

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)

ESCWA WATER DEVELOPMENT REPORT 4
NATIONAL CAPACITIES
FOR THE
MANAGEMENT OF SHARED WATER RESOURCES
IN ESCWA MEMBER COUNTRIES

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ABBREVIATIONS

ACSAD	Arab Centre for the Studies of Arid Zones and Dry Lands
ACWUA	Arab Countries Water Utilities Association
AMWC	Arab Ministerial Water Council
ASEAN	Association of Southeast Asian Nations
BGR	Federal Institute for Geosciences and Natural Resources
ENSAP	Eastern Nile Subsidiary Action Programme
ESCWA	Economic and Social Commission for Western Asia
FAO	Food and Agriculture Organization
GCC	Gulf Cooperation Council
GDP	Gross domestic product
GIS	Geographic information system
ICJ	International Court of Justice
IDB	Islamic Development Bank
ILA	International Law Association
IPCC	Intergovernmental Panel on Climate Change
IWLP	International Water Law Project
IUCN	International Union for the Conservation of Nature and Natural Resources
IWRM	Integrated water resources management
JEC	Joint Economic Committee
JTC	Joint Technical Committee
MRC	Mekong River Commission
NAFTA	North American Free Trade Agreement
NARIS	Nubian Aquifer Regional Information System
NSAS	Nubian Sandstone Aquifer System
NBD	Nile Basin Discourse
NBI	Nile Basin Initiative
NGO	Non-governmental organization
ORASECOM	Orange-Senqu River Commission
PERSGA	Regional Intergovernmental Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden
ROPME	Regional Organization for the Protection of the Marine Environment
SEEAW	System of Environmental-Economic Accounting for Water
SIDA	Swedish International Development Cooperation Agency
SMHI	Swedish Meteorological and Hydrological Institute
SADC	Southern African Development Community
TFDD	International Freshwater Treaties, Transboundary Freshwater Dispute Database
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
Watercourse Convention	United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses
WMO	World Meteorological Organization

Introduction

There is no doubt that the region of the Economic and Social Commission for Western Asia (ESCWA) represents one of the driest regions in the world.¹ In 2008, the average annual precipitation in the region was only around 200 mm, which constituted less than 20 per cent of the world average. Bahrain, Egypt, Qatar, Saudi Arabia and the United Arab Emirates received an average of even less than 100 mm of annual precipitation. Moreover, in terms of the total per-capita share of renewable water resources, 11 out of the 14 ESCWA member countries stood below the water-poverty annual threshold of 1000 m³; and five ESCWA member countries were listed among the top 10 water-poorest countries in the world, with even less than 100 m³ of total renewable water resources per capita annually. Despite limited water availability, demand for water to satisfy domestic needs and food production has been rapidly growing as a result of the explosive increase of the region's population, which has almost quadrupled over the past five decades from 67 million in 1961 to more than 250 million in 2009. As a result, the total average annual per-capita share of renewable water resources has also substantially decreased from 1,860 m³ to 560 m³ between 1967 and 2008.

Water scarcity is not the only water challenge facing the ESCWA region, or the broader Arab region. With more than half of the renewable water resources of ESCWA member countries coming from outside their borders, countries of the region are highly dependent on shared water resources. This high dependency, coupled with the increasing level of water scarcity in the region, has contributed to regional conflicts. Moreover, the region traditionally sought to achieve food security through domestic agricultural production, thereby exerting greater pressure on the already limited water resources. These water challenges are expected to exacerbate owing to the anticipated negative impacts of climate change on water resources. It is largely as a consequence of these challenges that the development of cooperative approaches for the management of shared water resources has become critical for the overall sustainable development of the region.

In general, cooperation over shared water resources, particularly in the ESCWA region, is a complex undertaking, with direct linkages to the social, economic and, most importantly, political settings of the individual countries and the region as a whole. The road from conflict to cooperation is lengthy and needs to hinge on trust-building initiatives in order to facilitate communication, coordination and collaboration; and to move from a process that concentrates on the allocation of rights and shares into joint planning and integrated development of the resource that leads to the allocation of socio-economic benefits. One of the main requirements needed to follow this cooperative path is the development of an appropriate legal framework on the regional level and corresponding capacity at the national level. For a regional legal framework to serve the prescribed purpose, it needs to be based on internationally accepted principles and customs.

This report provides a holistic view on shared water resources in the ESCWA region that takes into account the current challenges facing countries of the region and reflects them into the recent regional institutional and legal development in order to identify the gaps and clarify the prospects for sustained cooperation on shared water between countries of the region. This report does not intend to measure the institutional capacity of individual countries in terms of managing shared water resources, which has been the subject of other publications in recent years.^{2,3} While in principle the report focuses primarily on ESCWA member countries, given that the ESCWA region is encompassed within the larger Arab region and

¹ The ESCWA region refers to the following fourteen member countries: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, the Sudan, the Syrian Arab Republic, the United Arab Emirates and Yemen. Throughout the report, data for South Sudan are included in the data presented for the Sudan.

² ESCWA, "Knowledge Management and Analysis of ESCWA Member Countries Capacities in Managing Shared Water Resources" (E/ESCWA/SDPD/2009/7).

³ J. Trondalen, "Assessment of National Capacities for the Management of Shared Water Resources in Arab countries" (UNDP, 2009).

considering the new institutional and legal developments that have or are taking place within the broader regional context, the scope of some elements of the report, especially those connected to chapters I, III and V, have been expanded to cover the entire Arab region.

The report is divided into seven chapters. The first chapter highlights the challenges and risks that the Arab region collectively faces, and presents the response measures that have been taken individually and collectively in order to cope with these challenges. Chapter II maps water resources, both surface and groundwater, shared between countries of the ESCWA region. The information presented in this chapter is drawn from the forthcoming inventory of shared water resources in the ESCWA region.⁴ Along the lines introduced in the first chapter, chapter III highlights regional perspectives on the management of shared water resources. Within this scope, it introduces the regional cultural context and the policy frameworks that have been adopted to achieve water security, including the recent institutional development that has taken place at the broader regional level. Chapters IV and V complement each other and present the development of international water law and the development of international legal instruments and their impact, in substantive as well as process terms, on the development of a regional legal framework on shared water in the Arab region. Chapter VI provides an overview of the drivers for cooperation and tries to analyse the different theoretical approaches to cooperation and allocation in relation to the existing cooperation modalities found in the ESCWA region. Within that context, a number of bilateral agreements between countries of the region are included in the analysis. The final chapter highlights a number of conclusions that are drawn from the various chapters of the report.

⁴ The “Inventory of Shared Water Resources in Western Asia” is being prepared by the ESCWA-BGR Cooperation and will be released in 2012.

I. CHALLENGES, RISKS AND RESPONSE MEASURES

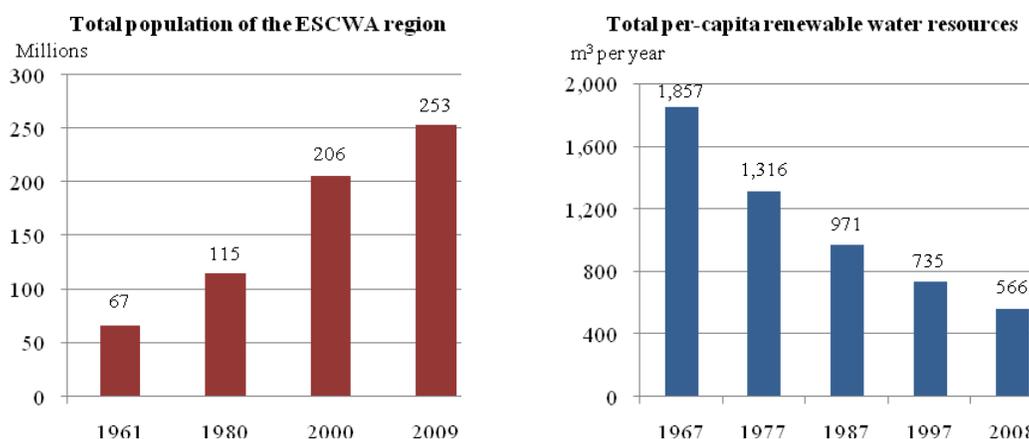
A. CHALLENGES AND RISKS

1. Water scarcity

While renewable freshwater resources in the ESCWA region have certainly been insufficient to meet the municipal, agricultural and industrial water demand of the region; rapid population growth over the past half century has resulted in the substantial decrease of total renewable water resources per capita, imposing severe water challenges to the region. As can be seen from figure I, the population of the ESCWA region has almost quadrupled in the last five decades, from 67 million in 1961 to more than 250 million in 2009. As a result, the total per-capita share of renewable water resources has also substantially decreased from 1,857 m³ to 566 m³ between 1967 and 2008. While the regional population growth rates are decreasing, population growth is expected to continue for the next few decades, thereby threatening to exacerbate water scarcity even further.

Moreover, the sustainability of water resources is threatened. Total freshwater withdrawal expressed as a percentage of the actual total renewable water resources is very high in the region. In particular, Kuwait (2,465 per cent), United Arab Emirates (2,032 per cent), Saudi Arabia (943 per cent), Qatar (455 per cent), Bahrain (219 per cent), Yemen (161 per cent) and Egypt (119 per cent) withdrew more than their total renewable water resources, indicating that water withdrawal practices of these countries are not sustainable.⁵

Figure I. Population and renewable water resources per capita trends



Sources: World Bank, “World Development Indicators”, available at <http://data.worldbank.org/indicator>; and Food and Agriculture Organization (FAO), “Aquastat Database Query” (2011), available at <http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en>.

2. Dependency on shared water resources

However, water scarcity is not the only water challenge of the ESCWA region. Countries in the region are highly dependent on shared water resources. The Euphrates and Tigris Rivers are shared between Iran, Iraq, the Syrian Arab Republic and Turkey; and the Nile River is shared between many riparian countries, including two ESCWA member countries, Egypt and the Sudan; while major groundwater resources are also shared between ESCWA member countries. Accordingly, dependency ratios that indicate the percentage of total renewable water resources originating outside the country are very high in several countries of the region, as can be seen from table 1.

⁵ Food and Agriculture Organization (FAO), “Aquastat Database Query” (2011), available at www.fao.org/nr/water/aquastat/data/query/index.html?lang=en.

TABLE 1. DEPENDENCY RATIO TO TRANSBOUNDARY INFLOWS IN ESCWA MEMBER COUNTRIES, 2008

Country	Dependency ratio (per cent)	Country	Dependency ratio (per cent)
Kuwait	100	Qatar	3.45
Egypt	96.86	Palestine	2.99
Bahrain	96.55	Lebanon	0.79
Sudan	76.92	Oman	0
Syrian Arab Republic	72.36	Saudi Arabia	0
Iraq	53.45	United Arab Emirates	0
Jordan	27.21	Yemen	0

Source: Food and Agriculture Organization (FAO), "Aquastat Database Query" (2011), available at <http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en>.

While relatively low dependency ratio in some ESCWA members does not necessarily mean full control over their water resources, as in the case of Palestine, high dependency on shared water resources coupled with increasing levels of water scarcity in the region have often contributed to regional conflicts. Indeed, there have been disputes over the flow and allocation of shared water in some rivers of the region. For example, water resources in the Golan Heights and the Jordan River, including its tributaries, and the Israeli and Palestinian use of the coastal aquifers have taken central parts in negotiations related to the occupied territories in the region. Moreover, while Turkey has been building dams and hydropower plants on the Euphrates and Tigris Rivers, which are shared with Iran, Iraq and the Syrian Arab Republic, this has been considered as serious threats to the water security of Iraq and the Syrian Arab Republic. Consequently, cooperative development and management of shared water resources becomes critical for the overall sustainable development of the region.

3. Water quality

Poor water quality is another important challenge that countries in the region need to address. Large quantities of domestic, agricultural and industrial wastewater are still discharged into shared water bodies without proper treatment, which has contaminated both surface and groundwater. Furthermore, excessive pumping of groundwater resources owing to high demand and the absence of proper regulations and enforcement mechanisms have resulted in higher salinity levels and, in some cases, to an increase in other "natural" contaminants such as fluorides in groundwater. Seawater intrusion has increasingly been witnessed in coastal areas, resulting from excessive abstraction of coastal groundwater or reduced river flows as can be seen from the reduction of water flows in the Euphrates and the Tigris and respective seawater intrusion in the downstream, Shatt el-Arab. Indeed, several reports have indicated that salinity has increased downstream in the southern region of the Shatt el-Arab.

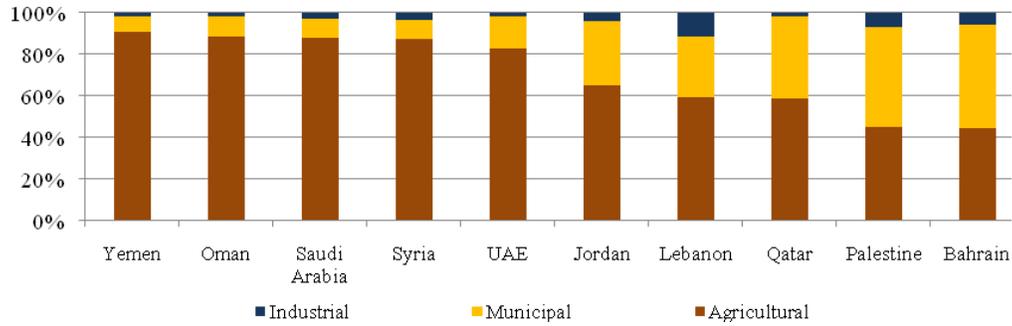
4. Food security, self sufficiency and agricultural productivity

Food security is another driver for the over-exploitation of shared water resources in the region. Given price fluctuations of the global food market and frequent export regulations of such food-exporting countries as the Russian Federation and Ukraine, some countries in the region have revived policies aimed at promoting domestic agricultural production. Consequently, a large percentage of water resources has been allocated to the agricultural sector despite the fact that the available water resources are far from sufficient to meet the demand of the region. Specifically, Oman, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen withdrew over 80 per cent of their total water withdrawals for agricultural purposes during the mid-2000s (see figure II); and agricultural water withdrawal exceeded industrial or domestic water withdrawal in most ESCWA member countries.⁶ This heavy water usage for agriculture has

⁶ FAO, 2011, op. cit.

been possible with excessive abstraction of water resources, including those from fossil groundwater resources, which has added to competition over shared water resources (both surface and groundwater) in the region.

Figure II. Sectoral water withdrawal in selected ESCWA member countries, 2003-2007



Source: FAO, “Aquastat Database Query” (2011), available at <http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en>.

Nevertheless, agricultural production within the ESCWA region could not meet the growing regional demand for food, which has increased rapidly during the past few decades owing to rapid population growth and changing diets. Between 1990 and 2008, while the total cereal consumption of the region increased by 76.67 per cent (around 34 million tonnes), the regional cereal production increased only by 37.97 per cent (about 10 million tonnes). This increasing supply and demand gap has been filled through food imports. Indeed, during the same period, regional cereal import has rapidly increased by 121 per cent from around 19.76 million tonnes in 1990 to 43.72 million tonnes in 2008. Accordingly, import dependency on cereal, expressed as total import over total consumption, has also risen, from 44.53 per cent in 1990 to over 55 per cent in 2008 (see table 2). The growing dependency on food imports can be directly linked to water availability, especially given that agriculture is the most water intensive sectors. It is simply not possible to meet the growing food demand with domestic food production in the water scarce ESCWA region.

TABLE 2. CEREAL PRODUCTION, EXPORT AND IMPORT QUANTITY IN THE ESCWA REGION, 1990-2008

Tonnes	1990	1995	2000	2005	2008	Percentage increase between 1990 and 2008
(a) Production	26 402 788	31 780 735	30 891 477	41 875 781	36 428 291	37.97
(b) Export	1 788 020	2 227 308	1 217 088	2 542 885	1 744 985	-2.41
(c) Import	19 762 596	22 436 442	33 776 805	39 488 747	43 717 738	121.21
(d) Total Consumption = (a) – (b) + (c)	44 377 364	51 989 869	63 451 194	78 821 643	78 401 044	76.67
(e) Import dependency = (c)/(d) * 100	44.53%	43.16%	53.23%	50.01%	55.76%	

Source: Food and Agriculture Organization (FAO), FAOSTAT, available at <http://faostat.fao.org/>.

Food security, however, does not necessarily mean food self-sufficiency, and domestic food production is not the only way to achieve food security. In this regard, Saudi Arabia is seeking to save water resources used in the agricultural sector through a policy shift from self-sufficiency in wheat production adopted during the 1980s and 1990s to total dependency on wheat imports by 2016. Plans have also been

developed to phase out the production of water intensive agricultural crops, including soya beans and animal fodder.⁷

Countries in the region have also started to search for stable sources of food supply through long-term farmland leasing contracts in comparatively water-rich countries. In particular, these agreements are actively occurring between countries of the Gulf subregion and some African and Asian countries, including the Sudan. Within that context, a Saudi Arabian private company, namely, Hail Agricultural Development Co (Hadco) has acquired farming land in the Sudan and plans to invest in farming activities.⁸ Equally, the United Arab Emirates developed plans to acquire 30,000 hectares of farmland in the Sudan in order to ensure food security;⁹ and Qatar has invested in the agricultural sector of the Sudan. These long-term land agreements have been developed in the hope of securing a more stable food supply for investing countries while benefiting host countries by creating local jobs, fostering infrastructure development and increasing agricultural productivity. However, the extent of the mutual benefits secured by hosting and investing countries has been questioned and has fostered attention on the need for guidance and exchange to achieve win-win solutions.

5. *Climate change*

Impacts of climate change on social and economic development pose another threat to the region. Water challenges are expected to worsen in the region stemming from the negative impacts of climate change on water resources. While further studies are still needed to better capture the impact of climate change, it is generally predicted that climate change will reduce water resources in the region owing to increasing temperatures and evapotranspiration ; while rising temperature is likely to boost demand for water.

The frequency and intensity of such extreme weather events as droughts and floods are expected to increase as well. Within that context, the fourth assessment report of Intergovernmental Panel on Climate Change (IPCC) predicted an increased intensity of cyclone activities in the Arabian Sea.¹⁰ Indeed, observations have shown increased intensity during the past few decades, with the strongest three cyclones in the Arabian Sea taking place since 2000, including the strongest “Gonu” in 2007 and the second strongest “Phet” in 2010.¹¹

6. *Water and energy linkages*

The growing energy demand is also a water challenge of the region given that the production and consumption of energy and water are closely related. In particular, oil production plants consume large quantities of water, both saline and freshwater, and the mining industry also requires water for washing and extracting minerals. Moreover, while the region has a high potential for solar energy, the most common cooling technique for concentrated solar power generation uses a large quantity of water. By contrast, energy is required for the production, distribution and treatment of water resources as well. In particular, the heavy energy consumption in desalination facilities has implications in the ESCWA region where many

⁷ Saudi Gazette, “Kingdom aims to double wheat reserves by 2014” (16 June 2011), available at www.saudigazette.com.sa/index.cfm?method=home.regcon&contentID=20110616103120.

⁸ Reuters, “Saudi Hail starts farm investment abroad in Sudan” (16 February 2009), available at <http://af.reuters.com/article/investingNews/idAFJJOE51F08L20090216>.

⁹ X. Rice, “Abu Dhabi develops food farms in Sudan”, *The Guardian* (2 July 2008), available at www.guardian.co.uk/environment/2008/jul/02/food.sudan.

¹⁰ Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Impacts, Adaptation and Vulnerability* (Cambridge, Cambridge University Press, 2007).

¹¹ Gulf News, “Facts about Tropical Cyclone Phet” (6 June 2010), available at <http://gulfnnews.com/news/gulf/oman/facts-about-tropical-cyclone-phet-1.636372>.

desalination facilities have been constructed. Pumping groundwater resources and treating wastewater also requires substantial energy. Consequently, energy availability has significant implications on water availability and use in the region.

Unfortunately, however, not all ESCWA member countries are energy rich. While countries of the Gulf Cooperation Council (GCC) consume large quantities of energy, ranging between 5,000 and 20,000 kg of oil equivalent per capita annually, the remaining ESCWA member countries suffer from energy deficiency, with as low as 328 kg of oil equivalent per capita in 2007.¹² For example, Beirut suffers from a daily power outage of three hours, while power cuts in Sana'a often disrupts water production activities and leads to reduced water supply to consumers. Moreover, while energy-rich countries in the Gulf subregion can relieve their water stress to some extent through desalination, their energy-poor neighbours in the region are often unable to resort to such costly alternatives and are therefore constrained in their ability to address water challenges. This partly also explains the political and economic sensitivity in dealing with shared water resources, particularly in energy-poor countries, given that alternative sources of water supply are limited compared to those countries with abundant energy.

7. Coordination at the national level

Addressing water challenges require coordination among various stakeholders given that water is a cross-cutting issue. In addition to water utilities, the allocation and management of water has huge direct as well as indirect implications on other sectors including agriculture, tourism, industry, health and education. The management of water resources therefore requires coordination at the national level. Priorities should be decided among contending uses that need to be consistent and coherent with national development goals. Moreover, government ministries and water stakeholders need to work together to avoid possible inefficiency and to design appropriate policies for integrated management of water resources. Obviously, this is a challenging task given that policies aimed at addressing water resources fundamentally affect the economic and social activities of diverse stakeholders. Furthermore, this becomes more difficult when coordination is necessary with other riparian countries over shared water resources.

Water-related legislations of the region are also often insufficient to coordinate various water stakeholders as well as riparian countries of shared water bodies; and the institutional capacity of countries in the ESCWA region for managing shared water resources are in many cases inadequate.¹³ In many countries, there are no institutional arrangements within the water ministries to deal with shared water. Additionally, the roles and functions of the various water institutions often overlap, and coordination mechanisms among these institutions are often not well established.

8. Knowledge management

As mentioned above, while many countries in the region are heavily dependent on shared water resources, information regarding shared water resources is still quite limited. In particular, detailed delineation of shared aquifers has not been sufficiently addressed, which has led to fragmented impressions and understanding of these aquifers among countries of the region. Moreover, data and information on shared water resources are still not available for two reasons, namely (a) some countries view data and information of shared water resources to be of a national security nature and thus are reluctant to share these information with the other riparian countries; and (b) some countries lack the technical and financial capacity to survey, examine and investigate these resources as well as maintain and manage the collected data in an effective manner.

¹² World Bank, *World Development Indicators*, available at <http://data.worldbank.org/indicator>.

¹³ ESCWA, "Knowledge Management and Analysis of ESCWA Member Countries Capacities in Managing Shared Water Resources" (E/ESCWA/SDPD/2009/7).

Monitoring the quality and quantity of shared water resources is also not an easy task given that it requires continuous monitoring in all riparian countries. Nevertheless, basin-level institutions managing shared water resources are only established in a few cases in the ESCWA region and with limited functionality. Equally, the regional legal framework for shared water resources that can encourage cooperation and coordination for information exchange as well as joint investigations and monitoring activities is still at the drafting stage.

9. *Investment projects*

There are also risks connected to financing projects on shared water resources. Investments without coordination or consultation between riparian countries could possibly lead to negative impacts on the other riparian countries. For instance, the construction of a dam at the upstream of a shared watercourse could potentially reduce or alter the water flow to the downstream countries, thereby leading to serious implications to the economy and environment of these countries. In fact, as has been pointed out, the dam construction on the Euphrates and Tigris in Turkey has reduced river water flows to Iraq, with the consequent reduction of available water for irrigation and other uses and also causing seawater intrusion at the downstream locations. Moreover, investment projects in shared water would not often achieve their expected goals unless cooperation of other riparian countries is guaranteed. Investments to improve water quality, in particular, will not achieve the desired objective without close coordination and cooperation over the shared water resources with other riparian countries (see chapter VI).

Consequently, cooperation and coordination of investment projects are critical in managing shared water resources. However, riparian countries often have conflicting interests in developing and managing shared water resources, particularly given that competing interests require different types of projects and investments. It is therefore difficult for riparian countries to act in harmony as the recurrent regional conflicts over shared water resources testify. Even though riparian countries recognize the need to work in a cooperative manner and to agree collectively on projects or investments related to shared water resources, important questions regarding the financing of the investment projects and the role of each country need to be answered prior to the actual execution of these projects (see chapter VI).

B. RESPONSE MEASURES

1. *Integrated policy frameworks at the national level*

Recognizing the above-mentioned challenges, countries in the ESCWA region have responded with various measures. First, Governments in the region have tried to mainstream principles and tools of Integrated Water Resources Management (IWRM) within their national policies and strategies. Specifically, IWRM, which advocates an integrated and participatory approach, can be defined as “a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”.¹⁴ Water scarcity of the region does not only limit the quality and quantity of water services, but also challenges agriculture, industry, tourism and various other sectors. Addressing water challenges in the ESCWA region therefore requires the involvement of various Government institutions, including planning ministries, agriculture and industry as well as water ministries, water utilities, water-user associations, local communities and other stakeholders.

To that end, ESCWA and other regional and international organizations have adopted and promoted IWRM principles and tools in the region. As a result, many countries have recognized the importance of IWRM and have tried to incorporate them in their water strategies, policies and plans. The Ministry of Water Resources and Irrigation in Egypt, for example, reflects IWRM principles and tools in its 2005

¹⁴ Global Water Partnership (GWP), “Integrated Water Resources Management”, TAC Background Papers No. 4 (2000).

Integrated Water Resources Management Plan; while the national water strategy of Jordan, entitled “Water for Life: Jordan’s Water Strategy 2008-2022”, also adopts IWRM approaches for ensuring sustainable management of its water resources.

However, there is still little evidence that water issues have been fully mainstreamed in discussions and policies beyond water ministries. While most other ministries and sectors probably recognize the water shortages of the region, it still seems to be treated as a problem of the water ministries. Intragovernmental institutions dealing with water issues in an integrated manner, such as inter-ministerial committees, do not seem to be popular; and where they exist, they have limited success. The involvement of non-governmental stakeholders is also still limited and has not yet been effectively incorporated into the water-related, decision-making process.

2. Demand and supply management

(a) Developing non-conventional water supply

Most countries in the region have tried to seek alternative supplies of water given that water resources in the region are mostly far outweighed by their water demand, and that large portions of total renewable water resources are shared with other riparian countries. In particular, GCC countries have invested heavily in the construction of desalination facilities. In 2008, some 44 per cent of global desalination capacity was located in the ESCWA region, with a total daily capacity of approximately 26 million m³.¹⁵ Four ESCWA member countries, namely Saudi Arabia, the United Arab Emirates, Kuwait and Qatar, are, in that order, among the top 10 desalinating countries in the world. Oman and Bahrain also have significant desalination facilities with daily capacities of 960,000 m³ and 783,000 m³, respectively.¹⁶ However, given that desalination is still an expensive option to address water shortages, desalination facilities of the region are mostly located in the relatively energy-rich countries of the Gulf subregion. Among other ESCWA member countries, Egypt, Iraq, and Jordan had significant desalination facilities with daily capacities of 712,000 m³, 310,000 m³, and 227,000 m³, respectively, in 2008.¹⁷

In the meantime, some countries in the ESCWA region have promoted wastewater treatment as an effective approach for environmental protection, while benefiting from the availability of treated wastewater for reuse. Facing water shortages, Jordan has developed its capacity for reusing treated wastewater. This is well presented in its national water strategy, which stresses the need to reuse treated wastewater for irrigation and for aquifer recharge. Currently, about 100 million m³ of treated wastewater is generated annually from 21 wastewater treatment plants and is mostly used for irrigation purposes in the Jordan Valley.¹⁸ According to the Ministry of Water and Irrigation in Jordan, the annual production of treated wastewater is expected to increase to about 240 million m³ by 2020.¹⁹

Similarly, wastewater treatment has also witnessed a rapid increase in Egypt, although recent data are not available. While 650 million m³ of wastewater was treated in 1993, the volume of treated wastewater more than quadrupled by 2001 to reach almost 3 billion m³.²⁰ Moreover, during the Gulf Wastewater Summit 2011, which was held in the United Arab Emirates in April 2011, GCC countries presented

¹⁵ ESCWA, “ESCWA Water Development Report 3: Role of Desalination in Addressing Water Scarcity” (E/ESCWA/SDPD/2009/4).

