely to have an on-going attempt to develop their IWRM plans.

⁴ Countries that may not have developed national water plans, strategies, or policies. However, considering the lagging level of country awareness of WSSD target for developing IWRM plans, country water capacity, and national economical standard, these countries are not likely to have an on-going attempt to develop their IWRM plans.

* Reference obtained from questionnaire survey conducted during the sessions of the AWC meeting in Dubai, January 2005.

The above Table listed 5 countries (Egypt, Jordan, Palestine, Tunisia, and Yemen) having advanced status in developing IWRM plans. Among these countries, Egypt has a National Water Resources Plans (NWRP) that is considered as a model document towards an IWRM plan development. Eleven countries (Algeria, Bahrain, Djibouti, Iraq, Lebanon, Libya, Morocco, Kingdom of Saudi Arabia, Sudan, Syria, and UAE) are yet in progress. The progress in IWRM plans development for the remaining Arab countries (six countries) is unknown, however, three out of which (Kuwait, Oman, and Qatar) are likely to be in progress, while the other 3 countries (Comoros, Mauritania, and Somalia) are unlikely to be in progress. The above Table

documented the expected date to develop a national IWRM plan for the Arab countries.

- **UNDP and AWC Roles in the Arab Water Sector**

UNDP works directly through its 18-country offices⁵ (COs) in the Arab region to target development assistance based on the needs of each Arab country, whether it is an LDC (Least Developed Country) or NCC (Net Contributory Country). UNDP has a regional office for the Arab States, namely the Regional Bureau for Arab States (RBAS), which focuses on programmes of a regional nature with a minimum of three countries participating. The regional programme is focusing its efforts on governance, global economic competitiveness, and information and communications technology (ICT). Through COs and RBAS various programmes and hubs can be launched to specifically target the development, monitoring and implementation of IWRM plans.

The Arab Water Council (AWC) was established in April 2004 as a non-profit organization working on regional scale in the Arab water sector with its interim president being the Minister of Water Resources & Irrigation of Egypt, and its interim technical secretariat in CEDARE, a regional organization working in the field of water resources in the Arab Region for more than twelve years. AWC's Goals emphasize the spreading of knowledge and exchange of technical experience, good practices, and outcome of various research and applications in the water sector. AWC also emphasizes the work on setting appropriate water policies for the Arab countries.

- **Potential Partners and Knowledge Hubs assisting in Developing & Implementing IWRM Plans**

Developing, monitoring, and implementing IWRM plans in the Arab region requires strategic partners that have regional capacity in the Arab countries. Potential partners that are currently (or have been) active in the Arab region water sector include (in an alphabetic order): Arab Aid, African Development Bank, Canadian International Development Agency, Global Environment Facility, European Union Water Initiative, FAO, U.S. Agency for International Development, USAID Regional Water Initiative, United Nations Development Programme, and World Bank. Section-3 provides a brief description of these potential partners.

On the other hand, knowledge is identified as a crosscutting value that plays a critical role foreseen for knowledge generation and utilization in the development of IWRM plans. Arab countries can utilize the following knowledge hubs for guidance and knowledge dissemination in regard to IWRM plans development: AWC, Awarinet, Cap-Net, CEDARE, ESCWA, EWP, GEF – (IW-LEARN), GWP-Med, NBCBN-RE, MEDRC, NWRC, IDRC, UNDP – DDC, UNESCO, UNEP, World Water Council, FAO, ACSAD, and ICARDA. Section-4 presents the websites and the access information to these hubs.

⁵ Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Djibouti, Somalia, Syria, Lebanon, Palestinian Territories, Iraq, Jordan, Saudi Arabia, Kuwait, Bahrain, UAE, and Yemen

- **Identified Gaps & Strategic Entry Points to Bridge these Gaps**

Most of the Arab countries are progressing in different phases and speeds towards developing national strategic water plans. However, awareness of formulation, development, and implementation of IWRM plans as required by WSSD target is lagging and in several cases lacking. After reviewing the status of documentation towards development of IWRM plans, the following gaps became obvious and threatening. These gaps are explained in Section-7 and introduced herein as follows:

- Gap 1- Experience and information are not easily shared among Arab countries
- Gap 2- Mobilizing the political will and awareness on the need to achieve the WSSD IWRM target of 2005 and other water related MDGs are lacking.
- Gap 3- Capacity building is required for IWRM plans development.
- Gap 4- Capacity building is required for IWRM plans implementation
- Gap 5- Shortage of water resources professionals exists in development agencies including UNDP COs.
- Gap 6- Several countries need to strengthen their capabilities in reporting "State of the Water" and assessing their own water resources.
- Gap 7- Coordination among the donor community in the water sector is required to avoid duplication and assure streamlining of water related activities towards IWRM plans development and implementation

The following strategic entry points are intended to bridge the above identified gaps in order to address the water challenges in the region and maximize the potential of successful development and future implementation of IWRM plans in the Arab countries:

- Entry 1- Institutional Strengthening of the Arab Water Council.
- Entry 2- IWRM Plans Development Program.
- Entry 3- IWRM Plans Implementation Program.
- Entry 4- Regional Program for Water MDGs in the Arab Region.
- Entry 5- IWRM Capacity Building Program for Governments & Civil Societies.
- Entry 6- IWRM Capacity Building Programs for UNDP COs.
- Entry 7- Arab Water Facility.
- Entry 8- State of the Water Report in the Arab Region.

The relation between the gaps and the strategic entry points to bridge these gaps are presented in the following matrix:

Gaps/Strategic Entries - Matrix		Identified Gaps						
		Gap-1	Gap-2	Gap-3	Gap-4	Gap-5	Gap-6	Gap-7
Bridging the Gaps	Entry-1	☐	☐					
	Entry-2			☐				
	Entry-3				☐			
	Entry-4		☐					
	Entry-5			☐	☐			
	Entry-6						☐	
	Entry-7					☐		☐
	Entry-8	☐					☐	

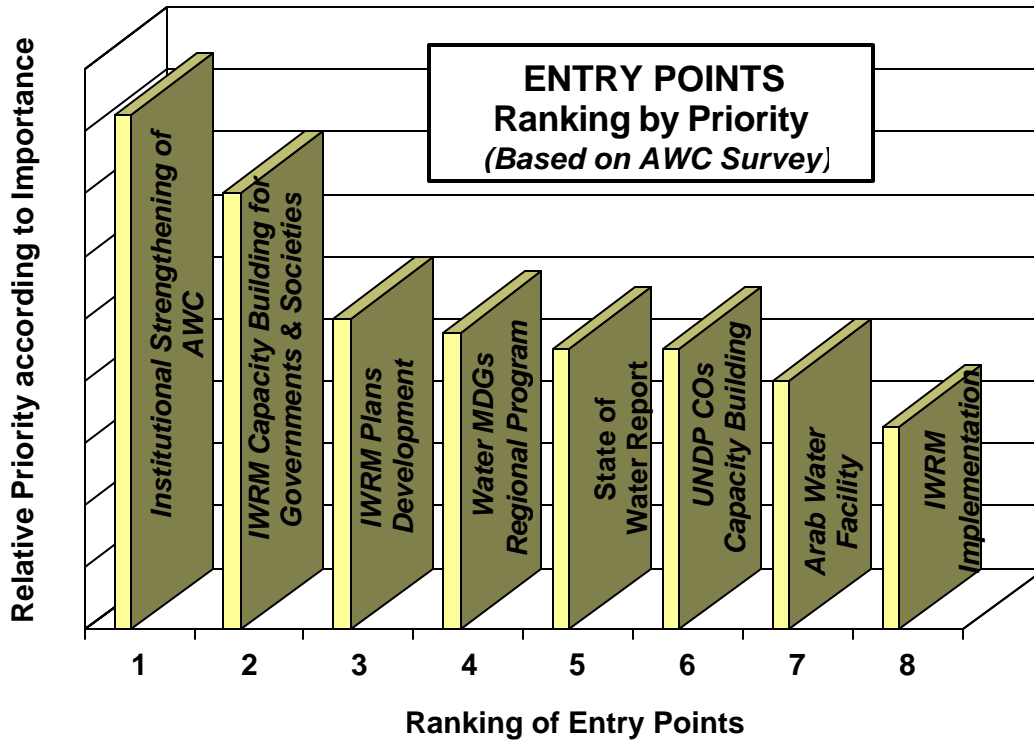
According to a questionnaire provided during the AWC meeting in Dubai (January 2005), the importance of each entry point was evaluated on a scale from 1 to 5 where a score of 5 determines the most important entry point, while a score of 1 represented the least important entry point. Analyzing the scores given to the strategic entry points by the AWC government and non-government members, the following ranking was determined: (where “1” represents highest priority and “8” represents least priority)

Strategic Entry Points	Rank	
	G*	NG**
Institutional Strengthening of the Arab Water Council	1	1
IWRM Plans Development Program	4	4
IWRM Plans Implementation Program	6	8
Regional Program for Water MDGs in the Arab Region	3	7
IWRM Capacity Building Program for Governments & Civil Societies	2	2
IWRM Capacity Building Programs for UNDP COs	5	6
Arab Water Facility	7	5
State of the Water Report in the Arab Region	8	3

* Ranking provided by Arab Water Council Government Members

** Ranking provided by Arab Water Council Non-Government Members

Combining both ranking schemes, the following chart illustrates the overall ranking of entry points where rank “1” indicates highest relative priority and rank “8” indicates least relative priority.

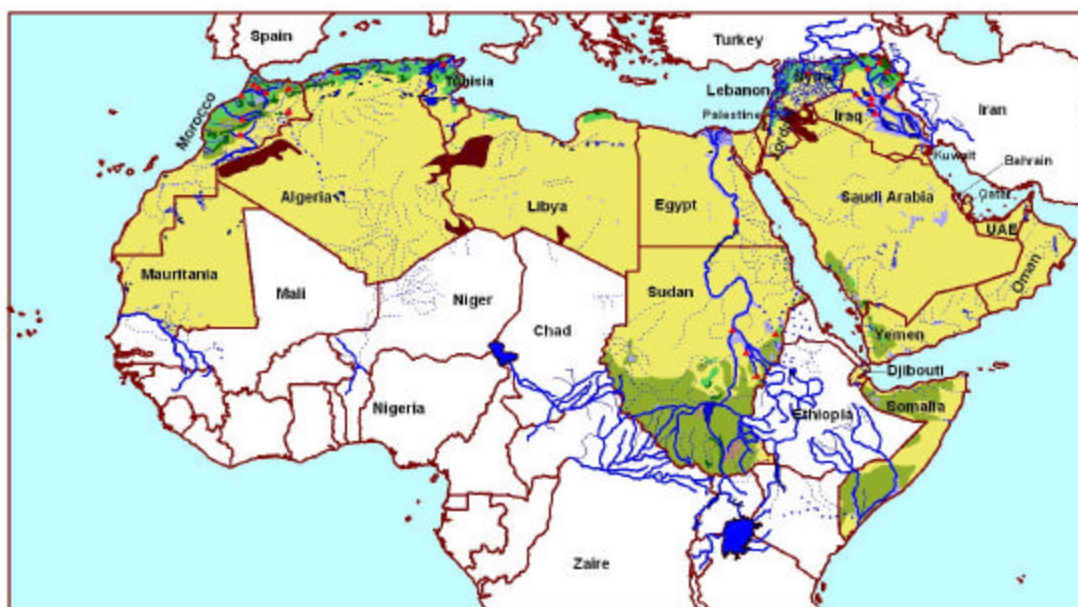


In conclusion, this report presents important information towards having an integrated vision for IWRM plans development status in the Arab countries. Not only did the desk review provide a baseline assessment for the available documentation in the Arab countries towards development of IWRM plans, it also highlighted the supporting elements required to advance the progress of Arab countries towards developing and implementing IWRM plans. This report is not intended for micro-scale evaluation of steps taken by Arab countries towards IWRM plans development. However, the report sketches a profile for the likelihood of Arab countries to achieve the WSSD IWRM targets. The report identifies potential partners, knowledge hubs, existing gaps, and strategic entry points to bridge these gaps. This document serves UNDP and AWC among other partners to formulate regional and national programmes for IWRM plans development, implementation, and monitoring in Arab countries.

2.0 INTRODUCTION




2.1 Purpose of the Report

Integrated Water Resources Management (IWRM) views water as a single resource with competing uses and inter-linkages with the ecological, social and economical systems. One fundamental aspect of an IWRM plan is the management of surface and subsurface water in qualitative, quantitative and ecological sense from a multi-disciplinary perspective focusing on the water needs and requirements of society at large.



Arab Region - Scope of the Study

Following the World Summit on Sustainable Development held in Johannesburg in 2002, the international community called for all countries to “develop integrated water resources management (IWRM) and water efficiency plans by 2005, with support to developing countries”. In response, the UNDP Regional Environmental Focal Points workshop held in Beirut (January 2003) recommended a desk review to further design develop, implement a comprehensive UNDP regional support programme for water governance in the Arab Region. Accordingly, UNDP regional programme was to be formulated in three phases as follows:

-  Phase I: Desk Review on IWRM Plans
-  Phase II: National/Regional Consultations Process
-  Phase III: Drafting of the Regional Programme

On the other hand, the newly-established Arab Water Council (AWC) called for developing an IWRM support program in the region starting by assessing the status of developing IWRM plans at the national level. This showed common interest between the AWC goals and the objectives of the UNDP/RBAS in formulating a regional programme for supporting the water sector in the Arab region

This report covers Phase I (desk review) of the regional programme Formulation in process. The desk review aims at providing a feedback on the taken actions towards developing National Integrated Water Resources Management (IWRM) plans in the Arab Countries. The desk review describes the key actors and major stakeholders involved in IWRM plans, and presents the status of current steps taken by Arab countries to meet the agreed upon WSSD target of developing IWRM plans by 2005. In addition, this report identifies potential partners/donors and hubs of knowledge for IWRM in the region.

As an integral part in supporting the development of IWRM plans, this desk review emphasizes the capacity building needs for governmental institutions in addition to UNDP country offices in the Arab Countries. In this context, the report highlights UNDP and AWC roles in supporting the Arab water sector and further proposes several UNDP/AWC partnership potentials to bridge the existing gaps. The report recommends various entry points for UNDP/AWC partnership to support the development of national IWRM plans in the Arab countries and further implement such plans.

2.2 Integrated Water Resources Management (IWRM)

Integrated water management means that all the different uses of water resources are considered together. Water allocations and management decisions consider the effects of each use on the others. They are able to take account of overall social and economic goals, including the achievement of sustainable development. Integrated approaches imply moving away from fragmented approaches. GWP proposed a checklist to move from fragmented to integrated approach by considering the following aspects:

- Enabling Environment
 - Policies: setting goals for water use, protection and conservation.
 - Legislative framework: the rules to follow to achieve policies and goals.
 - Financing and incentive structures: allocating financial resources to meet water needs.

- Institutional Roles
 - Creating an organizational framework: forms and functions.
 - Institutional capacity building: developing human resources.

□ Management Instruments

- Water resources assessment: understanding resources and needs.
- Plans for IWRM: combining development options, resource use and human interaction.
- Demand management: using water more efficiently.
- Social change instruments: encouraging a water-oriented civil society.
- Conflict resolution: managing disputes, ensuring sharing of water.
- Regulatory instruments: allocation and water use limits.
- Economic instruments: using value for efficiency and equity.
- Information management and exchange: improving knowledge for better water management.

Thus, an Integrated Water Resources Management (IWRM) plan should address specific objectives and goals for the national interest of the people and the environment. In comparison with fragmented approaches, an IWRM approach assesses the country's main water related development problems more effectively and efficiently. It seeks to avoid the lives lost, the money wasted, and the natural capital depleted because of fragmented decision making about developing and managing water resources that did not take into account the interrelated impacts of sectoral actions. Specific to Arab countries, transboundary water aspects, combating desertification, flood protection, water shortage, non-traditional water resources including wastewater reuse, and drought preparedness are among the main concerns that should be addressed in IWRM plans.