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ministry of Water and Irrigation in Jordan, “Water for Life: Jordan’s Water Strategy, 2008-2022” (2009).

¹⁹ Ministry of Water and Irrigation in Jordan, Jordan Homepage, available at www.mwi.gov.jo/sites/en-us/SitePages/Water_per_cent20Policies/Waste_per_cent20Water_per_cent20Policy.aspx.

²⁰ FAO, op. cit.

substantial investment in wastewater treatment infrastructure. However, wastewater treatment in the ESCWA region as a whole is still limited and insufficient to treat substantial quantities of wastewater.

Other alternative water supply sources have also been studied in the ESCWA region. While water harvesting techniques have been used since ancient times, Jordan’s water strategy clearly highlights the importance of rainwater harvesting for irrigation and water supply. Cloud seeding technologies are also being experimented and tested in the region. Studies by the United Arab Emirates on the potential application of weather modification technologies through its cloud seeding project reported positive results in May 2008.²¹ Equally, the National Centre for Meteorology and Environment Protection in Saudi Arabia has implemented a weather modification project.²² In addition, a number of long-distance, intra-basin transfers have been discussed at various occasions in or among countries and at regional level, such as building a pipeline from Turkey to various Mashreq countries and constructing an internal canal in the Sudan; the GCC has also studied building a desalinated water network linked to the GCC power grid.

(b) *Efficient use and water allocation*

Countries of the region have also pursued efforts to improve the efficiency of water use. While increasing water prices can lead to significant water conservation, it could lead to detrimental impacts on the poor and, as such, domestic water prices need to be carefully structured. Water tariff structures of the ESCWA region are often poorly structured and do not cover the full supply cost. Consequently, collected revenues from water sales are usually insufficient to finance the necessary infrastructural investment and proper maintenance of water services. Nevertheless, water tariff structures are gradually improving to reflect water production cost and to reduce wasteful patterns of water use. In this regard, Saudi Arabia has announced its plan to increase water prices for non-residential users.²³

Moreover, the heavy allocation of water resources to the agricultural sector has been addressed in the region. Agricultural water withdrawal is still substantial in the ESCWA region, and the amount of water withdrawn for agricultural purpose shows mixed trends. However, as measured by the percentage of agricultural water withdrawal over total water withdrawal, several ESCWA member countries have seen slowly decreasing trends over the past two decades. While the United Arab Emirates shows increasing agricultural water withdrawal as a percentage of the total renewable water resources, the majority of ESCWA member countries show decreasing percentage of agricultural water withdrawal (see table 3). In addition, there have been efforts to increase water use efficiency in the agricultural sector and to improve water productivity by adopting efficient water management and irrigation technologies. In this context, the water productivity of supplemental irrigation technology has been studied and introduced.

TABLE 3. AGRICULTURAL WATER WITHDRAWAL AS A PERCENTAGE OF TOTAL WATER WITHDRAWAL

Country	1988-1992	1993-1997	1998-2002	2003-2007
Bahrain	56.49	..	..	44.54
Egypt	..	86.14	86.38	..
Iraq	92.01	83.99	78.79	..
Jordan	76.90	..	..	64.96
Kuwait	..	60.22	53.87	..
Lebanon	..	67.67	64.20	59.54
Palestine	..	..	59.86	45.22
Oman	93.87	..	90.44	88.42

²¹ M. al-Hakeem, “Saudi cloud seeding programme under way”, *Gulf News* (27 May 2008), available at <http://gulfnews.com/news/gulf/saudi-arabia/saudi-cloud-seeding-programme-under-way-1.107053>.

²² Ibid.

²³ S., Abdullah, “Saudi Arabia plans water-price rise for non-residential use” (Bloomberg, 25 December 2010).

TABLE 3 (continued)

Country	1988-1992	1993-1997	1998-2002	2003-2007
Qatar	..	73.92	71.45	59.01
Saudi Arabia	89.95	..	..	88.00
Sudan	96.00	94.38	97.12	..
Syrian Arab Republic	..	88.98	88.08	87.53
United Arab Emirates	..	66.79	78.48	82.84
Yemen	92.09	..	90.00	90.74

Source: FAO, "Aquastat Database Query" (2011), available at <http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en>.

Note: Two dots (..) indicate that data are not available or are not separately reported.

(c) *Natural resource accounting*

Integrating natural resource accounting into the national accounting system can encourage countries to realize the value of their natural resources, including water as well as land, soil and forest. This allows taking natural resources into account when strategies, policies and projects are designed, thereby helping to promote the effective management of finite natural resources.

Through its Statistics Division, ESCWA has assisted member countries in establishing environmental accounts, including water accounts. Specifically, ESCWA promoted the use of the System of Environmental-Economic Accounting for Water (SEEAW), which provides a conceptual framework for filing hydrological and economic data in a standardized manner. As a result, countries in the region have shown some progress and experts from all ESCWA member countries have participated in trainings on SEEAW, thereby supporting and enhancing national capacities. Bahrain, Egypt, Iraq, Lebanon, Oman, Palestine and the Syrian Arab Republic have prepared pilot accounts, including physical supply and use.²⁴ Moreover, countries have been trying to develop national work plans on environmental accounts, including water, or to include work programmes on environmental accounts in their national environmental strategy; and have requested technical assistance from ESCWA to that end.²⁵

(d) *International trade and virtual water*

The trade structure of ESCWA member countries can help to relieve the growing water stresses of the region. In other words, by exporting less water-intensive goods and services, and importing more water-intensive goods and services, a country can virtually fulfil some of its water demand. The virtual water concept represents the amount of water embedded in goods and services. According to the Water Footprint Network, while about 900 litres of water are embedded in 1 kg of maize, 1 kg of rice and beef embed around 2,500 and 15,400 litres of water, respectively.²⁶

While countries in the region may not have fully recognized this yet, they have already benefited from this trade aspect of water. Given that water is not an abundant resource, generally, the production cost of water-intensive goods and services in the ESCWA region are likely to be more expensive than that of less water-intensive goods and services. Consequently, it is natural that countries in the region import water-intensive goods and services, while less water-intensive goods and services are exported. Indeed, the net virtual water savings related to international trade of ESCWA member countries are generally positive, meaning that ESCWA member countries are gaining water from international trade (see table 4). However,

²⁴ Department of Economic and Social Affairs (DESA), "Progress on Water Accounts in ESCWA Countries" (2010).

²⁵ Ibid.

²⁶ Water Footprint Network homepage, available at www.waterfootprint.org.

the net virtual water savings per capita of the ESCWA region shows substantial differences among member countries. While the data do not reflect per-capita GDP, trade volume and water scarcity of each country, it still provides relevant information for countries to rethink their trade structures and policies within the water balance perspective.

TABLE 4. NET VIRTUAL WATER SAVINGS RELATED TO INTERNATIONAL TRADE OF ESCWA MEMBER COUNTRIES, 1996-2005

Country	Related to trade in crop products	Related to trade in livestock products	Related to trade in industrial products	Total	Net savings per capita (m^3 /year with 2005 population)
Bahrain	582.9	195.4	7.2	785.5	1 079.6
Egypt	11 796.3	-456.4	355.3	11 695.2	151.6
Iraq	13 371.6	1 134.9	-3 528.9	10 977.6	385.5
Jordan	6 022.9	940.8	149.0	7 112.7	1 314.4
Kuwait	2 324.5	942.9	-86.1	3 181.3	1 254.7
Lebanon	2 314.5	2 423.8	198.4	4 936.7	1 209.5
Oman	1 615.8	1 770.7	-52.4	3 334.1	1 273.6
Qatar	668.4	219.1	-48.1	839.4	948.0
Saudi Arabia	16 944.2	3 306.3	-656.3	19 594.2	847.5
Sudan	-2 663.4	-274	42.5	-2 894.9	-75.4
Syrian Arab Republic	693.3	-230.7	-42.8	419.8	22.0
United Arab Emirates	5 157.6	1 889.8	-62.9	6 984.5	1 708.1
Yemen	11 164.9	16 189.8	-25.1	27 329.6	1 299.9
Total	69 993.5	28 052.4	-3 750.2	94 295.7	414.2

Sources: Calculated by ESCWA, based on data from M.M. Mekonnen and A.Y. Hoekstra, "National Water Footprint Accounts: The Green, Blue and Grey Water Footprint of Production and Consumption", Value of Water Research Report Series No. 50 (Delft/UNESCO-IHE Institute for Water Education, 2011); and World Bank, "World Development Indicators", available at <http://data.worldbank.org/indicator>.

(e) *Protecting water resources*

Countries in the region have also made efforts to protect the quality of their water resources. While the discharge of untreated wastewater is still an important source of water pollution, as noted above, there has been substantial improvement in wastewater treatment in many countries of the region, particularly Egypt and Jordan. Currently, Governments of the region recognize the importance of water resources protection. For example, the Ministry of Water and Irrigation in Jordan works to improve the protection of that country's water resources, particularly groundwater, by delineating and implementing water protection zones, developing and distributing water resources protection guidelines, and providing knowledge and training on protection.²⁷ Egypt is also working on water resources protection, with one of its main objectives listed as "maintaining water quality and protect[ing] water from pollution".²⁸ In the case of the United Arab Emirates and Yemen, water and environment-related issues are managed in an integrated manner under one ministry, namely the Ministry of Water and Environment.

However, protecting shared surface or groundwater resources from natural or man-made pollution is hardly done without cooperation and coordination among riparian countries. Given that the ESCWA region is highly dependent on shared water resources, cooperation and coordination for protection and preservation of water resources is vital. Unfortunately, however, the regional legal framework which provides principles and guidelines on the protection and preservation of shared water resources are still in the drafting stage. For regional cooperation on the marine environment, regional cooperation mechanisms include the following:

²⁷ Ministry of Water and Irrigation in Jordan, homepage, available at www.mwi.gov.jo/sites/en-us/SitePages/MWI_percent20BGR/Activities.aspx.

²⁸ Ministry of Water Resources and Irrigation in Egypt, homepage, available at www.mwri.gov.eg/En/objectives.htm.

(a) the Mediterranean Action Plan of 1975 (and the subsequent Barcelona Convention), where Egypt, Lebanon and the Syrian Arab Republic are among the contracting parties; (b) the Regional Intergovernmental Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), in which Egypt, Jordan, Saudi Arabia, the Sudan and Yemen participate; and (c) the Regional Organization for the Protection of the Marine Environment (ROPME) in the Gulf subregion that has all GCC countries in addition to Iran as members.

(f) *Building the knowledge base*

Countries in the region have tried to build their knowledge base to better manage water resources, particularly those shared with other countries. First, ESCWA member countries as well as other regional and international organizations and research institutes have studied the impact of climate change. There have been several efforts to understand how the rising temperatures and intensifying evapotranspiration affect the quantity and quality of freshwater resources as well as sea level. Among them, it is worth noting the Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab region, being implemented by the United Nations and League of Arab States specialized organizations. Within the framework of this regional initiative, ESCWA, in partnership with the League of Arab States, Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD), the Swedish Meteorological and Hydrological Institute (SMHI), the World Meteorological Organization (WMO), is implementing a project to study the impact of climate change on water resources through an assessment that integrates climate and hydrological modelling. This project, which is funded by the Swedish International Development Cooperation Agency (SIDA), will generate massive climate and hydrological data using high-resolution regional climate modelling). The generated data will provide a sound basis for further studies at the subregional and basin level or other related studies.

In addition, ESCWA and the Federal Institute for Geosciences and Natural Resources (BGR) in Germany are mapping shared water resources for both surface and ground water in the ESCWA region. As mentioned above, countries in the region have been comparatively uncooperative in terms of exchanging information regarding shared water resources within their territories compared to other regions; while, at the same time, some countries also lack institutional or human capacity to measure and maintain the monitoring of these data. Consequently, while there is no argument that it is critical to cooperate and jointly manage shared water resources in the ESCWA region, there is still not enough information indicating to what extent some of the water resources are shared, particularly in the case of groundwater resources. Consequently, the efforts of the regional cooperation project by ESCWA and BGR can be considered an important contribution to building a regional knowledge base for shared water resources in the ESCWA region. The cooperation of Governments of the region is essential for the goal of finalizing the inventory study and putting it to beneficial use.

(g) *Investment projects on water infrastructure*

Countries have also responded to water challenges with various investment projects, such as building water reservoirs, dams, canals, large-scale well fields, long-term water transfer schemes and water pumping stations. Dam construction is one of the most popular water projects used for energy production, flood control and to mitigate the impacts of droughts, as in the case of the Aswan High Dam or Merowe Dam construction in the Nile River.

However, as most water resources in the ESCWA region are shared between two or more countries, uncoordinated investment projects on shared water resources can harm other riparian countries. Accordingly, unilateral water investment projects often cause tensions between riparian countries as can be seen from the cases of dam construction on the Euphrates and the Tigris Rivers. Consequently, cooperation between riparian countries is necessary in many investment projects of the region. Moreover, water-investment projects require huge investments which, in many cases, represent an obstacle for a single country. Cooperation efforts between riparian countries can lead to joint financing of projects, which on one

hand lowers the financial burden on both countries and, on the other, attracts funding agencies and donors to support the implementation of the project. Riparian countries can also discuss their needs, share information and data on shared water resources; and conduct joint studies for investment projects.

ESCWA member countries have implemented some joint investment projects. For example, a joint project to construct a dam in the Orontes River was agreed between the Syrian Arab Republic and Turkey in 2005. The Orontes River, which flows from Lebanon to the Syrian Arab Republic and Turkey, causes frequent floods that damage agricultural production in both downstream countries. The proposed dam, referred to a “Dam of Friendship” by the Minister of Environment and Forestry in Turkey, is expected to benefit both countries by preventing floods, generating electricity and irrigating farms.²⁹ Joint investment projects are also identified in the Nile River. Under the umbrella of the Nile Basin Initiative (NBI), two ESCWA member countries, namely Egypt and the Sudan, are participating in the Eastern Nile Subsidiary Action Programme (ENSAP). Egypt and the Sudan are also member countries of another investment programme of NBI, namely the Nile Equatorial Lakes Subsidiary Action Programme, which “oversees the implementation of the jointly identified projects and promotes cooperative inter-country and in country investment projects related to the common use of the Nile Basin water resources”.³⁰

(h) *Stakeholder participation*

While stakeholder participation is still limited in the ESCWA region, water stakeholders are increasingly participating in the water decision-making processes. In particular, it is worth mentioning the Arab Countries Water Utilities Association (ACWUA), which was established in 2007 to provide an effective platform for governments, private-sector water suppliers and service providers, and experts to interact with each other. Currently, 79 water utilities from 11 ESCWA member countries are among its members; and private-sector companies, non-governmental organizations (NGOs) and academic institutions are associated members. It operates online and offline training courses, and organizes conferences and forums dealing with various water issues.

Additionally, ESCWA member countries have, to a certain extent, tried to encourage stakeholder participation at the community level. In the Sana’a Basin, for example, many water-user groups have been established throughout the basin area, and community groups are supported in terms of local water management. Stakeholder participation is also an important element in the management of shared water resources. For example, the Nile Basin Discourse (NBD), which is a network of civil society organizations from the 10 riparian countries, was founded to encourage stakeholder participation in the development of projects and programmes of NBI. It has a general assembly representing members from all the riparian countries; and organizes national discourse forums.³¹

(i) *Raising awareness and capacity-building*

Countries also recognize the importance of raising awareness and capacity-building, and have implemented related programmes. Between 2008 and 2009, the Ministry of Water and Environment in the United Arab Emirates implemented the “I care” campaign aimed at raising awareness of students for the conservation of natural resources, fisheries, livestock and agriculture and for rationing water consumption.³² Saudi Arabia also currently runs the “Water-Saving Awareness” campaign through the website of the

²⁹ Today’s Zaman, “Turkey and Syria to build friendship dam along border” (9 January 2011), available at www.todayszaman.com/newsDetail_getNewsById.action?newsId=231948.

³⁰ Nile Basin Initiative homepage, available at www.nilebasin.org/newsite/index.php?option=com_content&view=article&id=73&Itemid=87&lang=en.

³¹ Nile Basin Discourse homepage, available at www.nilebasindiscourse.org/.

³² Ministry of Environment and Water in the United Arab Emirates, homepage, available at www.moew.gov.ae/En/AboutMinistry/Projects/Pages/Activity131008.aspx.

Ministry of Water and Electricity in cooperation with the Ministry of Education.³³ The campaign connects water issues with other sectors, and runs awareness programmes for households and the agricultural and industrial sectors.

Moreover, many water conferences and forums have been held in the region. Jordan hosted the sixth International Water Association Specialist Conference (29 March-2 April 2011) where experts, Government officials and practitioners shared their knowledge and experience in water demand management; and the Ministry of Energy and Water in Lebanon organized the Third Beirut Water Week (24-27 October 2010).

ESCWA also supports member countries in building capacity to deal with various water issues through its Sustainable Development and Productivity Division (SDPD) as well as through provision of technical assistance. ESCWA provides member countries with short-term advisory services, with water and environment representing one of its main service areas. Between 2009 and 2010, ESCWA received 98 requests related to water and environment from its 14 member countries.³⁴ In particular, ESCWA assisted in developing a national approach to reuse treated sewage effluent and managed aquifer recharge in Bahrain; supported in reviewing appropriate guideline values for boron in drinking water in Oman; assisted in developing an action plan for integrated management of geospatial, water-related information database in Palestine; and assisted in implementing the National Water Harvesting Study in the Sudan. Moreover, ESCWA proposed a development account project to its eighth tranche (2012-2013) for building capacity of the countries in the region for climate change adaptation and is currently waiting for its final approval.

³³ Ministry of Water and Electricity in Saudi Arabia, homepage, available at <http://tarsheed.mowe.gov.sa/>.

³⁴ Klingbeil, R., "Technical Cooperation and Regional Advisory Services in the Field of Water Resources" (2011), presented at the ninth session of Committee on Water Resources (Beirut, 23-25 March 2011).

II. SHARED WATER RESOURCES IN THE ESCWA REGION: AN OVERVIEW

A. BACKGROUND

The ESCWA region is one of the most arid areas in the world where temperatures are higher than 40 degrees Celsius and rainfall lower than 100 mm throughout the widespread deserts that dominate the area.³⁵ Yet it is a region blessed with noteworthy volumes of freshwater both on the surface and as groundwater in the subsurface (aquifers). While most of the surface water is in a few major rivers flowing into the ESCWA region (interregional surface water systems),³⁶ considerable volumes of water also flow along localized ephemeral wadis that often run across the borders of neighbouring ESCWA member countries (intraregional surface water systems). Similarly, there are large regional aquifer systems that extend between neighbouring countries within the ESCWA region (intraregional groundwater systems) and across the border of the region as a whole (interregional groundwater systems).

On the transboundary level, any substantive changes, disruption or pollution of these systems in one country can have a damaging impact on the resources of adjacent countries in terms of quantity and quality of water, as discussed in chapter I. While these transboundary implications may not be immediately apparent, they may nevertheless be difficult to reverse. Shared water resources therefore play a significant role in the stability and development of the region, creating hydrological, social and economic relations and interdependencies between riparian countries, both Arab and non-Arab. Cooperation across national borders and even across the region is essential if sustainable management of shared water resources is to be realized. For this purpose, accurate and up-to-date information on all surface and groundwater systems across political borders is crucial.

This chapter aims to provide an overview of shared water resources in the ESCWA region based on the ongoing inventory that is being undertaken by ESCWA and BGR.³⁷ It identifies and presents all shared surface and groundwater resources in the ESCWA region, including seasonal streams. Preliminary findings from this inventory confirm that, to some extent, cooperation on major shared surface water systems, including collecting and exchanging relevant data/information, has been established over the years, while cooperation on shared groundwater systems remains very limited and many systems have still not been clearly identified or described. Hence, more focus in the inventory is given to the characterization of the aquifer systems owing to the availability of data at this stage.

B. SHARED SURFACE WATER RESOURCES

Water availability in the ESCWA region is affected by its predominantly semi-arid to arid climate, and most ESCWA member countries experience a combination of low rainfall with high spatial and temporal rainfall variability. Humid conditions prevail only in certain parts of the mountainous areas along the northern and southern extremities of the region, affecting the occurrence of surface water. As a result, apart from the Nile, perennial rivers occur only in the Mashreq region where the combination of high rainfall and temperate conditions, especially in the northern source areas and along the Mediterranean coast, generate enough surface runoff to form major (permanent) rivers (see figure III).

By contrast, surface water resources are limited across the Arabian Peninsula owing to scant rainfall and high evaporation rates, with the exception of the mountainous areas along the Red Sea and certain parts of the Arabian Sea where relatively humid conditions prevail. Irregular albeit heavy rainfall may occur in these mountain areas during summer, thereby resulting in an extensive network of wadi (ephemeral) channels throughout the Arabian Peninsula. The current climatic conditions in this area do not sustain perennial river systems.

³⁵ ESCWA, "Compendium of Environmental Statistics in the ESCWA Region 2008-2009" (E/ESCWA/SD/2009/13).

³⁶ The only case of a major river leaving the ESCWA region is the Orontes River (also known as al-Assi), which flows into Turkey.

³⁷ ESCWA and Federal Institute for Geosciences and Natural Resources (BGR), "Inventory of Shared Water Resources in Western Asia" (unpublished).

1. Shared perennial rivers

Shared surface water basins in the ESCWA region can be classified into the following four groups: rivers discharging into the Persian Gulf, rivers discharging into the Mediterranean Sea, rivers discharging into the Dead Sea, and other internal drainage systems. Table 5 presents the shared perennial rivers of the region. For illustrative purposes, the individual rivers and basin components in large or complex systems as well as their shared tributaries are listed. Table 5 also includes information on the riparian countries and some key physical characteristics.

TABLE 5. SHARED SURFACE WATERCOURSES IN THE ESCWA REGION

River flow direction	Main surface watercourses/ basin components	Riparian countries/territories	Basin area (km ²)	River length (km)	Average annual discharge (million m ³)	Shared tributaries
Rivers discharging into the Persian Gulf (interregional system)	Euphrates-Tigris Basin	Iran, Iraq, Syrian Arab Republic, Turkey	771 500	Euphrates: 2 781	Euphrates: 25 000	<u>Euphrates:</u> Sajur, Jallab/Balikh, Khabour
				Tigris: 1 850	Tigris: 52 600	<u>Tigris:</u> Feesh Khabour, Greater Zab, Smaller Zab, Diyala, Karkeh
Rivers discharging into the Dead Sea (Interregional system)	Jordan-Yarmouk Basin	Israel, Jordan, Lebanon, Palestine, Syrian Arab Republic	18 300	251	1 248	<u>Of Shatt El Arab:</u> Karun <u>Upper Jordan River:</u> Banias, Hasbani-Ouazzani and Dan
Rivers discharging into the Mediterranean Sea	Nile River (interregional system)	Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda	3 000 000	6 695	109 500	
	Orontes River (interregional system)	Lebanon, Syrian Arab Republic, Turkey	37 900	448	2 800	Afrin, Karasu
	Nahr El Kebir River (intraregional system)	Lebanon, Syrian Arab Republic	981	62	330	
Internal Drainage Systems	Qweik River (interregional system)	Syrian Arab Republic, Turkey	7 000	126	9.5	

Sources: ESCWA, United Nations Environment Programme (UNEP) and Islamic Development Bank (IDB), "Water Resources Assessment in the ESCWA Region Using Remote Sensing and GIS Techniques" (1996); ESCWA, "Knowledge Management and Analysis of ESCWA Member Countries Capacities in Managing Shared Water Resources" (E/ESCWA/SDPD/2009/7); ESCWA and Federal Institute for Geosciences and Natural Resources (BGR), "Inventory of Shared Water Resources in Western Asia" (unpublished); Friends of the Earth Middle East (FOEME), "Roadmap for the Rehabilitation of the Lower Jordan River" (2011), available at http://foeme.org/uploads/13147126360~%5E%5E~Water_Plan_August_30_2011.pdf; and Nile Basin Initiative, "Summary Fact File about the River Nile" (2011), available at www.nilebasin.org/newsite/index.php?option=com_content&view=article&id=52_per cent3Athe-river-nile&catid=36_per cent3Athe-nile-river&Itemid=75&lang=en.

Notes: Only tributaries shared with or among ESCWA member countries are listed.

The annual inflow at the Dead Sea is estimated at 250-300 million m³.

Despite the presence of a number of rivers in the water scarce ESCWA region, the majority of this surface water originates from outside the region's borders (in other words, as interregional systems), as indicated in table 5. Out of the seven ESCWA member countries that share surface waters, namely Egypt, Iraq, Jordan, Lebanon, Palestine, the Sudan and the Syrian Arab Republic, at least four countries depend greatly on inflow from other countries. Specifically, more than half of the surface water resources of Egypt, Iraq, the Sudan and the Syrian Arab Republic originate from outside their national borders.³⁸

Egypt, for example, relies almost solely on the Nile River for its supply of freshwater. The Nile is ranked among the largest in the world and receives most of its discharge from precipitation falling well outside the ESCWA region on the upland plateau of East Africa and the highlands of Ethiopia. Iraq and the Syrian Arab Republic are also heavily dependent on other countries for their surface waters, their principal sources being the Tigris and Euphrates Rivers, which are mainly fed from the Taurus Mountains in southern Turkey and, in the case of Iraq and to a lesser degree, from tributaries to the Tigris originating in Iran. Another shared river originating from outside the ESCWA region is the Qweik River, a small-scale internal drainage system that flows from Turkey, where most of the discharge is generated, into the Aleppo province of the Syrian Arab Republic.

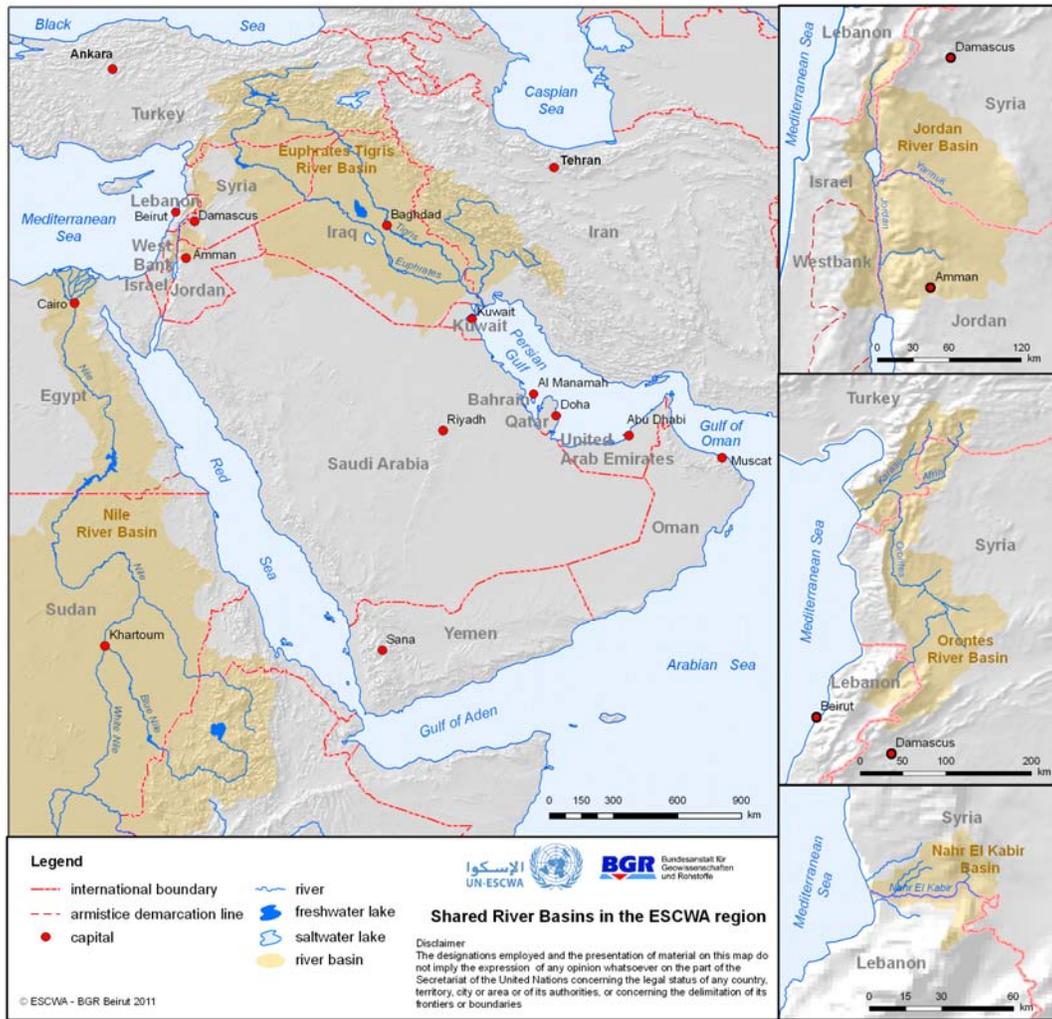
The remaining perennial rivers all originate within the ESCWA region. Lebanon and the Syrian Arab Republic share the Nahr El Kebir and the Orontes Rivers. Both Lebanon and the Syrian Arab Republic are also upstream riparian countries of the Upper Jordan tributaries, which constitute the headwaters of the Jordan River. These are the Hasbani-Ouazzani River (originating in Lebanon), the Baniyas River (Baniyas spring and catchment are located mainly in the occupied Golan Heights), and the Dan River (fed by groundwater originating mainly from Lebanon and partly from the Syrian Arab Republic). The Jordan River Basin also includes the Yarmouk Basin and the Dead Sea.

In addition to the rivers flowing through the ESCWA region and neighbouring non-Arab countries, several surface watercourses cross the boundaries into the Arab region. This is the case in the Lake Chad Basin, which has an area of 2,388,700 km² and encompasses eight countries, namely Algeria, Cameroon, Central African Republic, Chad, Libya, Niger, Nigeria and the Sudan. There are also many rivers that host exclusively Arab countries as riparians, such as the Dra and the Guir rivers, both shared by Algeria and Morocco.³⁹

³⁸ FAO, op. cit.

³⁹ World Water Assessment Programme (WWAP), *World Water Development Report: Water for People, Water for Life* (2003).

Figure III. Overview map of shared rivers in the ESCWA region



2. Shared seasonal wadis

Wadis are ephemeral streams in which water flows only after periods of heavy rain, and they most commonly develop in desert valleys. In addition to sustaining nomadic life in remote desert areas, shared wadis are important as a source of freshwater supply to rural areas from shallow aquifers, where they serve as means for aquifer recharge.

Many of these systems occur in the Arabian Peninsula, where intermittent short-duration flash floods that result from heavy summer rains descend from the highlands of Oman, Saudi Arabia and Yemen. They either debouch onto the coastal lowlands or flow towards the interior parts of the Arabian Peninsula, where they disappear into sand dunes or in the vicinity of isolated outcrops. They form closed, comparatively small basins and are commonly subject to aeolian deposits. High evaporation rates result in the accumulation of salts in the downstream areas, however, relatively fresh water can usually be abstracted further upstream and some are locally important shallow aquifers.

These wadi systems are often the only source of water for nomadic populations across the Arabian Peninsula. An example is the Rub' al-Khali Desert, where many wadi channels descend from the plateau

areas in the northeastern part of Yemen (Hadhramaut) flowing north to Saudi Arabia or northeast to Oman. Another example for shared wadis can be found at the northern border of Saudi Arabia with Iraq and Kuwait. These wadi systems originate north-northeast of the an-Nafud ad-Dahna Deserts and flow across the al-Hasa plain towards the Euphrates valley and Shatt el-Arab. A third example of shared wadi system is the al-Kuntilla area, east Sinai, which traverses the eastern border of Egypt towards Israel.

C. SHARED GROUNDWATER RESOURCES

Groundwater occurrence and movement is governed by many factors, such as surface features, including, among others, rainfall intensity and distribution, geo-morphological features and topography; and sub-surface structures and lateral changes, including, among others, tectonic faults and structure, types of rock formation/aquifer, and lithological and structural features. Given the similarity in the geologic history in neighbouring countries, the same water-filled rock unit frequently forms an aquifer system in two or more countries. In the ESCWA region, many of these systems occur in extensive geological formations that cover tens and sometimes hundreds of kilometers. However, smaller systems also exist, particularly in tectonically complex areas or in wadi discharge areas where several channels join together and enhance the accumulation of thick alluvial deposits (wadi aquifers).

1. *Characterization of shared aquifer systems*

An “aquifer system” refers to a series of two or more aquifers that are hydraulically connected, and there are several possible ways of categorizing it.⁴⁰ However, no classification, identification and delineation of shared groundwater basins in the region have ever been undertaken. By contrast to surface water, groundwater basins are much more difficult to delineate owing to a number of factors. First, the catchment area of each river basin can easily be determined by land-surface topography, while the boundaries of a shared aquifer system are often not well defined and are therefore more difficult to determine. Secondly, flow changes owing to rainfall runoff and abstraction are quickly apparent in surface water systems, while groundwater flow reacts over a much larger time scale. Consequently, many years or even centuries may elapse between initial recharge and eventual discharge to a spring, stream or the sea. Groundwater quality is also important given that it can limit the intended use.

For the purpose of this report, shared aquifer systems are considered to be mainly separate aquifer systems that are not connected to other major surface water resources. The least disputable aquifer characteristic, namely, that related to the geological age or era, has been chosen here as the main basis for aquifer identification.⁴¹ From the management standpoint, it is important to know how groundwater flows and how it is retained within the aquifer systems (the aquifer type) and whether or not they are continuously replenished (renewability with freshwater), as follows:

(a) *Aquifer type*: Groundwater in aquifer systems of the region can occur in the following ways: (i) porous aquifers, which are dominated by primary voids (pores), and consist mainly of sandstone and alluvial sediments along river/wadi channels and foothill areas of the Arabian Peninsula; (ii) fissured/karstic aquifers, which are dominated by fractures and karstic features that result in a high anisotropy of flow, and are mainly carbonate rocks occurring in the eastern part of the Arabian Peninsula and along mountain areas of the Mashreq and Taurus-Zagros; and (iii) mixed aquifers (mixed pores and fissures), with different types of rocks occurring in relatively unstable areas in which sedimentation is interrupted by magmatic activities and/or volcanic events, mainly in the northern part of the region;

(b) *Renewability with freshwater*: In terms of recharge, the shared aquifer systems in the region can be considered to belong to either of the following two broad categories: (i) *renewable aquifer systems that*

⁴⁰ United Nations General Assembly, “The Law of Transboundary Aquifers” (2009).

⁴¹ There are three geological eras, namely: Paleozoic (oldest), Mesozoic (middle) and Cenozoic (youngest).

receive significant present-day recharge (often >20 mm/yr), which represent systems that may not be vulnerable to groundwater mining if used wisely; and (ii) *non-renewable aquifer systems with low renewability*: receiving no significant present-day recharge (often <20 mm/yr) containing mostly fossil groundwater, which represent systems that are vulnerable to groundwater mining regardless of how they are used.

2. Identified shared aquifers systems

Applying the above criteria, a preliminary list of 19 shared aquifer systems can be identified in the ESCWA region. The final listing of these aquifer systems will be provided in the ESCWA-BGR inventory to be issued in 2012. These aquifer systems are presented in table 6 and displayed on the map in figure IV.

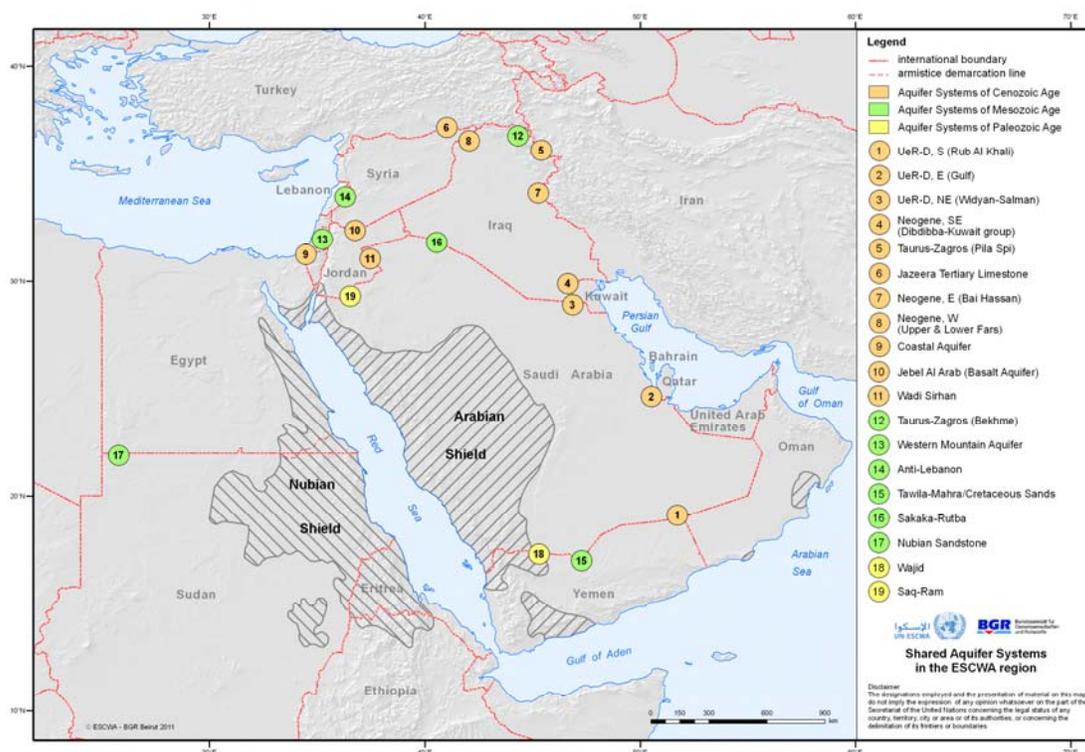
TABLE 6. SHARED AQUIFER SYSTEMS IN THE ESCWA REGION

Era	Shared aquifer system	Sharing countries/territories	Aquifer type	
Cenozoic	Umm er-Radhuma – Dammam, northeast section (Widyan-Salman)	Iraq, Kuwait, Saudi Arabia	Fractured/karstic	Non-renewable
	Umm er-Radhuma – Dammam, east section (Gulf)	Bahrain, Qatar, Saudi Arabia	Fractured/karstic	
	Umm er-Radhuma – Dammam, south section (Rub Al Khali)	Oman, Saudi Arabia, United Arab Emirates, Yemen	Fractured/karstic	
	Neogene, southeast section (Dibdibba – Kuwait group)	Iraq, Kuwait, Saudi Arabia	Fractured/karstic	Renewable
	Neogene, west section (Upper and Lower Fars)	Iraq, Syrian Arab Republic	Mixed	
	Neogene, east section (Bai Hassan) ^{a/}	Iran, Iraq	Porous	
	Wadi Sirhan	Jordan, Saudi Arabia	Porous	
	Jebel Al Arab (Basalt aquifer)	Jordan, Saudi Arabia, Syrian Arab Republic	Mixed	
	Coastal Aquifer ^{a/}	Sinai, Israel, Palestine	Porous	
	Jazeera Tertiary Limestone ^{a/}	Syrian Arab Republic, Turkey	Fractured/karstic	
Taurus-Zagros (Pila Spi section) ^{a/}	Iran, Iraq	Fractured/karstic		
Taurus-Zagros (Bekhme section) ^{a/}	Iraq, Turkey	Fractured/karstic		
Mesozoic	Anti-Lebanon	Lebanon, Syrian Arab Republic	Fractured/karstic	Non-renewable
	Western Mountain Aquifer	Sinai, Israel, Palestine	Fractured/karstic	
	Sakaka-Rutba	Iraq, Jordan, Saudi Arabia	Porous	
	Tawila- Mahra/Cretaceous Sands	Saudi Arabia, Yemen	Porous	
	Nubian Sandstone ^{a/}	Chad, Egypt, Libya, the Sudan	Porous	
Paleozoic	Saq-Ram	Jordan, Saudi Arabia	Porous	Non-renewable
	Wajid	Saudi Arabia, Yemen	Porous	

Source: ESCWA-BGR Cooperation.

^{a/} These relate to interregional systems.

Figure IV. Overview map of shared aquifer systems in the ESCWA region



Note: The border between the Sudan and South Sudan is not delineated in this map.

The aquifer systems described in table 6 are categorized by geological era, as follows:

(a) Paleozoic and Paleozoic to Mesozoic aquifer systems: The aquifers of the region exclusively belonging to the Paleozoic era are sandstone aquifers with limited renewability that are found only in the Arabian Peninsula. It comprises the Saq-Ram aquifer system (known as Saq or Saq-Tabuk in Saudi Arabia and Ram, Rum, Disi or Disi-Mudawwara in Jordan), which consists of several formations of the Cambro-Ordovician age. The deposition of the formation comprising the Wajid aquifer system extends to the Permian period. The Nubian sandstone aquifer is of the Paleozoic to Mesozoic age (Carboniferous to the Middle Cretaceous) and is made up of a sequence of continental sandstones and sands intercalated with argillaceous beds,⁴²

(b) Mesozoic aquifer systems: These aquifer systems are mainly found in the Arabian Peninsula and the Mashreq part of the region. On the Arabian Peninsula, the Sakaka-Rutba aquifer system in the north is formed by the extension of the Wasia (known as Sakaka) together with the overlying Aruma formation. On the southern part of the Arabian Peninsula, the Biyadh and Wasia formations grade together with the Aruma to form a thick sandstone unit known as the Cretaceous Sands in Saudi Arabia and Tawila-Mahra in Yemen, which correlate stratigraphically, thereby referred to as the Tawila-Mahra/Cretaceous sands aquifer system. The dominant Mesozoic aquifers of the Mashreq region are the carbonate rocks of the Western Mountain Aquifer system and the Anti-Lebanon aquifer system, ranging in age from Upper Cretaceous to Jurassic. The Bekhme Karst aquifer system is another Mesozoic aquifer composed of limestone-dolomite and covers large areas mostly in the northern Taurus-Zagros Mountains;

⁴² ESCWA, United Nations Environment Programme (UNEP) and Islamic Development Bank (IDB), “Water Resources Assessment in the ESCWA Region Using Remote Sensing and GIS Techniques” (1996).

(c) Cenozoic aquifer systems: Most of the shared aquifers in the ESCWA region belong to this class. The most extensive aquifer system is the Umm er-Radhuma-Dammam, which nearly extends from the northern to the southern end of the Arabian Peninsula. This system generally comprises three Paleogene (Paleocene-Eocene) formations, namely Umm er-Radhuma, Rus and Dammam.⁴³ Another larger system is composed of the clastic Neogene formations, extending across most of the northern Arabian Platform, and is divided into three shared sections: the conglomerates of the eastern section or Bai Hassan aquifer system at the foothill of the Taurus-Zagros mountains; the southeastern section or Dibdibba-Kuwait Group aquifer system; and the western section or Upper and Lower Fars aquifer system, also known as Fatha-Injana aquifer system consisting of Upper to Middle Miocene strata (gypsum, limestone, and mudstone). By contrast to the extensive Umm er Radhuma-Dammam aquifer system, other Cenozoic aquifer systems are significantly smaller and/or highly complex. West of Umm er Radhuma-Dammam, the Paleogene deposits extend further to the Hamad plateau area where they underlie unconsolidated Neogene-Quaternary deposits (Wadi Sirhan). The clastic formations of Eocene to Holocene age of the Coastal Aquifer are situated along the Mediterranean coast. The Jazeera Tertiary Limestone aquifer system is of Middle Miocene age. A completely different aquifer system is the Jabal al-Arab aquifer system that consists of volcanic sequences of Neogene-Quaternary age. In the Taurus-Zagros Mountains, the Pila Spi aquifer system is a highly complex fractured karstic aquifer of Eocene age.

In addition to the aquifer systems encompassing the ESCWA region mentioned above, other aquifers are exclusively shared between Arab countries, the main one being the Northwestern Sahara Aquifer System. It extends through 1,019,000 km² and is shared between Algeria, Libya and Tunisia. Another example is the Tindouf Aquifer, with an area of 210,000 km² that underlies Algeria, Morocco and to a lesser extent Mauritania.⁴⁴

3. Shared wadi aquifer systems

Shared wadi aquifer systems exist mainly along the middle reaches of larger wadis and consist of permeable alluvial material often restricted by less permeable fine sediments in the flood plain areas and are recharged from surface runoff collected in the wadis (indirect recharge). They are commonly found in southwestern Saudi Arabia and northwestern Yemen and, to a lesser extent, in the northwestern area of the Hajar Mountains in Oman and the United Arab Emirates, where the size of the catchment area, the rainfall intensity and/or duration, and the soil type are favourable for rapid infiltration of large volumes of rainfall through well-defined wadi channels. Appreciable volumes of surface water carried by wadi channels during the rainy season flow to close valleys near the western edge of the Arabian Shield. While many of these wadi aquifers occur within Saudi Arabia (Wadi Dawasir system), the Asir-Nejran system originates inside Yemen and, hence, constitutes a shared aquifer system. Another shared wadi aquifer system is the Al Hasa-Al Dahira system between Oman and the United Arab Emirates.

⁴³ Umm er-Radhuma is the principal aquifer and the most widely spread, and Rus is the least important. It is divided into three shared sections: the northeastern section or Widyan-Salman aquifer system; the eastern section or Gulf aquifer system; and the southern section or Rub' al-Khali aquifer system.

⁴⁴ UNESCO and International Hydrological Programme (IHP), *Atlas of Transboundary Aquifers: Global Maps, Regional Cooperation and Local Inventories* (Internationally Shared Aquifer Resources Management (ISARM) Programme, 2009).

III. SHARED WATER RESOURCES MANAGEMENT FROM A REGIONAL PERSPECTIVE

A. REGIONAL CULTURAL CONTEXT

In ESCWA member countries, water is considered in principle a public good. However, often individual land rights are linked to water use and abstraction rights. Until now ESCWA member countries have relied on scarce waters for their livelihood that includes basic domestic activities and production of food, which is the most water-intensive user among the competing sectors. Owing to the expansion of Arab cities over the years, economic development that includes investment in industrial production and rapid population growth, the region as a whole moved from water sufficient positions to water insufficiency, thereby rendering the Arab position more vulnerable with their increased reliance and dependence on water already originating from outside their borders. Recent developments related to climate change, food security and their effect on water resources have further exacerbated this situation. Climate change is expected to affect rainfall patterns, river flows and sea levels; and the effects of climate change have already been seen in terms of more frequent drought periods. Additionally, Arab countries have been increasing virtual water import in the form of food stuff since the early 1970s to meet growing needs. This increase in virtual water import across the region shows that its role is likely to increase as to address food security issues by bridging the gap between national food productions and growing demand. Furthermore, with respect to the Gulf subregion, as mentioned in chapter I, large investments in desalination plants, and water supply development projects are noticeable.⁴⁵

1. *Regional traditions and customs in water management practices*

Management of water resources in the region lay traditionally at the local level for centuries. Local communities managed the allocation of water, and the preservation of water quality by focusing on the sense of ownership and allocating responsibilities to appropriate stakeholders in the management of the resource.⁴⁶ The influence of tribal decisions in some areas also played an important role in allocating limited water resources. Informal water institutions, which were formed in several areas in the Arab region mainly by farmers and nomads, had an important role in promoting improved agricultural practices that took into consideration the scarcity of the resources and difficulty of accessing it. These communities created and improved techniques of farming and irrigation that were subsequently used in several regions of the world.⁴⁷ As shown in table 7, many traditional water systems and techniques were widely used in many countries of the Arab region primarily to conserve and convey water resources in an equitable and efficient manner, in light of the limited resources. These techniques vary from *meskats* and *jessour* of central and southern Tunisia, namely, systems aimed at conserving rainwater; *qanats* in Marrakech and Iran; *dawras*, *nawbas* and other time measurements in Egypt; and the *aflaj* system in Oman.⁴⁸

As for water legislation in the region, it can be traced back to the Qur'an and Hadith, the Code of Justinian and Roman law, the Old Testament, Egyptian Pharaonic Water Regulations and the famous code of Hammurabi. The Code of Hammurabi, decreed around 1760 BCE, included provisions regulating waterworks, allocation and use. Earlier, in 2400 BCE, the Assyrians adopted irrigation laws that compelled irrigators to maintain an equitable use of the water in their shared systems.⁴⁹ In the Islamic law, which

⁴⁵ ESCWA, "ESCWA Water Development Report 3: Role of Desalination in Addressing Water Scarcity" (E/ESCWA/SDPD/2009/4).

⁴⁶ Arab Water Council, *Arab Countries Regional Report* (2009).

⁴⁷ J.A. Allan and C. Mallat, "Water in the Middle East: Legal, Political and Commercial Implications" (1995).

⁴⁸ Ibid.

⁴⁹ O. al-Jayyousi, "The role of formal, informal religious, traditional and customary regulations in managing shared water resources in ESCWA region" (2009), presented at the Expert Group Meeting on Applying IWRM Principles in Managing Shared Water Resources (Beirut, 1-3 December 2009).

constitutes customary law and practice in the region and is formally recognized in most Arab countries, there are two primary water rights, namely the right to satisfy thirst and the right for irrigation. The first right establishes the right for humans to satisfy their own thirst and that of their animals. The second right gives water users the right to irrigate their fields. In addition, Islamic law clearly points out that the interests of the society take priority over the interests of individuals when they cannot be reconciled. Islamic law also stipulates that special consideration is to be given to the ability of various groups to secure their water welfare without the government's intervention as the authorities should mainly protect and care for disadvantaged groups. Communal ownership of water resources is reinforced in the Islamic legal system by declaring that people are partners in water, fire and pasture.⁵⁰

TABLE 7. DISTRIBUTION OF TRADITIONAL WATER SYSTEMS IN ARAB COUNTRIES

Country	Cistern	Small dams	Hafirs	Tree trunks	Koroum/ghadirs	Terraces/masateh	Irrigation diversion dams	Water spreading dykes	Miskat	Artificial recharge	Check dams
Algeria		X				X	X	X			
Bahrain											
Egypt	X	X			X		X	X		X	
Iraq	X	X	X		X	X	X	X			
Jordan	X	X	X		X	X	X	X		X	
Kuwait			X								
Lebanon	X	X	X		X	X	X	X			
Libya	X	X				X			X		X
Mauritania		X	X					X			
Morocco	X	X			X	X	X	X		X	
Qatar			X							X	
Saudi Arabia		X	X		X	X		X			
Sudan		X	X	X	X		X	X		X	
Syrian Arab Republic	X	X	X			X	X	X			
Tunisia	X	X				X	X		X		X
United Arab Emirates		X								X	
Yemen	X	X	X			X	X			X	

Source: A. Zaki, "Water Harvesting Techniques in the Arab Region" (UNESCO Cairo Office, unpublished presentation).

2. Current water management practices

The emergence of demand and supply management concepts in recent years has led to an increase in the role of governments in monitoring and managing water resources through funding big water infrastructure projects, and the formation of new institutional structures aimed at managing these resources at the national and local level. Influenced by such concepts, these institutions were not only trusted to manage water supply but also to manage demand for water in order to optimize the use of water and allocate water

⁵⁰ N. Faruqi, N. et al, *Water Management in Islam* (IDRC/UNU Press, 2001).

efficiently between different sectors, namely agriculture, industry and households. These institutions, however, are viewed in some countries as ineffective and fragmented given that they are disseminated across different government departments, thereby leading in some cases to problems of bureaucracy and inefficiency in decision making. Moreover, in some countries, the private sector is involved in the production and conveyance of drinking water and the management of wastewater through partnership with the public sector.⁵¹

In the 1960s, Arab countries started investing in large-scale water infrastructure systems to supplement traditional supply resources in view of securing water for their increasing water needs, energy production and farming, or even for controlling water flows in the associated rivers. Large-scale dams have been built in Egypt, Iraq, Morocco, the Sudan and the Syrian Arab Republic, while other relatively smaller dams were built in Egypt, Jordan, Oman, Saudi Arabia, the Sudan and Tunisia aimed at water harvesting and recharging depleting aquifers.⁵²

Furthermore, agreements on building joint dams have been reached among several Arab countries in order to maximize use of shared resources. Such agreements include sharing the water of al-Kabeer al-Janoubi River and for building a joint dam, which was agreed between Lebanon and the Syrian Arab Republic in 2002; building the al-Wahda Dam on the Yarmuk River, between Jordan and the Syrian Arab Republic in 2004, where they agreed to a particular cost sharing arrangement for the design and construction of the Dam.⁵³

Water legislation in the majority of Arab countries is still governed by a combination of Sharia law and some traditional practices, in addition to various elements of modern water codes and customary practices. Arab countries have begun to realize the importance of comprehensive water legislation and have taken steps to update existing laws or to introduce new laws in order to cover these development activities. Many of the water legislations in the region were enacted between 1967 and 1985 and some countries, including those in the Gulf subregion, Egypt, Jordan, Lebanon and Yemen, have made an effort to revise or modernize existing laws or to introduce new water legislation in the past decade, while preparing their respective national water resources plans that are largely in line with the principles of IWRM.⁵⁴

A review of the evolution of water legislation shows that countries depending largely on surface water usually enact laws designed to regulate river flow diversion and establish water quality standards for drinking and reuse purposes and control pollution, in addition to providing for water allocation guidelines. Countries that rely mainly on groundwater have a tendency to issue directives or laws aimed at regulating groundwater development and abstraction. Examples of these laws are the Water Law of 2002, Law 12 of 1995 and Law 54 of 2002 in Jordan; Law 12 for irrigation and drainage and Law 4 of 1994 for the protection of the environment in Egypt; the Water Law in Lebanon; Law 33 of 2002 in Yemen; and Law 11 of 1991 in Bahrain.⁵⁵

3. Shared water resources

In the Arab region, similarities in culture, history and language have contributed to some degree to the settlement of conflicts over shared water resources, leading to increased common welfare and common

⁵¹ ESCWA, "Updating the Assessment of Water Resources in ESCWA Member Countries" (E/ESCWA/ENR/1999/13).

⁵² Arab Water Council, *Arab Countries Regional Report* (2009).

⁵³ ESCWA, "Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region" (E/ESCWA/SDPD/2005/15).

⁵⁴ ESCWA, "Guidelines With Regard to Developing Legislative and Institutional Frameworks Needed to Implement IWRM at the National Level in the ESCWA Region" (E/ESCWA/SDPD/2007/1).