Various theoretical and practical approaches have been presented in the literature and addressed in conferences and summits to identify and quantify multi-objectives in water resources planning and policy formulation. The presented materials in this desk review serve merely as an introduction to this subject. The desk review mainly focuses on the existing policies/plans/strategies towards developing national IWRM plans in Arab Countries. Implementing IWRM should ensure social equity, economic efficiency, and environmental sustainability in all sectoral water uses.

2.2.1 Strategy, Policy, and Plan

The terms Strategy, Policy and Plan have different meanings. To explain these terms, an understanding of their terminology is required.

Strategy

The concept of strategy has been borrowed from the military and adapted for use in the water sector among other sectors. In water, as in the military, strategy bridges the gap between policy and tactics. Together, strategy and tactics bridge the gap between ends and means. Strategy also refers to the means by which policy is

affected. According to “Catalyzing Change” handbook by GWP, “The process of creating a strategy is an opportunity for countries to take a coherent, as opposed to an ad hoc, approach to improving how they develop, manage and use water resources to achieve sustainable development goals” and “A strategy defines goals and agrees on how goals could be pursued ... even outlining a range of possibilities suited to different contingencies”.

Policy

According to free dictionary definition; policy is a set of steps that rationalizes the course of actions taken by a government or a group. A water policy is a high-level overall plan that embraces the general goals and directives of the country with respect to water.

Plan

A plan is a formal program for specified target. It comprises a series of steps to be carried out or goals to be accomplished utilizing an arrangement scheme. A plan translates the chosen strategy into concrete objectives and related activities. This report targets IWRM plans.

Because the differentiation between the terms: Strategy, Policy and Plan; may become confusing and varies from one interpretation to the next, this report presents the status of developing national IWRM plans, regardless of the terminology used by various Arab countries. In other words, whether it is called water national plan, policy or strategy; this report will present the development and implementation status for such plan/policy/or strategy as a document towards IWRM plans.

2.2.2 IWRM Plan/Policy/strategy Principles

Water Resources Management is the integrating concept for a number of water sub-sectors such as hydropower, water supply & sanitation, irrigation and drainage. An integrated water resources perspective ensures that social, economical, environmental and technical dimensions are taken into account in the management and development of water resources. Identifying a specific set of objectives to be incorporated in multi-objective formulation of an IWRM plan can be very tedious and frustrating process.

The specific directive on IWRM Action Plans made at the World Summit on Sustainable Development (WSSD) conveys five clear messages (Jønch-Clausen, Torkil, 2004):

- Countries must translate principles of IWRM into a specific plan;
- Countries must complete IWRM Plans by a firm target date - 2005;
- All countries should have a Plan - whether they are rich or poor, whether they have plentiful water resources or scarce water resources;

- Developing countries must be supported in the process of preparing their Plans, and
- The content of these Plans must be wide-ranging, covering institutional, financial and technological change.

IWRM addresses decision making on development and management of water resources for various uses taking into account the needs and desires of different users and stakeholders in order to maximize the resultant economic and social welfare in an equitable manner, while maintaining and improving the functions and services of the ecosystem. According to Guidance in preparing a National IWRM and Efficiency Plan, the plan should provide a road map for changing from current fragmented ways of water resources planning to an integrated approach. The plan should cover three main aspects:

- Current approaches to water resources planning, development and management;
- Target (future) approaches to water resources planning, development and management; and
- Transition plan, means, and methodology to change from current to future approaches.

The above aspects lines with contents of most national strategic plans. Specifically for IWRM plans, the following section provide an in-depth vision for what is expected in an IWRM plan.

2.2.3 Guidelines for Preparing IWRM Plans

Preparation of IWRM plans involves multi-disciplinary coordination that requires numerous considerations to provide better water management. According to the guidelines for the preparation of IWRM plans as presented in the GWP technical committee in Stockholm, 2004 (*Bertilsson et al., 2002*), an IWRM can be summarized as follows: “ a road map to guide the changes needed to move from fragmented to integrated ways of developing, managing and using a country’s water resources, and to accelerate action towards those ends. It clearly establishes the goal posts and the road to achieve them, with milestones along the way”.

GWP issued a checklist of issues that might be addressed in an IWRM plan. The checklist can be used in evaluation of reviewed strategies/plans/policies for the extent of their adherence to the expectations of IWRM plans. The checklist include:

- Interfaces between macro-economic and water resource decision making
- Efficiency of water infrastructure
- Mitigation of the effects of floods and droughts and other extreme water-related events
- Non-conventional water resources and conservation technologies
- Water quality and broader environmental issues

- Eco-hydrological issues
- Data collection systems, and access to information by users
- Policy instruments and the legal and regulatory framework
- The role of the state and the potential for public private partnerships
- Processes for reconciling water quantity and quality needs of all water users
- Mechanisms for consultation and public participation
- Interfaces between river basins and adjacent coastal and marine environments
- The roles of women in the provision, management and safeguarding of water
- Capacity building
- Management agencies (including river basin organizations)
- Mechanisms to achieve financial sustainability

On the other hand, four main pillars for IWRM were identified, namely; (i) Holistic Management, (ii) Decentralization, (iii) Stakeholder Participation, and (iv) Financial Sustainability. This report presents the actions taken (if any) towards the preparation of IWRM plans in addition to the identified challenges and objectives.

Not isolated from other national strategies and plans such as those related to environment (e.g. pollution prevention, cleanup actions, .. etc.) and economy (e.g. poverty reduction, investment encouragement, etc.), an IWRM plan should consider the specific conditions and targets for such plans.

2.3 The MDGs & WSSD Targets

No strategy for the reduction of poverty can ignore people's vital requirements for water. On the other hand, sustainable development policies must address the need for equitable and sustainable management of water resources in the interests of society as a whole. Freshwater is a finite and precious resource essential for sustaining life, ensuring sustainable social welfare and economic prosperity, and ecosystem health.

Combining the recommendations of the World Summit for Sustainable Development (WSSD) held in Johannesburg in 2002, and the Millennium Development Goals (MDGs); the following targets for drinking water and sanitation within the context of an integrated approach to water resources management were identified:

- ☐ To reduce by half the proportion of people with out access to safe drinking water and adequate sanitation by 2015.
- ☐ To prepare national integrated water resources management plans by 2005.

The WSSD recommends that IWRM plans be accomplished by 2005 by adopting the following:

- Develop and implement national/regional strategies, plans and programmes with regard to integrated river basin, watershed and groundwater management, and introduce measures to improve the efficiency of water infrastructure to reduce losses and increase recycling of water
- Employ the full range of policy instruments, including regulation, monitoring, voluntary measures, market and information-based tools, land-use management and cost recovery of water services, without cost recovery objectives becoming a barrier to access to safe water by poor people, and adopt an integrated water basin approach
- Improve the efficient use of water resources and promote their allocation among competing uses in a way that gives priority to the satisfaction of basic human needs and balances requirement of preserving or restoring ecosystems and their functions, in particular in fragile environments, with human domestic, industrial and agriculture needs, including safeguarding the drinking water quality
- Develop programmes for mitigating the effects of extreme water-related events
- Support the diffusion of technology and capacity-building for non-conventional water resources and conservation technologies, to developing countries and regions facing water scarcity conditions or subject to drought and desertification, through technical and financial support and capacity-building
- Support wherever appropriate, efforts and programmes for energy-efficient, sustainable and cost-effective desalination of seawater, water recycling and water harvesting from coastal fogs in developing countries, through such measures as technological, technical and financial assistance and other modalities
- Facilitate the establishment of public-private partnerships and other forms of partnership that give priority to the needs of the poor, within stable and transparent national regulatory frameworks provided by the Governments, while respecting local conditions, involving all concerned stakeholders, and monitoring the performance and improving accountability of public institutions and private companies.

With regard to the target for establishing national IWRM plans by 2005, most of the Arab countries already have set policies, plans, or strategies that serve as a step towards an IWRM plan. However, the level of preparation for a specific national IWRM plan varies from one country to the other. Some countries including Egypt and Saudi Arabia have established a progress schedule towards the finalization of an IWRM plan. Other countries including Algeria, Bahrain and Lebanon intends to set a National IWRM plan but did not announce scheduled actions in this regard. On the other hand, several countries have not indicated their intention to further develop an IWRM plan for what seems as lack of awareness on the WSSD target of developing IWRM plans by 2005.

2.4 Report Organization

- Section 1- Executive Summary

- Section 2: Introduction

This section presents brief concept of IWRM. The section states the background and objectives of this desk review.

- Section 3: Status of IWRM Plans in the Arab Countries

This section presents the available policies, laws, or master plans that are perceived by their respective countries as a step towards National IWRM plans. The section also discusses the capacity building needs for Arab governments and identifies the potential partners and donors in the region.

- Section 4: Potential Knowledge Hubs for IWRM in the Arab Region

This section presents the potential hubs of knowledge that are currently serving the region and can be utilized to access knowledge and information on IWRM plans development and implementation.

- Section 5: UNDP Role in the Water Sector

This section briefly highlights the current UNDP involvements in the Water Sector. The section also presents the potential of UNDP support in developing IWRM plans in addition to capacity building needs of its own country offices, ministries responsible for water, and civil society working in the water sector.

- Section 6: AWC Role for Support in the Water Sector

Recently launched in 2004, the AWC is briefly highlighted in this section including its objectives, activities, and principles. The briefing on AWC aims to visualize the suggested partnership with UNDP (presented in Section 7) to support IWRM plans development and implementation in the Arab Region.

- Section 7: Strategic Entry-points for a UNDP/AWC partnership in the Arab Water Sector

This section presents the common interest goals and objectives of the UNDP and the AWC. The section suggests several alternatives for potential cooperation between the UNDP and AWC to serve the region. The suggestions are intended as an initial brain storming stage to be further evaluated and studied on quantitative performance needs at a later stage.

3.0 STATUS of IWRM PLANS in the ARAB COUNTRIES

To properly assess the status of developing IWRM plans in the Arab Region, a letter has been sent by Chairman of the founding committee of the AWC to the country representative members of the AWC founding committee informing them of the ongoing desk review and the water initiative being launched with UNDP. In the letter, the members were asked to liaise with the respective UNDP COs and to provide copies of any national Integrated Water Resources Management Plans or other water strategies that could be of use for the desk review. The correspondence received from respective officials and COs were forwarded to CEDARE, Interim Secretariat of the AWC, and made available for this desk review.

This report utilized available feedback from AWC country members and UNDP COs in addition to supplemental literature review. UNDP COs were also contacted to assess the status of IWRM plans development in their respective countries, and IWRM capacity building needs. The following is a review of the IWRM plans development in their representative Arab countries based on the available information.

3.1 The current status of IWRM plans in the Arab Region

The Arab countries are listed in alphabetical order. For each Arab country, the following sections present the existing documentation that could be considered as policies/strategies/plans towards the development of an IWRM plan. The sections also discuss specific water challenges and needs in addition to water governance aspects for each country.

3.1.1 Algeria

3.1.1.1 Existing documentation

This desk review identified four documents that address IWRM principles in a broad concept. These documents are: 1) National Strategic Elements in the Water Resources Field by the Ministry of Water Resources; and 2) "Rapport sur l'etat et l'avenir de l'environnement" (French document): Report on the condition and the future of the environment, 3) National Action Program to Combat Desertification, and 4) Rapport National Sur le Secteur de L'eau en Algerie (French document): National report on water sector in Algeria. Among the above-mentioned documents, the first document (National Strategic Elements in the Water Resources Field) scratches the surface on important topics for IWRM plans. A document entitled: "National Plan for Water, 2005" was also recognized by the country as a plan towards IWRM.

The above documents discuss the water challenges in broad concept including the water scarcity in the region and the effect of climatic changes. The documents

evaluate the existing and future (until Year 2013) water resources and demands. The documents also present the involved stakeholders, institutions and ministries that can participate in the implementation of a strategic water plan. The documents refer to a new water strategic plan, however, the said strategy is not yet in place (this desk review did not encounter the actual documentation for such strategy). On the other hand, the formulation of IWRM plan can be feasible utilizing the existing awareness and the already exerted efforts for formulating the required main elements of the plan.

3.1.1.2 Challenges and Needs

Algeria puts water challenges among its priorities on the national scale. The amount of annual renewable water resources in Algeria is estimated at 19.4 billion cubic meters (bcm). Surface water supply is decreasing because of drought conditions for long periods. In addition, the groundwater capacity is not properly evaluated. On the other hand, re-use of drainage and sewage water is not yet considered. The above-mentioned documentation emphasizes the current growing concern in Algeria that is represented in the improper balance between water demand and available renewable water resources. The documentation states the following challenges:

- Social and economical development in the last two decades increased the demand for domestic, industrial and agricultural use. Assigning the water distribution ratios between these demands has become a problem.
- Algeria finds deficiency in treatment of sewage and agricultural drainage that caused contamination of surface and ground water in some areas.
- The extensive use of groundwater water exceeded the recharge volume to the aquifers.
- At the current time, Algeria is among seventeen (17) African countries exposed to water scarcity. The water status in Algeria is expected to worsen mainly because of: Irregular geographic distribution of water resources; Irregular distribution of rainfall; Washout of dams; Water leakage because of aged water distribution network; Water pollution; Poor water infrastructure in spite of important investment; Raised cost of water development and distribution; and Shortage in maintenance.

The identified elements for national strategy aim at water sector development by achieving two main goals: 1) Insure the supply of citizens with suitable drinking water, and 2) Improve food coverage by increasing water-irrigated lands. Supplementary required water will be obtained from future desalinization process.

3.1.1.3 Water Governance and On-going Activities

Ministry of Water Resources governs the water sector in Algeria. The Directorate of Studies and Hydraulic Schemes in the Ministry manages the water resources studies, hydraulic schemes and IWRM plan development. Various Departments and Authorities within the Ministry of Water Resources are involved in implementing water regulations. No evidence of the commitment from other ministries to support a

future water IWRM plan is yet in place. The understanding of the requirements and mechanism of commitment between the different shareholders and institutional bodies may need enhancement during capacity building program towards developing an IWRM plan.

Training programmes were initiated in the early 90's, with consultants, but stopped very quickly due to some instabilities encountered by the country. There is no reported activities at this time about the progress of an IWRM plan development in Algeria. However, the financial and technical expertise levels together with the improving political stability in the country make the progress towards IWRM plan development likely to occur.

3.1.2 Bahrain

3.1.2.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **"National Strategy for Environmental Protection of Water Sector"**; Bahrain Water Sector, 2003.

The strategy presents an evaluation of the existing and future water resources status in Bahrain. The strategy also presents the gaps in legislations concerning water resources development and protection. Reuse of drainage water and minimization of water distribution losses are discussed in the strategy. Targets and means were clearly presented in the documentation.

Other reports that provide useful information for an IWRM plan include (but not limited to): "Multidisciplinary Programming Mission for Agricultural Development in the Kingdom of Bahrain", FAO Regional Office for the Near East, 2002; and Plan for Water Sector 2006-2020. The reports provide useful information on capacity building for different sectors in Bahrain including water resources, irrigation and land engineering, agricultural economics, and policy analysis & planning.

3.1.2.2 Challenges and Needs

The Kingdom of Bahrain is suffering from water shortage. The agricultural abstraction have fluctuated around the 100 millions cubic meters per year (Mm³/y), the municipal water consumption has increased substantially from about 5 Mm³/y in 1952 to about 47 Mm³/year in 1980. Till that time, the country's water requirements were met entirely by groundwater from Dammam aquifer. Overabstraction and wasteful use of groundwater for irrigation damaged the aquifer seriously. Seawater intrusion occurred in the eastern part of the island and as a result, the agricultural activities are diminishing. Bahrain has an annual deficit in water balance of about 110Mm³. The total water demand is approximately 320 M m³/y, met by three sources; groundwater (220 Mm³), desalinated water (80 Mm³) and treated sewage effluent (20 Mm³). The groundwater reserves are suffering from severe degradation in quality and quantity, due to over-abstractions.

According to a report provided by the Government of Bahrain to the United Nations Commission on Sustainable Development, Fifth Session, 7-25 April 1997, New York, in response to the implementation of Agenda 21, groundwater resources in Bahrain are depleting due to increased abstraction exceeding the natural recharge. Directorate of Water Resources under the Ministry of Works and Agriculture is making every effort to control excess water use.