⁵⁵ ESCWA, "Module 3 on Legislative and Organizational Frameworks" (E/ESCWA/SDPD/2005/WG.1/4).

development of resources. However, many of these Arab countries also share water with non-Arab countries where such common understanding on culture, language and history do not necessarily exist. Adding to this difference, most of Arab countries are downstream countries whereby relations among these countries are governed and influenced by the usual upstream-downstream competition over water resources.⁵⁶

When comparing traditional and religious laws for managing shared water resources with international water law and principles, a number of common bases exist, and a mutual approach can be established. Reasonable and equitable water allocation, consultation and preserving the public interest are the main principles that overlap. Traditional and religious laws for managing shared water resources are mostly in line with the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (referred to hereafter as the Watercourse Convention) and the Law of Transboundary Aquifers of 2009. They all agree on the notion of minimum harm principle as stipulated in the Helsinki Rules, and to the concept of limited sovereignty of States when dealing with shared water that are mentioned in those rules and the Watercourse Convention. They all provide objective and rational criteria for water allocation based on consultation in order to ensure cooperation, public interest and equity (see chapter IV).

Enforcement of legal instruments related to shared waters, however, requires commitment by riparian States given the absence of any international enforcement entity. It should be noted that not all Arab countries voted initially in favour of the Watercourse Convention. Specifically, 15 out of 22 Arab countries voted in favour, namely Algeria, Bahrain, Djibouti, Jordan, Kuwait, Libya, Morocco, Oman, Qatar, Saudi Arabia, the Sudan, the Syrian Arab Republic, Tunisia, United Arab Emirates and Yemen; while Egypt abstained from voting.⁵⁷

B. ARAB COOPERATION AND INTEGRATION

Arab countries were mostly colonized or under foreign administration prior to gaining their independence during the twentieth century. The political boundaries of the newly established States faced a challenge in building positive inter-State relations and coping with the issue of sharing water resources owing to the defiance of these waters to the political boundaries that had been largely imposed on them by former suzerain powers. The League of Arab States was successful in mitigating the effect of some water-related tensions among several Arab countries, including, for example, between Iraq and the Syrian Arab Republic in the 1980s. Gulf countries had the ability to develop alternate albeit more expensive sources of water for their domestic consumption.

However, relations with non-Arab countries, which are in most cases the upper riparian countries of the water flowing into the region, have not been very positive. The vulnerable position of Arab countries owes, as mentioned above, to the fact that most are downstream countries, thereby putting them at risk of lower water availability from these shared resources stemming from increased water demand in the upstream countries. This situation led to the increased need for “Arab solidarity”, which recognized that Arabs need to defend their common interests for the benefit of all. This concept of solidarity was developed for Arab countries in order to help provide mutual assistance in facing “external threats”.

While Arab economic integration is still relatively weak, it has improved significantly over the past few years. However, the magnitude of intraregional trade has remained significantly low despite recent efforts devoted to enhance the situation. Moreover, while Arab countries continue to trade significantly with the rest of the world, the share of intra-Arab country trade of the total trade of ESCWA member countries has remained below 12 per cent, and registered 6.3 per cent for the GCC countries in 2007.⁵⁸ This compares

⁵⁶ K. Abu-Zeid and M. Elrawady, “Water Rights and Equity in the Arab Region” (2008).

⁵⁷ Comoros, Lebanon and Mauritania were absent, while Iraq, Palestine and Somalia were not represented.

⁵⁸ ESCWA, “Summary of the Survey of Economic and Social Developments in the Economic and Social Commission for Western Asia Region, 2010-2011” (E/ESCWA/EDGD/2011/2).

negatively with the higher levels of internal trade achieved in other integrated regions across the world. For example, in the same year, 2007, the interregional share of trade among the countries of the Association of Southeast Asian Nations (ASEAN) was 25.4 per cent; in Latin America, the interregional share of trade was 14.4 per cent; within the North American Free Trade Agreement (NAFTA) area, the interregional share of trade was 41 per cent; and between the member countries of the European Union, interregional trade was registered at 66 per cent of their total trade. The ESCWA region has witnessed various regional agreements and intraregional physical infrastructure projects aimed at facilitating intraregional trade, including the Agreement on International Roads in the Arab Mashreq. However, the number of physical infrastructure projects geared towards improving water storage and management has been limited.

In order to improve the situation and enhance regional economic integration and cooperation, Arab countries recently dismantled many trade barriers among them. Furthermore, a number of Arab countries, namely Egypt, Jordan and Lebanon, have pursued greater trade liberalization policies by dismantling systems of quantitative controls, cutting tariff levels and streamlining tariff systems, and introducing export promotion schemes and current and capital account convertibility. Policies to promote non-oil, non-mineral exports were also implemented in some countries that rely heavily on primary commodities.

All efforts aimed at enhancing Arab integration are led by the League of Arab States, which has developed and concluded many mutual treaties, conventions and agreements in view of increasing the level of integration. At an institutional level, besides the main Ministerial Council of Foreign Affairs, the League of Arab States has established various ministerial councils that look into specific sectors and reach common positions on them. Given the pivotal role of water in sustainable development and the impact of water scarcity at the local, national and regional levels, the League of Arab States established the Arab Ministerial Water Council (AMWC) in 2008 (described below). The decision to establish the Council reflects the regional political will to elevate water issues from the traditional technical level to the more influential political level. The establishment of AMWC also demonstrates the interest of member countries in dealing with water issues of a regional nature, including those connected to the management of shared water resources.⁵⁹

C. REGIONAL INSTITUTIONAL FRAMEWORK

Realizing the pivotal role of water for sustainable development and the compounded impacts of water scarcity at the local, national and regional levels, countries in the region have stepped up their political commitment and cooperation to a new level. The establishment of AMWC in July 2008 reflects a unified regional political will to promote discussion on water issues from the technical level to the political level. This Council's primary vision was to boost and coordinate Arab cooperation efforts within a joint Arab strategy in order to combat water challenges and strengthen Arab water security. Within that vision, AMWC aims to enhance water demand management, develop and preserve water resources both in terms of quality and quantity, promote the integrated management of water resources and protect Arab water rights.

AMWC is supported by several institutions, as follows:

(a) The Executive Bureau of the Council is an intergovernmental body that meets on a biannual basis. It comprises one representative out of nine member countries of the League of Arab States who serve for two-year terms. The selection of these nine representatives is based on the following criteria: three member countries that chair the Arab Summit (the current, previous and forthcoming chairs), three elected representatives and three serving on the basis of alphabetic rotation;

(b) The Technical, Scientific and Advisory Committee, which supports AMWC and the Executive Bureau, comprises technical representatives drawn from the League of Arab States member countries, expert

⁵⁹ ESCWA, "Working Paper on the Joint Management of Shared Water Resources Within an Integrated Water Resources Management Context: Fostering a Legal Framework for the Arab region" (E/ESCWA/SDPD/WP.2).

representatives of regional organizations, and expert representatives of a number of NGOs working at the regional level;

(c) The Technical Secretariat of the Council, which also coordinates the logistical and administrative support to AMWC, is technically supported by ACSAD and the Centre of Water Studies and Arab Water Security, and facilitates the work of the Technical, Scientific and Advisory Committee.

The Technical Scientific and Advisory Committee meets on a biannual basis prior to the meetings of the Executive Bureau and it usually discusses the topics and issues identified during the meetings of the Council, recommends appropriate courses of action and reports its recommendations to the Executive Bureau. This can involve mandating one or more members of the Committee to conduct additional research. The Executive Bureau then deliberates the recommendations of the Technical Committee and passes resolutions accordingly. The resolutions of the Executive Bureau, which are primarily related to the progress made in the implementation of Council resolutions, are followed up and discussed during the annual meeting of the Council.⁶⁰

With respect to shared water resources, AMWC identified shared water resources as a regional priority and emphasized the importance of using all available international water-related legal instruments to secure and protect Arab water rights. In its first session, which was held in July 2009, AMWC passed a resolution calling on enhancing negotiating skills for Arab countries sharing water with non-Arab countries.

In its second session, which was held in July 2010, AMWC passed a resolution calling for the preparation of a draft legal framework on shared waters within the Arab region. Specifically, it invited the Centre of Water Studies and Arab Water Security, ESCWA, ACSAD and SIWI to “prepare a draft legal framework on shared waters within the Arab region for its discussion during the next meeting of the Technical Scientific Advisory Committee of the Ministerial Council in January 2011”.⁶¹

This resolution of the AMWC is viewed as a major step towards improved legal arrangements among the League of Arab States member countries and their neighbours. The preparation of such a framework provides an opportunity to clarify principles related to the management of shared water resources at principally the intraregional level (between countries of the Arab region), but could also influence cooperation at the wider interregional level (between the Arab region and the bordering non-Arab countries).

With respect to the regional institutions named in the resolution to prepare the draft legal framework, the Centre for Water Studies and Arab Water Security is a regional centre that was established in accordance with the decision of the Council of the League of Arab States on 15 September 1996 as part of the League of Arab States Secretariat to follow up on water-related issues in the Arab region in view of preserving Arab water rights, especially with respect to challenges faced by the Israeli occupation of Arab land and the relationship between Arab and non-Arab countries. The Centre aims to formulate a unified Arab position on water issues that is based on thorough research undertaken at technical and legal levels in order to identify challenges and problems facing this sector between the Arab countries and with non-Arab countries, and is based in Damascus.

Within that context, ESCWA is an important knowledge provider and resource hub for supporting cooperation and management of shared water resources through its well-established regional coordination mechanisms and intergovernmental processes, such as the ESCWA Committee on Water Resources. ESCWA collaborates with other regional organizations, including other United Nations agencies and programmes, and technically supports the League of Arab States and its sub-organs and institutions. Additionally ESCWA has the ability to draw on technical and financial resources to offer direct support to its

⁶⁰ Arab Ministerial Water Council website, available at www.arableagueonline.org.

⁶¹ Arab Ministerial Water Council (AMWC) resolution No. 20, item 3.

member countries in their endeavours to enhance cooperation and management of shared water resources. Such support is provided through projects and partnerships, including the ESCWA-BGR Cooperation on water resources. Through this collaboration with BGR, ESCWA has responded to member countries request to install monitoring systems for shared water resources and organized expert meetings and workshops on shared water resource management and integrated water resources management. .⁶²

ACSAD, which was established in 1968 within the aegis of the League of Arab States, aims to improve agricultural research in arid and semi-arid regions, and assists Arab countries in achieving integrated water resources management through the optimization and rationalization of their water use; provides guidance on the use of brine water and wastewater in agriculture production; and seeks to conserve the environment and biodiversity and combat desertification; and creates databases on land, water resources, crops and livestock in the region. Over the years, ACSAD has been able to assist Arab countries with technical studies, hydrological and hydro-geological GIS maps and an extensive water database that has supported the preparation water plans and strategies in the region.⁶³

D. REGIONAL POLICY FRAMEWORKS

1. *Geopolitics of shared water resources*

In general, upstream countries stress on their sovereign right to make use of water within their territories, particularly for development purposes, while downstream countries rely on the concept of absolute territorial integrity to protect their rights. In addition, the rapidly increasing economic, social development and expansion of most countries in the past decade have increased water demand, thereby leading to large investments in hydraulic infrastructures. These investments in the form of dams, water treatment and electricity generating stations are erected to optimize and maximize benefits from these scarce resources. However, the negative impact of such structures can be felt in downstream countries, which is the case of most Arab countries.⁶⁴ Arab countries are mostly downstream countries and continue to complain of the situation and accuse upstream and usually non-Arab countries of overexploiting the shared resources. Upstream countries, on the other hand, justify their expanding water use as a matter of national security. Furthermore, there is a lack of globally adopted international legal instruments in the form of binding agreements or conventions that could compel these countries to change their plans.

In cases of conflict, riparian countries resort to bilateral, multilateral and regional agreements or even make reference to international water treaties and conventions to resolve water allocation and management challenges. While some bilateral or even multilateral agreements are in place, in general they are not comprehensive in that they fail to take into consideration all existing riparian countries. The absence of such comprehensive treaties present pretexts to those neighbouring countries that have not been included to give importance to such issues as territorial sovereignty and optimum use of water resources that usually provides upstream countries with the perception that they have greater control over these resources. The power imbalance among riparian countries also impacts on the behaviour of these countries towards water use, thereby affecting the relationship between riparian countries and favouring the strongest while leaving the weak in a vulnerable position.

⁶² ESCWA website, available at www/escwa.un.org.

⁶³ ACSAD website, available at www.acsad.org.

⁶⁴ Ibid.

2. Arab Water Security Strategy

The first Arab Economic and Social Development Summit (Kuwait, 19-20 January 2009) mandated the newly established AMWC to prepare a regional strategy for Arab water security.⁶⁵ The strategy, which was drafted by ACSAD, included a wide range of water-related issues covering most of the components and principles of integrated water resources management. AMWC adopted the final version of the strategy in June 2011 after discussions held during its first meeting in Algiers in June 2009, the review of the Executive Bureau in January 2010, and the incorporation of comments and proposals made by the Arab Water Experts Committee formed by several Arab countries and organizations to finalize the strategy. The approved Arab Strategy for Water Security in the Arab Region to Meet the Challenges and Future Needs of Sustainable Development (2010-2030) is set to be submitted to the next Arab Economic and Social Development Summit for endorsement at the level of heads of State.

The Arab Water Security Strategy elaborates joint priorities for realizing sustainable development in the Arab region. It covers the period 2010 to 2030 and its indicators of achievements will be reviewed every five years. This Strategy represents a long-term programme and provides a mechanism to assist Arab countries in overcoming potential challenges in the development and management of water resources in the region, making reference to potential future challenges in that field.

Water resources in the region are characterized by their limited supply, the diversification of their geographical distribution, the mounting competition for their uses beside the complex interactions between springs, streams and estuaries of many tributaries and rivers, groundwater layers, in addition to having some springs and water resources under foreign occupation. The common challenges that transcend national borders lead to the need to unify and consolidate Arab potentials and expertise to reach Arab integration. However, the implementation of this Strategy requires contribution of all parties at stake as its objectives cannot be achieved without coordination and cooperation between national organizations and water ministries as well as specialized Arab regional organizations, international organizations and the civil society involved in the water sector. This Strategy is to be used by AMWC as a guiding framework through which the League of Arab States member countries can develop a unified response to such water challenges as national and regional water and food security, climate change, and their impacts on water availability in the region.

With respect to shared water resources, the Strategy makes reference to existing and potential political tensions resulting from the absence of bilateral or multilateral water treaties and agreements that can assist riparian countries in regulating water allocation. The Strategy also stresses the need for such treaties and agreements in order to avoid tensions that could threaten regional stability. Additionally, it makes reference to the water situation in the occupied Arab territories, namely Palestine, the Syrian Golan and certain areas in Southern Lebanon, where the use of these resources is controlled by Israel, while Arab residents are deprived of the right to access these resources. The Strategy also acknowledges the need for sound and joint management and monitoring of shared water resources, and emphasizes the need for clear tools to facilitate concluding agreements between countries on the basis of fair allocation mechanisms, thereby ensuring an equitable share of water resources.

3. Strategy for Water in the Mediterranean

Participants of the Euro-Mediterranean Ministerial Conference on Water, which took place within the framework of the Union for the Mediterranean (Dead Sea, Jordan, 22 December 2008), agreed to prepare a shared and long-term Strategy for Water in the Mediterranean (SWM), and approved guidelines for its elaboration.⁶⁶ A Euro-Mediterranean water expert group (WEG) was entrusted to work on preparing this

⁶⁵ League of Arab States, "Report and Resolutions of the Third Session of the Arab Ministerial Water Council (Cairo, 15-16 June 2011)" (in Arabic).

⁶⁶ Cooperation in the Water Sector, Union for the Mediterranean, available at www.ufm-water.net/.

SWM involving national governments, local authorities and regional stakeholders. The aim of developing a strategy for this particular region is to provide a common policy framework for achieving IWRM and foster effective cooperation between Euro-Mediterranean partners within the overall context of sustainable development. The Strategy is to contribute towards several long-term social and economic objectives, including, among others, preserving scarce water resources, improving water governance, enhancing water and sanitation services and their durability, safeguarding public health, preserving the functions of ecosystems and promoting sustainable development. Within that context, SWM provides a guiding document with orientations and objectives on water resources management and protection agreed by all countries in the Union for the Mediterranean, supported and enriched through inputs from stakeholder groups, including civil society. It also aims to stimulate the development of policy, cooperation and technological tools; promote the exchange of knowledge; and contribute towards peace and stability.

This Strategy is structured around four main thematic fields, namely: (a) effective water governance; (b) water and climate change adaptation; (c) water demand management and efficiency, non-conventional resources; and (d) water financing optimization and valuation.

The Strategy can only succeed by planning follow-up action and developing concrete projects with a focus on sustainability, while addressing specific water challenges and helping to solve the problems of regional concern.

IV. INTERNATIONAL LEGAL INSTRUMENTS FOR THE MANAGEMENT OF SHARED WATER RESOURCES

A. CUSTOMARY INTERNATIONAL LAW

1. Sources

Customary international law develops through a process of claim and counterclaim between countries. When one State undertakes an action, the affected State will either accept that action or take steps to challenge it. If the matter is important to the objecting State, it could eventually escalate its opposition through a variety of actions up to the possibility of an armed conflict. Regardless of the outcome, over a period of time a pattern of practice will emerge that describes how States behave.

Customary international law is determined by the legal and political communities after examining a wide variety of sources of State practice. Rulings of international courts and findings of international arbitrators are also useful tools in determining whether a certain practice rises to the level of a rule of customary law.⁶⁷ Moreover, treaties and other international legal instruments are used to reveal the extent of the applicability of a practice and the degree of its binding effects as an international custom even on States that are not party to such treaties. In this regard, even a legal instrument that is not yet enforced might be an indicator of customary law. Similarly, resolutions of the United Nations General Assembly, as well as similar decrees of other international and regional organizations, have been used as effective evidences that a particular rule is elevated to a level of a legal obligation.⁶⁸

Another source for customary international law is principles derived from national legal systems, which, contrary to the common understanding, are not the result of States' practices and have not been subject to the process of claims and counterclaims. These principles have been used by politicians and decision makers to fill the gap or clarify uncertainty of issues that have not reached the level of international customs.

Historically, State practice concerning internationally shared waters is mostly related to surface waters. The reflection of the customary norms and rules to transboundary aquifers is only a recent development. Exclusive dependence on customary international rules and norms to allocate surface or groundwater between riparian countries has not been very successful owing to its informality, lack of defined operational procedures and the lack of effective institutional arrangements and enforcement mechanisms.

2. Codification of customary international law

While rules of customary international law are not always easily determined, experience shows that its sources, as outlined above, has led to the identification of many widely accepted principles in various fields. Successful areas of customary law have tended to be codified within the United Nations system. In fact, customary rules could be codified because they enjoy wide consensus among the international community and are generally followed. Even when a customary law has been codified, parts of it often remain as customary rules. An illustration example is the Law of the Sea whereby, after its codification in a number of international legal instruments, much of its provisions remain customary given that many States have declined to officially ratify some or all of these legal instruments.

Even when rules of customary international law have been identified, they usually lack effective means of enforcement. Without appropriate and objective enforcement mechanisms, the chance that national interests prevail over the obligation to international customs increases markedly. Another issue of relevance

⁶⁷ I. Brownlie, *Principles of Public International Law*, seventh edition (Oxford University Press, 2008).

⁶⁸ J.W. Dellapenna, "The Customary International Law of Transboundary Fresh Waters", *Int. J. Global Environmental Issues*, Vol. 1, Nos. 3/4 (2001).

to the effectiveness of international customary rules is the need to develop appropriate and effective institutional arrangements that transfer those customary rules into actual implementation on the ground.

It is unrealistic to presume that international law alone can resolve the problems related to the management and allocation of shared water resources, with all of its complex and interrelated factors and specificities. Geopolitical factors are considered crucial in shaping a State's perception and position towards shared water resources and, thus, determine its capacity and "political and even military" power to protect that perception or position. In some cases, the interests of one State might be compromised to the degree that it decides to risk engaging in an armed conflict. While the pressure on scarce water resources in itself creates incentives for cooperative solutions to the problems confronting the countries sharing the resources, the development and establishment of a formal legal system is considered to be a necessity to prevent potential conflicts.

B. INTERNATIONAL WATER LAW

International law is defined as the body of law that governs the legal relations between or among States or nations. The statute of the International Court of Justice (ICJ) lists the sources of international law to include international conventions, international customs and general principles of law recognized by civilized nations. Generally, the legal instruments that contribute to international law can be divided into two categories, namely: binding instruments, commonly known as "hard law"; and non-binding documents, known as "soft law". The first category sets the legal obligations of State parties to these instruments and is usually in the form of a charter, treaty or convention. The second category, which is mainly composed of declarations, recommendations and statements, provides, as a rule, guidelines and principles and as such imposes more of a moral obligation on States.

By ratifying a binding instrument, States recognize their obligation to respect its stipulations. These instruments become binding to States that have ratified, accepted or acceded to such instruments; and while the terms of these instruments are not binding to non-party States, they are indirectly affected given that the terms of binding instruments are considered legal source in the international judicial system. Instruments of "soft law" do not create legal obligations for States and as such are not binding in international law. Nevertheless, many of these instruments have strong moral and political value, and have also contributed to the formulation of other binding instruments.

International river basins are estimated to cover nearly half the world's land surface, generate roughly 60 per cent of the global freshwater flow and are home to approximately 40 per cent of the global population.⁶⁹ While efforts at the international and regional scales have served to promote cooperation between riparian States, the greatest development in cooperation on shared water resources have been at the basin scale. Of the large numbers of legal instruments on shared water, many were developed to clarify the rules, rights and obligations on the navigational uses of international rivers. With growing demand for freshwater and the need to withdraw water for consumptive uses, more attention was directed towards the non-navigational uses of international rivers, leading to the development of various soft law instruments. Similarly, recognition of the growing importance of groundwater to supply the increasing water demand have led to the development of several legal instruments that aim to regulate the use and allocation of water in transboundary aquifers.⁷⁰ Among the legal instruments that were developed during the past 60 years, those prepared by the International Law Association (ILA) stand out as the basis for the current direction in managing shared water resources.⁷¹

⁶⁹ M. Giordano and A. Wolf, "The World's International Freshwater Agreements", in *Atlas of International Freshwater Agreements* (UNEP, 2002).

⁷⁰ Two of these "soft law" instruments are the draft Bellagio treaty and the Seoul Rules.

⁷¹ The International Law Association (ILA), which was founded in 1873, is an international non-governmental organization whose aim is to "study, clarify and develop international law, both public and private, and the furtherance of international understanding and respect for international law".

Of the ILA documents on shared water resources, the Helsinki Rules is considered the first comprehensive document to tackle the uses of international rivers; and while it is non-binding, it has influenced the preparation of the Watercourse Convention.⁷² In order to overcome the deficiency of excluding “confined” groundwater, ILA developed the Seoul Rules aimed at complementing the Helsinki Rules by generalizing the terms that govern international rivers to transboundary “confined” aquifers.⁷³ In its efforts to develop a comprehensive legal guidance that both considers the physical characteristics of shared waters and addresses new matters not previously addressed in previous documents, ILA prepared and adopted the Berlin Rules in 2004. The Berlin Rules encompasses a holistic approach that integrate the traditional rules regarding shared waters with rules derived from customary international environmental law and international human rights law that apply to all waters, surface and groundwater, both national and international.

Codification of international law is mostly the responsibility of the United Nations system. In the area of shared water resources, the United Nations has developed, at the global level, two legal instruments, namely, the Watercourse Convention and the Law of Transboundary Aquifers.⁷⁴ While the Watercourse Convention was adopted by the General Assembly in 1997, it is still not enforced given that it has not obtained the ratifications of at least 35 Member States of the United Nations. On shared groundwater, the United Nations General Assembly, in its sixty-third session in December 2008, passed resolution 63/124 on the draft articles of the Law of Transboundary Aquifers. The final legal form of the draft articles has not been decided and will be examined by the General Assembly in its sixty-sixth session in 2011. While neither of the two United Nations instruments has binding power yet, the process of their development, which enjoyed consensus or majority agreement among Member States, provides them with a political and legal status that cannot be ignored. Additionally, the lengthy deliberation process towards their development has incorporated many of State practices within their terms and as such has elevated some of their key principles to the level of international customs.

In order to highlight the content of international water law, the following sections of this chapter focus on the directions employed in the three main legal instruments, namely the Helsinki Rules, the Watercourse Convention and the Law of Transboundary Aquifers. Understanding of the international mainstream concepts of management, cooperation and allocation of shared waters should assist the Arab region to clarify the legal direction it needs to follow in order to help secure its fair share in the waters that the region shares with others.

1. Scope of legal instruments on shared water resources

The scope article of the legal instruments on international watercourses and transboundary aquifers usually sets the application of these instruments. It is noticeable that the field of application of these instruments has evolved over the years from “the use of the waters...” (article I of the 1966 Helsinki Rules) to add “measures of protection, preservation and management of...” (article 1 of the Watercourse Convention), and widening the field of application even further by including “other activities that have or likely to have an impact upon” (article 1 of the 2008 Law of Transboundary Aquifers). This shift has coincided with the development of the concept and principles of integrated water resources management which view the use of water resources within the surrounding social, economic, political and environmental settings. This development can be viewed as an indication that future legal instruments, whether international, regional or bilateral, will focus on the integration of water within the broader scope of sustainable social and economic development.

⁷² A long list of legal instruments on shared water is available at www.internationalwaterlaw.org/documents/intldocs/.

⁷³ In this context, confined means non-renewable or fossil, as opposed to the usual sense in hydrogeology.

⁷⁴ For the development process of the two legal instruments, see C. Yamada, “First Report on Shared Natural Resources” (International Law Commission, 2003).

For the purpose of this report, the definition of scope, or field of application, is expanded to incorporate the issues of resource type and the legal connection to existing bilateral, multilateral or basin agreements. The three above-mentioned legal instruments show that, while historically the focus has been on surface water resources (international rivers) and groundwater directly connected to these international rivers, a shift towards including non-renewable groundwater disconnected from international rivers is evident. While the Helsinki Rules incorporate only groundwater to the extent that it connects to surface water, the Seoul Rules consider shared non-renewable aquifers to constitute an international drainage basin under the provisions of the earlier Helsinki Rules and as such are subject to the same provisions proposed for international rivers.⁷⁵

Similarly, during the development process of the Watercourse Convention (1970-1997), the focus had been on international rivers and connected mostly renewable groundwater. Realizing the vital importance of non-renewable groundwater for sustaining life, health and the integrity of ecosystems, the United Nations International Law Commission (ILC) adopted a resolution in 1994 that recommended the application of the provisions of the Watercourse Convention to “confined” transboundary groundwater. The ILC resolution was submitted to the General Assembly as part of their report on the Law of the Non-Navigational Uses of International Watercourses (adopted later by the General Assembly as a convention in 1997). The recommendation of ILC was not reflected in the text of the convention, owing probably to time constraints resulting from the need to reopen many of the settled issues for discussion in the light of the introduction of “confined” groundwater, thereby risking extending the already long preparation time period of 27 years. The acknowledgment by ILC of the need to manage shared water resources through a holistic approach that considers the conjunctive use of surface and all groundwater resources reflects the parallel development that had been made in the field of water management.⁷⁶

In an effort to codify international law for the use of natural resources (gas, oil and groundwater), and partially in response to the exclusion of “confined” groundwater within the provisions of the Watercourse Convention, the General Assembly decided to prepare a legal instrument on shared natural resources. Owing to sensitivities in dealing with gas and oil, the focus of the legal instrument resorted to only shared groundwater.⁷⁷ By incorporating both non-renewable “confined” and renewable groundwater, the draft articles of the Law of Transboundary Aquifers overlap with the provisions of the Watercourse Convention. As expressed by some authors, this may potentially lead to conflicting management approaches, especially when the Law of Transboundary Aquifers identifies a groundwater resource to include both the geological rock formation and the water contained within that formation.⁷⁸

In viewing the impact of legal instruments at the international level on the bilateral, multilateral or basin level agreements, the three international instruments of the Helsinki Rules, the Watercourse Convention and the Law of Transboundary Aquifers seem to differ substantially in accordance with the format of the legal instrument and the resource type. While the Helsinki Rules, which is a non-binding legal instrument, points out that it does not supersede other instruments, such as agreements, conventions or binding customs (article 1), the Watercourse Convention, which is a more binding legal instrument, details the rights and obligations of parties to existing and potential future watercourse agreements and insinuates

⁷⁵ The Seoul Rules were adopted by the International Law Association at its sixty-second conference held in Seoul in 1986 to serve as an addendum to the Helsinki Rules adopted by the association in 1966. The full text of the Seoul Rules is available at www.internationalwaterlaw.org/documents/intldocs/seoul_rules.html.

⁷⁶ International Law Commission (ILC), *Yearbook of the International Law Commission*, vol. 2 (1994), part 2, available at [http://untreaty.un.org/ilc/publications/yearbooks/Ybkvolumes\(e\)/ILC_1994_v2_p2_e.pdf](http://untreaty.un.org/ilc/publications/yearbooks/Ybkvolumes(e)/ILC_1994_v2_p2_e.pdf).

⁷⁷ C. Yamada, “Second Report on Shared Natural Resources: Transboundary Groundwaters”, which was presented to the fifty-sixth session of the International Law Commission (Geneva, 3 May-4 June and 5 July-6 August 2004) and is available at http://untreaty.un.org/ilc/documentation/english/a_cn4_539_add1.pdf.

⁷⁸ S. McCaffrey, “Current Developments: The International Law Commission Adopts Draft Articles on Transboundary Aquifers”, *The American Journal of International Law*, vol. 103, No. 2 (2009), p. 272.

also the need to harmonize existing agreements with its principles (articles 3 and 4). The Law of Transboundary Aquifers, on the other hand, does not refer to existing agreements, probably under the assumption that, unlike shared surface water, transboundary aquifers have not been the subject of numerous agreements. Within that context, the Law encourages “aquifer States” to establish joint mechanisms of cooperation (article 7) and to enter into bilateral or regional agreements, or arrangements among themselves (article 9).

2. *Management concepts*

Generally, international legal instruments do not explicitly specify the concepts to be used in managing shared water resources. They nevertheless usually define the hydrological limits of the water resource, including their link to other resources, which could indirectly influence the management modality of these resources. An example that clarifies the impact of resource limits and boundaries on the management concept is the variation between the Helsinki Rules and the Watercourse Convention in defining the hydrological limits of the water resource. While the Helsinki Rules adopts the drainage basin to define the boundaries of the resource and as such incorporates all waters within the physical boundaries of that drainage basin, the Watercourse Convention adopts the “watercourse” to define the hydrological limits of the resource, thereby limiting the available water to that confined within the watercourse and its tributaries.⁷⁹

An implication that results from the adoption of different hydrological limits is the inclusion or exclusion of water to be considered as part of the international water resource. In the case of the Helsinki Rules, the definition of the drainage basin allows for the inclusion of water other than that flowing within the tributaries and main course of the international river in the form of soil moisture that is directly used for rain-fed agriculture, forestry, landscaping or any other beneficial use. This holistic view in the selection of the hydrological limits of the shared water resource has a direct impact on the management and allocation of the resource or the distribution of benefits that result from the use of shared water resources. The selection of the “drainage basin” as the hydrological management unit coincides with the international mainstream that promotes integrated management of water resources taking into consideration all available water within the basin. It is thus reasonable to conclude that the selection of the hydrological limits of the shared resource has a direct influence on the way that the resource is managed. Moreover, the adoption of the “drainage basin” to delineate shared water resources coincides with the principles of integrated water resources management and increases the available waters within the drainage basin, which could lead to higher water shares to dryer, downstream riparian countries. The delineation and thus the physical definition of a drainage basin differ according to the resource type, that is, groundwater or surface water. As such, the differences in the definition of a drainage basin need to be considered in the conjunctive management of shared surface and ground water resources.

3. *Principles of international legal instruments*

(a) *Absolute sovereignty and territorial integrity*

In general, the position of riparian countries on the different principles is primarily determined by their geographical location. Upstream countries tend to opt for the inclusion of the sovereignty principle, which gives them greater control over shared resources.⁸⁰ While the sovereignty principle is aligned with the Charter of the United Nations, unlike land and fixed borders, water resources are of a mobile nature, distributing benefits across borders and, consequently, sovereignty over them is more likely to be limited.

⁷⁹ The Helsinki Rules define an international drainage basin as “a geographical area extending over two or more States determined by the watershed limits of the system of waters”.

⁸⁰ S. Salman, “The United Nations Watercourse Convention Ten Years Later: Why has its Entry Into Force Proven Difficult?”, *Water International*, vol. 32, No. 1 (2007), pp. 1-15.

Following this argument, downstream countries, on the other hand, are against the inclusion of the sovereignty principle in legal instruments,⁸¹ and place greater emphasis on absolute territorial integrity as the overriding principle determining water allocation between riparian countries.⁸² Both doctrines – absolute territorial sovereignty and absolute territorial integrity – imply inflexibility and allow for little compromise, and have therefore received little support among the international legal community and in States’ practices. They are regarded as inequitable in water allocation, as well as in their biased preference for upstream and downstream States, respectively. A more acceptable principle from both ends is the principle of reasonable and equitable use, which combines elements of both principles in that it recognizes and evaluates the shared and competing interests of all States sharing the water resource.⁸³

The position of the current legal instruments on the issue of sovereignty is mixed. While the Helsinki Rules does not refer to sovereignty at all, the Watercourse Convention highlights sovereign equality and territorial integrity in addition to mutual benefits and good faith as the base elements of cooperation between riparian countries. The Law of Transboundary Aquifers, on the other hand, establishes sovereignty as a guiding principle, and while it restricts such sovereignty to the terms of its articles as well as to the provisions of international law, the inclusion of sovereignty as a standalone principle may be considered as questioning the concept of limited sovereignty that had been widely accepted and as such is considered a setback by some international legal experts.⁸⁴

(b) *Equitable and reasonable use*

A flexible approach to allocate shared water resources among riparian countries is based on the principle of “equitable and reasonable use”. This principle seems to emphasize the notions of both compromise and fairness. In the absence of an abstract definition of equity, many countries would tend to adopt a definition that serves their objectives whereby an upstream State, for example, may claim its diversion to be equitable while the downstream State may still object on the grounds that the action is not equitable. While embedded within its meaning, it is commonly understood and accepted that equitable allocation is not synonymous with equal shares. Unlike other principles and doctrines, such as absolute sovereignty and territorial integrity, the principle of equitable and reasonable use is a loose concept that tries to balance different and potentially competing factors, including population, historic use, expectations, efficiency and environmental impacts. This is exacerbated by the fact that many of these factors are time dependent, either those connected to the resource with potential impacts of climate change, or those connected to varying needs with population growth and changing socio-economic settings of one or all riparian countries.

Under the equitable and reasonable use principle, each riparian State is entitled to a reasonable and equitable share in the beneficial uses of a shared water resource. While this principle is widely considered and accepted as the main guidance for the allocation of shared water resources, and while it directs the process, in theory, it fails to identify a practical approach that quantifies the rights of the various riparian countries. In addition to the direction that the principle provides, the Helsinki Rules introduced a set of 11 factors that aim to facilitate the allocation process. A similar approach was also adopted in the

⁸¹ S. McCaffrey, *op. cit.*

⁸² Absolute territorial integrity provides lower riparian States the right to the continuous or natural flow of a river flowing from upper riparian States, and permits upper riparians to exploit the waters of a river so long as such use does not affect the interests of lower riparians. In effect, lower riparian States receive a veto power or a monopoly over the water rights of upper riparian States.

⁸³ G. Eckstein, “Application of International Water Law to Transboundary Groundwater Resources and the Slovak-Hungarian Dispute Over Gabčíkovo-Nagymaros”, *Suffolk Transnational Law Review*, vol. 19 (1995), p. 67.

⁸⁴ See S. McCaffrey, “Sovereignty and Cooperative Management of Shared Water Resources in a Time of Shrinking Availability: The Role of International Law” (2010), which was presented at the International Conference on Transboundary Aquifers: Challenges and New Directions (ISARM 2010) (Paris, 6-8 December 2010); and O. McIntyre, “Fragmentation in International Water Resources Law: Reconciling the International Law Commission’s 2008 Draft Articles on Transboundary Aquifers with the 1997 UN Watercourses Convention” (2010), which was also presented at ISARM 2010.

Watercourse Convention and the Law of Transboundary Aquifers. The extended list of allocation factors seems to have been developed as a result of the consensus-building process, which led to the need to take account of all (upstream and downstream) concerns. It is believed that once the allocation factors are consolidated in a simplified format that allows for quantifying the share of each riparian country, the current debate on the supremacy of the two main principles – equitable and reasonable use and no significant harm – on each other will become irrelevant.

(c) *Allocation factors*

A close look into the allocation factors of the three main legal instruments reveals two distinct justifications/directions for the allocation process. The first refers to the “right” of a riparian country to a definite share of the shared water resource, which is reflected from factors that relate to the natural characteristics of the resource, including geography, hydrology and climate. This is clearly explained in the Helsinki Rules and the Law of Transboundary Aquifers, where the factors incorporate the contribution level of each riparian country to the watershed area, to the quantity of water or to the recharge of a shared aquifer. The second direction provided by the set of allocation factors refers to the “need” of the riparian countries and is reflected in the factors that relate to population, existing and potential uses, social and economic needs, the availability of alternative resources and the promotion for efficient use. These two directions and their associated factors try to establish a balance between the concepts of rights and needs, thereby catering for all concerns of upstream as well as downstream riparian countries. It can be noticed that while the list of factors in the earlier Helsinki Rules articulates the “natural or rights” factors in greater details, the corresponding lists in the Watercourse Convention and Law of Transboundary Aquifers consolidate these factors into one or two general statements. This can be viewed as a tendency towards putting greater weight on the “needs” factors and less emphasis on the “rights” factors.

The movement towards giving more weight to needs is also evident from the drop of the two “rights-related” clauses of compensation and past use from the lists of the Watercourse Convention and the Law of Transboundary Aquifers while they are included within the factors list of the Helsinki Rules. The partial shift of weight from the “rights” in favour of the “needs” is aligned with the prevailing mainstream theoretical approach that favours allocation of benefits from water rather than that of rights on the basis of the existing and potential needs.⁸⁵

Another observation that complicates the allocation process on the basis of these extended factor lists is the fact that both the “natural” and the “needs” factors are time dependent whereby factors related to geography and hydrology are influenced by the effects of climate change; while the factors related to population and the socio-economic needs cannot be easily predicted owing to the large number of variables that dictate the social, economic and political development of a country. The element of time dependency introduces an additional level of difficulty in the allocation process given that what appears reasonable and equitable today might in a few years appear less reasonable or less equitable owing to social and economic changes of one or all riparian countries. Such changes would, in practical terms, raise the need for continuous review of the allocation process, which might not always be politically feasible.

(d) *Priority of use*

Within the national context, many traditions and social customs and values often, formally or informally, influence and even dictate the priority system of water use. In the Islamic water appropriation system, for example, drinking and household uses are given priority over other uses, such as irrigation.⁸⁶ The picture somewhat changes when it comes to shared water between riparian countries, where the priority systems of water use in these countries may differ or even contradict each other. Moreover, a universal

⁸⁵ More analysis on the shift from rights to benefits is provided in chapter V. See also C. Sadoff et al., *Share: Managing Water across Boundaries* (International Union for Conservation of Nature and Natural Resources (IUCN), 2008).

⁸⁶ See N. Faruqui et al, op. cit.; and O. al-Jayyousi, “Greywater use: Islamic perspectives” in S. McIlwaine and M. Redwood, *Greywater Use in the Middle East: Technical, Social, Economic and Policy Issues* (Practical Action Publishing/CSBE/IDRC, 2010).

priority system would indirectly influence the allocation process, thereby neglecting to account for the water needs of the different countries for various uses.

This is probably the justification behind the inclusion of article 6 and article 7 of the Helsinki Rules, which treat all categories of present and potential future water uses as equal.⁸⁷ While the Watercourse Convention follows the same approach to that of the Helsinki Rules and incorporates an article that equates all uses of an international watercourse, similar to that of the Law of Transboundary Aquifers, the Watercourse Convention also introduces the concept of “vital human needs” to be given special regards during settlement of conflicts and/or during the weighing process of the allocation factors. Accompanying explanatory documents to the convention show that vital human needs do not only refer to drinking water, but also include the “water required for production of food in order to prevent starvation”.⁸⁸ This interpretation could be used as an entry point by the water-scarce countries to influence the allocation process.⁸⁹ Globally, the priority of drinking water over other uses has been reinforced recently by the General Assembly resolution that declared the right to safe and clean drinking water as a human right.⁹⁰

(e) *The obligation not to cause significant harm*

The principle of no significant harm receives wide recognition as a general principle of international law and is applied in numerous international treaties, declarations and other international legal instruments. Customary international law obliges States not to use, or allow the use of, their land for acts contrary to the rights of other States. In evaluating whether a State’s action causes, or will cause, harm to another State, inflicted injury or losses from such harm must be considered “appreciable”, “substantial” or “significant” before international water law is explored. For the injury or loss to rise to the level of “appreciable” or “substantial”, it must have subsequent tangible impacts upon public health, economic production or the environment of another State.⁹¹ While harm within the context of water management might instinctively be linked to water quality, over-exploitation of a shared water resource or the diversion of a shared river could detrimentally affect another State’s territory in violation of the essence of this principle and international law.

The relation between the principles of equitable and reasonable use and the no significant harm is controversial in that both can be viewed as a basis for determining the type of use and the allocation process. While the two United Nations legal instruments on international watercourses and transboundary aquifers include the no significant harm as a separate principle, the earlier Helsinki Rules incorporates the no significant harm as one of the factors that defines and identifies equitable and reasonable use. The inclusion of the no significant harm as a separate principle was viewed as a victory by delegates of downstream countries during the negotiations of the Watercourse Convention. Other delegates “mostly of upstream countries” did not consider the inclusion of the no significant harm as a defeat given that the text stipulates that preventing harm is bound by taking “all appropriate measures”, the recognition that significant may be tolerated, and that conflicts are not settled by applying the no significant harm rule alone but through the package of articles relating to both equitable and reasonable use and no significant harm. The compromise to incorporate both principles within the Watercourse Convention could be regarded as a partial victory for both sides.⁹²

⁸⁷ The Helsinki Rules are available at www.internationalwaterlaw.org/documents/intldocs/helsinki_rules.html.

⁸⁸ United Nations General Assembly, “Convention on the Law of the Non-Navigational Uses of International Watercourses” (1997).

⁸⁹ S. McCaffrey, “International Water Law for the 21st Century: Contribution of the U.N. Convention”, *Journal of Contemporary Water Research and Education*, No. 118 (2001).

⁹⁰ United Nations General Assembly “The Human Right to Water and Sanitation” (A/RES/64/292).

⁹¹ G. Eckstein, op. cit.

⁹² S. McCaffrey, op. cit.

The basis for the evaluation of what and who constitute an injury or a loss (if injury and loss can represent the impacts of harm) to rise to a level considered “significant” need to be identified by taking the local specificities of the situation into account. It can be argued that without clear thresholds and benchmarks, the concept of significant harm is rather relative and open for opposing interpretation by the different parties, thereby leading to potential conflicts. It has been proposed to define significant harm in accordance with the tangible injury or loss that it inflicts on human public health, the economy or the environment. Translating such injury and loss into a financial value might facilitate the compensation process if need arise.

(f) *Cooperation*

The idea of sharing a water resource in itself implies a consequential need to cooperate. While a failure to cooperate does not necessarily lead to conflicts, the probability of hostilities and conflicts could increase depending on additional factors, including the level of water scarcity and the dependency level on such shared water resources.⁹³ Many riparian countries of international watercourses have entered into formal or informal bilateral agreements to clarify rights and duties as well as cooperation arrangements aimed at managing these shared water resources, which have led experts to consider shared waters an element of cooperation rather than a cause for conflict.⁹⁴

While many of these agreements focus on such specific issues as allocation and quality protection, among others, the majority of these agreements cannot be considered comprehensive in that they do not serve as a base for integrated management of these basins. The current theoretical trend, backed by the principles of integrated water resources management, is towards more comprehensive integrated agreements that involve all riparian countries of a water basin, with a focus on cooperation as the overriding direction featuring the shift from allocation of rights to allocation of benefits as well as the focus on the optimal and sustainable use of the resource and the preservation and protection of the environment.⁹⁵ The move from communication and coordination towards higher cooperation levels, such as integration and joint management modalities, usually faces many obstacles in practice, especially between riparian countries experiencing low levels of trust.

Even though the Helsinki Rules, whose terms require definite interactions between parties, stipulate the need to communicate and coordinate, cooperation is not included as a standalone principle. Despite being a non-binding, “soft” legal instrument, its articles give an impression of rigid obligations that are based on solid legal foundations. These features, in addition to others such as detailed conflict settlement arrangements, seem to suggest that the Helsinki Rules are more of an allocation instrument than a cooperative framework.

The Watercourse Convention, on the other hand, introduces cooperation as a separate principle. Sovereign equality, territorial integrity, good faith and mutual benefits are stated as the basis of cooperation among riparian countries, with the aim of achieving optimal use and adequate protection of the resource. Moreover, the Convention promotes the establishment of joint institutional arrangements and joint management mechanisms;⁹⁶ and requires exchange of data and information and prior notifications of planned

⁹³ For an in-depth analysis of the factors that define and determine cooperation on shared waters refer to C. Sadoff et al., op. cit.; and N. Mirumachi and J.A. Allan, “Revisiting Transboundary Water Governance: Power, Conflict Cooperation and the Political Economy” (2007), which was presented at the Proceedings of the CAIWA International Conference on Adaptive and Integrated Water Management: Coping with Scarcity (Basel, Switzerland, 12-15 November 2007).

⁹⁴ See, for example, A. Wolf, “Healing the Enlightenment Rift: Rationality, Spirituality and Shared Water”, *Journal of International Affairs*, vol. 61, No. 2 (2008); and A. Wolf et al., “Water Can be a Pathway to Peace, not War”, Navigating Peace Policy Brief No. 1 (Woodrow Wilson International Centre for Scholars, 2006).

⁹⁵ C. Sadoff et al., op. cit.

⁹⁶ Articles 8 and 24 of the Convention.

measures, which would necessarily require suitable institutional arrangements at the national level and higher coordination at the bilateral, multilateral or basin levels. These features of the Watercourse Convention reveal its cooperative character, which is expected owing to the political screening that it experienced throughout its lengthy preparation.

The Law of Transboundary Aquifers follows the Watercourse Convention on the inclusion of a separate article on cooperation and the promotion for joint institutional arrangements and joint management mechanisms as well as the need to harmonize monitoring standards and methodologies.⁹⁷ Despite these cooperative features, the inclusion of the sovereignty principle is considered by some authors to empower the position of individual riparian countries on the expense of mutual and collective approaches, thereby making the Law of Transboundary Aquifers a lesser cooperative framework compared to the Watercourse Convention.⁹⁸

(g) *Community of interests*

The principle of community of interests proposes to use the waters of a river basin as a single unit in an integrated and optimal manner. The maximized benefits that result from its use are then shared between the riparian countries. By seeking the optimal benefits from the use of shared water resources, it goes a step beyond the principle of reasonable and equitable use. This theory promotes the highest economic efficiency and the greatest beneficial use possible, albeit sometimes at the cost of equitable distribution of benefits among the States sharing the resource. Moreover, being based on economic efficiency, this theory ignores all national boundaries and considers the entire water system as a single economic and geographic unit. Ideally, while the theory of community of interest can be regarded as the most efficient theory for the management of shared water resources, in practice it faces many obstacles related to the criteria to be used for the distribution of benefits, sovereignty and national security, among others, that could make it impractical given the prevailing low level of trust normally found between riparian countries.

4. *Strength and enforcement of international legal instruments*

It has been argued that, unlike national and domestic laws and legal systems, international law does not feature an obligatory jurisdiction and centralized enforcement mechanisms. The only effective way for individual States to exercise their rights connected to international law is to resort to the ICJ.⁹⁹ Similarly, it has been suggested that the concept of enforcement of international law through the imposition of legal sanctions or penalties is unduly narrow.¹⁰⁰ Nevertheless, in analysing the existing experience on the various aspects of enforcement of the multilateral environment agreements (MEAs), it was concluded that the conception of enforcement as imposition of penalties has wrongly led to conclude that international law lacks effective mechanisms.

The array of enforcement mechanisms that are available within MEAs, including the wide spectrum of collective processes of deliberation, justification and judgment, were highlighted in order to argue against penalties or even sanctions in the wider sense of “disincentives”, which are not feasible or even appropriate in all settings. On one hand, it is doubtful that sanctions and penalties are feasible unless they are viewed to be lawful and acceptable; and on the other, in many cases non compliance is not by choice, rather it is the

⁹⁷ Articles 7, 8, 13 and 14 of the Law of Transboundary Aquifers.

⁹⁸ S. McCaffrey, “Current Developments: The International Law Commission Adopts Draft Articles on Transboundary Aquifers”, *The American Journal of International Law*, vol. 103, No. 2 (2009), p. 272.

⁹⁹ S. McCaffrey, “An Assessment of the Work of the International Law Commission”. *Natural Resources Journal*, vol. 36 (1995), p. 297.

¹⁰⁰ J. Brunnee, “Enforcement Mechanisms in International Law and International Environmental Law”, in *Ensuring Compliance with Multilateral Environmental Agreements: A Dialogue Between Practitioners and Academia*, U. Beyerlin et al. eds. (Martinus Nijhoff Publishers and VSP, 2006).

result of limited technical and/or financial capacity. It was ultimately concluded that the limited reliance of many MEAs on penalties or sanctions and their focus on justificatory processes and concrete means to promote compliance is not a sign of the weakness of international environmental law, but of its flexibility and strength.¹⁰¹

While the Helsinki Rules serves as guidance and is non-binding, it encompasses detailed and fixed procedures on notifications and conflict resolution, which would need to be accepted and complied with when these Rules are formally adopted. Similarly, once the Watercourse Convention is ratified by 35 States, it enters into force and all of the actionable measures and procedures included in its terms become mandatory on all States party to the Convention. The impact of the Convention on non-member parties is only of a moral and indirect nature, resulting from its contribution to the pool of legal sources available to ICJ. The Convention does not preset a definite institutional setup for the follow-up of its implementation, which provides its members the flexibility to develop an appropriate institutional arrangement that fosters its implementation and enforcement of its terms. A distinction should be made between the terms that require formal detailed enforcement structures at the Convention level and those that are more of a guidance and directional nature, which would need to be clarified and enforced through bilateral or basin-level agreements. Given that the Watercourse Convention and potentially the Law of Transboundary Aquifers constitute the only viable legal instruments that have the potential to guide cooperation over shared water resources at the international level, they are expected to form the reference legal base on the management of shared water resources once they enter into force.

Global legal instruments on shared water resources

Of the many, three stand out as the most referenced and have influenced the international perception towards cooperation on international watercourses and transboundary aquifers. Two of these instruments are the product of the United Nations system, while the third, the Helsinki Rules, is a soft legal instrument adopted by the International Law Association (ILA) in 1966. As the earliest of the three instruments, the Helsinki Rules have influenced the direction and shape of the other two instruments, namely the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses (Watercourse Convention) and the United Nations General Assembly resolution on the Law of Transboundary Aquifers. While neither of the two United Nations instruments has come into force yet, some key guiding principles incorporated within their provisions are widely recognized and accepted.

The three instruments incorporate many similar guiding principles, such as the equitable and reasonable use, the obligation for resource protection and preservation and, to varying degrees, the obligation to cooperate. They also follow the same approach for water allocation through the evaluation of a comparable list of natural and socio-economic factors that need to be weighed and considered together in order to reach a conclusion on the basis of the whole. While the two United Nations instruments promote cooperation through separate provisions, the Helsinki Rules encourages cooperation, including, for example, exchange of data and prior notification of planned measures, through provisions related to conflict prevention and settlement. Despite many similarities between the three instruments, they still differ in the way they consider such issues as sovereignty, priority of use, and the connection between surface and ground waters (see table 8).

¹⁰¹ Ibid.

TABLE 8. COMPARISONS BETWEEN THE HELSINKI RULES, THE WATERCOURSE CONVENTION AND THE LAW OF TRANSBOUNDARY AQUIFERS

Issues Legal instrument	Principle resource management unit	Sovereignty	Relation to bilateral and multilateral agreements	Type of groundwater included	Representation of the no significant harm	Priority of use	Procedures for conflict prevention and settlement
Helsinki Rules	Drainage basin	No	Does not supersede existing agreements	Renewable groundwater only	Not a separate standalone principle ^{d/}	No ^{b/}	Extensive
Watercourse Convention	Watercourse	No	Promotes streamlining with its principles	Renewable groundwater in direct contact with river only	A separate standalone principle	Yes ^{c/}	Extensive
Law of Transboundary Aquifers	Renewable and non-renewable aquifers	Yes	Encourage parties to enter into bilateral and multilateral agreements	Both renewable and non-renewable ^{d/} groundwater	A separate standalone principle	Yes ^{c/}	None

Source: Compiled by ESCWA.

^{a/} One of 11 factors that determine equitable and reasonable share.

^{b/} Stress on no inherent preference of any use over any other use or category of uses.

^{c/} Highlight the priority for vital human needs. The “statement of understanding” of the Working Group, which accompanies the text of the Convention, indicates that in determining ‘vital human needs’, special attention is to be paid to providing sufficient water to sustain human life, including both drinking water and water required for production of food in order to prevent starvation.

^{d/} Overlap with the terms of the Watercourse Convention.

V. A LEGAL FRAMEWORK FOR SHARED WATERS IN THE ARAB REGION

A. BACKGROUND

The Strategy for Water Security in the Arab region, which aims to face the challenges and meet future requirements of sustainable development, was motivated by a number of pressing issues, chiefly severe water scarcity, high dependence on water resources that originate outside the Arab region, additional challenges imposed by the impacts of climate change on the availability of already limited water resources, and the need to adopt IWRM approaches.¹⁰² The Strategy refers to shared water resources and warns that without equitable and fair allocation agreements on the major international rivers, regional stability remains threatened, particularly given the increasing water use in the upstream non-Arab riparian countries. It also acknowledges that many Arab countries share surface and groundwater resources and that these intraregional shared resources are mostly not subject to legal agreements to ensure their proper and optimal use. The Strategy also highlights the need to seek appropriate means to allow countries to reach agreements that facilitate the equitable and fair allocation of shared water resources.¹⁰³

The issue of shared water resources has also been an issue of major concern to AMWC and is reflected in several of its resolutions. While the issue of shared water has been viewed from its multiple dimensions, including political, security and socio-economic, it is apparent that the legal aspects of shared water has been given special attention within the deliberations and decisions of the Arab water ministries. In that regard, AMWC has passed several resolutions aimed at promoting a collective engagement of Arab countries within the relevant and current discussions on the international scene. Two resolutions, in particular, focus on the following:¹⁰⁴ (a) consolidating the regional views and perspectives on the draft articles of the Law of the Transboundary Aquifers; and (b) an effort to converge the viewpoints and, therefore, the positions of Arab countries on the Watercourse Convention.¹⁰⁵

In response to these resolutions, the Centre of Water Studies and Arab Water Security organized two expert group meetings, each on the Law of Transboundary Aquifers and on the Watercourse Convention. During the second meeting, two diverging views on the Watercourse Convention emerged, with one calling for the immediate ratification of the Convention on the basis that it strengthened the position of Arab countries in obtaining their fair and equitable share in international water resources; and the other viewpoint highlighted some shortfalls of the Convention in terms of adopting the widely accepted basin-level management approach and a perceived failure to address adequately the legality of historic agreements. It became clear that the two positions would not converge and given the importance of reaching a unified regional legal vision on shared water resources, it was proposed that a regional legal framework could, in principle, address the concerns of the different Arab countries.