After various studies and activities in the Bahraini water sector, in coordination with international agencies such as FAO and others, the following main objectives are set: Provide sufficient potable water with acceptable quality to face the existing and future water demand; Provide sufficient water (after satisfying domestic use) for development and industrial uses; Evaluate and develop new water resources on a continuous basis; Seek new water sources and water techniques; Preserve water resources, specifically groundwater; Human resources development working in the water sector; Increase operation efficiency for water utilities; Raise water awareness; Improve existing water data bases for water policies; Improve water service; and Adopt integrated water resources management.

3.1.2.3 Water Governance and On-going Activities

The water sector is governed by three ministries: Ministry of Agriculture is in charge of collecting data concerning groundwater resources and sectoral demands in addition to partial treatment of sewage water, Ministry of Electricity and Water is in charge of water supply in water distribution networks, and Ministry of Environment is in charge of water use in public gardens and streets.

Few laws are already in place including Law number 21 of year 1996 that emphasizes the governing status for sustainable development and environmental protection. However, the law does not explicitly discuss groundwater protection and development.

Reviewing the existing water strategy, Bahrain will require assistance in institutional development and interaction to better develop an IWRM plan. In addition, Bahrain will need technical assistance in formulation of an IWRM plan in terms of legislative framework and demand management.

3.1.3 Comoros

3.1.3.1 Available Documentation

There is no documentation available that could be considered towards an IWRM plan development in Comoros. However, there are number of reports that document the current water resources status in the country. These reports include Earth Trend Country Profile for Comoros provided by AQUASTAT (a global database of water statistics maintained by the FAO).

3.1.3.2 Challenges and Needs

Comoros is among countries suffering from water scarcity in the current time. In addition, the country suffers from severe water quality problems.

3.1.3.3 Water Governance and On-going Activities

The Ministry of Rural Development, Fishing, Handicraft and Environment governs the water sector in Comoros. There is no information on Comoros progress towards development of an IWRM plan by 2005. However, the unavailable documentation of taken steps towards water resources management, in addition to the economical conditions in the country suggest that the progress towards the development of an IWRM plan by 2005 is unlikely.

3.1.4 Djibouti

3.1.4.1 Available Documentation

The available documentation that could be considered towards an IWRM plan are:

- 1) **“Strategy for Reducing Water Poverty”**, 2003.
- 2) **“National Directive Water Scheme; Water Action Plan for Djibouti”**, 2000.
- 3) **“National Action Plan for the Environment 2001-2010”**

The strategy for reducing water poverty for water sector (French document) presents the current status of water sector in Djibouti, and states the objectives in addition to the recommended strategies for developing the existing water resources. The document also prioritizes the various required actions for financing consideration.

The document on National Directive Water Scheme evaluates the current water resources, sectoral needs, and water quality standards. The document forecasts future need based on demographic growth and lists the institutes managing the program. An action program is recommended and the associated financing requirements are also presented.

On the other hand, the National Action Plan for the Environment covered the water management aspects with regard to the impact on the environment. The document presented the existing conditions, limitations, institutional and government involvement. Other documents including National Action Programme to Combat Desertification and Water Law have useful information that can be used in an IWRM plan, but the documents do not demonstrate a management plan by themselves.

3.1.4.2 Challenges and Needs

Similar to most Arab countries, the Republic of Djibouti faces an acute shortage of water (the annual amount of rainfall is between 150 and 250 mm per year). The capital Djibouti and most towns of the country as well as most of the villages suffer from deficiency of good quality water supply. Rehabilitation of rural pumping stations, the assessment of the water points and the establishment of new water wells are major concerns. A strategy is required to address these actions and to promote participatory management of the water wells with the local population and the regional communities. The country needs major assistance in development of water infrastructure. Most rural towns require in-depth hydrogeological survey to identify suitable water aquifers. The three priority towns are Ali Sabieh, Obock and Dikhil. The priority actions for the town of Djibouti are: The implementation of a management and protection study of the Djibouti water table; and The implementation of a technical and economic study to compare a sea water desalination option to that of the water supply from the Hanlé plain for purposes of mobilisation of a new drinking water resource.

3.1.4.3 Water Governance & On-going Activities

The Djibouti institutions dealing with the water policy are regrouped within the Technical Secretariat for Water and the National Committee for Water Resources. In 1999, the Technical Secretariat has undertaken to develop a complete plan for national water. This work has led to the drafting of institutional reforms in the field of water resources that contains a summary of financial needs. The development of an IWRM plan to meet the 2005 target is yet in progress.

3.1.5 Egypt

3.1.5.1 Available Documentation

The available documentation that could be considered towards an IWRM plan are:

- 1) **“Integrated Water Resources Management Plan”**, World Bank, 2005
- 2) **“National Water Resources Plan (NWRP)”**; Ministry of Water Resources & Irrigation (MWRI), 2004.
- 3) **“Main Features for Water Policy towards Year 2017”**; Ministry of Water Resources & Irrigation (MWRI), January 2000.

The NWRP is considered as a model example document towards development of an IWRM plan. The document focuses on the physical improvements necessary to satisfy the supply-demand imbalance. The totality in the approach to water resources/agricultural/urban water management is significantly expressed throughout the plan. The NWRP emphasizes the coordination between ministries, stakeholders, NGOs and civil societies to ensure the successful implementation and sustainability for the integrated management of the water resources. Institutional reform, financing and privatization, planning and cooperation, and gender issues were also considered in the NWRP.

The Main Features for Water Policy towards Year 2017 document provides an evaluation for existing water resources, future water demands by Year 2017; and main guidelines for policies and strategic plans for water resources development. Additionally, Law 12, governing drainage and irrigation; and Law 48 of year 1982, protecting Nile River and watercourses; contain legislative aspects for an IWRM plan.

The IWRM Plan has been prepared complement the action-oriented, implementation framework of the NWRP. It addresses the gaps in NWRP and provides for additional measures and provisions that facilitate the transition towards an integrated management approach within the water sector. The IWRM Plan assesses the current water resources management setup and practices along with the ongoing reform efforts led by the MWRI. The Plan identifies the actions agreed upon as major interventions to pursue an effective integrated framework for water management over the next 15 years.

3.1.5.2 Challenges and Needs

The preparation of an IWRM Action Plan for Egypt is very timely. With a rapidly growing population, Egypt is experiencing great challenges, from government subsidies being very high and unsustainable to diminishing per capita and per acre water availability (because of growth) along with deteriorating water quality (salinity, pollution, and rural sanitation). To address these challenges and provide a forum for discussion of opportunities, the Ministry of Water Resources and Irrigation (MWRI) together with the assistance of the World Bank implemented a number of preparatory actions to overcome these challenges.

The water policy aims to evaluate the existing and available water resources in Egypt. This includes the annual 55.5 bcm from the river Nile and potential additional 9 bcm from expected projects. The policy evaluates the water demand in Year 2017 and the expected renewable water resources by then. In addition, the water policy compares the future water demands with the required water resources. The policy also identifies the strategies to achieve the water policy. This strategy includes:

- Optimum use of available water resources
Reduce water losses; Irrigation development; Project cost sharing; Optimum use of groundwater; Reuse of drainage water; and Reuse of sewage water.

- Water Resources Development
Increase water share at Aswan through various upstream projects; Treatment of brackish water; and Utilization of rainfall and flood plains.

- Water quality management
The water policy also identifies the method of achieving objectives in specific and systematic approach.

3.1.5.3 Water Governance and On-going Activities

The Ministry of Water Resources and Irrigation (MWRI) governs the water sector in Egypt. However, tangible management emerges from the fact that the Ministry of Housing administers domestic water network supply, while the Ministry of Agriculture administers on-farm water irrigation.

Egypt is among countries that have taken serious steps towards evaluation of the existing water policies to further finalize a National IWRM plan. In the process, an IWRM Committee was formed within the MWRI. Numerous meetings at the national level, in coordination with IWRM Committee, were held with regional/local identities to review documentation, to conduct studies, and to prepare IWRM evaluation workshops. Among these workshops, the Alexandria workshop was held in 2004, in coordination with the World Bank as part of its strategic engagement in IWRM. The IWRM document has been prepared as a product of this coordination.

3.1.6 Iraq

3.1.6.1 Available Documentation

During the AWC committee meeting in Dubai (January 2005), a documentation entitled: "General Scheme of Water and Land Development in Iraq, 1982, 1991" was presented as a step towards an IWRM plan. There is no other available documentation that could be considered towards an IWRM plan development in Iraq.

3.1.6.2 Challenges and Needs

There is only one river basin in Iraq, the Shatt Al-Arab basin. The Shatt Al-Arab is formed by the confluence downstream of the Euphrates and the Tigris rivers and flows into the Persian Gulf. The average annual flow of the Euphrates as it enters Iraq is estimated at 30 bcm/year. About 10 bcm/year are drained into the Hawr Al-Hammar (Aquastat, 1997). The total annual water resources (surface and ground water) are estimated at 42.8 bcm where 92% is used in agriculture sector.

Currently, there are approximately 4 million Iraqis living in regions where water is scarce or non-existent. Various non-profit groups work to help the smallest of these communities — typically populations of less than 1,000 — to find and establish a source of water. However, many mid-sized communities with populations above 1,000 but below 5,000 are underserved.

3.1.6.3 Water Governance and On-going Activities

The rural water initiative will install approximately 150 wells in 300 rural communities. The project is scheduled for completion in all 17 governorates by August 2005 and is expected to benefit a total of 750,000 individuals.

Recently, the Iraqi government officials are including environmental planning in the design and implementation of water resource projects. The officials will encourage attention to environmental effects of the national reconstruction activities (Washington, DC, USA-November 19, 2004-**Jobwerx News**). However, the current instability in Iraq suggests that the progress towards the development of an IWRM plan by 2005 is unlikely.

3.1.7 Jordan

3.1.7.1 Available Documentation

The available documentation that could be considered towards an IWRM plan are:

- 1) **“Water Strategy & Water Policies in Jordan”**; The Hashmite Kingdom of Jordan, Ministry of Water & Irrigation, 2003.
- 2) **“The National Water Master Plan”**; The Hashmite Kingdom of Jordan, Ministry of Water & Irrigation, 2003.

The major policy changes which started in 1997, emphasized on water demand management and giving a major role for the private sector. The water strategy and water policies document covers five main aspects: 1) water strategy, 2) groundwater management policy, 3) water utilities policy, 4) irrigation water policy, and 5) wastewater management policy. In addition to the current and future water resources management aspects, the document highlights the legislation and institutional setup, shared water resources, public awareness, health standards, private sector participation, financing and research development issues. The document also presented the management policy for groundwater aiming at development of the resources; its protection, management and measures need to bring the annual abstractions from the various renewable aquifers to the sustainable rate of each. The policies covered the water strategy, institutional development, private sector participation, water pricing and cost recovery, human resources, water resources management, water quality and the environment, service levels, public awareness, conservation and efficiency measures, and investment.

The National Water Master Plan (NWMP) document presents the results obtained from the application of water resources modules. These include: rainfall-runoff module, dams safe yield module, and waste water module. The NWMP utilizes GIS based digital tools including water resources and demand assessment, water balancing, assessing water reasonable options and strategies to reverse water imbalances, and ultimately better manage and develop the country water resources.

3.1.7.2 Challenges and Needs

According to the Water Strategy for Jordan, the population increase of the country has not been normal, nor has the natural growth rate been commendable. Jordan has hosted several waves of refugees, displaced persons and returnees as a result of the prolonged conflict in the Middle East. After the year 2005, it is estimated that the freshwater resources will be fully utilized and there will be no more known resources within Jordan for development to meet the demand. The per capita share of indigenous renewable water resources is 175 m³ in 1996. The average share of rain fed agricultural land is 0.1 hectare per capita. Present water use already exceeds the renewable freshwater resources by more than 20%. Water and energy are twins; sweet water is generated from salty waters with energy inputs, and energy is generated from waterfalls. Jordan is almost void of indigenous energy resources, is also below the water poverty line, and is managing a fragile environment.

The water strategy on resource development dictates that the full potential of surface water and groundwater shall be tapped to the extent permissible by economic feasibility, and by social and environmental impacts. Investigation works of deep aquifers shall be conducted to support development planning. The interactive use of ground and surface water with different qualities shall be considered. Assessment of the available and potential resources shall be conducted periodically.

In addition, wastewater shall not be managed as 'waste'. It shall be collected and treated to standards that allow its reuse in unrestricted agriculture and other non-domestic purposes, including groundwater recharge. In addition, marginal quality water and brackish water sources shall be listed to support irrigated agriculture.

3.1.7.3 Water Governance and On-going Activities

The Ministry of Water and Irrigation governs the water sector. The water strategy document highlights the legislation and the institutional setup, in addition to shared water resources, public awareness, performance, health standards, private sector participation, research and development, and finance.

To ensure a framework for broad stakeholder participation, public private partnership for water supply and sanitation has been tested in pilot areas. The experience with public private partnerships in the operation and maintenance of the water supply and sanitation systems in Amman is improving revenue generation and enhancing operation efficiencies, as well as improving water demand management.

In the current time, efforts to enhance water research for water management are in place. Emphasis is given to liaison with international institutions to keep abreast with modern technological advances, and to facilitate technology transfer and adaptation.

3.1.8 Kuwait

3.1.8.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **“Development Plan for Kuwait (2001-2006), Water Sector Objectives”**.

The document discusses the objectives of the water sector including research for development of desalinization techniques, water resources management, and re-use of sewage water.

3.1.8.2 Challenges and Needs

In Kuwait, the average rainfall is 110 mm per year and the fresh water streams do not exist. The fresh water resources are limited to groundwater, desalinated seawater, and treated wastewater effluents. The total conventional fresh water resources available in Kuwait are 6 Mm³/year while the total water demand has exceeded 350 Mm³/y in the year 2000. With the continued deterioration of existing groundwater resources, almost 90% of the water demand is currently satisfied through seawater desalination plants. The history of desalination in Kuwait dates back to 1951 when the first distillation plant was commissioned. Currently the desalination capacity is 1.65 Mm³/day of which 1.47 Mm³/day is provided by multi-stage flash distillation (MSF) and 0.17 million m³/day is supplied by reverse osmosis (RO). On the other hand, tertiary treated wastewater effluents of about 0.4 million m³/day are produced by three major municipal wastewater treatment plants. Such effluent is currently utilized in irrigation. The country needs assistance in developing fresh water resources especially in the area of wastewater reuse.

3.1.8.3 Water Governance and On-going Activities

There are no reported activities towards an IWRM plan development in Kuwait. However, considering the level of economical status of Kuwait together with the technical expertise in the country, the progress of an IWRM plan development is very likely to be on going.

3.1.9 Lebanon

3.1.9.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **“Work Plan for Ministry of Energy and Water, Years 2000-2009”**; 1999.

Based upon the request of both the Prime Minister and the Minister of Information in year 1999, the Ministry of Energy and Water (former Hydraulic and Electric Resources) prepared a 10-year work plan. There is no available national IWRM Plan in Lebanon at the current time. The Work Plan presents plans, strategies and policies relevant to potable water, irrigation and wastewater. Reviewing the Work Plan, the document satisfies several aspects according to the guidelines for IWRM plans development. However, the document focused on domestic water supply instead of integrated water resources management.

Another documentation is the State of the Environment Report (2001) that provides various water management issues in relation to the environment of the country.

3.1.9.2 Challenges and Needs

Relying on groundwater to fill the deficits in potable water and in irrigation has led to over-pumping of groundwater. This is in addition to the drying of most springs. Considering the cost of exploiting and pumping groundwater, other economical solutions became a necessity.

In an average year of rainfall, Lebanon has 8 bcm of water of which only 2 bcm is exploitable and only 1.2 bcm is being exploited. The irrigation sector utilizes 70% of this amount (i.e.0.85 bcm). Lebanon is in a relatively fortunate hydrological position. It is estimated that the yearly precipitation results in an average yearly flow of 8,600 million cubic meter (Mm³), giving rise to 40 major streams and rivers (including 17 perennial rivers) and more than 2,000 springs. Despite this seemingly abundant resource, Lebanon is poised to experience a water deficit within 10-15 years, unless sound and radical water management policies are developed and implemented.