Consequently, a call for the need to prepare a regional legal framework was included in the recommendation of that meeting.¹⁰⁶ Adoption of such a legal instrument by Arab countries would in principle lead to a unified legal position of the region towards cooperation, allocation and management of shared water resources.

¹⁰² See chapters I and II.

¹⁰³ League of Arab States, “Arab Strategy for Water Security in the Arab World to Face the Challenges and Future Requirements for Sustainable Development, 2010-2030” (in Arabic, 2011).

¹⁰⁴ League of Arab States, “Report and Resolutions of the First Session of the Arab Ministerial Water Council (Algiers, 29-30 June 2009)” (in Arabic, 2009), resolutions 5 and 6.

¹⁰⁵ Out of the 22 member countries of the League of Arab States, only eight Arab countries have ratified the Convention, namely Iraq, Jordan, Lebanon, Libya, Morocco, Qatar, Syrian Arab Republic and Tunisia.

¹⁰⁶ League of Arab States, 2010. “Report and Resolutions of the Second Session of the Arab Ministerial Water Council (Cairo, 1-2 July 2010)” (in Arabic, 2010).

Based on the recommendation of the expert group meeting and the recommendations of the Technical Scientific Advisory Committee, AMWC passed a resolution in its second session inviting the Centre of Water Studies and Arab Water Security and ESCWA in cooperation with ASCAD and SIWI to prepare a draft legal framework on shared water in the Arab region.¹⁰⁷ While the resolution called for the preparation of a legal framework, it did not specify the format of that legal instrument nor did it state the need for a background study to identify the justifications and the regional specificities that would naturally dictate the directions of the proposed legal instrument.

B. PREPARATORY APPROACH AND PROCESS

Given the absence of directions or limitations of the legal framework and lack of guidelines to be followed in its preparation, it became the responsibility of the mandated institutions to come up with a suitable approach that included both substance and process. Consequently, a concept note identifying the different elements of the preparation process was developed by ESCWA. A two-phase approach was proposed to include, in the first phase, a substantive component that incorporates the preparation of an analytical paper to serve as a basis for discussions among the mandated institutions, which would lead to the preparation of a background working paper aimed at identifying the concept and elements of the legal framework; and a second phase that includes a process component to incorporate the drafting of the articles of the legal instrument and the consultation and consensus-building on the draft among representatives of Arab countries and regional experts. Details of these phases are set forth below.

1. *Phase I*

Based on the concept note, it was suggested that the mandated institutions convene a round-table discussion to discuss the various substantive and procedural elements of the legal framework. The substantive elements were identified to include rationale and justification, regional specificities, scope, guiding principles and the legal format. In order to facilitate the discussions and at the same time benefit from the accumulated international experience in the field of international water law, the ESCWA-BGR regional cooperation project,¹⁰⁸ acting on behalf of the mandated institutions, employed an international expert to prepare a brief analytical study that could serve as the basis for discussions of the round-table meeting. In addition to representatives of the mandated institutions and the international expert, several regional legal experts on shared water were also invited to participate in the meeting, which took place at ESCWA on 13-14 December 2010.

The comprehensive discussions of the meeting clarified, to an acceptable level, the directions of the legal framework as well as the reasoning for its contents. Participants were aware of the fact that while the regional legal framework needs to follow the directions of the international mainstream, it should at the same time serve the interests of the Arab region in accordance with its specificities. Such a balance means that the legal framework would need to be broad and incorporate the widely accepted guiding principles in a manner that effectively highlights the concerns of the region. The main conclusions of the meeting on the directions and content of the legal framework were as follows:

(a) The legal framework needed to take into account the relevant specificities of the region, including water scarcity, food security, agricultural productivity and employment, economic capacity in relation to trade policies and virtual water, institutional capacity and the geopolitical role of water in the region;

(b) There was a need to capitalize on existing regional cooperative and institutional structures among Arab countries, particularly those structures under the political umbrella of the League of Arab States;

¹⁰⁷ Ibid., resolution 20; and R. Klingbeil and M.I. al-Hamdi, “Transboundary Water and Transboundary Aquifers in the Middle East: Opportunities for Sharing a Precious Resource” (2010), which was presented at the International Conference on Transboundary Aquifers: Challenges and New Directions (ISARM 2010) (Paris, 6-8 December 2010).

¹⁰⁸ This project is jointly implemented by the Federal Institute for Geosciences and Natural Resources (BGR) and ESCWA.

(c) The legal framework needed to adopt a general guiding structure and avoid as much as possible going into details, as long as it achieved the minimum acceptable level of cooperation. Detailed procedures should, as much as possible, be left to bilateral, multilateral or basin-level agreements;

(d) While politically more difficult to negotiate and ratify, binding legal instruments generally provide a more solid and rewarding platform for cooperation. As such, it is advisable to follow a process that leads to a binding legal instrument;

(e) Cooperation needed to constitute the overriding principle within the legal framework and is to be advocated and publicized as a cooperative instrument;

(f) Objectivity of the legal framework would serve wider recognition and/or acceptance at the national, regional and international levels. While the legal framework needs to be generally consistent with international norms and directions, it must also attain, to the maximum possible, consensus among Arab countries;

(g) An adequate institutional setup is needed to operationalize the legal framework. In that regard, it is important to use existing institutional structure at the regional level, particularly AMWC and its subsidiary institutions, committees and secretariat.

While the preparation of the legal framework is justified by the ministerial resolution, other justification factors include the need to manage conjunctively both surface and groundwater resources in an integrated manner and as per IWRM principles; the need for a unified vision on shared water resources among Arab countries; the need to complement socio-economic integration of the Arab region; and the need for effective instruments that prevent and settle potential water-related conflicts.

The meeting concluded with the recommendation to prepare a background paper that elaborates many of the issues that were raised during the meeting, namely water-related specificities of the region, the justification for a legal framework on shared water in the Arab region, the scope of the regional legal framework, the guiding principles to be included in the legal framework and its legal form. The working paper was consequently prepared by ESCWA and formed the basis for drafting the articles of the legal framework.¹⁰⁹

2. Phase II

Having reached a consensus among the mandated institutions on the general directions to be followed and the components of the legal framework, particularly after the preparation of the background paper, the partner institutions requested ESCWA to prepare a draft legal framework along the agreed lines. This preliminary draft of the legal framework would be the subject of discussions in an intergovernmental consultation meeting as per the recommendations of the Technical, Scientific, and Advisory Committee of AMWC, and the resolution of the Executive Bureau in its third meeting at the League of Arab States headquarters in 27 April 2011.¹¹⁰

ESCWA and the Centre of Water Studies and Arab Water Security, with support from the ESCWA-BGR regional cooperation project, organized the Intergovernmental Consultative Meeting on the Draft Legal Framework for Shared Water Resources in the Arab Region (Beirut, 24-26 May 2011). In addition to representatives from Arab countries, participants from a number of regional and international organizations participated in the Meeting.

¹⁰⁹ ESCWA, "Working Paper on the Joint Management of Shared Water Resources Within an Integrated Water Resources Management Context: Fostering a Legal Framework for the Arab region" (E/ESCWA/SDPD/WP.2).

¹¹⁰ League of Arab States, "Report and Resolutions of the Third Session of the Arab Ministerial Water Council (Cairo, 15-16 June 2011)" (in Arabic, 2011), resolution 20.

That Meeting can be viewed as a consensus-building exercise whereby participants were tasked to convert the draft-for-discussion version of the legal framework into a draft legal instrument to be forwarded to the Ministerial Council for further deliberations at the more elevated political level. The Meeting can thus be considered as a major milestone in the preparation process given that participants were able to change, add to or delete from the proposed draft legal framework, both in form and content. By the third day of the Meeting, participants had agreed on a legal format and adopted the form of a binding convention. They also had reached a draft that incorporated most of the comments and concerns that had been raised throughout the meeting; and, subsequently, unanimously approved the modified draft and recommended that the outcome of the Meeting be reported to the Ministerial Council (the English translation of the draft agreement is contained in the annex of this report). The participants also recommended a second round of formal consultation on the draft agreement through its distribution to Arab countries for further comments, and proposed another consultative meeting of national representatives and regional experts to consolidate the comments of the countries into a final version of the agreement that could be submitted to the Ministerial Council for approval.

The progress made in the implementation of the Council's resolution was reported to the third session of AMWC (Cairo, 15 June 2011). The Ministers focused on the political sensitivity of shared waters and particularly of shared surface water resources. These deliberations concluded with a resolution to reorient the legal framework to focus only on shared groundwater resources.¹¹¹ The resolution also called for the distribution of a revised version of the draft legal framework, which notes the refocus on shared groundwater resources, to Arab countries for comments. The Centre of Water Studies and Arab Water Security and ESCWA were also asked to organize a second consultative meeting to consolidate the comments of countries and reach a revised draft. The outcomes of the second intergovernmental consultative meeting will be presented to the AMWC and its associated bodies for consideration in 2012.

While the separation between shared surface and groundwater resources might be politically favourable, the general nature of the principles proposed in the draft legal framework render it possible to apply to both surface and groundwater resources. Pursuing separate approaches and principles to surface and groundwater resources management also counters widely accepted IWRM guidelines that call for the integrated management of all water resources at the basin level. It is also beneficial to ensure that the same guiding principles are applied to both surface and groundwater resources when managing shared water resources and engaging in bilateral and multilateral agreements in order to avoid conflicting messages and positions during international deliberations, priority-setting and negotiations.¹¹² A common legal framework could also facilitate improved coordination and integrated management of these scarce-water resources in the Arab region.

In view of these developments, discussion is under way as to whether a separate agreement on surface water resources could also be considered for preparation among Arab countries, or whether the proposal for an integrated legal framework that includes both surface and groundwater resources should be introduced for reconsideration by AMWC.

C. LEGAL FRAMEWORK ON SHARED WATER IN THE ARAB REGION

It can be argued that the special characteristics or specificities of the Arab region play a determinant role in how water resources – intraregional (shared among Arab countries) or interregional (shared with non-Arab countries) – are allocated, managed and used. Some of these specificities include the growing water scarcity, compounded by the potential adverse impacts of climate change; large economic variations between

¹¹¹ Ibid. An argument was raised to distinguish between shared surface and groundwater resources, along the lines of the United Nations process with its two separately prepared legal instruments, namely the Watercourse Convention and the Law of Transboundary Aquifers.

¹¹² By addressing surface and groundwater jointly, the initial draft regional legal framework seeks to avoid the same challenging situation faced at the global level, with the existing Watercourse Convention and the draft Law of Transboundary Aquifers overlapping and possibly contradicting each other in specific situations.

various Arab countries; a tradition of agricultural-based economies and employment; changing national and regional food-security policies; limited institutional capacity to manage effectively national and shared water resources; general insecurity of water rights to shared water resources and a sense of vulnerability from being often the downstream riparian countries or exposed to a basin hegemony; political tensions and instability in some Arab countries; and a power imbalance. These issues, among others, determine the way in which Arab countries view and manage both national and shared water resources.

Based on some of the specificities of the Arab region, it is understandable that some countries, especially those under risk of reduced shares of the major shared rivers, would opt for the development of a binding legal instrument that sets their rights of prescribed shares to shared water resources. Ideally, basin-level binding agreements that set the guiding principles and allocation rules of shared water resources for all riparian countries would be favoured by all Arab riparian countries. Given that, for various reasons, including those highlighted above, the Arab region lacks comprehensive basin-wide agreements on the major shared river basins, the second best alternative that could partially protect the rights of Arab riparian countries to equitable and fair shares in shared water resources is the adoption of a reference, international and binding legal instrument that sets the duties and responsibilities of riparian countries and establishes the guiding principles for the cooperation, management and allocation of shared water resources.¹¹³

In that regard, the candidate legal instrument that is widely recognized by the international community is the Watercourse Convention. Despite the fact that the Convention is still not in force, eight Arab countries have ratified it, namely Iraq, Jordan, Lebanon, Libya, Morocco, Qatar, the Syrian Arab Republic and Tunisia.¹¹⁴ However, none of the non-Arab upstream riparian countries of the region's shared watercourses has ratified the Convention. In fact, Turkey, which represents the upstream riparian of the Euphrates and Tigris, and Burundi, one of the upstream riparian countries of the Nile, voted against the Convention.¹¹⁵ By failing to accept the provisions of the Convention, which were developed over almost three decades, the upstream riparian countries of the shared water resources in the Arab region show little willingness to cooperate. In realizing this fact, Arab countries need to adopt a strategic approach in order to translate the socio-cultural solidarity that exists among them into a unified political position that supports the rights of Arab riparian countries to fair, just and equitable allocations in shared water resources.

A prerequisite in achieving this goal is for Arab countries to unify their views and positions on the issues that constitute cooperation, management and allocation of shared water resources, which in turn could lead to the adoption of a cooperative legal framework. Arab countries would need to accept the provisions of such a legal framework as the principle instrument that regulates the cooperation on shared water resources both between them and other non-Arab upstream countries and, moreover, among Arab countries themselves, especially given that they share many surface and groundwater resources. It is important for the legal framework to take the specificities of the Arab region into consideration as long as they do not widely deviate from the internationally accepted provisions. The adoption of a regional legal framework would serve to gain greater credibility of the region at the international level, while at the same time contribute to the international customary water law given that States' practices constitute an element in the development of international customs.

1. Rationale and justification

While the resolution of the Arab Ministerial Water Council on the preparation of the legal framework on shared water marks an encouraging step, there is a need for a closer look into the factors that justify the resolution and its implementation, especially given that the resolution did not include any background

¹¹³ A clear example of such a position is that of Iraq, which has repeatedly requested Arab countries to ratify the Watercourse Convention.

¹¹⁴ The current status of the Convention is available at <http://treaties.un.org/Pages/ViewDetails.aspx?src=UNTSO&tabid=2&msgid=27&chapter=27&lang=en#Participants>.

¹¹⁵ The record of the vote is available at www.internationalwaterlaw.org/documents/intldocs/convention_press.html.

information leading to its adoption. Among the many factors that contribute to the need for the adoption of a legal instrument on shared water in the Arab region include water scarcity, growing water demand, high dependency on external water resources, water hegemony and geopolitics, economic growth and social stability, and food security and agricultural production. For the scope and purpose of this report, three main factors are further detailed below.

2. Resource type

While in practice, it tends to be more convenient to manage surface water separately from groundwater owing mainly to their prevailing nature and location of use, many benefits are derived from planned conjunctive use of surface and groundwater, both to the development of the resources and their sustainability.¹¹⁶ In addition to the direct benefits, conjunctive use of groundwater and surface water in a structured manner is consistent with the widely accepted principles of IWRM. The physical linkages between surface water and groundwater are, in many cases, not easily determined and need detailed hydro-geological examinations and field explorations. Owing to the often hidden three-dimensional nature of groundwater and its interaction with subsurface strata in aquifers, it is more difficult and costly to monitor, regulate and enforce related policies and plans than it is for surface water. Where surface water is unavailable or is near to its full potential use, many countries of the region are turning to groundwater to satisfy the growing demand.

The increasing reliance on groundwater has resulted in declining water reserves of many renewable and especially non-renewable aquifers in various countries of the region. Available records show that at least 10 Arab countries withdraw groundwater in excess of the annual renewable recharge, thereby leading to declining groundwater levels.¹¹⁷ Many Arab countries are suffering from illegal drilling despite the adoption of licensing arrangements; and where drilling is regulated, monitoring and enforcement of measures to control abstraction rates are weak or nonexistent. It can be concluded that although groundwater, both renewable and non-renewable, has gained importance for satisfying the growing water demand in the Arab region, it is not conjunctively managed with surface water in accordance with IWRM plans.

Besides some of the major shared rivers and other less significant surface water in the form of perennial rivers and streams and ephemeral wadi flows, many of the shared water resources between Arab countries are renewable and non-renewable aquifers. Owing to the growing dependency of many Arab countries on shared surface and groundwater resources, it is evident that any legal framework on shared water resources needs to incorporate groundwater resources together with surface water in one inclusive instrument.¹¹⁸ The absence of a legal instrument that addresses all types of shared water resources, which constitutes a deficiency at the global level, marks an opportunity for the Arab region to incorporate all types of shared water resources, namely, surface water (perennial and ephemeral) and groundwater (renewable and fossil), into a single comprehensive legal instrument.

3. Conflict prevention and settlement

Negotiating agreements on shared water resources is a lengthy and difficult process. It usually involves other, related or unrelated political considerations and, as such, agreements on shared water are not always bound purely to technical matters. This is particularly true in water-scarce areas where water is viewed as a source of power by some countries. While the existing collective solidarity and the potential for mediation provided by the institutional structures of the League of Arab States can be viewed as an effective method for conflict settlement, the organizational setup of the League does not yet encompass a regional

¹¹⁶ T. Shah et al., "Conjunctive Use of Groundwater and Surface Water" (World Bank, 2006).

¹¹⁷ According to the FAO Aquastat database, these countries are as follows: Bahrain, Djibouti, Jordan, Kuwait, Libya, Qatar, Saudi Arabia, Tunisia, United Arab Emirates and Yemen.

¹¹⁸ The Arab region as a whole, in addition to many individual Arab countries, has a high dependency ratio on external water resources.

tribunal similar to that of the South African Development Community (SADC) region.¹¹⁹ In the absence of a regional tribunal, regional treaties and agreements are viewed as effective conflict-prevention mechanisms that can and assist in their settlement when conflicts occur. This is certainly true for issues connected to national security, of which shared water resources qualifies as an issue that contains many ingredients of conflict.

While an armed conflict over shared water has not occurred between countries of the Arab region, the growing demand on water and the need of the different riparian countries to secure rights to shared water resources could trigger armed conflicts. Triggered by the growing water scarcity, intra-State water-related conflicts among water users have been reported in many Arab countries. The region exhibits a high level of vulnerability towards the use and allocation of shared water resources. Without adequate mechanisms to reduce the risks for conflicts over water, the region is a candidate for violent incidents, both between riparian countries of shared watercourses and between riparian countries of smaller shared surface water and transboundary aquifers. It can thus be concluded that a legal instrument that clarifies the rules and principles on cooperation, management and allocation of shared water resources can be an effective tool not only for settlement of conflicts, but also for their prevention in the first place.

4. *Political will*

The League of Arab States was established more than 65 years ago with the aim of strengthening ties between member countries and coordinate their political plans in order to achieve higher levels of cooperation and maintain their independence and sovereignty.¹²⁰ Since its establishment, the League has developed and concluded many mutual treaties, conventions and agreements in an effort to achieve the desired level of social and economic integration.¹²¹ Recognizing the pivotal role of water in sustainable development and the concomitant impact of water scarcity at the local, national and regional levels, the League established AMWC in 2009. While the decision to establish the Council has come relatively late in comparison with other ministerial councils of the League, it nevertheless reflects a regional political will to elevate water issues from the traditional technical level to the more influential political level. Establishment of the Council also reflects the interest of Arab countries to cope with water issues of a regional nature, including those connected to the management of shared water resources.

While interregional shared surface water resources with non-Arab countries remain one of the main focus issues of AMWC, members of the Council have realized that they cannot make a distinction on how shared waters are allocated and managed only on the bases of their location. The AMWC resolution that calls for the preparation of a legal framework on shared water in the Arab region is evidence of that realization where, by default, the proposed legal framework is set to focus mainly on shared water resources among Arab countries themselves. Moreover, the legal framework is expected to have impacts on cooperation with non-Arab countries, at least through the advancement of international customary law. This action by AMWC can be viewed as a major step towards integrated water policies and improved legal arrangements between Arab countries. By submitting to a set of clearly defined guiding principles, the region has the chance to position itself with regard to the management of shared water resources, both between the countries of the region and within the wider regional context (that is, between the region and its bordering non-Arab countries). It is understood that the ultimate aim of the proposed legal framework is to serve as a guide that sets out the main principles upon which the cooperation, management and allocation of shared water resources between riparian countries and aquifer states are to be based.

¹¹⁹ Article 20 of the Charter of the League of Arab States allows for the establishment of an Arab Court of Justice with the consent of a two-third majority of member countries. The Charter is available at www.arableagueonline.org/las/arabic/categoryList.jsp?level_id=108.

¹²⁰ According to the Charter, areas of cooperation between member countries include economic and financial affairs, trade and customs, transport and communications, culture, immigration and security, social and health.

¹²¹ Examples of these treaties and conventions are as follows: Treaty of Mutual Defense and Economic Cooperation between the Countries of the League of Arab States; Convention of Arab Free Trade Zone; Arab Agreement on Judicial Cooperation; and the Convention of the Organization of Arab Women.

5. *International legal principles through a regional lens*

Within the context of the various international legal instruments on shared water resources, the section on the guiding principles constitutes the heart of these documents. It is these principles that usually dictate the direction and define the boundary limits of cooperation between riparian countries. Generally, the guiding principles included in the international legal instruments can be summarized as follows:¹²² (a) general obligation to cooperate; (b) environmental protection; (c) equitable and reasonable use; and (d) obligation not to cause significant harm.

The following discussion does not intend to examine the rationale and historical development of these principles; rather, it aims to provide a sense of their relevancy for inclusion in the legal framework for the Arab region.¹²³

(a) *A general obligation to cooperate*

Elements of cooperation in good faith are usually reflected in this principle and reinforced in other principles that are considered subordinates of cooperation, such as the regular exchange of data and information, prior notification of planned measures and conflict settlement. While countries rarely contest the concept of cooperation as such, they often disagree on the detailed measures and actions incorporated within its provisions. An example is the divergent positions of countries on the detailed measures for prior notification, despite concurrence on the principle in its generality. In that regard, it is important to differentiate between legal instruments on the basis of both their purpose and implementation level, where framework or guiding instruments at the wider level (global or regional) can emphasize the principle in its general format, while leaving the details to bilateral and multilateral agreements. In doing so, the wider-level legal frameworks could serve as directional instruments that promote cooperation and at the same time leave ample room for the negotiating parties to define the specific actionable measures on a case-by-case basis.

Following the above rationale, it is advisable that the proposed legal framework for the Arab region avoids going into operational details, given that this could lead to unnecessary disagreements and thus create an obstacle for its approval. Nevertheless, the legal framework should allow for the development of detailed actionable measures on the different areas of cooperation, either through negotiations of separate protocols at the regional level or, more appropriately, through the promotion of bilateral, multilateral or basin-wide agreements between riparian countries.¹²⁴ It is also quite useful to employ the strong sense of solidarity between Arab countries by making cooperation the overriding character of the legal framework given that this can serve as an additional catalyst factor for socio-economic regional integration.

(b) *Environmental protection*

The inclusion of a separate principle that highlights the need to protect the environment within the provisions of a regional legal instrument on shared water does not intend to define the national or regional policy on the field of environmental protection. Within the context of the Arab region, the main aim of an environmental protection provision within a regional legal instrument on shared water is to prevent, control and reduce water pollution from point and non-point sources that causes or is likely to cause transboundary impacts, and to promote managing shared waters using water-management approaches that are ecologically sound. In order to prevent, control and reduce transboundary impacts, riparian countries, particularly those upstream, need to take relevant legal, institutional and technical protective measures at the national level.

¹²² See S. Salman, "The United Nations Watercourse Convention Ten Years Later: Why has its Entry Into Force Proven Difficult?", *Water International*, vol. 32, No. 1 (2007), pp. 1-15; and D. Seligman et al., *World's Major Rivers: An Introduction to International Water Law with Case Studies* (Colorado River Commission of Nevada, 2008).

¹²³ See also chapter IV.

¹²⁴ Protocols could detail the process, timing, steps and actions to be followed for relevant issues, including prior notification of planned measures, conflict settlement, exchange of data and information, and environmental protection and pollution control.

Similar to the approach proposed for the drafting of the principles on cooperation, the regional legal instrument could highlight, in general terms, the need for environmental protection, with particular emphasis on protecting water quality, while leaving detailed measures and procedures to be developed either through a separate protocol at the regional level or through bilateral, multilateral or basin-wide agreements.

(c) *Equitable and reasonable use*

From a general reading of national positions on the principle of equitable and reasonable use, it appears that while all countries are in agreement on the notions of equity and fairness, they differ in the methodology that translates these concepts into tangible rights and shares for riparian countries. The approach followed in the existing international instruments on international watercourses and transboundary aquifers is the consolidation of a long list of factors that are to be collectively evaluated in order to define and identify equitable and reasonable uses, thereby leading to an acceptable allocation process on a case-by-case basis.¹²⁵

While the notion of fairness appears to be embedded within the meaning of equitable and reasonable, it is rather useful to define fairness and identify its elements in order to facilitate the allocation process. Within that context, for example, should fairness be interpreted as a reward to those countries using water more efficiently and as a penalty to those making less efficient use of available water, or to countries with financial capacities to develop such alternative water sources as desalination? Moreover, fairness dictates that a country that has developed shared water resources to the extent that its population have become heavily reliant upon them should not be deprived of an adequate share of those resources, taking into account possibilities for conservation and greater efficiency of use. However, at the same time, other sharing States that have been slower to develop these shared water resources should not be barred from reasonably increasing their use of these resources, provided such increases are efficient and necessary for the improvement of living conditions or economic development. While clear answers to the issue of fairness cannot be reached within the scope of this report, these questions would need to be raised during the bilateral, multilateral or basin-wide negotiations between riparian countries in order to reach an allocation process acceptable to all sharing parties.

Based on the above, it is essential that the legal framework for the Arab region incorporates the internationally recognized and accepted principle of equitable and reasonable use within its provisions. It is not, however, advisable that the legal framework prescribes to a preset of factors that frame the allocation process into a unified template, but preferably leaves it to the involved parties to negotiate in good faith the allocation process in accordance with the local elements of fairness and specificities of the situation on a case-by-case basis.

(d) *An obligation not to cause significant harm*

Despite concerns over the supremacy between the principles of equitable and reasonable use, and the opinion that “harm” is best ascertained in the context of specific agreements concluded by two or more riparian countries of a particular shared water resource, the inclusion of the no significant harm as a separate principle within the provisions of a legal instrument for the Arab region seems in line with the region’s specificity of being mostly downstream water-scarce countries. While available legal instruments on shared water resources do not provide clear definition for significant harm, it is important to relate inflicted harm or injury to tangible losses on public health, economic productivity or the environment.¹²⁶ Once the legal framework incorporates the no significant harm as a guiding principle, it becomes necessary to adopt an approach that incorporates mitigation measures of such losses and injuries and also introduces the concept of compensation.

¹²⁵ See also chapter IV.

¹²⁶ G. Eckstein, *op. cit.*

6. *The legal framework, structure and content*

Realizing that external renewable water resources constitute more than half of the renewable water in countries of the Arab region, securing the rights to those resources becomes an element of national and regional security. A common vision and a unified understanding of the legal basis to manage shared water resources, both internally (between countries of the region) and externally (with neighbouring, upstream non-Arab countries), can constitute a major step towards achieving water security in the region.

Despite the common perception that specific allocation rules should override any legal instrument on shared water in the Arab region, it should be realized that provisions to prevent, reduce pollution and protect water quality need to be included within the legal instrument. A balance between cooperation, management, allocation provisions and water-quality protection measures of shared water resources is the current global mainstream given that it relates to the norms of the international customary law and is recommended to be generally followed in any regional legal instrument for it to be considered acceptable.

Of all guiding principles, cooperation should form the backbone of the regional legal framework and should be viewed as a necessary predicate to the effective implementation of the other proposed basic principles. Other principles to be incorporated in the provisions of the regional legal instrument include the regular exchange of data and information, timely notification of planned measures, dispute settlement, environmental protection, reasonable and equitable use, and the obligation not to cause significant harm.

A legal instrument that aims to regulate shared water resources would need to clearly define those resources in terms of their physical properties as well as the concept used in their management. Given the large diversity of the Arab region in that it includes a number of major shared rivers and some extensive and local transboundary aquifers, and realizing the heavy reliance on both types of shared water resources in the different parts of the region, it becomes important for the regional legal instrument to include and address the conjunctive use of both types (surface as well as renewable and non-renewable groundwater resources) within its provisions and in the wider hydrological limits of a drainage basin. The adoption of IWRM approaches at the “drainage” basin level would account for all types of available water resources, including green water, which could enlarge the available water resources and justify the current or even increased water share to the dryer downstream countries.¹²⁷

The AMWC resolution calls for the preparation of a legal framework, which needs to take a specified legal format that reflects its purpose and function. While in principle, the regional legal framework can adopt either a binding or a non-binding format, given the regional specificities and the relevant factors that justifies its preparation, a binding legal instrument in the form of an agreement or convention is recommended.

For any legal instrument to be effective, it is important to develop a suitable institutional arrangement that can follow up the implementation of its various provisions. While the proposed legal framework in this case includes only directional provisions that do not involve many operational actions, it remains essential to develop or identify an appropriate institutional arrangement that follows up its provisions. In that regard, it is possible to use the existing institutional structures of AMWC.¹²⁸ In time, the political drive behind the need to manage jointly shared water resources in the Arab region could grow, thereby leading to the amendment of the proposed legal framework with stronger and more binding provisions, that is supported by an institutional setup.

¹²⁷ According to Falkenmark, green water is defined as the fraction of rainwater that infiltrates into the root zone and is used for biomass production, equating with evapotranspiration, while blue water comprises runoff, groundwater and stream base flow. See M. Falkenmark, “Land-Water Linkages – A Synopsis in Land and Water Integration and River Basin Management” *FAO Land and Water Bulletin* (1995), pp. 15-16.

¹²⁸ These institutional arrangements include the Executive Bureau; the Technical, Scientific, Advisory Committee; and the Technical Secretariat.

VI. OPERATIONALIZING BILATERAL AND BASIN-LEVEL AGREEMENTS ON SHARED WATER RESOURCES IN THE ESCWA REGION

The interplay of the ESCWA region's political and physio-geographic characteristics creates region-specific dynamics in which water security plays a large part in motivating, driving and operationalizing cooperation modalities that aim to ensure freshwater supply and quality, and any necessary environmental protection. Efforts to prevent or resolve conflicts have to take into account the region's prevailing aridity, and the fact that ESCWA member countries depend for more than half of their water supply on resources originating outside their borders. As a result, cooperation modalities tend to focus on infrastructure projects (such as reservoirs) and allocation mechanisms, which then define the shape of any necessary institutional arrangements. Cooperation modalities are further complicated by the domination of many of the region's watersheds by "basin hegemony", namely States that wield comparatively greater political and economic power.

A. LEVELS OF COOPERATION

Countries decide to cooperate based on the factors that would advance their interests. In the arid ESCWA region, the key interest is water security. As a result, the level of cooperation depends, in part, on the level of hydrological dependence or interdependence, and varies among the region's different riparian neighbours along a "spectrum" that extends from simple ad-hoc communications to coordination of activities, and to integration of legislation and management.

1. *Discussion of the cooperation spectrum*

In any surface watershed or groundwater basin, riparian States share a common overarching interest, namely, the need to guarantee their own water security in order to ensure both basic needs and sustainable economic growth. Their own national agendas are therefore likely to include the same general goal, even when they differ on specifics. Their goal may extend beyond strictly the security of basic water supply, including such needs as flood control or the maintenance of environmental flows.

In theory, this should create a specific overlapping, cooperative agenda that is in the interest of all stakeholders. However, in practice, the presence of an imbalance of power among riparian States creates a situation whereby "water conflicts lie somewhere between the much feared but non-existent 'water wars' and the much lauded examples of trans-boundary water 'cooperation'" where "conflicts fall short of war and are largely silent".¹²⁹ This is often the case of the ESCWA region. Yet, the actual mechanisms of cooperation are still worth investigating in isolation of power imbalances. This can help to establish a baseline that will define the quality of any future cooperation.

Such cooperation would therefore be defined by how much this cooperative agenda enhances or complements specific national agendas. It would not necessarily be an "all or nothing" proposition. Rather, cooperation is defined by a "range of cooperative activities" that are "determined by hydrological, environmental, economic, social and political factors".¹³⁰ Together, those factors determine how the interests of the riparian States define the extent of their cooperation, along a "continuum of cooperative options" showing increasing levels of cooperative effort.¹³¹ Theoretically, cooperative options would thus extend from uncooperative, unilateral actions that are undertaken in the context of independent, non-transparent national plans, to coordination of activities through communication and information sharing, to collaboration through the adaptation of national plans, and finally to joint action in management or investment. This is elaborated below and in figure V.

¹²⁹ M. Zeitoun and J. Warner, "Hydro-Hegemony – A Framework for Analysis of Trans-Boundary Water Conflicts", *Water Policy*, No. 8 (2006), pp. 435-460.

¹³⁰ C. Sadoff et al., *op. cit.*

¹³¹ *Ibid.*

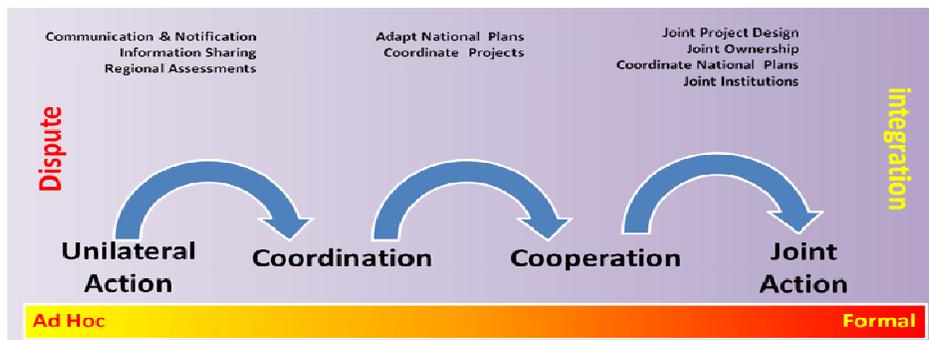
(a) *Unilateral action*: Such actions are undertaken when no efforts are being made to communicate or cooperate over the management of the shared water resource. As each riparian State moves to secure its interest, it fails to factor in the effect of actions undertaken by others. In this case, the cumulative impact of uncoordinated changes can be such that it actually undermines the water security and development plans of all stakeholders;

(b) *Coordination and communication*: This allows for the exchange information about the shared water resources and can prevent unilateral actions from taking place without prior notification. Coordination and communication fosters a minimal level of cooperation and facilitates consultation on problems, projects and plans. This improves managers’ understanding about the areas in the shared watershed that extend beyond their territory. In addition, it provides them with insights into the potential impacts of projects carried out by other countries. This also facilitates information symmetry, which can help to improve monitoring frameworks, avoid conflicts, increase consultation regarding forecasted infrastructure projects, and build confidence and trust, thereby increasing willingness to cooperate and collaborate in the future;

(c) *Cooperation and collaboration*: This allows certain amount of coordination through discussion and exchange on specific national plans. Within a collaborative framework, ongoing national plans can be discussed and adapted to accommodate the interests and concerns of neighbouring riparian States sharing the same watershed. Collaboration can be taken a step further, with national projects developed with the consultation of other riparian States within a basin-wide perspective. This collaboration can either be ad hoc or formal;

(d) *Joint action and integration*: This represents the highest level of cooperation whereby concerned riparian States work as partners in basin-wide development schemes. At this level, cooperation needs to be formalized by treaties that can frame terms for joint actions, which can be as simple as joint management or as integrated as joint ownership and management of assets.

Figure V. The cooperation continuum



Source: C. Sadoff et al., *Share: Managing Water across Boundaries* (International Union for Conservation of Nature and Natural Resources (IUCN), 2008), p. 28.

In practice, the level of cooperation required depends first on the resource limitations faced by cooperating countries, and then on their vision of their development needs and goals. For this reason, there can be no prescribed “better” level of cooperation, as the actual type of cooperation would depend on prevailing conditions. Furthermore, the level and extent of cooperation is also affected by various cooperative actions, given that each resulting action influences the other. For example, while information exchange may promote collaboration, non-cooperative unilateral actions may adversely affect the chances of future joint actions.

In the case of the water-scarce ESCWA region, ensuring access to water is often a national priority that goes a long way to define the development strategies of member countries. The region’s population is

continuously increasing, which often leads to “increasing pollution and wastage”, thereby degrading water quality.¹³² National priorities are thus focused on ensuring “the protection, equitable and sustainable use of” the region’s shared water resources.¹³³ In this context, cooperation is pursued to advance national interests in the region’s shared water basins in an approach that defines any relevant opportunities.

Once jointly decided, the actual modalities of cooperation will require specific allocation of resources, such as funding. Given that increasing levels of cooperative effort are needed as cooperation moves from one level to the next, more financial and human resources need to be made available in order to meet the needs for greater institutional capacity.

2. *Examples of shared water resource management in the ESCWA region*

In the ESCWA region, cooperation over shared water resources has been modest, with only a handful of concluded agreements, most of which are bilateral rather than basin-wide.¹³⁴ Those cooperation modalities that exist take many forms, from informal technical committees or expert meetings, to more formal joint projects or inter-State agreements.

Among those cooperative agreements between ESCWA member countries, five examples are selected that fit differently along the cooperative continuum, as illustrated by figure V. They cover agreements between Egypt and the Sudan, Iraq and the Syrian Arab Republic, Jordan and Saudi Arabia, Jordan and the Syrian Arab Republic, and Lebanon and the Syrian Arab Republic. The principal issue of most of the agreements was water quantity, and they deal differently with issues related to monitoring, joint management, groundwater and information exchange. When agreements call for an issue to be tackled (information exchange) but without specified modalities for implementation, they are considered “informal” in that respect. None of the selected agreements had clear provisions for financing, enforcement mechanisms or processes for stakeholder participation.

(a) *Egypt and the Sudan: the Nubian Sandstone Aquifer System (NSAS)*

In July 1992, Egypt and Libya established the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System (NSAS).¹³⁵ Chad and the Sudan joined the authority in the late 1990s. It is a system of connected aquifers across an area of 2.2 million km² that underlies a large portion of Egypt, eastern Libya, northern Sudan and northern Chad. Given the lack of rainfall in the region, the water resources of the aquifer are non-renewable.

This joint authority has been given responsibility “for collecting and updating data, conducting studies, formulating plans and programmes for water resources development and use, implementing common groundwater management policies, training technical personnel, rationing the aquifer water, and studying the environmental aspects of water resources development”.¹³⁶

¹³² ESCWA, “Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region” (E/ESCWA/SDPD/2005/15).

¹³³ ESCWA, “Knowledge Management and Analysis of ESCWA Member Countries Capacities in Managing Shared Water Resources” (E/ESCWA/SDPD/2009/7), p. 69.

¹³⁴ ESCWA, “Assessment of Legal Aspects of the Management of Shared Water Resources in the ESCWA Region” (E/ESCWA/ENR/2001/3).

¹³⁵ More information on the Joint Authority is available at www.jasad-nsas-ly.org/en/index.php.

¹³⁶ C. Yamada, “Second Report on Shared Natural Resources: Transboundary Groundwaters”, which was presented to the fifty-sixth session of the International Law Commission (Geneva, 3 May-4 June and 5 July-6 August 2004) and is available at http://untreaty.un.org/ilc/documentation/english/a_cn4_539_add1.pdf.

(b) *Iraq and the Syrian Arab Republic: the Euphrates River*

On 17 April 1989, Iraq and the Syrian Arab Republic signed the “Joint Minutes Concerning the Provisional Division of the Waters of the Euphrates River”. These minutes were taken during the thirteenth session of the Joint Technical Committee (JTC) that was first established in 1983 within the framework of the Joint Economic Committee (JEC) between Iraq and Turkey in 1980. JTC had held two bilateral meetings between Iraq and Turkey in 1982; and in 1983, before the Syrian Arab Republic joined as the third member country of the Committee. The tri-partite meetings continued for seven years until 1989, during which JTC discussed the exchange of hydrological and meteorological data; information concerning the progress achieved in the construction of dams and irrigation schemes, particularly concerning the initial filling plans of the Karakaya and Atatürk Dams in Turkey; and the development of a methodology to define reasonable and appropriate amount of water allocations.¹³⁷

By 1989, it was clear that consensus could not be reached on what constituted “reasonable” and “appropriate” amounts of water allocation. Further bilateral meetings were held between Iraq and the Syrian Arab Republic, resulting in the joint minutes of April 1989. The joint minutes served to restate the two countries’ commitment to take a united stand on the issue of Euphrates water in a basin where the uppermost riparian State, namely Turkey, controls most of the water. The two countries have to contend with the fact that there is no international treaty to regulate the common exploitation of the Euphrates. The only agreements that currently exist are bilateral agreements that lay down general principles and emphasize the rights of downstream countries. Those agreements were concluded between the Syrian Arab Republic and Turkey (1987 and 2001), and between Iraq and the Syrian Arab Republic (1989).¹³⁸ The latter focused only on reaching an allocation formula, dividing up the flow that crosses from Turkey to 42 per cent to the Syrian Arab Republic, and 58 per cent to Iraq.

TABLE 9. EXAMPLES OF SHARED WATER RESOURCES IN THE ARAB REGION

	Egypt, Libya and the Sudan	Iraq and the Syrian Arab Republic	Jordan and Saudi Arabia	Jordan and the Syrian Arab Republic	Lebanon and the Syrian Arab Republic
Basin	Nubian Sandstone Aquifer System (NSAS)	Euphrates	Disi Aquifer	Yarmuk	Nahr al-Kabir
Date	July 1992	April 1989	February 2007	September 1987	20 April 2002
Type of collaboration	Agreement	Joint minutes	Memorandum of understanding	Agreement	Agreement
Principal issue/area	Water quantity	Water quantity	Water quantity	Water quantity, hydropower	Water quantity
Allocation	-	Flow percentage	-	-	Flow percentage
Joint infrastructure	Regional information system	No	No	Joint dam	Joint dam
Basin-level organization	Yes	No	No	No	No
Institutional set-up	Joint authority	Joint technical committee	-	Joint commission	Joint commission
Monitoring	Yes	-	-	-	-

¹³⁷ ESCWA, “Assessment of Legal Aspects of the Management of Shared Water Resources in the ESCWA Region” (E/ESCWA/ENR/2001/3).

¹³⁸ Ibid.

TABLE 9 (continued)

	Egypt, Libya and the Sudan	Iraq and the Syrian Arab Republic	Jordan and Saudi Arabia	Jordan and the Syrian Arab Republic	Lebanon and the Syrian Arab Republic
Joint management	Yes	Yes	-	Yes	Yes
Groundwater ^{a/}	Yes	No	Yes	No	No
Information exchange	Yes	Informal ^{b/}	Informal ^{b/}	Yes	Informal ^{b/}

Source: Compiled by ESCWA, adapted from International Water Law Project (IWLP), available at www.internationalwaterlaw.org/documents; International Freshwater Treaties, Transboundary Freshwater Dispute Database (TFDD), available at <http://ocid.nacse.org/tfdd/treaties.php>; the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer Waters, available at www.jasad-nsas-ly.org/en/Establishment.php; and League of Arab States, "Report and Resolutions of the Third Session of the Arab Ministerial Water Council (Cairo, 15-16 June 2011)" (in Arabic, 2011).

a/ This refers to whether the agreement contains provisions for groundwater resources.

b/ There appears to be information exchange, but no formal document or guide to describe how this cooperative instance is to be implemented.

A hyphen (-) refers to none detected or not applicable.

(c) *Jordan and Saudi Arabia: the Disi Sandstone Aquifer*

As part of the development of the Disi Aquifer, also known as the Saq and Disi sandstones, Jordan and Saudi Arabia have been extracting different volumes of water from the Aquifer for agricultural irrigation. Jordan recently started the development of the "Disi Water Conveyance Project", which intends to pump about 100 million m³ per year from the Aquifer for drinking water mainly in Amman. Additional developments from the Disi Aquifer have taken place for the water supply in Aqaba.

Cooperation in that context is defined within the framework of a memorandum of understanding between Jordan and Saudi Arabia, dated 1 February 2007. The agreement was concluded at the ministerial level between the Ministry of Water and Irrigation in Jordan and the Ministry of Electricity and Water in Saudi Arabia, and contained general provisions to frame the cooperation between the two countries.¹³⁹

The memorandum contained a specific provision for the creation of a 10-km wide "preserve" corridor on each side of the border between the two countries in which no new agricultural projects would be initiated. In addition, the agreement noted Jordanian efforts to limit water extraction in some areas of the Aquifer; and noted the need to establish a mechanism for cooperation, monitor the exploitation of the Aquifer through observation wells and the sharing of relevant information.

(d) *Jordan and the Syrian Arab Republic: the Yarmuk River*

On 9 September 1987, Jordan and the Syrian Arab Republic signed the Agreement Concerning the Utilization of the Yarmuk Waters, which reaffirmed the mutual commitment by both countries to manage jointly the Yarmuk River. The project centred on a dam at Maqarin aimed at providing hydropower and water whereby Jordan would receive 25 per cent of the hydropower generated and access a share in the water stored behind the dam. This Agreement revived plans that had been discussed and agreed in the 1950s as part of early negotiations on managing the waters of the Jordan River Basin.

(e) *Lebanon and the Syrian Arab Republic: Nahr al-Kabir al-Janoubi*

On 20 April 2002, Lebanon and the Syrian Arab Republic signed an agreement aimed at sharing the Great Southern River Basin and at jointly building a dam across it. Nahr al-Kabir al-Janoubi forms part of

¹³⁹ League of Arab States, "Memorandum of April 19, 2010 from the Permanent Mission of the Hashemite Kingdom of Jordan to the Arab League" (2010). Included in *Explanatory Notes to the Agenda of the Second Session of the Arab Ministerial Water Council* (Cairo, 1-2 July 2010). Document No. (0357)P-01/(07/10)02/17C (in Arabic).

the border between the two countries, and its basin covers 990 km², of which 295 km² falls in Lebanon, and 695 km² is in the Syrian Arab Republic.

In the agreement, the river flow was allocated in proximity to the proportion of each country's territory in the drainage area of the basin, thereby allocating Lebanon 40 per cent and the Syrian Arab Republic 60 per cent of the flow of the river, estimated at 150 million m³ per year. The agreement established a process of cooperation between the two countries through a joint committee to share data and information. Within the framework of the agreement, the construction of a joint dam was decided.¹⁴⁰ Unlike the case of the Yarmuk River, where the cost of the Maqarin dam was entirely born by Jordan, the cost of the joint dam at Idleen Nura al-Tahta would be shared on equal basis.

B. DRIVERS OF COOPERATION

While self interest may not be the main motivator of countries, it is the most durable. Therefore, any sustainable cooperative effort must take into account how the self interest of countries drives them to cooperate and strive to achieve benefits that outweigh the costs of any lack of cooperation. In the ESCWA region, such benefits are intimately linked to water supply. This is because the region faces all four of the major problems in water of the world, namely: provision of safe drinking water, requirements for agriculture and industry, sustainability of development projects and use of shared resources.¹⁴¹

This is evidenced by existing cooperative agreements, which highlight general "explicit" objectives, while emphasizing more "implicit" goals related to their mutual self interest.¹⁴² Various agreements start by mentioning such explicit objectives as sustainable use, sustainable development, the need to "strengthen bonds of Arab brotherhood and the special relationship existing between two fraternal countries".¹⁴³ However, they quickly move to frame means to substantiate their need to enhance "the joint relations and the Arabic brotherhood"¹⁴⁴ through "high spirit of responsibility towards the common, vital, and legitimate interests"¹⁴⁵ by defining such implicit goals as "proper management"¹⁴⁶ and "sharing" their common basin "in a reasonable and equitable"¹⁴⁷ manner in order to secure such needs as "the irrigation of arable lands and the generation of electric power".¹⁴⁸

Such implicit goals then represent the tangible expression of national self-interest, and define the drivers that specifically enhance conflictive or cooperative tendencies of a relationship. However, given that some countries may not view their security interests as part of a common goal, this may affect their view of what constitutes "cooperation" with their neighbours. In this case, interactions over shared waters would be shaped by "power relations and the status of the political economies", especially in basins where there is a power imbalance among riparian States.¹⁴⁹

¹⁴⁰ The agreement is available at <http://ocid.nacse.org/tfdd/treaties.php?page=full&origin=river&tn=616>.

¹⁴¹ See A.K. Biswas, "Integrated Water Resources Management: A Reassessment – A Water Forum Contribution", *Water International*, vol. 29, No. 2 (2004), pp. 249-256; and G.J. Nasr, "Limitations of the Hydraulic Imperative: The Case of the Golan Heights", *International Journal of Water Resources Development*, vol. 25, No. 1 (2009).

¹⁴² A. Jägerskog and M. Daoudy, "Event Summary and Conclusions: Session on Cooperation as Conflict? Towards Effective Transboundary Water Interaction" (2009), which was presented at World Water Week (Stockholm, 16-22 August 2009) and is available at www.worldwaterweek.org/.

¹⁴³ Jordan-Syrian Arab Republic: "Agreement Concerning the Utilization of the Yarmuk Waters"; and Egypt-Sudan: "Joint Authority for the Study and Development of the Nubian Sandstone Aquifer Waters".

¹⁴⁴ Lebanon-Syrian Arab Republic: "Agreement for the Sharing of the Great Southern River Basin".

¹⁴⁵ Iraq-Syrian Arab Republic: Law No. 14 of 1990 ratifying the "Joint Minutes Concerning the Provisional Division of the Waters of the Euphrates River".

¹⁴⁶ Egypt-Sudan: "Joint Authority for the Study and Development of the Nubian Sandstone Aquifer Waters".

¹⁴⁷ Lebanon-Syrian Arab Republic: "Agreement for the Sharing of the Great Southern River Basin".

¹⁴⁸ Jordan-Syrian Arab Republic: "Agreement Concerning the Utilization of the Yarmuk Waters".

¹⁴⁹ N. Mirumachi and J.A. Allan, op. cit.

The absence of formal cooperation leads powerful riparian States to define a policy vision centred on a “hydraulic imperative”.¹⁵⁰ The political situation could potentially escalate whereby water issues become increasingly “securitized”. This is a particular concern in the ESCWA region given the high dependency ratio of many countries.¹⁵¹ Moreover, the more powerful State can move to consolidate its “hydro-hegemony”, thereby ensuring that its already powerful political economy is able to benefit disproportionately from shared resources. Any “cooperative agreement” would then only serve to “perpetuate asymmetric and harmful situations”, as in the case of Palestine, which is deprived of access to a fair share of shared water resources.¹⁵² Yet any agreement based on “hydro-hegemony” is inherently unsustainable, given that it tends to impose rigid strictures on water resources. However, such resources are “intertwined with other development [and] social sectors” and they will always be “neither homogenous, nor constant or consistent over time”.¹⁵³

Already, in those basins of the ESCWA region where hydro-hegemony prevails, national authorities have been placing increasing demand on freshwater resources, pumping such resources as groundwater at unsustainable rates. In many cases, this “race to the bottom” is leading to aquifer depletion and pollution, thereby depriving future generations the use of the waters.¹⁵⁴ By contrast, in regions such as SADC, riparian States appear to have realized that strategic security considerations are a major determinant of cooperation, thereby leading to the emergence of a “hydropolitical complex”.¹⁵⁵ This has led them to a state where the benefits of cooperation, a “normative foundation” and “a robust institutional system” have become drivers of future cooperative behaviour that “institutionalize the value of cooperative behavior between sovereign States”.¹⁵⁶

In this context, such issues as climate change “remain largely oblivious to boundaries, functioning as a coherent system regardless of maps and borders”, and “create, even impose, international environmental linkages that demand holistic and integrated management”.¹⁵⁷ The combination of external environmental changes and internal water stresses may become an additional driver of cooperation.

C. INSTITUTIONAL ARRANGEMENTS

An essential element of any agreement is the establishment of appropriate legal and institutional frameworks that benefit from high-level political support. Political support is not translated by “exhortatory” language and promises of voluntary engagements, but by clear organizational frameworks. Agreements on shared water resources should therefore leave no room for interpretation with regard to institutions, their core mission and mandates, and any need for regulations and governance.

¹⁵⁰ F. Nasrallah, “Middle Eastern Waters: The Hydraulic Imperative” *Middle East International*, No. 374 (27 April 1990), pp. 16-17.

¹⁵¹ The “dependency ratio” is a ratio of externally to internally generated water resources, and indicates the extent of a country’s reliance on outside sources of freshwater.

¹⁵² M. Zeitoun and N. Mirumachi, “Perpetuating Water Conflict through Asymmetric Cooperation” (2009), which was presented at World Water Week (Stockholm, 16-22 August 2009).

¹⁵³ A.K. Biswas, op. cit.; and G.J. Nasr, op. cit.

¹⁵⁴ A. Jägerskog, “MENA Water Overview: Transboundary Cooperation, IWRM and Opportunities for Swedish Engagement” (Swedish International Development Cooperation Agency, 2007).

¹⁵⁵ A.R. Turton, “Water as a Source of Conflict or Cooperation: The Case of South Africa and its Transboundary Rivers”, CSIR Report No. ENV-P-CONF 2005-002 (2005).

¹⁵⁶ Ibid.

¹⁵⁷ ESCWA, “The Environment in the Transboundary Context in the ESCWA Region: Situation and Recommendations” (E/ESCWA/SDPD/2005/5), pp. 4 and 8.

1. *Types of agreements*

Cooperation agreements can be classified based on provisions for institutions. Agreements can be considered to fall in either of three categories, namely: those that remain informal or that do not designate institutions, those that assign specific governmental representatives or plenipotentiaries, and formal arrangements that establish specific institutions.

In the first case, when there is no agreement or no institution has been formally designated, implementation can still be assured as long as the political commitment is maintained. This is the case of the Disi Aquifer shared by Jordan and Saudi Arabia where the collaboration between the two countries is generally informal. Indeed, while the memorandum of understanding between the two countries made clear specifications for a “preserve”, that is a corridor with restrictions for new water developments, and for the need to establish cooperation mechanisms, it made no clear specification as to how they would operate. All ongoing cooperative efforts as part of this agreement do not therefore have a formal structure. However, owing to the apparent shared goodwill between these basin riparian States, this relatively informal structure has so far proven sufficient.

However, there are drawbacks to the lack of a formal institution aimed at ensuring or monitoring implementation. This can happen even with the existence of formal mechanisms, including memoranda of understanding, or the appointment of governmental representatives to facilitate the implementation of an agreement. In this case, any joint commission that is established tends to be more ad hoc in nature, which limits its action from both ends of the decision-making hierarchy.