Since the end of the war, the irrigation department at the Lebanese Ministry of Energy and Water has been trying to reduce the loss of water by improving the structures of existing canals by developing water catchments and by the construction of diversion weirs on the rivers.

The international policy over the problem of water and its resources does not allow Lebanon to waste the water into the sea, knowing that other countries are suffering from a lack of water. The country needs substantial support in capacity building specifically in groundwater management and wastewater reuse aspects.

3.1.9.3 Water Governance and On-going Activities

The Ministry of Energy and Water governs the water sector in Lebanon. The Work Plan prepared by the Ministry aims to identify the required capacity for the study, expropriation and supervision of works within the hydraulic projects in order to satisfy the water needs of the population by insuring additional water sources through: Potable water projects; Wastewater projects; Irrigation projects; and Projects of alignment and rectification of the rivers. The establishment of a training center in the field of water resources is in process.

3.1.10 Libya

3.1.10.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **National Strategy for Water Resources Management, 2000-2025**; 1999.

Based on the response received from the Libyan Arab Jamahiriya officials, Libya has accomplished a final action plan entitled: "National Strategy for Water Resources Management, 2000-2025" in 1999. The strategy includes the evaluation of existing water resources situations, future development needs and methods to achieve targets.

3.1.10.2 Challenges and Needs

Only 2% of the total area of Libya (1.76 million Km²) is cultivable. The total water withdrawal for agricultural, domestic and industrial sectors was estimated at 4.6 bcm (Aquastat, 1997), which are almost eight times the annual renewable water resources. About 87% of total water withdrawal is used for agricultural purposes. All desalinated water is currently used for domestic and industrial purposes and all treated wastewater is used for agricultural purposes.

3.1.10.3 Water Governance and On-going Activities

The General Water Authority governs all water resources assessment and monitoring in Libya, while the Secretariat of Agriculture and Animal Wealth is responsible for the development of irrigated agriculture and the implementation of major projects. A special Authority "The Great manmade River Water Utilization Authority" is responsible for the use for agricultural purposes of the water transported from the desert to the coast. The Secretariat of Municipalities takes care of the water supply to urban settlements (Aquastat, 1997). In the current time, the country is organizing awareness campaigns to educate farmers on efficient irrigation practices. The development of a national IWRM plan is yet in progress.

3.1.11 Mauritania

3.1.11.1 Available Documentation

There is no available documentation that could be considered towards an IWRM plan development in Mauritania.

3.1.11.2 Challenges and Needs

Mauritania has a total area of about 1 million km². The total annual renewable surface water resources are estimated at 11.1 bcm. The annual groundwater

resources are estimated at 4 bcm. Almost 92% of the annual water resources are used in the agricultural sector. The country suffers from water scarcity in most rural areas.

The high costs of groundwater extraction, the elevated soils salinity, the high evapotranspiration, in addition to the insufficient and the irregular rainfall and the surface flow pose strong challenges for Mauritania. Financial and technical supports are highly needed for the country.

3.1.11.3 Water Governance and On-going Activities

The Ministry of Hydraulics and the Ministry of Rural Development and Environment govern the water sector in Mauritania. There are no reported activities in Mauritania towards development of an IWRM plan at the current time. The non-existence of available documentation on national water policies/strategies suggests that the progress towards development of an IWRM plan is unlikely.

3.1.12 Morocco

3.1.12.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) “**River Basins Water Plan**”1997.
- 2) “**Water Law**”; 1995.

The Water Law, 1995, approved a water plan to develop the water resources in order to meet the water demand on mid- and long- terms. The water law established the roles and responsibilities for High Council for Water and Climate under H.H. The King of Morocco to direct water policies toward water conservation and filling the gaps between rural and urban areas to ensure water security. The water law approves national water plan. The law also deals with water resources in terms of water basins that help in the decentralization of water management and application of partnerships between the different stakeholders and users. In addition, Morocco was the first Arab country to establish a National Water Council by H.H. King of Morocco.

3.1.12.2 Challenges and Needs

The Moroccan climate varies from sub-humid in the north, semi-arid to arid in the centre to arid in the south. Rainfall is erratic both spatially and temporally. In the mountainous areas it may reach 1000 mm/year or more, in the centre average rainfall is 300 mm down to 50 mm on average in the Sahara to the far south.

Out of 150 billion m³ of precipitation that falls on the country every year only 29 bcm are considered effective rain, divided between surface runoff (20 bcm) and

groundwater recharge (9 bcm). Potential water budget is estimated at 20 bcm divided between surface water (16 bcm) and groundwater abstraction (4 bcm).

The northern part of the country that occupies 10% of its area and accommodates 35% of the population consumes more than 50% of the country's water budget. Groundwater is found in 32 deep aquifers and more than 48 shallow aquifers. More than 50% of groundwater is exploited in the northern and central parts of the country. The country needs support in groundwater and wastewater development aspects.

3.1.12.3 Water Governance and On-going Activities

On the institutional side, water management in Morocco is mainly formulated by the National Office for Potable Water, Ministry of Agriculture and Rural Development (irrigation water); Ministry of Equipment (regulation). World Bank and UNDP, in addition to some contributions from European Union and United States, are actively assisting the country in various water related projects. IWRM plan development is taking place and is expected to be completed in Year 2006.

3.1.13 Oman

3.1.13.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) "**Integrated Master Plan for Portable Water, 20 Years**", Ministry of National Economy, 2003.
- 2) "**National Water Resources Master Plan, 20 Years**", Ministry of Water Resources, 2000.
- 3) "**Water Resources Master Plan, 10 Years**", Ministry of Water Resources, 1989.

3.1.13.2 Challenges and Needs

The total area of Oman is 0.312 million Km² with a coastal line of 1700 km. The internal renewable water resources are estimated at 0.985 bcm. Surface water resources are scarce. The annual groundwater recharge is estimated at 0.955 bcm. Other non-conventional water resources are used; wastewater annual reuse is estimated at 26 million m³ and water annual desalinization is estimated at 34 million m³. The country needs substantial support in developing its non-conventional water resources to meet its demands in the coming years.

3.1.13.3 Water Governance and On-going Activities

The Ministry of Water Resources governs water resources assessment while Ministry of Agriculture and Fisheries governs the irrigation sector. The country is initiating programs to improve the data collection, to assess the water resources, and to study water demand and its spatial distribution.

There are no reported activities towards development of IWRM plan. However, considering the available documentation towards IWRM plans development, the level of economical status of Oman together with the technical expertise in the country, the progress of an IWRM plan development is likely to be taking place.

3.1.14 Palestine

3.1.14.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **"National Water Plan (NWP)"** Palestine National Council, 2000.

In 2000, the National Water Plan (NWP) was developed to summarize the main concepts, findings and recommendations of a Water Sector Strategic Planning Study (WSSPS) that adopted the IWRM concepts and developed an investment plan for the water sector in Palestine. The World Bank funded the WSSPS in 1998. The main target group of the NWP was the decision makers and Ministers of the Palestinian National Council, who have the responsibility to approve the water policies and strategies developed by the PWA.

3.1.14.2 Identified Challenges

Water is one of the major areas of conflict in the Middle East, and it is the most scarce resource in the region. The Palestinian Authority was keen to establish an entity whose main task and responsibility is to manage and develop the water resources in an optimum way and to secure and provide water at an affordable price for the Palestinian population. Consequently, the Palestinian Water Authority (PWA) was established to fulfill this goal. One of the first challenges that faced the PWA was the development of a national plan that adopts the concepts and approaches of Integrated Water Resources Management, especially with the ongoing conflict over the water rights and control of water resources by Israel.

As the coastal aquifer in the Gaza Strip is of great environmental concern; due to depletion of resources and degradation in quality especially with the high chloride content, USAID funded a project to develop the Coastal Aquifer Management Programme. It was referred to as the CAMP project and its main objective was to prepare and develop an Integrated Aquifer Management Plan for Gaza, as well as further develop the capacity of the PWA staff in IWRM.

In the West Bank, water resources evaluation studies were conducted for the Eastern aquifer basin, the Western aquifer basin, and the Northeastern aquifer system. Spring flow was also evaluated.

The strategic plan outlines the direction in which the Palestinian water sector should be developed to the year 2025 and proposes the actions to be taken to achieve the water sector goals. General categories of development are identified for:

- Institutional and Administrative Building: include planning and management, legislative policy and standards, quality and environmental, financial and economic, and institution building actions.
- Groundwater supply
- Water Conveyance and Distribution: include a National Water Carrier with a conveyance line to transport desalinated water from the Mediterranean Sea and new distribution networks.
- Surface Water Supply: to achieve the targets of 40 MCM/yr of surface water resources by 2025 in addition to existing supplies.
- Demand Management: include leak detection, repairs, ..etc.
- Wastewater Management and Reuse.

3.1.14.3 Water Governance and On-going Activities

Parallel to the CAMP project in Gaza and the preparation of the Integrated Management plan, the USAID funded the West Bank Water Resources Management Plan. This plan was completed in May 2003. There is also an ongoing project that is studying the North East and Western Aquifers in Palestine and developing different management options for the Palestinian Water Authority. The project is funded by DFID (UK).

There were many IWRM studies prepared in Palestine for the benefit of the Palestinian Water Authority (PWA). During the development and preparations of these plans and studies PWA staff acquired the necessary skills, knowledge and awareness regarding IWRM. Moreover, since most of the International firms and consultants worked closely with Palestinian professionals, NGOs, academic institutions and consulting firms while preparing these studies, they transferred many of the necessary knowledge and skills in IWRM to their fellow Palestinians. Therefore, Palestinians were fortunate in this respect as they had the opportunity, not only to get exposed to the new concepts of IWRM, but to use these concepts and tools and integrate them in the newly developed Palestinian water and environmental Sector plans.

3.1.15 Qatar

3.1.15.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) "**Master Water Resources and Agricultural Plan (MWRADP)**", 1981.

The document is relatively old and is lacking updates of current water resources assessment. The document may not reflect many of the elements and pillars required for an IWRM plan. Based on information received during the AWC Dubai

meeting (January 2005), a National Water Strategy is expected to be completed by 2005.

3.1.15.2 Challenges and Needs

The total area of Qatar is 11,000 km². There is practically no permanent surface water. The annual groundwater recharge is estimated at 50.43 million m³ (Aqustat 1997). Desalinization of seawater is the main source to satisfy the increasing water demand in the country.

The country needs support in capacity building to expand their non-conventional water resources through desalinization and wastewater reuse.

3.1.15.3 Water Governance and On-going Activities

The Ministry of Municipal Affairs and Agriculture and the Ministry of Electricity and Water govern the water sector aspects. There are no reported activities towards development of IWRM plan. However, considering the level of economical status of Qatar together with the technical expertise in the country, the progress of an IWRM plan development is very likely taking place.

3.1.16 Kingdom of Saudi Arabia

3.1.16.1 Available Documentation

The available documentation that could be considered towards an IWRM plan is:

- 1) **"Phase I: Water Sector Strategy and Action Plan"**, Ministry of Water and Electricity, 2004.

3.1.16.2 Challenges and Needs

The increasing Water use exceeds the total renewable water resources for the country. In 2004, the total estimated annual renewable water resources quantity was 8 bcm. The water use for the agriculture sector was about 17 bcm, for the domestic sector was 2 bcm and for the industrial sector was 0.6 bcm. Recently, many dams were built for flood control and groundwater recharge. On the other hand, Saudi Arabia is the largest producer of desalinated water from the sea, the annual production is about 3 mm³/day. In addition, Saudi Arabia produces an excess of 1.5 million cubic meters per day from sewage treatment plants. Further development and sustainability of groundwater resources are required for the country.

3.1.16.3 Water Governance and On-going Activities

Recently formed, the Ministry of Water and Electricity governs the water sector in Saudi Arabia. The Saudi Ministry of Water and Electricity is currently setting the Water Sector Strategy and Action Plan in compliance with IWRM plan requirements. The process of preparation is divided into three (3) phases. The first phase “the assessment of current water resources management situation” accomplished in January 2004; the second phase is for development of strategic policies for the water sector through extensive in country consultation (on-going); and the third phase is for development of an action plan for the implementation of the strategy. The process would take at least three more years. The phases are conducted with the assistance of the World Bank and UNDP.

3.1.17 Somalia

3.1.17.1 Available Documentation

There is no available documentation that could be considered towards an IWRM plan development in Somalia.

3.1.17.2 Challenges and Needs

The total area of Somalia is 0.637 million km². The total renewable water resources are estimated at 6 bcm/year. The water resources in Somalia are dominated by surface water. Groundwater potential is limited because of the limited natural recharge to the aquifer (Aquistat, 1997).

Somalia needs support in assessing its groundwater resources in addition to expanding of other non-conventional water resources to meet its demand.

3.1.17.3 Water Governance and On-going Activities

Ministry of Mineral and Water Resources and its National Water Center govern the water sector in Somalia. There are no reported activities towards development of an IWRM plan. Considering the level of economical status of Somalia and the lack of sufficient water policies documentation, the progress of an IWRM plan development by 2005 is unlikely to be taking place.

3.1.18 Sudan

3.1.18.1 Available Documentation

The available documentation that could be considered towards an IWRM plan:

- 1) "**Sudan National Water Policy**"; Ministry of Irrigation and Water Resources, 2003.

The Sudan National Water Policy was developed through the cooperation of Ministry of Irrigation and Water Resources, UNDP and FAO. The document brings together several aspects of water resources management, utilization, and protection in the context of a policy. The Sudan water policy relates to various aspects including agriculture, industry, health, energy and transportation. Other documentation that could be considered towards an IWRM includes: The Master Plan for the Nile Waters in Sudan, and 25-Year Water Strategy.

3.1.18.2 Challenges and Needs

The annual amount of available water resources is 30 bcm. This is the summation of the Sudan's share of the Nile waters, the average flow of the non-Nile streams, and the renewable groundwater. Sudan may increase its share of the Nile waters by working with Egypt to conserve some of the water that evaporates from the southern swamps. Work on Phase I of the Jonglei canal has begun but has been halted since 1983 due to the conflict in the South. Other projects might start after the successful completion of Jonglei project.

3.1.18.3 Water Governance and On-going Activities

The Ministry of Irrigation and Water Resources (MIWR) governs the water sector in Sudan. All water affairs were brought under one umbrella of the Ministry. Section 10 of the Council of Ministers Resolution in 1995 defines the powers for the national focal point for water resources as the MIRW.

The main water regulations in Sudan are based on the 1951 Regulations that cover the licensing aspects for pumping water from Nile according to the Nile Pumps Control act. Prior to 1992, the policies and legislations were fragmented. According to the National Comprehensive Strategy (NCS) of 1992, the irrigation and water resources sector is considered as a sub-sector of the agricultural sector. Its policy objectives and strategies became defined.

3.1.19 Syria

3.1.19.1 Available Documentation

The available documentation that could be considered towards an IWRM plan:

- 1) "**Water Sector Analysis in Syria**"; Ministry of Irrigation, 2000.

Other documents that discuss water strategies in Syria are: 1) Executive summary of a paper prepared by the WB with the Ministry of Irrigation on the Irrigation Sector,

2001; and 2) FAO's Study on Water Policy Reform in the Near East: Syria Case study, 1996.

The formulation and adoption of the national water strategy and policy in Syria are prerogative of the High Council of Planning under the chairman of Prime Minister and membership of the ministers of water related ministries (Irrigation, Agriculture, Housing and Utilities, Planning, Economy, .. etc.). The High Council of Planning also adopts draft annual and mid-term plans for water resources development. The mid-term water program is a component of the five year plan for economic development (current 8th plan is for the period 1996-2000). The annual plans are incorporated in the annual plans of relevant ministries.

3.1.19.2 Challenges and Needs

According to the Water Policy Reform in the Near East, the high rate of population growth in Syria could be an important obstacle to development in future, particularly as water has a significant role in the well being and welfare of the country's people. The national renewable available water resources of 11.34 bcm/year, already places Syria in the group of water-scarce countries by 2000.

Uncontrolled water abstraction caused depletion of aquifers deterioration of groundwater quality in the desert (Salameh), Damascus, and Aleppo and salt-water intrusion in the coastal area. There is a need for continuing efforts to achieve the necessary compacts and agreements on the use and development of international rivers especially Euphrates and Tigris. In addition, the increase in the salinity of the Euphrates river would lay huge area of agricultural land in the Euphrates basin in Syria and will damage the industrial installations and water treatment plants for domestic use.

3.1.19.3 Water Governance and On-going Activities

There is no evidence of an existing national IWRM plan in Syria, particularly as regards to the institutional and legal setting and the main challenges/gaps. The existing water legislation can not be considered in the context of IWRM plan as no specific quantitative targets are identified. According to Water Sector Analysis, some of the water related laws and legislative decrees have been identified as outdated because of the rapid change of water circumstance in the country including increased water demand, water shortage and imbalance with unforeseen draw-down of groundwater surface, and deteriorating water quality. Serious constraint is that the executing agencies have no means to control illegal wells construction and groundwater use and water pollution. The present laws and legislative decrees no long meet the changes of various elements of water issues.

The government policies (in conformity with strategy) have been directed toward intense development of the infrastructures for water regulations and utilization (dams, irrigation, drainage systems, water supply systems, waterpower electricity production etc.) These were supported with allocation of investments, institutional

reorganization and build-up. The last 8th five-year plan defines the following general objectives of water policy:

- Full use of groundwater resources;
- Optimal use of water, extending land reclamation and transforming rain fed lands into irrigated ones;
- Increase of number of dam reservoirs, as well as extension of utilization of river water and concentration in winter irrigation;
- Conservation of water resources, protection against pollution and sever pumping of groundwater; and
- Extension of the use of appropriate modern techniques of irrigation.

Among the strategy objectives, is the technical capacity building of the institutions participating in the implementation of IWRM, through a wide range of training modules in different aspects related to water resources planning and management.

3.1.20 Tunisia

3.1.20.1 Available Documetation

The available documentation that could be considered towards an IWRM plan is:

- 1) L'Etat de l'Environnement**, 2002.
- 2) L'Avenir de l'eau : un nouveau challenge pour la Tunisie**
- 3) The Long Term Strategy for the Water Sector in Tunisia**; Ministry of Agriculture, 2003

3.1.20.2 Identified Challenges

With the increase of the needs and the scarce resources, the need for IWRM plan became essential. The agriculture, to which more than 80% of the water resources are allocated, will be required to use the irrigation water more efficient to provide a more effective utilization towards the other economical sectors. The irrigated sector is hence required in the future to improve even more its management conditions, in order to develop in a competitive economic perspective and to optimize the various resources that are attributed to it.

On the other hand, the water sector is obligated to meet the increasing water demand for all the urban and rural areas of the country as well as the tourist and industrial needs. Meeting the entire drinking water demand on the long term will require improving the efficiency of the networks, saving water, exploiting the all of the water released and, at last, resorting to desalination. The last decade 1990-2000 has been marked by the realization of ambitious integrated projects for water management. This has allowed the increase of available water resources, which has increased from 2.76 bcm in 1991 to 3.525 bcm in 2000, as shown in the figures of the following table. The complementary 10 years plan 2001-2010 was assigned the objective of reaching a supply of 4.6 bcm. The plan is based on the principals of

saving water, rationalizing its use and developing its unconventional resources, including using treated sewage water.

3.1.20.3 Water Governance and On-going Activities

Ministry of Irrigation governs the water sector in Tunisia. Meeting increasing demands with limited resources requires developing more efficient mechanisms of management and control, finding the most viable compromises between the levels of demand and the preservation of the environment and water resources. This should be done while considering the impact of investments and operation that could grow faster than the economic growth. The future management, unlike the present one that is essentially based on the conventional waters, has to take into consideration more unconventional resources, like sewage water, seawater desalination and even importing water to meet the increasing demand.

The country needs significant capacity building to face the new challenges of expected water shortage in the country in terms of water resources management.

3.1.21 UAE

3.1.21.1 Available Documentation

There is no available documentation that could be directly considered towards an IWRM plan development in UAE. However, the following documents could have significant input for an IWRM plan: National Environmental Strategy-National Water Strategy (2000), and reports from an on-going project related to integrated water management.

3.1.21.2 Challenges and Needs

The total area of the United Arab Emirates is about 83,600 km². The average annual groundwater recharge is estimated at 120 million m³. The total groundwater extraction exceeds the groundwater natural recharge. Thus, the groundwater depletion probably amounts to over 1 bcm/year (Aquastat, 1997). The country depends on desalinization of seawater to satisfy the increasing water demand. The internal coordination for funding water resources related projects is among the country priorities at this time.

3.1.21.3 Water Governance and On-going Activities

The Ministry of Electricity and Water is responsible for the drinking water supply including well drilling, desalinization plants, water supply and planning. The Ministry of Agriculture and Fisheries is responsible for the development and management of the agricultural water supply. The Federal Environmental Agency controls and regulates water pollution issues. Lately, a new Ministry of Energy comprising water resources responsibility was created. A pre-assessment mission on WRM in

collaboration with UNDESA was conducted and is currently under review by the Ministry of Energy.

3.1.22 Yemen

3.1.22.1 Available documentation

The Government of Yemen has published the following key-documents connected to Water Resources Management:

- 1) National Water Resources Strategy and Policy (National Water Resources Authority, 1998)
- 2) Water Law (Ministry of Legal Affairs, 2002)
- 3) National Water Sector Strategy and Investment Program, NWSSIP, (Ministry of Water and Environment, 2005)

3.1.22.2 Challenges and Needs

In Yemen, water withdrawal is estimated to be around 3.5 km³/y, exceeding by more than one third the renewable water resources of 2.5 km³/y. This has led to the alarming depletion of groundwater in a number of basins wiping out irrigated agricultural production and investments in some parts of these basins. This water reality imposes on the country the challenge of reducing the existing unsustainable use of water resources through the implementation of the water law, improved basin management and better planning for rational utilization of water resources. Furthermore, major challenges in the field of human resources development and institutional capacity building remain a major obstacle to the implementation of integrated water resources management plans.

3.1.22.3 Water governance and ongoing activities

In 1996 Yemen embarked on a water resources reform program by establishing the National Water Resources Authority (NWRA). Major achievements of NWRA are a national water resources strategy & policy, the issuing of the Water Law, the division of the country into 14 water basins, water basin management plans for Taiz, Tuban-Abyan, and Hadhramout, a watershed management policy, the opening of NWRA branches in Taiz, Aden and Sana'a, awareness activities, several technical studies, water assessment studies, and the establishment of information systems.

In 2003 the Ministry of Water and Environment (MWE) was established, bringing all water-related institutions under the same umbrella (except for the irrigation sub-sector, which remains under the Ministry of Agriculture and Irrigation (MAI)). A milestone achieved by the MWE – in collaboration with the MAI – is the participatory formulation of a comprehensive National Water Sector Strategy and Investment Program (NWSSIP). The NWSSIP sets out the challenges and strategic directions for the mid-term future, linked to a detailed investment program, including institutional strengthening and capacity building programs. Donors have issued a declaration of support for the NWSSIP and perceive it to be the guiding document for improved donor harmonization and alignment with government priorities and policies. The NWSSIP is currently discussed in the Cabinet for ratification.

3.2 Potential Partners / Donors Assisting the Water Sector

Partners and donors currently active in assisting the water sector can play a major role in assisting Arab countries towards the development of IWRM plans by 2005. The role of partners and donors can be further extended to the implementation of such plans. The following is a partial list of potential partners and donors that would be considered for assistance in development of IWRM plans and related capacity building. The order of the listing does not reflect the magnitude or the activity level for the mentioned agencies.

The United Nations Development Programme (**UNDP**) has been most active in public awareness and education programmes in the water sector, and capacity building for decentralization. Because of its country offices, UNDP is at a strategic advantage for promoting awareness for improved water governance. UNDP also has experience in water sector administrative reform, participatory approaches to planning and management, cooperation and partnership activities with other ministries. UNDP is limited in its ability to provide assistance in water quality/pollution and water pricing/cost recovery, though some respondents stated that these are areas where specific technical skills are necessary.

The World Bank (**WB**) is one of the United Nations' specialized agencies, and is made up of 184 member countries. These countries are jointly responsible for how the institution is financed and how its money is spent. Along with the rest of the development community, the World Bank centers its efforts on the reaching the Millennium Development Goals, agreed to by UN members in 2000 and aimed at sustainable poverty reduction. The "World Bank" is the name that has come to be used for the International Bank for Reconstruction and Development (**IBRD**) and the International Development Association (**IDA**). Together these organizations provide low-interest loans, interest-free credit, and grants to developing countries.

The Global Environment Facility (**GEF**) is active in almost all of the countries, particularly the Small Grants Programme. The GEF, established in 1991, helps developing countries fund projects and programs that protect the global environment. GEF grants support projects are related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. In most cases, the Ministry responsible for water management is the coordinating or executing authority for UNDP projects. Some are in partnership with other donors (e.g. Palestine and Yemen), while others are NGO executed (e.g. Tunisia).

The United Nations Educational Scientific and Cultural Organization (**UNESCO**) seeks to develop the tools and skills needed to achieve a better understanding of those basic processes, management practices and policies that will help improve the supply and quality of global freshwater resources. The water related goals are: Assess the state of the world's freshwater resources and ecosystems; Identify critical issues and problems; Develop indicators and measure progress towards achieving sustainable use of water resources; Help countries develop their own assessment capacity; and Document lessons learned and publish a World Water Development Report (WWDR) at regular intervals.

The U.S. Agency for International Development (**USAID**) has made the preservation and environmentally sound development of the world's water resources a top priority. The Agency's investments have helped improve access to safe and adequate water supply and sanitation, improve irrigation technology, enhance natural environments, and develop better institutional capacity for water resources management in countries around the world. This has supported the Agency's underlying goals of reducing conflict and improving the welfare of people across the globe. Recently, the USAID Regional Water Initiative (**USAID-RWI**) is under evaluation to be launched in the near future. USAID-RWI will be a potential funding department for water sector in the Arab region

The Canadian International Development Agency (**CIDA**) is the federal agency charged with planning and implementing most of Canada's development cooperation program in order to reduce poverty and to contribute to a more secure, equitable and prosperous world. CIDA supports efforts to achieve the MDGs in various aspects including water.

Food and Agricultural organization of the United Nations (**FAO**) - Water Resources, Development and Management Service is one of the major tasks of the Water Resources, Development and Management Service (AGLW) consists of supporting FAO member nations in sustainable use of limited fresh water resources. The AGLW assesses water resources and monitors agricultural use; assists in water policy formulation and promotes irrigated agriculture and efficient water use through management innovations, modernization and institutional reforms.

The African Development Bank (**ADB**) is a regional multilateral development bank, engaged in promoting the economic development and social progress of its Regional Member Countries (RMCs) in Africa. The Bank's operations cover the major sectors, with particular emphasis on agriculture, public utilities, transport, industry, the social sectors of health and education, and concerns cutting across sectors, such as poverty reduction, environmental management, gender mainstreaming, and population activities. Most Bank financing is designed to support specific projects. However, the Bank also provides program, sector, and policy-based loans to enhance national economic management. The Bank also finances non-publicly guaranteed private sector operations. The Bank actively pursues co-financing activities with bilateral and multilateral institutions.

The European Union (**EU**) is committed to contribute to halve by 2015 the proportion of people who are unable to reach or afford safe drinking water and the proportion of people who do not have access to adequate sanitation and to establish national water resources management plans by 2005. The EU has several funding programs including agriculture and environment. The EU launched European Union Water Initiative (EUWI) to support projects in the water sector.

The **EUWI** is being developed after a modular approach. Strategic regional and thematic partnerships draw together government, civil society, private sector and other stakeholders. The organizational framework reflects the partnership approach,

allowing the active participation of a broad group of stakeholders actively involved in water and development issues. At the same time, it fully respects the existing decision making processes established between the EU institutions.

The **Arab Aid** coordination group consists of eight institutions; five are multilateral aid institutions (Islamic Development Bank, OPEC fund, Arab Fund for Economic & Social Development, Arab bank for Economic Development, and Arab Gulf Programme for UNDO) and three bilateral aid institutions (Abu Dhabi Fund for Development, Saudi Fund for Development, and Kuwait Fund for Arab Development). The following sections present the above institutions.

The Islamic Development Bank (**IsDB**) is an international financial institution established in 1975 to foster economic development and social progress in member countries and Muslim communities in accordance with the principles of Islamic Shari'ah.

The Arab Bank for Economic Development in Africa (**BADEA**) was established in 1975 to strengthen economic, financial and technical cooperation between the Arab and African regions, to make Arab African solidarity a concrete reality and to base the co-operative venture on foundations of equality and friendship.

The Arab Gulf Programme for United Nations Development Organizations (**AGFUND**) is a development non-profit-making institution, established in 1980 to support the sustainable human development efforts, targeting the needy groups in the developing countries, particularly women and children, regardless of any discrimination.

The **OPEC fund** for International Development was established as an expression of South-South solidarity. The Fund is dedicated to promoting cooperation between OPEC member states and other developing countries. It pursues this aim primarily by helping provide the financial resources those countries need to realize their economic and social development goals.

The Arab Fund for Economic and Social Development (**Arab Fund**) is an autonomous development finance Pan-Arab regional organization. The Arab Fund contributes to the financing of economic and social development projects in Arab States through financing economic and social development projects by making loans on concessionary terms to governments and public enterprises and corporations, financing private sector projects in member states, establishing and administering special funds whose purpose is compatible with that of the Arab Fund.

The Saudi Fund for Development (**Saudi Fund**) is Saudi Arabia's channel for bilateral aid to other developing countries. The Saudi Fund provides united, concessional loans to developing countries with the aim of helping them implement plans and, where necessary, restructure their economies. Projects that promote the social and economic well being of poor people in low-income and least developed countries are accorded special emphasis.

The **Abu-Dhabi Fund** offers economic aid in the form of loans, equity participation and provides expertise and technical assistance to Arab, African, Asian and other countries in support of their economic growth.

The Kuwait Fund for Arab Economic Development (**KFAED**) was established as an agency for the provision and administration of financial and technical assistance to the developing countries. The Fund is dedicated to promoting cooperation and friendship between Kuwait and other developing countries. It achieves the said objective by extending financial assistance to developing countries.

Other donor countries that are active in the water sector in the Arab region include the Netherlands, Denmark (**DANIDA**), Norway and Sweden. Some of the knowledge hubs on IWRM presented in the next may also be providing funding for the water sector in the Arab region.

4.0 POTENTIAL KNOWLEDGE HUBS for IWRM in the ARAB REGION

The knowledge hubs for IWRM region represent the main sources of information for development of IWRM in the Arab region. The following listing is presented in an alphabetical order and does not reflect the order of importance or magnitude of involvement in the region.

4.1 ACSAD (www.acsad.org)

ACSAD is the Arab Centre for the Studies of Arid zones and Drylands, a regional center for research and studies pertaining to the development of the arid and semi-arid areas of the Arab World. It was established in Damascus (capital of the Syrian Arab Republic) in 1971 within the framework of the League of Arab States. The website takes you to ACSAD's water resources program which provides the program structure, objectives and achievements.

4.2 AQUASTAT (http://www.fao.org/ag/agl/aglw/aquastat/water_res)

AQUASTAT is a global database of water statistics maintained by the Food and Agriculture Organization of the United Nations (FAO). AQUASTAT collects its information from a number of sources --national water resources and irrigation master plans; national yearbooks, statistics and reports; FAO reports and project documents; international surveys; and, results from surveys done by national or international research centers. In most cases, a critical analysis of the information was necessary to ensure consistency among the different data collected for a given country.

AQUASTAT was developed by FAO in 1993; data have been available on-line since 2001. Most freshwater data are not available in a time series, and the global data set contains data collected over a time span of up to 30 years. AQUASTAT updates their website as new data become available, or when FAO conducts special regional studies. Studies were conducted in Africa in 1994, the Near East in 1995-96, the former Soviet republics in 1997, selected Asian countries in 1998-99, and Latin America & the Caribbean in 2000. Data from the Blue Plan on Mediterranean water withdrawals were last updated in 2002. Most data updates include revisions of past data.

4.3 Awarenet

The objectives of AWARENET (Arab Integrated Water Resources Management Network) are to identify, consolidate and spread regional knowledge; facilitate capacity building; disseminate knowledge and coordinate actions among network

members and stimulate regional cooperation and communication. The long term objective is to improve the implementation of Integrated Water Resources Management concepts in the countries of the ESCWA region.

The AWARENET network in the Middle East has made arrangements for regional courses. Networks in South and South-east Asia, Southern Africa, West Africa, and the Nile Region are also planning training courses to ensure that information and knowledge on integrated water resources management will flow freely throughout their regions, reaching decision makers, water experts and teachers in many countries.

In its capacity to act as a hub of knowledge for IWRM plans development and implementation, Awarenet is keen to increase the awareness by adopting a number of sets of activities. These are:

1. Creation of the knowledge network;
2. Improve knowledge exchange;
3. Establish objective research programmes;
4. Improve the quality of the output generated by the network

Although the role of Awarenet is vital in developing IWRM plans, however, its impact on the Arab regional state is limited. This is mainly because of its limitation to the ESCWA region that covers a limited number of Arab countries.

4.4 AWC (www.arabwatercouncil.org)

The Arab Water Council (AWC) was established as a non-profit / non-governmental professional organization devoted for serving the Arab region. The AWC acts as a hub for studies and advisor for water development, protection, and management with special emphasis on water policies, plans, strategies, and technical advancement. The AWC consists of representatives of Arab countries, organizations, and individuals regardless of their ethnic, color, age, sex, religion or political background.

4.5 Cap-Net (www.cap-net.org)

Cap-Net is an international network for capacity building in integrated water management. The partnership of autonomous international, regional and national institutions and networks is committed to capacity building in the water sector.

Cap-Net links hundreds of capacity building institutions and individuals across the world and offers the opportunity for coordinated and sustained capacity development. With international partners, Cap-Net and associated networks are already delivering capacity building services to hundreds of water managers. Capacity building consists of three basic elements:

- Creation of an enabling environment with appropriate policy and legal frameworks;
- Institutional development, including community participation (women in particular); and

- Human resources development and the strengthening of managerial systems.

These elements all have to be pursued in a balanced manner as addressing one without the others leads to skewed and inefficient development. Thus capacity building is not only training or human resources development but is broader, encompassing the three elements described above to create the environment within which the knowledge and skills can actually be used. Cap-Net provides capacity building in terms of integrating concept combining, policy, legal, regulatory, institutional and human resources issues in a holistic approach towards sustainable water resources management.

4.6 CEDARE (www.cedare.org)

The Centre for Environment and Development for the Arab Region and Europe CEDARE was established on the basis of a joint commitment by the three principal sponsors, namely the Government of Egypt (GOE), the Arab Fund for Economic and Social Development (AFESD) and the United Nations Development Programme (UNDP).

- CEDARE was established within the Arab Region and Mediterranean Europe, to become a Centre of Excellence which can assist the region in its efforts to pursue global environmental trends and support national programme efforts in the implementation of Agenda 21, through fostering their national capacities .
- CEDARE's main mission is: Capacity building of its member countries, promoting skills in environmental management, transfer of technologies, environmental education, and development of environmental policies.
- Assist member countries to achieve some of their important national and regional priority goals of sustainable development, particularly in the management of freshwater resources; land resources development and urbanization and human settlements. Facilitate inter-country cooperation and exchange of information and experience.

Thus, the main function of CEDARE is that of an "enabling" agent in support of sustainable development initiatives at national, sub-regional and regional levels, stimulating the implementation of international conventions and agreements in the region. Specifically, as a mandate for hub of knowledge to develop/implement IWRM plans, CEDARE has the following capabilities:

- Conduct Regional studies and promote the implementation of regional projects with emphasis on assessment optimal use and sustainable development of the available resource base.
- Capacity building of national institutions / personnel working in the fields of land degradation, conservation and combating desertification, through provision of training, workshops and special programmes, with focus on innovative and appropriate techniques as well as integrated approach to resource management and development.

- Provide demand driven technical assistance to member countries.
- Networking among national and regional / international institutions working in the field to exchange experiences, case studies and news relevant to the present mandate.
- Collaboration and coordination of programmes and activities with the regional and international organizations acting in the region, especially for the implementation of international conventions related to combating of desertification and conservation of biodiversity.

4.7 DDC/UNDP (www.surf-as.org/DDC/DDC.html)

The UNDP Drylands Development Centre (UNDP/DDC) is a centre of excellence dedicated to working with people to fight poverty in the drylands of the world. The Centre helps to influence policies and bring about lasting changes. It is also working closely with the UNDP Water Programme. One of the major tasks is to ensure that water is being taken into account in the Integrated Drylands Development Programme (IDDP). The sixteen IDDP countries have all expressed a strong demand for different water services. In pursuit of the Millennium Development Goals, the Drylands Development Centre for the Arab States works in partnership with governments, civil society actors, private sector and other UN Agencies to address issues of natural resource management and poverty alleviation. DDC-AS fosters partnership with a number of bilateral donors, particularly with the EU countries.

4.8 EMWIS (www.emwis.org)

The EMWIS is the Euro-Mediterranean Information System aims to facilitate access to information, develop sharing of information and elaborate common outputs and cooperation programs on the know-how in the Water sector. It is an information and knowledge exchange tool between the Euro Mediterranean partnership countries, necessary for the implementation of the Action Plan defined at the Euro Mediterranean Ministerial Conference on Local Water Management.

The EMWIS aims to:

- Facilitate the access to information
- Develop the sharing of information
- Elaborate common outputs and cooperation programs on the know-how in the water field

The geographical domain is Euro-Mediterranean. Above all, EMWIS is concerned with the information available in the 27 countries, signatories of the Barcelona Convention (1995): the 15 countries of the European Union and the 12 Mediterranean partners (including Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, and Tunisia). For IWRM plans, the available information has been approved. Only the information sources granting a quality seal by EMWIS managers

will be accessible through this system. The information quality, updating and reliability will be guaranteed by each information source.

4.9 ESCWA (www.escwa.org.lb)

The Economic Commission for Western Asia (ECWA) was established by Economic and Social Council resolution 1818 (LV) of 9 August 1973 as the successor to the United Nations Economic and Social Office in Beirut (UNESOB). In 1985, the Commission was re-designated the Economic and Social Commission for Western Asia (ESCWA), in accordance with Economic and Social Council resolution 1985/69 of 26 July 1985, in order to acknowledge more fully the social aspect of the Commission's activities. The majority of activities under the regular programme of work are regional in dimension. There are, however, a limited number of activities that are country-specific, but have regional implications.

ESCWA promotes economic and social development through regional and sub regional cooperation and integration and serves as the main general economic and social development forum within the United Nations system for the ESCWA region. ESCWA is a part of the Secretariat of the United Nations and is one of the five regional commissions that report to the Economic and Social Council, the principal organ of the United Nations responsible for coordinating economic and social activities in the United Nations system.

Emphasizing its role as a hub of knowledge for IWRM plans development/implementation, ESCWA, in cooperation with UN Information Service, organized an Expert Group Meeting to review comprehensive Integrated Water Resources Management (IWRM) training material for the ESCWA region. The meeting took place in March 2004.

ESCWA promotes IWRM through capacity-building of policy makers, practitioners and researchers involved in water resources management. In this respect, UN ESCWA, in collaboration with BGR, built on the accumulated international and regional experiences to support the effort of ESCWA Member States in implementing an integrated approach to water resources management, and the application of IWRM concepts to the conditions of the ESCWA Member States.

4.10 EWP (www.egyptianwaterpartnership.org)

The Egyptian Water Partnership (EWP) is an informal platform to discuss water issues and water policies, exchange information and start joint activities between different stakeholders and water players.

The mission of the EWP is to promote sustainable management of water resources at national and local levels, through effective implementation of integrated water resources management principles. The EWP works in close collaboration to put Integrated Water Resources Management (IWRM) in practice.

EWP serves as an independent stakeholder platform, a vehicle to promote IWRM principles, capacity building and awareness on IWRM in Egypt. The Partnership achieves this in a multi-disciplinary approach by bringing together organizations from a range of backgrounds to share knowledge and develop common vision for facing water problems in a participatory approach. The EWP aims at making water everybody's business in Egypt. EWP is an avenue for public hearing on water related issues and for awareness on water issues and IWRM.

The priority issues identified for action in the EWP plan of work are:

- confronting Egypt's water scarcity
- water pollution abatement and protection
- water rights and equity
- partnership towards attaining the water MDGs and WSSD targets.

The EWP is a multi-stakeholder platform, which comprises four major categories of partners. These are:

1. Governmental institutions (ministries)
2. Academia and National Consulting Firms
3. End Users
4. Other Civil Society Members

The overall objectives of the Egyptian Water Partnership are the promotion of integrated water resources management which can be achieved through coordinated efforts of various water stakeholders, with the aim of maximizing the benefit from water; economically and socially without compromising the sustainability of water and its quality.

The specific objectives of the Egyptian Water Partnership are:

1. Identify critical water issues of local and national importance on the basis of ongoing assessments of the state of water.
2. Serve as the neutral platform to bring together a large number of different perspectives to provide balanced contributions to discussions on national water resources plans, water sector policies, large projects or water legislations, and to provide a common vision on IWRM and promote the implementation of IWRM strategies.
3. Disseminate information and facilitate sharing of experience among users, policy makers, and planners on new developments, good practices and research findings and familiarize different water stakeholders with other programmes.
4. Co-operate in global and regional programmes and initiatives, and will establish links with regional and international organizations such as GWP, GWP-Med, WWC, UNDP, CEDARE, UNESCO, etc.
5. Raise awareness of water resources issues, and build capacities for various stakeholders to achieve better comprehension and implementation of IWRM.
6. Serve as a public hearing instrument to solicit public opinion on water related projects at the local and national levels, and serve as platform for practical action for instance through developing support to promising initiatives in the field of IWRM or lobbying for changes in water management practices.

4.11 FAO (www.fao.org)

Food and Agricultural organization of the United Nations (FAO) - Water Resources, Development and Management Service - is one of the major tasks of the Water Resources, Development and Management Service (AGLW) consists of supporting FAO member nations in sustainable use of limited fresh water resources.

The AGLW assesses water resources and monitors agricultural use; assists in water policy formulation and promotes irrigated agriculture and efficient water use through management innovations, modernization and institutional reforms.

4.12 GWP-Med (www.gwpmmed.org)

The Global Water Partnership – Mediterranean (GWP-Med) is a Regional Water Partnership of the Global Water Partnership (GWP). GWP-Med, in its present form, was created in 2002 and it is the successor partnership to the Mediterranean Technical Advisory Committee of GWP (MEDTAC). The seven founding organizations for GWP-MED are: MAP/UNEP, CEDARE, International Centre for Advanced Agronomic Studies (CIHEAM), Euro-Mediterranean Irrigators Community (EIC), The Mediterranean Cities Network (MedCities), Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), Mediterranean Water Institute (IME), and Mediterranean Water Network.

GWP-Med represents the Global Water Partnership in the Mediterranean, and as such has the responsibility of implementing its principles and initiatives in the region. GWP-Med goal is to promote and exchange knowledge on IWRM for the sustainable use of the region's water resources.

In its mandate to provide a hub of knowledge to develop/implement IWRM plans, GWP-Med can:

- Promote and sustain a strong partnership in the Mediterranean among competent organizations that have an impact on water management;
- Make the principles of sustainable use and integrated management of water resources (IWRM) widely known, recognized and applied by countries and all other stakeholders in the Mediterranean, through appropriate mechanisms for sharing information and experience;
- Support exemplary actions at local, national, and regional level to demonstrate the value applicability and positive impact of the above principles.
- Seek and facilitate the appropriate international funding and involvement of international institutions for activities promoting IWRM;
- Introduce, help to implement and adapt to the specificities of the Mediterranean region, global initiatives launched or adopted by the GWP.

4.13 ICARDA (www.icarda.org)

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is one of the 15 centers strategically located all over the world and supported by the Consultative Group on International Agricultural Research (CGIAR). With its main research station and offices based in Aleppo, Syria, ICARDA works through a network of partnerships with national, regional and international institutions, universities, non-governmental organizations and ministries in the developing world; and with advanced research institutes in industrialized countries.

In its capacity to act as a hub of knowledge for development of IWRM plans, ICARDA's mission is to improve the welfare of poor people and alleviate poverty through research and training in dry areas of the developing world, by increasing the production, productivity and nutritional quality of food, while preserving and enhancing the natural resource base. In addition, most of Arab countries lie within the geographic area of ICARDA. The geographic mandate of ICARDA covers the countries of Central and West Asia and North Africa (CWANA), as well as developing countries with subtropical and temperate dry areas.

4.14 IDRC (www.idrc.ca/waterdemand/)

The Canadian International Development Research Center is a Canadian public corporation that works in close collaboration with researchers from the developing world in their search for the means to build healthier, more equitable, and more prosperous societies. IDRC's programs are managed by three Program Areas: 1) Environment and Natural Resources Management, 2) Information and Communication Technology, and 3) Corporate Projects and sites. Water information can be found under the first program.

WaDImena is a five-year multi-donor funded program (2004-2008) coordinated by IDRC. Participating countries include Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, Tunisia and Yemen. The project builds on the success of the WDM Forums (2002-2003) and previous research conducted by IDRC and our partners. WaDImena translates awareness into action for tangible impacts. Activities are directed toward applied research, field-based pilot activities and a regional exchange facility to promote capacity development, experience sharing and knowledge networking. In addition, IDRC has been involved in Egypt since 1971, allocating more than \$24.7 million and supporting about 116 projects, some of which were regional in scope. Water quality and water management remained an important focus, along with agriculture/farming and health. IDRC also began supporting research into environmental protection. Among recent projects in Egypt: Using Social Values to Manage Water Better, Conserving Water by Linking Traditional Knowledge to Science, and Meeting Water Demand.

4.15 IIED

International Institute for Environment and Development (IIED) is an independent, non-profit organization promoting sustainable patterns of world development through collaborative research, policy studies, networking and knowledge dissemination. IIED's website has a new water page with many publications that can be downloaded or printed.

4.16 IRC-InterWater (www.irc.nl/interwater)

InterWATER offers information about more than 650 organizations and networks in the water supply and sanitation sector, related to developing countries. You can search for an organization on name, acronym, location or description, using the search box on the right hand corner of this page, or by selecting a region on this page. Each organization has a short description, contact details, e-mail and website address, and related sites where applicable.

4.17 IUCN (www.iucn.org)

The World Conservation Union (IUCN) has a directory of organizations and programmes working in water management in the region as well as global organizations that could develop programmes in the region. IUCN builds bridges between governments and NGOs, science and society, local action and global policy. In Arab countries, IUCN has offices in Mauritania, Lebanon and Saudi Arabia.

4.18 IWRC (www.iwlearn.net)

This International waters Resource Centre (IWRC) site provides access to over 2,000 information resources related to transboundary waters management, including projects, people, documents, courses, presentations and much more. In particular, you should find institutions programs/projects and individuals related to transboundary river basins in your and others regions.

4.19 MEDRC (www.medrc.org)

The mission of the Middle East Desalination Research Centre (MEDRC) institute is to conduct, facilitate, promote, co-ordinate and support basic and applied research in water Desalination technology and supporting fields. To raise the standard of living in

the Middle East and elsewhere by cost reduction and quality improvement in the technical processes of water desalination.

The website contains the centre's publications, final reports of the MEDRC program as well as a section on MENA universities and research institutions which contains an online directory of pertinent information including institute description, profile on departments related to water desalination, faculty contact information with email links, and description of courses seminars and workshops.

4.20 METAP (www.metap.org)

Supported by the European Commission, the European Investment Bank (EIB), the United Nations Development Program (UNDP) and the World Bank, the Mediterranean Environmental Technical Assistance Program (METAP) was established in 1990 to bring together the Mediterranean countries to cope with and reduce the effects of environmental degradation.

In 1996, Capacity 21 joined the European Commission (EC), the European Investment Bank (EIB), and the World Bank as a partner in the third phase of the Mediterranean Environmental Technical Assistance Programme (METAP III). The Arab States, which are partners in METAP III, are: Algeria, Egypt, Jordan, Lebanon, Morocco, Syria, Tunisia, and Palestine.

The METAP programme acts as a catalyst for regional cooperation and action, bringing together countries with common environmental concerns. Based on collaborative arrangements with municipalities, countries, NGOs and bilateral donors, METAP provides grant funding for activities to assist countries in:

- Designing environmental projects
- Strengthening environmental management capacity
- Establishing environmentally sound policies
- Mobilizing resources to finance environmental investment in the region

In its capacity to be a hub of knowledge for IWRM plans development and implementation, METAP III has also included a set of regional capacity-building activities intended to:

- Strengthen environmental institutions
- Promote the exchange of information and experience
- Strengthen institutional links within and among METAP countries

4.21 NBCBN-RE (www.nbcbn.com)

NBCBN-RE is the Nile Basin Capacity Building Network for River Engineering. It is an environment in which professionals from the water sector sharing the Nile River Basin would have the possibility to exchange their ideas, their best practices and lessons learned. Through this network, education, training, research and exchange of information for and by professionals can take place. Generally the network is established as a regional program to build and strengthen the capacity in the Nile

riparian countries for an environmentally sound development and integrated water resources management of the Nile River Basin.

4.22 NWRC (www.nawqam.org)

The National Water Research Center (NWRC) was established twelve research institutes in Egypt that play a national and international role. On the local scale, the center - from its inception - has worked to strengthen the research programs of its research institutes. This has been possible by creating linkages with relevant Egyptian Universities and other research centers such as the Agricultural Research Center, the National Research Center and the Egyptian Academy of Scientific Research and Technology. Further assistance has been offered to the Institutes by helping them raise funds from internal and external sources to implement their programs. Other specific assistance is summarized as follows: planning and evaluating research programs, publishing research results nationally and internationally, and organizing seminars, workshops and conferences.

4.23 UNESCO water portal (www.unesco.org)

The United Nations Educational Scientific and Cultural Organization (UNESCO) Water Portal is intended to enhance access to information related to freshwater available on the World Wide Web. The site provides links to the current UNESCO and UNESCO-led programmes on freshwater and will serve as an interactive point for sharing, browsing and searching websites of water-related organizations, government bodies and NGOs, including a range of categories such as water links, water events, learning modules and other on-line resources.

Surfers can also add or modify links to help maintain an accurate online resource. All water managers are invited to participate by providing information on activities, useful links, news and content that they wish to share with others and generally make more widely available.

4.24 UNEP (www.unep.org)

The United Nations Environmental Programme (UNEP) provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. In its homepage, there are resourceful links to information on water for governments and scientists.

Other resourceful knowledge hub that can be considered for assistance in development of IWRM plans is the International Center for Advanced Mediterranean Agronomic Studies (CIHEAM) at www.ciheam.org.

5.0 UNDP ROLE in the ARAB WATER SECTOR

5.1 Introduction

In its capacity, UN agencies prepare the United Nations Development Assistance Framework (UNDAF) to assess the socioeconomic and environmental situation, the development priorities and the proposed interventions of the UN System for each individual country. Based on the UNDAF, UNDP prepares the Country Cooperation Framework (CCF) that defines the areas of cooperation/support for a given programming cycle (e.g. 2001 - 2005). The CCF is approved by the Government and represents the formal framework for UNDP activities in the respective country. Based on the CCF, UNDP then develops the Strategic Results Framework (SRF) which translates the agreed areas of support into concrete projects/programmes with timelines, budgets, performance indicators, etc. These projects/programmes fall under specific UNDP Service Lines, which correspond to the corporate practice areas in alignment with MDGs.

Through series of Country Cooperation frameworks (CCFs) in various Arab countries including Algeria, Egypt, Kuwait, Lebanon, Morocco, Saudi Arabia, Sudan, Syria, Tunisia, UAE, and Yemen; UNDP was able to generate alternative and cutting-edge development thinking and to address emerging challenges presented by globalization.

In addition to CCFs, UNDP developed several programs including the Assessment of Development Results (ADR) that is closely linked to other corporate exercises and results based management (RBM). It used as a starting point the results expressed in the Strategic Results Framework (SRF), the Country Cooperation Framework (CCF) and the United Nations Development Assistance Framework (UNDAF). The information generated by monitoring and evaluation was used as inputs into the analysis, such as outcome or project evaluations and local monitoring data for various countries.

UNDP also supports of The Global Water Partnership (GWP). The GWP seeks to support integrated approaches to sustainable water management by encouraging stakeholders at all levels to work together in more effective, efficient and collaborative ways. The Partnership is an international network open to all organizations involved in water resources management, including governments of developing as well as developed countries, UN agencies, multilateral banks, professional associations, research organizations, the private sector and non-governmental organizations.

Through the GWP, UNDP was also involved in a Dialogue for Effective Water Governance: The purpose of the Dialogue was to bring stakeholders together to examine the political processes that drive water governance systems. It created a platform for conflict resolution, negotiation, social learning and collective decision-making. UNDP is an active partner of the Dialogue Task Force, which includes network members of the GWP and the International Council for the Environment

(ICLEI). The outcomes of the discussions in the Dialogue on Effective Water Governance was fed into the Governor's meeting of the Inter-American Development Bank in March 2002, and contributed to the World Summit on Sustainable Development (WSSD) in South Africa in September 2002, and the Third World Water Forum in Japan in March 2003.

5.2 Potential for UNDP Support in Developing National IWRM plans

Developing, monitoring, and implementing IWRM plans in the Arab region requires strategic partners that have regional capacity in the region. While seeking capacity building partners in the Arab region, UNDP works directly through its 17 country offices (COs) to target development assistance based on the needs of each Arab country, whether it is an LDC (Least Developed Country) or NCC (Net Contributory Country). UNDP also has a regional programme for the Arab States, i.e. the Regional Bureau for Arab States (RBAS), which focuses on programmes of a regional nature with a minimum of three countries participating. The regional programme is focusing its efforts on governance, global economic competitiveness, and information and communications technology (ICT). Through COs and RBAS various programmes and hubs can be launched to specifically target the development, monitoring and implementation of IWRM plans.

5.3 IWRM Capacity Development Needs for the UNDP

UNDP plays an operational role in assisting countries to build cross-sectoral capacities and put in place effective and sound policies and institutions to manage and develop water resources in a sustainable way. However, UNDP is limited in its ability to provide assistance in water quality/pollution and water pricing/cost recovery where specific technical skills are necessary. UNDP strives to provide the in-house capacity building for its own country offices (COs) resources to sustain its strength to accomplish its mission in the water sector.

Based on a survey among UNDP COs, Water Survey Analysis, the respondents indicated that there is a lack of best practices in the region in terms of privatization and private sector participation, technical know-how and a demonstration of methods and practical applications. Conflict resolution skills, particularly over shared water resources could also benefit from capacity development.

According to the above mentioned report, means by which UNDP country offices could enhance their own knowledge, and to apply this to projects and activities include: experience exchange, CO staff training, development of topic-specific knowledge networks/communities of practice, demonstrations of innovative approaches in non-conventional water resources management, integrating community participation in water and sanitation projects, establishment of a database of experts, and access to case study successes and failures. A few respondents also indicated the need for a UNDP staff member (SURF) to provide assistance to countries on developing water projects and activities in integrated water resources management, rather than a technical expert.

Integrated Water Resources Management (IWRM) involves strategies, plans and various action plans. This involves economic, environmental and policy evaluation. Although many of the COs do not have water resources specialists, however, most of the existing staff at COs have been working on projects that involve types of studies and evaluations. Specific feedbacks received from various countries in response to an enquiry that has been forwarded to all Arab countries during the course of this desk review emphasized the importance of targeted training for the COs staff to better engage in water sector. Example feedbacks received from country offices in response to the capacity building aspect of this desk review is presented below.

For Algeria, the Environmental Program Officer has general experience in Environmental Management including Water Management. However, the CO capacity needs to be strengthened to better engage in policy development, strategy and planning. They have completed a project funded by the Algerian government in training personnel using GIS for the Management for Water Resources. This project was of great benefit to the "l'Agence Nationale des Ressources Hydrauliques (ANRH)". In 2003, they also started implementing an Environmental Management training program which includes training for technicians (vocational staff) in Water Management and Saving. The program provides a diploma for participants. Participants attending the training will later work with the municipalities, water authorities as well as the decentralized offices of the Ministry of Environment.

For Egypt, there are two water resources specialists at the levels of a PhD and a Masters degree in water resources development. With respect to water initiatives in the office, this would include: 1) Demonstration of low cost wastewater treatment techniques using engineered wetlands, 2) Utilization of remote sensing and computer modeling techniques in groundwater development, 3) Social Assessment for an Egyptian water development mega project, and 4) Medwet Coast Project that works on the conservation of biodiversity in one of the Egyptian Northern lakes open to the Mediterranean that receives agricultural drainage through the management of the water balance. In addition the office is supporting three regional water initiatives that include: 1) Developing a Water Demand Management Forum among the Arab States to exchange experiences in the areas of wastewater reuse, water valuation, decentralization and public private partnerships, 2) The Nile Transboundary Environmental Action Plan which is the environmental component of the Nile Basin Initiative including Nile riparian countries, and 3) Management of The Nubian Sandstone Aquifer shared between Chad, Libya, Egypt and Sudan.

For Libya, the CO does not have a national roster of specialists in water issues, and the staff has never been acquainted with any result of capacity assessment exercise in the area of water management. However, national experts in this area are available and have dealt the CO. The CO staff is currently providing support to the national water authority through a project aiming at strengthening the national capacities required for water resources monitoring.

For Palestine, UNDP has been the lead organization that helped to establish the Palestinian Water Authority through its Water Resources Action Program (WRAP) in

1995. The capacity built within the WRAP taskforce was the nuclei of the Palestinian Water Authority (PWA). During the first two years, the WRAP task force (that were mainly UNDP staff) formed the core staff of the newly established PWA. Because of their experience, professional and technical skills, many of the WRAP/UNDP team members within the PWA, were chosen to manage and lead other projects, within the PWA, such as the Water and Wastewater Services Improvement Program that was funded by the World Bank and the Coastal Aquifer Management Plan that was funded by USAID.

For Saudi Arabia, the CO does not currently have any Water Resources Specialists nor the capacity in the area. The CO has a focal point with a lot of reading behind and hardly any experience besides following up with the Ministry and preparation of the PD due to be signed as soon as the final little glitches are taken care of. The country (i.e. Saudi Arabia) though has a very prominent Water resources Specialist who are working in with the CO on the Enabling Activity for Climate Change. The focal point recommends to build the capacities in this sector.

For Tunisia, the CO has only one Senior Environment Programme Manager who holds an MSC in Economics specializing in Energy Management and Policy. However, she has an understanding of land/water situation in Tunisia through her involvement in the implementation of the UN Convention to Combat Desertification. She is also involved in a current project to support that National Action Programme - desertification, in 4 governorates (with the support of the Drylands Development Centre - DDC) with a strong focus in local management of land/water resources. They have no direct project in IWRM or the water sector. She needs targeted training to better engage in water sector. With her background and exposure to the above-mentioned issues, she would manage to "absorb" this support.

6.0 ARAB WATER COUNCIL ROLE in the WATER SECTOR

Recently launched in April 2004, the Arab Water Council (AWC) was established as a non-profit / non-governmental professional organization devoted for serving the Arab region. The AWC acts as a hub for studies and advisor for water development, protection, and management with special emphasis on water policies, plans, strategies, and technical advancement. The AWC consists of representatives of Arab counties, organizations, and individuals regardless of their ethnic, color, age, sex, religion or political background.

The AWC bridges the gap between:

- Arab League that would only consider views from governmental representatives from Arab countries, neglecting a large sector of the society without appropriate means for considering their views in water development;
- Scientific centers that would be focused on field and applied research without much emphasis on policy formulation, decision making, and private sector participation; and
- Established international organizations that would be efficient for launching various programmes that support their objectives, however, without always considering the regional benefit of the Arab region.

Thus, the AWC is established to handle water related issues in the Arab countries regardless of its national or regional differences. The AWC provides an appropriate alternative for representation by governmental, private, institutional, social and individuals that would assist in coordination of required efforts and experience towards integrated water management for the Arab region. In addition, the presence of the AWC assures that its recommendations and actions will be based on regional benefit and good.

6.1 Objectives

The main objectives for the AWC can be summarized as follows:

1. Recall for Integrated Water Resources Management to ensure most appropriate, effective and fair use for available water resources that benefits the people of the region.
2. Advise public, private, and voluntarily enterprise on development, planning, design, operating, and maintaining water systems on local, national and regional scales.
3. Ensure appropriate participation for all involved parties in decision making and fair contribution for levels of people in water benefits.

4. Influence the decision makers, policy formulation, strategic views in regard to water related issues with special emphasis on those issues concerning policy concepts, water management, and infra-structure operation for water resources as well as funding water projects.
5. Represent all regional visions and ideas in international summits that discuss water issues that involves policy formulation and methods of operation and management water resources infra-structure and funding resources.

6.2 AWC Activities

The AWC is interested to be involved in persistent water related issues in the Arab region, that includes:

- ☐ Assistance in setup of networks and provide support for various working groups;
- ☐ Facilitate exchange of experience, data, information, and documentation in addition to electronically post database among AWC members;
- ☐ Prepare and provide executive summaries, technical papers, and available data related to international and regional water resources policies in order to enhance the vision and interest of AWC members;
- ☐ Provide independent technical expertise in regard to major water projects according to general needs;
- ☐ Assist in securing donations and humanitarian assistance in case of disasters and emergency response for affected regions;
- ☐ Coordinate conferences, exhibitions, workshops and symposiums to discuss and exchange opinions on as needed basis;
- ☐ Publish periodicals that provide related news and information of interest to the members of AWC;
- ☐ Establish an online site to facilitate the dissemination of electronic data to AWC members in addition other users;
- ☐ Provide a periodical scientific journal to publish technical papers and scientific researches;
- ☐ Provide books, technical reports, and conference proceedings;
- ☐ Utilize various public media to elevate national awareness towards water issues and their objectives to preserve water.

6.3 AWC Principles

The AWC works on a regional level according to a number of principles that are precise, clear and ensure success and sustainability of the council. Among these principles, but not limited to:

- ☞ Transparency and Direct policy to ensure clear responsibilities and response from representative members and society;
- ☞ Democratic management to include the maximum possible number of effective members and strength;
- ☞ Independence from central international powers to ensure that the council is reflecting the regional interest and good with no external influence;
- ☞ Implement Integrated Water Resources Management that exceeds the limits of sectors, users and trans-boundary issues without affecting national unity and countries independence; and
- ☞ Respect international treaties, national laws, and cultures or the region.

7.0 STRATEGIC ENTRY-POINTS for UNDP/AWC SUPPORT in the ARAB WATER SECTOR

7.1 Common Interest Goals & Targets

The Arab region is by far the driest and most water scarce region in the world, and that is increasingly affecting the economic and social development of most countries in the Region. Arab region has 5% of the world population and 1% of the world's freshwater resources. The region's average water availability is about 1,200 cubic meters per year per person compared to the world's average of almost 7000 cubic meters per year. This means that the water endowment per capita in the Arab region is less than one fifth of that of the rest of the world. In addition, it is estimated that about 50% of water supply for domestic and industrial water is lost either by the leakages in the network or by misuse and inefficient production processes. The overall efficiency of most irrigation systems is only about 45% due to considerable losses. A proportion of the water losses (almost 50%) could be saved and irrigation efficiency can be increased (to about 80%) through implementation of proper IWRM (Abu-Zeid and Hamdy, 2004).

Goal #7 of the Millennium Development Goals (MDGs) calls to ensure environmental sustainability with target to halve the proportion of people with sustainable access to safe drinking water. On the other hand, following the World Summit on Sustainable Development held in Johannesburg in 2002, the international community called for all countries to "develop integrated water resources management (IWRM) and water efficiency plans by 2005, with support to developing countries".

UNDP Goals #1 and #3 support MDGs. UNDP Goal #1 aims to achieve the MDGs and reduce human poverty. UNDP Goal 3 aims to sustain energy and environmental development by implementing effective water governance (line service 3.2 for UNDP Core Results). The expected core results are expressed as follows:

- *Water governance considerations incorporated into national sustainable development frameworks, and efficient and equitable water resources management and water supply and sanitation service delivery increased.*
- *Access of poor populations to adequate and safe water supply and basic sanitation increased, and local management of water resources improved.*
- *Transboundary dialogue and processes to improve cooperation on regional and global water challenges in place.*

On the other hand, the RCF (2002-2006) for the UNDP Regional Bureau for Arab States underpins knowledge as one of its 3 main strategic areas of support. It specifically states "the region requires specific support to the acquisition and use of knowledge as critical determinants of growth and of capacity to harness globalization for human development and poverty reduction". The identification of knowledge

gaps and the compilation and dissemination of comparative experiences, know-how, good practices as well as the promotion of ICT as a means to generate and ensure the dissemination of knowledge and information are expected to be achieved in the form of concrete operations and programmes within this framework.

According to the Arab Human Development Report, there are 3 main constraints to development: 1) knowledge, 2) Gender Equality, and 3) Governance.

Knowledge is a cross-cutting value that pervades the first two pillars of the RCF given the critical role foreseen for knowledge generation and utilization in the human development of Arab States. The region also requires specific support to the acquisition and use of knowledge as critical determinants of growth and of capacity to harness globalization for human development and poverty reduction. Emphasis on this area also emanates from the recognition that the expansion of people's knowledge capabilities has an intrinsic value in itself in addition to its instrumental significance.

Matching the above criteria, the Arab Water Council (AWC) was established in April 2004. The AWC is a non-profit organization working on regional scale in the Arab water sector. AWC's Goal #3 emphasizes the spreading of in knowledge and exchange of technical experience, good practices, and outcome of various research and applications in the Arab countries. Goal #3 also emphasizes the work on setting appropriate water policies for the Arab countries.

Integrating the above goals, targets and frameworks, the interaction of goals, views and objectives are clearly matched between UNDP and AWC. The following sections provide example visions for UNDP/AWC potential cooperation in the Arab region.

7.2 Potential Regional Cooperation & Identified Gaps

In fulfilling the MDGs and the WSSD goals, the UNDP can support the AWC in providing knowledge and capacity building in the Arab Region. The role of UNDP participation will focus on providing the development and implementation tools for Arab Countries to fulfill the water related obligations to achieve their set goals. On the other hand, monitoring the progress of such development and implementation phases will be essential to identify the strength and weakness of development plans. Historically, several national Water Resources five- and ten-year plans have not reached the desired goals because of failure to set action plans with the required means/budget and monitor their progress and compliance with the set targets. The above is also true for global goals and targets.

It is important to note that the CCF identifies the areas of cooperation in the water sector, and the SRF refers to the specific programmes being implemented. In order for a country office to work in the water sector, this area should be clearly identified in the CCF. Reviewing the CCfs for Arab Countries, the water role is not clearly emphasized in the CCFs for several countries. An example is Yemen where water (and IWRM) is prominent in the CCF/SRF. On the other hand, the support to the

water sector is considerably limited in a country like Lebanon. The regional programme should help in addressing these issues by raising the substantive credibility of UNDP/AWC in the water sector.

To better propose areas in which UNDP can potentially support AWC to provide technical assistance, the following gaps are identified:

- Gap 1- Sharing of experience and information among Arab countries
- Gap 2- Lack in mobilizing the political will and awareness on the need to achieve the WSSD IWRM target of 2005 among other water related MDGs
- Gap 3- Need for capacity building on IWRM plans development
- Gap 4- Need for capacity building on IWRM plans implementation
- Gap 5- Shortage of water resources professionals in development agencies including UNDP COs
- Gap 6- Weakness in the State of the Water reporting including water resources assessments capabilities
- Gap 7- Coordination among the donor community in the water sector to avoid duplication and assure streamlining of water related activities towards IWRM plans development and implementation

To bridge the above gaps, the UNDP/AWC partnership strategic entry-points in the water sector of the Arab region can be:

7.2.1 Institutional Strengthening of the Arab Water Council.

The UNDP can assist in institutional strengthening of the Arab Water Council. The AWC will act as a knowledge hub for capacity building in the Arab region. The AWC will provide technical assistance for Arab Countries to develop IWRM plans, and technical means for implementing such plans.

UNDP COs in the Arab Region can mitigate capacity needs in the Arab countries. AWC will identify available capabilities and successful implementation experience in the water sector. According to the emerging needs, AWC will guide Arab countries to achieve their capacity building while providing the following services:

- Evaluate capacity building and technical requirement needs in the Arab region;
- Design custom-tailored capacity building plan for each country depending on specific needs;
- Coordinate with UNDP COs the action plan for capacity building and technical assistance for Arab countries.

The preliminary framework dialogue of work is expected to be as follows:

- AWC will identify the various capacity building needs for the different Arab Countries.
- AWC will coordinate with UNDP COs to correspond with the relative countries officials to identify specific capacity building requirements for each Arab country.
- AWC will compile the capacity needs from various countries based on the correspondence received from the Arab water sectors and UNDP COs and recommend an action plan.
- AWC will recommend a road map to address and satisfy the required capacity building for the various Arab countries. (Addressing the capacity building requirements will be a continuous process at various stages of each country development. The capacity building can be in terms of providing expertise, training, development tools, etc... to be identified in Phase II of this study).

In addition, the AWC will coordinate and unify political water visions and technical expertise among the Arab countries. The above efforts will be executed through matured institutional development capacity of the AWC. Institutional strengthening of the AWC can bridge the previously identified Gaps # 1 and 2.

7.2.2 IWRM Plans Development Program

The AWC, through UNDP COs in the Arab Region, can support Arab countries in developing IWRM plans. Recognizing and evaluating the existing water strategies/plans/policies in each country will act as a first step towards identifying the specific requirements for IWRM plans development. On the other hand, the target date of 2005 set by WSSD in Johannesburg to set a national IWRM plan for all countries is not achievable for several Arab countries. An action plan is required for development of these plans and implementation at a later point. Arab countries cannot afford missing-a-turn along the road to IWRM plan development.

UNDP/AWC partnership can assist in providing the required expertise, example models, and guidance in developing national IWRM plans. This entry point can bridge the previously identified Gap # 3.

7.2.3 IWRM Plans Implementation Program

Developing an IWRM plan for further implementation goes through series of steps (refer to Guideline for preparing IWRM plan document). UNDP/AWC partnership can assist countries in identifying the bottlenecks for implementing IWRM plans in their region. The partnership can also assist in mitigating the financial means and administrative requirements for effective implementation. This entry point can bridge the previously identified gap number 4

7.2.4 Regional Program for Water MDGs in the Arab Region

Regional Coordination Unit & National Task Forces for Water MDGs in the Arab Region will standardize the assessment criteria for monitoring progress in achieving water MDGs, mobilize the political will for achieving MDGs, raise public awareness on water MDGs, and assess the availability of national funds for achieving MDGs (to identify the need for additional funding requirement). Numerous examples exist for goals and plans that have not reached their end-target because of failure to monitor their development and implementation while considering the extent of compliance with the set action plan. The establishment of a regional coordination unit (Coordination Unit for Water MDGs) for the monitoring and evaluation of the MDGs for water will serve this purpose.

The established unit will continuously monitor the progress of IWRM plan at Arab countries. Utilizing the existing capabilities and concept of AWC, this unit should be established within and under the umbrella of the AWC to have a strategic position that would enable the unit to carry out its monitoring responsibilities. The unit will set action plans for each Arab country to develop IWRM plan by a practical target date. The unit will also follow up implementation phase. Specifically the unit will be responsible for the following tasks:

- Set action plan for each Arab country to develop a satisfactory nation IWRM plan by the target date.
- Monitor each country actions to fulfill the set action plan. The unit will raise flags to assist countries when drifting away or lagging along the set action plans.
- Recommend correction actions to countries facing problems in executing action plans to develop their IWRM plans.

The unit will communicate with existing regional hub(s) at the Arab region. Under supervision of the unit, the identified hub(s) will communicate with UNDP COs to set an action plan for each country in the Arab region. The UNDP COs will monitor, on a periodical schedule, the follow-up of each country with the set plan and convey the compliance to the unit. Accordingly, the unit will evaluate the taken step(s) and identify whether the countries are on track or require correction action to keep focused on their targets. This entry point can bridge the previously identified Gap #2.

7.2.5 IWRM Capacity Building Program for Governments & Civil Societies

The UNDP/AWC partnership can mitigate capacity needs in the Arab countries. The partnership will identify available capabilities and successful implementation experience in the water sector. Accordingly, the partnership will design a specific capacity building program for various countries to achieve the development target.

Specifically, groundwater management and wastewater reuse shall be a key task in capacity building programs. Regional organizations in the region (for example: CEDARE, ESCWA, FAO RNE, UNDP RBAS, UNEP ROWA, UNESCO ROSTAS, ACSAD, ..etc) can be major players in capacity building and training streaming to avoid overlapping and wasting of resources and to improve coordination. This entry point can bridge the previously identified Gaps #3 and 4.

7.2.6 IWRM Capacity Building Programs for UNDP COs

UNDP plays an operational role in assisting countries to build cross-sectoral capacities and put in place effective sound policies and institutions to manage and develop water resources. However, UNDP is limited in its ability to provide assistance in water quality/pollution and water pricing/cost recovery where specific technical skills are necessary. UNDP/AWC partnership will provide the in-house capacity building for its own country offices (COs) resources to sustain its strength to accomplish its target mission in the water sector. This entry point can bridge the previously identified Gap # 6.

7.2.7 Arab Water Facility

The Arab Water Facility will assist in establishing national Donor-Assistance-Groups (DAGs) for donor agencies to coordinate their activities in the Water Sector on the national level. Based on the assessment for country needs, the Arab Water Facility will identify the priority projects in the water sector and coordinate the communication with potentially interested donor agencies to fund and implement these projects. Subsequently, the AWF will mobilize funds for soft and infrastructure water projects. The AWF will prioritize programs for funding, set criteria for accepting projects, and define guidelines for considering water-related project proposals. This entry point can bridge the previously identified Gaps #5 and 7.

7.2.8 State of the Water Report in the Arab Region

Similar to the World Water Development Report (WWDR), the State of the Water Report in the Arab Region will periodically present a snapshot on freshwater resources in the Arab region; identify the challenges to life and well being in addition to the management challenges. The State of the Water Report will introduce pilot case studies that have been implemented worldwide and specifically in the Arab countries to benefit future attempts in the region. This entry point can bridge the previously identified gaps numbers 1 and 6.

The strategic entry points presented in this section will serve as the main entry points for collaboration and support for the UNDP/AWC in the Arab water sector. UNDP CCFs and RCFs will act as sources of backbone information for assessed needs of individual countries during the future development of regional program in the Arab water region.

8.0 REFERENCES

1. Abu-Zeid, M. and Hamdy A., Water Crisis and Food Security in the Arab World: Where We Are and Where Do We Go, 2004, Cairo, Egypt.
2. Abu-Zeid, K. and Abdel Meguid, A., Status of Integrated Water Resources Management Planning in Arab Mediterranean Countries, International Conference on Water Demand Management, World Bank Session, Dead Sea, Jordan, 2003.
3. African Development Bank, Policy for Integrated Water Resources Management.
4. Algeria Country Report
http://www.gwpmmed.org/products_documents/country_reports/algeria.pdf .
5. Algerian Ministry of Water Resources. National Strategic Elements in Water Resources Field, 2004.
6. Alia Ibrahim, USAID funds workshop on water policy. Lebanonwire, the Daily Star, March 2003, (<http://www.lebanonwire.com/0303/03032808DS.asp>).
7. CapNet, Capacity Building Network For Integrated Water Resources Management http://www.cap-net.org/showhtml.php?filename=iwrm_definition
8. CEDARE, Wastewater Management and Reuse Assessment in the Mediterranean
9. CEDARE, GWP-Med, From Vision to Action for achieving IWRM, Framework for Action for North Africa
10. Yadh LABANE, Climate change and Water Resources In Tunisia, Institut National de la Météorologie
11. Daniel Loucks, Jery Stedinger, Douglas Haith. Water Resources Systems Planning and Analysis, 1981.
12. ESCWA, Water Issues in ESCWA Region: Status and Challenges, 2004.
13. ESCWA United Nations Economic & Social Commission for Western Asia
<http://www.escwa.org.lb/about/main.htm> .
14. Fred Nicolos, 2000; Strategy. Definitions and Meaning.
http://home.att.net/~nickols/strategy_definition.htm .
15. Government of Bahrain, Information Provided by the Government of Bahrain to the United Nations Commission on Sustainable Development, Fifth Session, 7-25 April 1997, New York, (<http://www.un.org/esa/earthsummit/barin-cp.htm>).

16. GWP, CapNet, Training Manual, 2004.
17. GWP, Catalyzing Change: A handbook for developing integrated water resources management (IWRM) and water efficiency strategies, 2004.
18. GWP, Current Status of National Efforts to Move towards Sustainable Water Management Using an IWRM Approach, 2004.
19. GWP, Guidance in Preparing A National Integrated Water Resources Management and Efficiency Plan: Advancing the WSSD Plan of Implementation, 2004.
20. GWP, Integrated Water Resources Management, TAC Background Paper No . 4.
21. GWP-Med, <http://www.gwpmed.org/mission/mission.htm>.
22. The Hashemite Kingdom of Jordan, Ministry of Water & Irrigation Jordan's Water Strategy & Water Policies in Jordan.
23. Informal Stakeholder Baseline Survey by Global Water Partnership version 1 "Current Status of National Efforts to move towards Sustainable Water Management using an IWRM Approach "
24. IWRM in Palestine
25. FAO Land and Water Development Division
<http://www.fao.org/ag/agl/aglw/aquastat/countries/morocco/index.stm>.
26. Mauritania Country Profile
<http://www.afro.who.int/wsh/countryprofiles/mauritania.pdf>.
27. Ministry of Water Resources & Irrigation of Egypt, National Water Resources Plan, 2004
28. The Millennium Development Goals in Arab Countries towards 2015 : achievements and aspirations.
29. Nada Raad, Lebanon is no exception to global water shortages, Experts tout projects to preserve precious resource. Lebanonwire, the Daily Star, June 2003, (<http://www.lebanonwire.com/0306/03060609DS.asp>).
30. The National Water Master Plan in Jordan.
31. Palestinian Water Authority, Impact of Water Crisis in the Gaza Strip.
32. UNDP Regional Bureau for Arab States, Water Survey Analysis.
33. Tarek El-Zein, Water shortage by 2025. Lebanonwire, the Daily Star, January 2003, (<http://www.lebanonwire.com/0301/03011807DS.asp>).

34. Torkil Jørgensen-Clausen, "Integrated Water Resources Management (IWRM) and Water Efficiency Plans by 2005" Why, What and How?
35. UNDP Regional Programme Formulation, TOR, Phase I: IWRM plans
36. UNDP Multi-Year Funding Framework
37. UNDP Water Governance Strategy
38. UNDP Poverty-Environment
39. Water Quality Management in Algeria
[http://inweb18.worldbank.org/mna/mena.nsf/Attachments/WQM+Algeria+A4/\\$File/WQM+Algeria+A4.pdf](http://inweb18.worldbank.org/mna/mena.nsf/Attachments/WQM+Algeria+A4/$File/WQM+Algeria+A4.pdf).

Arab Water Council (AWC)

AWC Interim Technical Secretariat
c/o CEDARE, 2 Elhegaz Street, Heliopolis, Cairo, Egypt
Tel: (202) 451-3921/2/3/4 # 662 Fax: (202) 451-3918
E-mail: arabwatercouncil@cedare.org
Web Site: www.arabwatercouncil.org

United Nations Development Programme (UNDP)

Regional Bureau for Arab States
304 East 45th Street, FF-1204
New York, NY 10017
Tel: (212) 9066422 Fax: (212) 906 5566
E-mail: rbas.environment.hq@undp.org
Web Site: www.undp.org

Centre for Environment & Development for Arab Region & Europe (CEDARE)

2 Elhegaz Street, Heliopolis, Cairo, Egypt
Tel: (202) 451-3921/2/3/4 # 661 Fax: (202) 451-3918
E-mail: water@cedare.org
Web Site: www.cedare.org