At the implementation end, work could easily be slowed or stopped owing to the lack of clearly agreed-upon procedures and allocation of responsibility. Specifically, no party knows for sure which does what and when. At the decision end, the lack of a strong political mandate from all riparian States means that, even when formally established and defined, a joint committee can still be hindered in its work. This was evident in the case of the agreement between Iraq and the Syrian Arab Republic on the Euphrates, where non-compliance became a growing problem given the “weak monitoring capacity” of JTC and compounded problems related to the lack of formal Turkish commitment.¹⁵⁸ The lack of formal channels for coordination and communication between the two countries led to a serious crisis in 1998.

The need for formal communication channels can best be ensured through formal institutions, which can be as extensive as the basin organizations that involve all riparian States, or as simple joint commissions that can be only bilateral. In the ESCWA region, the recent history of “acrimony and poor cooperation among most riparian States” is such that basin-wide agreements that give rise of basin organizations “are not likely to be achieved in the near future unless special efforts are made”.¹⁵⁹ Given the emphasis on bilateral agreements, the focus has been on setting up various types of joint committees to facilitate cooperation and further the implementation of these agreements; and to help to ensure that information is shared and jointly acted upon. This is in line with the Watercourse Convention, which encourages the establishment of joint mechanisms or commission to facilitate cooperation between the Riparian Parties.¹⁶⁰ Among the reviewed agreements, joint committees were formally established as part of the agreements between Egypt, Libya, the Sudan and Chad; Lebanon and the Syrian Arab Republic; and Jordan and the Syrian Arab Republic (see table 10). In the case of Egypt and Libya, the joint authority has carried out activities that appear mostly focused on research and information sharing.¹⁶¹

¹⁵⁸ M. Daoudy, “Asymmetric Power: Negotiating Water in the Euphrates and Tigris”, *International Negotiation*, No. 14 (2009), pp. 359-389.

¹⁵⁹ ESCWA, “Assessment of Legal Aspects of the Management of Shared Water Resources in the ESCWA Region” (E/ESCWA/ENR/2001/3).

¹⁶⁰ Watercourse Convention, Article 8.

¹⁶¹ K. Abu-Zeid and A. Abdel-Meguid, “Pioneering Action in Managing the Transboundary Nubian Sandstone Groundwater Aquifer” (2006), available at <http://water.cedare.int/cedare.int/files15%5CFile2813.pdf>.

TABLE 10. EXAMPLES OF AGREEMENT TYPES AND THE COOPERATION CONTINUUM IN THE ARAB REGION

Cooperation continuum		Egypt, Libya and the Sudan	Iraq and the Syrian Arab Republic	Jordan and Saudi Arabia	Jordan and the Syrian Arab Republic	Lebanon and the Syrian Arab Republic
		NSAS	Euphrates	Disi Aquifer	Yarmuk	Nahr al-Kabir
Dispute	Conflict					
	Non-cooperation	Upstream riparian				
Coordination	Ad-hoc notification					
	Regional assessments	Regional information system				
	Information symmetry	Joint authority	Joint technical committee	-	Joint commission	Joint commission
Collaboration	Adapt national plans					
	Consult on national plans					
	Activity coordination	Agreement (1992)	Joint minutes (1989)	Memorandum of understanding (2007)	Agreement (1987)	Agreement (2002)
Joint Action	Bilateral					
	Basin-wide				Joint dam	Joint dam

Source: Compiled by ESCWA.

2. Funding for implementation and follow up

Once an agreement is in place, “process financing” becomes a key factor in ensuring its successful implementation. Once funding is secured, properly supported joint commissions can effectively implement the agreements. In practice, funding can come from three types of sources, namely contributions from riparian countries, donor aid and/or revenues.

In the case when a joint commission is funded by riparian contributions, the contribution formula can be established on the basis of a “weighted share”. In this formula the weighting is defined by a variety of parameters that describe the contribution of each basin State, according to catchment areas, average flow, irrigated areas, population and per-capita GDP.¹⁶² However, when there is a large difference in relative economic power, such an arrangement can create or reinforce hydro-hegemony. More powerful riparian States could devote comparatively more resources to cooperative initiatives over shared waters, and thus easily work to advance their interests.

¹⁶² This is the case of the Mekong River Commission (MRC), where the contributions of Thailand, Laos, Cambodia and Viet Nam are 34, 18, 18 and 30 per cent, respectively. See A. Nicol et al., “Transboundary Water Management as an International Public Good” (Ministry for Foreign Affairs in Sweden, 2000); and P. Hirsch et al., “National Interests and Transboundary Water Governance in the Mekong” (March 2006).

It is in those cases that donor aid can help. At the very least, it can then help to supplement the limited resources of some basin States and prevent contribution formulas from breaking down. At most, it allows weaker economies to leverage the economic power of donor countries. However, donors cannot be expected to “fill in” gaps in governance, and aid generally requires the presence of formal institutional arrangements. Furthermore, any institutional gap cannot be filled by the United Nations, given that none of its agencies has an explicit mandate. Within that context, United Nations agencies can only “support programmes in shared water management, but less so the establishment and creation” of new institutions.¹⁶³ Any institutional gap needs to be filled in “locally” through agreement among basin States.

Reinforced by clear agreements, institutions can effectively fund themselves with the revenues generated by in-basin activities. This can be done through such levies as surcharges on projects implemented in the basin, whether funded by donors or by the private sector. This is the case of the Mekong River Commission (MRC), whose revenues are largely the product of a surcharge of 8 per cent on such projects. Despite this high surcharge, the revenues of MRC do not amount to more than 25 per cent of its operating budget of US\$2 million.

In the case of the ESCWA region, there appears to be no such mechanism for in-basin revenues among the agreements considered. Funding provisions appear to be vague; even in those agreements that purport to undertake joint projects no specific provisions are made for a clear mechanism or authority to take care of the expected common expenses.

For instance, while the agreement on NSAS appears to rely heavily on donor funding, the extent of such an involvement remains hard to ascertain. Currently, the focus of most of the activities appears to be in planning and data acquisition, and on a programme to develop a regional strategy, which was launched on 5 October 2000. This strategy incorporates terms of reference for “monitoring and exchange of groundwater information” and “monitoring and data sharing”.

The agreement on Nahr al-Kabir al-Janoubi only mentions that both countries will split in half “all the costs necessary to study and construct the dam”, and only states that each party would “try to get the necessary financing from self or external sources” (article 10). The agreement on the Yarmuk does not address this aspect in detail. It does specify that 75 per cent of the electric power generated will go to the Syrian Arab Republic, with 25 per cent to Jordan, which also would have the right to “use the overflow” from the joint dam (article 7). Moreover, most of the “implementation and construction” expenses would be borne by Jordan (article 8). The agreement further delves into the minutiae of allocating quotas for workmen to be employed in the construction of the dam (article 5). Within the framework of the joint minutes of 1989 between Iraq and the Syrian Arab Republic, there are no clear funding provisions regarding the implementation of joint activities on the Euphrates River.

In the long term, riparian States need to establish more formal mechanisms if sustainable cooperation is to be maintained, failing which any absence or shortcoming of in-basin financing could endanger long-term ownership. Part of this funding could be generated through investment facilitation, which constitutes an important part of sustainable development. In theory, this could help to guide investors and donors who would otherwise “find their way” into the basin without proper guidance. For example, in the case of the NBI, donors have funded many of its various programmes in spite of the fact that it relies only on limited information sharing on projects among riparian States, with no established basin agency. However, investments can aggravate an adverse situation in a basin, as in the case the Euphrates, where Turkey was able to secure significant financing for its GAP Project, in spite of much international opposition. The new dams are now established “facts on the ground” that any future basin-wide agreement has to contend with.

However, by taking on the direct role of investment facilitator, any basin-wide management authority risks undermining its objectivity, given potential conflicts with its main tasks of regulation, knowledge production and conflict management. An excessive focus on investment facilitation risks placing an agency

¹⁶³ A. Nicol et al., *op. cit.*

in a difficult position among various donor with diverging views, policies, interests and levels of engagement. Rather than acting as an arbiter among them, the agency could then be led to focusing on harmonizing donor view, which represents a difficult task with comparatively high transaction costs.

D. ALLOCATION MECHANISMS AND FACTORS

Transboundary water management involves allocating the benefits of a shared basin among riparian States. This allocation is generally of two types, namely by “benefits” or by “right”. In regions where the focus is on economic development, water is allocated to those who will abstract and apply it to a given use, depending on the relative “benefits” they draw from it. In water-scarce regions, where water is essential to ensure basic needs, water allocation focuses on a formal or informal entitlement, conferring “rights” to withdraw water.

In the ESCWA region the basic need for water extends from domestic water use for drinking, to water abstractions for agriculture in rural areas, thereby ensuring essential livelihoods.¹⁶⁴ The basic need for water then takes on a specific meaning in the ESCWA region and therefore has a socio-economic imperative for such a semi-arid region, particularly in the case of Egypt, Iraq, Jordan, the Sudan, the Syrian Arab Republic and Yemen.¹⁶⁵

Once this basic need is secured, the needs for other sectors of activity, such as industry or tourism, can be considered. This allows riparian States to increase the range of cooperative possibilities without endangering critical livelihoods. In order to do so, allocation mechanisms should be put in place with a focus on following a consensual regulatory framework, and of cultivating proper consultation with various stakeholders. Such fair allocation formulas need to be “transparent”; constructed on the basis of formulas, including a “weighted share”; and defined by a variety of parameters that describe both the physical and socio-economic properties of the shared basin, including, among others, catchments, average flow, irrigated areas, population and proportion of local income that is generated either by agriculture or “off-farm income”.

The different agreements reviewed take different approaches in this respect, as follows:

(a) Some agreements make no mention of either allocations or the parameters used to define those allocations. This is the case of the agreements between Egypt, Libya and the Sudan on the NSAS; and the discussions between Jordan and Saudi Arabia on the Disi Aquifer;

(b) Other agreements mention allocations and determine how they are defined. In the case of Nahr al-Kabir al-Janoubi, the agreement of 2002 only considers one factor to define allocation, namely the approximate proportion of the catchment basin area that lies on either side of the river that forms the boundary between the two countries.¹⁶⁶ This disregards two critical factors: (i) large differences in contributions to the flow of the basin from either side of the river; and (ii) discrepancies in the socio-economic structure between Lebanon and the Syrian Arab Republic;

(c) In the case of the Yarmuk agreement of 1987, the allocations of water and power appear structured, based on a variety of parameters. However, rather than defining a mechanism for managing allocations, article 8 of the agreement only specifies set proportions for the rights and benefits of each riparian State.

Once allocation factors are agreed upon, the implementation of those mechanisms can rely on the provision of data. This need for accurate data to comprehensively inform planning is a common challenge to any element of the cooperation continuum, whether in terms of coordination, cooperation or joint action. In

¹⁶⁴ See also chapter IV.

¹⁶⁵ ESCWA, “Food Security and Conflict in the ESCWA Region” (E/ESCWA/ECRI/2010/1).

¹⁶⁶ Article 11 of the Agreement for the Sharing of the Great Southern River Basin.

order to ensure data accuracy, two issues need to be properly addressed, namely, lack of sharing and “unevenness”.

On the one hand, lack of data sharing is the most common problem, particularly in basins where a hostile political environment prevails. On the other, in those cases when data are available, it would mean little without a coherent vision and comprehensive planning. Otherwise, data risk being defined with a greater focus on funded projects rather than on the development needs of riparian States. This can result in an unevenness that may slant development towards the vision of the donor at the expense of local priorities. This may be the case in the Euphrates basin, where development is increasingly defined by the requirements of Turkey’s GAP Project.¹⁶⁷ The Project may benefit southeastern Anatolia through higher agricultural output and regulate the flow of the River. However, any regulation of the River flow will not necessarily address the needs of the downstream riparian States, namely Iraq and the Syrian Arab Republic. Furthermore, the damming of the Euphrates may actually exacerbate drought risks downstream, and may further the demise of the Hammar marshes in southern Iraq.

Both issues are easily addressed within the framework of a clear cooperation framework that ensures that data is shared properly, with critical, independent observing mechanisms, thereby verifying that water is properly allocated and managed.

E. SCOPE OF RESOURCE MANAGEMENT

A perception of fairness is essential for the success of any cooperation. This is facilitated by ensuring that all parties know and understand the intent and purpose of a shared water agreement, which should clarify the scope of cooperation.

Cooperation is further enhanced through mechanisms that guarantee that no new project falls out of the scope of what has been agreed. Those mechanisms need to be flexible enough to take into account the fact that each water resource, whether surface or groundwater, has its own unique geography, hydrology, politics and cultural context. Given that there is no such a thing as a “typical” shared water resource, there need not be a single approach for the implementation of cooperation agreements. It is only necessary to ensure that the scope of the agreement is clearly defined, and is ideally done through a formal structure.

Ideally, such a structure should have the following characteristics:

(a) Any cooperating institutions should be able to rely on enabling policies, meaningful powers and mechanisms to verify and monitor. While such routine management tasks are better administered by narrow bureaucracies, high-level political commitment remains essential to ensure compliance and ensure “political feasibility”, without which institutional arrangements will not endure.¹⁶⁸

(b) The specifics of its organizational structure should be defined based on implementation needs. In such a supranational context, a balance needs to be struck between the need for national decisions to be implemented and the obligation of non-interference in a State’s prerogative.

The perception of fairness can be further enhanced by ensuring that information trickles up from the local level. This requires the involvement of civil society stakeholders that have both a sufficient and a similar degree of political space at the national and basin-wide levels. This is essential for any cooperative endeavour for two reasons, namely: (a) it informs cooperating riparian States of alternative views and local interests; and (b) it allows any formal basin authority to develop a better understanding of the needs of diverse stakeholders.¹⁶⁹ Otherwise, the basin authority would risk developing a very limited view of the problem landscape as it strives to serve an increasingly limited constituency.

¹⁶⁷ The Güneydoğu Anadolu Projesi (GAP) is Turkey’s development project for southeastern Anatolia.

¹⁶⁸ A. Nicol et al., *op. cit.*

¹⁶⁹ P. Hirsch et al., *op. cit.*

F. WATER QUALITY AND ENVIRONMENTAL PROTECTION

Formal agreements need to guarantee a commonly acceptable level of water quality as well as environmental protection. Consequently, legal rules among riparian States may need to be harmonized and provisions made to adapt their application to the specific basin that is managed jointly.

The importance of this issue is highlighted by rules governing the responsibility for pollution. Indeed, given that, in a legal sense, what constitutes pollution differs among various States, the entire rationale behind them may not be environmental and may often depend on whether a State finds itself upstream or downstream. The responsibility for pollution created in the past varies among States, with some applying them retroactively to firms that caused it, whether under new management or not; and others relying on public financing for cleaning up any existing pollution, while only penalizing new proprietors for any subsequent damages.

Furthermore, even once responsibility has been established, rules for managing fines differ among States. While taxes and charges to fund environmental services have become widespread in the past 15 years, they differ widely in their uses and implementation. For example, France tasks its *Agences de Bassin* with levying charges on pollutant and subsidizing river cleanup; while Russia relies on structures that are more centrally managed.¹⁷⁰

For this reason, in the absence of a common regulatory framework or tradition between riparian States, international norms and principles can form the basis for agreements to guarantee water quality and environmental protection. Alternatively, in the case of the ESCWA region, the common culture of its member countries can be used as a basis for such agreements.

G. CONFLICT PREVENTION AND RESOLUTION

Any cooperation on shared water should be based on a joint vision or strategic plans among riparian States. This is implemented through a properly supported legal and institutional framework that engages upstream riparian States and benefits from high-level political support.

This can be done as part of a joint commission tasked with essential basin management activities. The joint commission would need access to “unfiltered” information to help clarify its goals and ensure that objectives are being met. In practice, its mission would have three core components, namely planning, regulation and water governance, and knowledge-building. The work of the commission needs to be supported by proper arbitration mechanisms, which need to be in place in order to ensure that conflicts are resolved transparently and efficiently and in accordance with the joint vision.

1. *Need to involve the uppermost riparian country*

Formally, any basin-wide cooperation would be implemented for the benefit of the people of the basin. Within a river basin, a formal framework creates a forum to bring together various stakeholders into the management structure. This is particularly important to both upstream and downstream riparian States, given that it clearly identifies the different classes of stakeholders to be considered, namely owners, implementers and beneficiaries. This ensures that both the sense and the rights of ownership are broad within the riparian States, and bring attention to the basin from all political levels, in addition to civil society.

Ideally, beneficiaries of basin-wide cooperation are a diverse group that includes all the users of that shared resource, such as upstream and downstream riparian States, private investors and various civil society organizations. In promoting development, care must therefore be taken to consider the implications of particular projects for various social groups and across different locations. In cases where formal basin organizations have been established, this can be done by focusing on recruiting diverse staff in order to

¹⁷⁰ A. Nicol et al., op. cit.

generate a variety of points of view within the organization, as in the case of the Orange-Senqu River Commission (ORASECOM), which is part of the SADC treaty.

In the ESCWA region, upstream riparian States were involved in the case of the Yarmuk, NSAS, Disi Aquifer and Nahr al-Kabir. However, it is the extent of cooperation on the Yarmuk that showcases the most extensive involvement of an upstream riparian. This was done by splitting the costs and benefits from any joint activity, with the downstream State taking the initiative of funding the largest proportion of the costs. In the agreement, the Syrian Arab Republic agreed to cooperate on a joint dam with Jordan, which, as a downstream riparian State, agreed to fund most of the costs of the dam in exchange for a share of “the overflow from the reservoir” and 25 per cent of the electric power.¹⁷¹

On the other hand, the extent of cooperating activities on NSAS has been limited. Furthermore, the cooperation between Lebanon and the Syrian Arab Republic is among countries that appear to consider themselves as both upstream riparian States of a “borderline river”, as evidenced by an allocation formula based on their relative proportion of basin territory.¹⁷²

Other agreements fail to bring in the involvement of upstream riparian States. In the case of the agreement on the Euphrates between Iraq and the Syrian Arab Republic, the signed joint minutes does little to bring the involvement of the Turkish riparian upstream of both countries. Previous other agreements did little to bring in the upstream riparian State, especially given that Turkey was able to secure funding for most of its planned activities as part of its GAP Project. Nominally, the Turkey-Iraq friendship treaty of 29 March 1946 included a protocol that defined Turkish obligations to inform Iraq of any conservation works, and not to change the flow of the Euphrates or construct waterworks projects without consulting Iraq.¹⁷³ However, since the protocol was initially intended with addressing the need to build up flood control works, Turkey considers that the agreement is not relevant for current conditions.¹⁷⁴

2. Planning

Provisions for future planning are an essential component of any agreement, given that they ensure the continuing sustainable development of the basin. The agreement should make provisions for a joint commission to focus on prioritizing projects in a manner that helps to coordinate national plans of its riparian States in a rational manner and in the perspective of their impacts on the shared water. In this development planning function, it should be active and not reactive, constantly evaluating or investigating development schemes with impact on the basin, including controversial projects.

Such commissions have been set up as part of the agreements on the Euphrates, NSAS, Nahr al-Kabir, and the Yarmuk. Where these lacked significant mandate, as in the case of JTC on the Euphrates, the committees have had to interrupt their activities. Wherever specific goals had yet to be defined, as in the case of NSAS, the committees focused on information building. Other committees that had more information and a clearer mandate were able to further their plans, as in the case of the joint committees that were set up as part of Nahr al-Kabir and the Yarmuk.

Funding issues may push joint committees to search for other sources of financing. They are sometimes tasked with facilitating or encouraging such key priorities as sustainable development, or are requested to do so by the provisions of the agreements that enjoin them to “study methods of defraying the costs of construction and maintenance” of hydraulic works.¹⁷⁵ However, in practice, translating their

¹⁷¹ Articles 9a and 9b, 8a and 8c of the Agreement Concerning the Utilization of the Yarmuk Waters.

¹⁷² Articles 3 and 11 of the Agreement for the Sharing the Great Southern River Basin.

¹⁷³ Protocol 1 of the Treaty of Friendship and Good Neighbourly Relations between Iraq and Turkey.

¹⁷⁴ M. Daoudy, “Asymmetric Power: Negotiating Water in the Euphrates and Tigris”, *International Negotiation*, No. 14 (2009), pp. 359-389.

¹⁷⁵ Article 10.i of the Agreement Concerning the Utilization of the Yarmuk Waters.

activities into “investment facilitation” carries risks. Investment facilitation is essentially an “advocacy” task and not a managerial one, which can lead to conflicts of interest and, moreover, could substitute local needs to donor priorities. As a result, it risks affecting the objectivity of managers and therefore hinders their ability to act as an arbiter between priorities. The task of facilitating investment should therefore be better left to other bodies.

3. Governance

The complexity and diversity of interests in water and river-basin management can often be clarified within the national framework and at the local level. The success of governance depends on the definition of clear and measurable objectives, proper funding and adequate stakeholder involvement in the project. The role of any joint commission in this context depends on the extent of harmonization of the regulations of its various riparian States. At the very least, the rules of any established joint commission should generally take precedence over national rules in the context of the basin. At most, as in the case of ORASECOM, the commission could serve as a catalyst towards harmonizing rules within a consensual framework.

It is generally accepted that the role of “civil society” in assisting the joint commission in the management of shared water agreements is important. In practice, the role of civil society varies, as shown in table 11, from that of providing information or feedback to detailed involvement in management, as in the Jordan Basin; or even in “second track diplomacy and confidence building”, as in the Southern Caucasus.¹⁷⁶ However, such a variety of roles does not hide the fact that civil society organizations and NGOs can only supplement or assist the work of formal government structures, and can never replace them. The complexity and diversity of interests in water and river-basin management requires that the role of civil society be clearly and formally defined, and depends on the advancement of the implementation of an agreement on shared water resources.

TABLE 11. STRUCTURED ROLE FOR CIVIL SOCIETY

Process stage	Possible role
Initiating process	<ul style="list-style-type: none"> • Civil diplomacy between neighbouring groups • Construction of dialogue through networks of civil society groups at a regional level
Institutional management	<ul style="list-style-type: none"> • Observers to the main meetings • Development of networks to feed into policy development and data collection
Programme implementation	<ul style="list-style-type: none"> • Capacity-building, independent monitoring of process • Assistance in feedback of ideas and impacts from local communities
Investment in water management works	<ul style="list-style-type: none"> • Implementation and co-funding, where appropriate • Provision of technical expertise in development of management. works including social and environmental impact assessment

Source: Nicol et al., “Transboundary Water Management as an International Public Good” (Ministry for Foreign Affairs in Sweden, 2000).

4. Knowledge-building

Knowledge-building is an important element that aims to ensure that stakeholders benefit from information, which is a by-product of any river management activity. Any basin administration authority needs to build up a strong base of professional staff whose role is to receive river or groundwater data and

¹⁷⁶ A. Nicol et al., op. cit.

coordinate with established research and teaching institutions. This allows it to apply independent and objective knowledge about resource management, and to provide increasingly informed advice. Furthermore, any management authority should also have a “governance link” with related decision making in order to ensure that the agency is able either to act on the knowledge produced or to influence others to do so in the perspective of sustainable development.

The importance of the role of knowledge-building was apparent in the case of most of the examples surveyed in the ESCWA region, even in the more limited cases of NSAS and the Euphrates. On the Euphrates, even when JTC could not fulfil its mandate, its knowledge-building played a positive role, as information sharing appears to have facilitated coordination of some irrigation plans, notably during the initial filling of the Karakaya and Atatürk Reservoirs in Turkey.¹⁷⁷ Similarly, the joint authority on NSAS contributed to knowledge-building; and the studies it undertook or facilitated resulted in the Nubian Aquifer Regional Information System (NARIS) and a regional mathematical model to simulate development scenarios. However, for such work to allow for enhanced sharing of information and regional monitoring of the shared resource, it would still require the integration of existing observations stations into a “regional monitoring network”, and the addition of any new stations as deemed necessary.¹⁷⁸

However, building the knowledge base and capacity in this area needs to be taken a step further. Specifically, it requires water governance institutions to be connected to local-level institutions, and to secure the active participation of all stakeholders. This could require “nested institutional arrangements where small local institutions form the building blocks, which come together to create larger management institutions”, thereby avoiding “a disconnection between the river basin management institutions and the water users”.¹⁷⁹ For example, SADC management institutions tend to be viewed as part of regional integration.¹⁸⁰ In addition to better management, such integration helps to “de-secure” shared water issues.¹⁸¹ To some extent, this was achieved as part of the agreements on the Yarmuk and Nahr al-Kabir, where the members of the respective joint commissions coordinated with local authorities, and were given “the freedom to move without any restriction or fees”.¹⁸² However, no clear mechanisms were specified that could implement such facilities.

5. Need for arbitration mechanisms

Arbitration is a key component of any formal cooperation framework. An arbitration function could also be supplemented by mechanisms for direct intervention whereby an authority is tasked with applying rules, adjudicating or carrying out assessments relevant to particular disputes. This can be done by drawing on accumulated knowledge during the course of joint management of the basin, which is used to provide an objective point of reference that can serve as a “negotiating baseline”.

In a shared basin, arbitration would be necessary to address three main types of conflicts, as follows:

(a) Conflicts among riparian States are seen when aggrieved parties expect a third party to step in and resolve conflicts in the event of water-related impacts. This could be the role of a basin-wide authority, such as a basin organization, which could use accumulated basin knowledge to make better decisions. This is the

¹⁷⁷ A. Jägerskog, “MENA Water Overview: Transboundary Cooperation, IWRM and Opportunities for Swedish Engagement” (Swedish International Development Cooperation Agency, 2007).

¹⁷⁸ K. Abu-Zeid and A. Abdel-Meguid, *op. cit.*

¹⁷⁹ P. Hirsch et al., *op. cit.*

¹⁸⁰ E. Mapedza et al., “Transboundary Water Governance Institutional Architecture: Reflections from Ethiopia and Sudan”, CP 19 Project Workshop Proceedings (International Water Management Institute, 2009), p. 249.

¹⁸¹ A.R. Turton, “Reflections from South Africa on a Possible Benefit-Sharing Paradigm for Transboundary Waters” (2008), which was presented at the First African Water Week (26-28 March 2008).

¹⁸² Article 13 of the Agreement for the Sharing of the Great Southern River Basin.

case of ORASECOM, which can deploy three different “task teams” to address legal, technical and groundwater issues;

(b) Conflicts among various stakeholder interests occur when riparian expectations extend beyond the cooperating agency’s own view of its role. This happens when a basin organization or a joint commission is established that lacks the power to act without formal governmental requests, and still finds itself addressed by local governments, civil society organizations, business interests or donors. Such agencies could address this issue by constantly providing critical expert reviews that would form the basis of informed and open debate on various projects and issues. However, they still need to be mandated to do so in the first place;

(c) Conflicts of interest can occur even in the best of cooperative environments and may emerge when a basin management agency is not able to act as an honest broker. This is addressed by ensuring that the basin agency is established with clear guidelines and proper funding. The agency needs to be unconstrained by diplomatic or political considerations, thereby allowing debates among riparian States to move beyond national interests and focus on the needs of water management in the shared basin.

None of the agreements in the ESCWA region appears to have such provisions. When they do mention the possibility of conflict, they only enjoin members of joint commissions to “report the matter forthwith to their governments”, and leave the matter of arbitration to a committee that has yet to be defined.¹⁸³

H. IMPLEMENTATION

In a shared basin, the actual implementation of cooperation depends on a riparian State’s perception of its key interests. Cooperation then falls along a continuum of cooperative options that extends from unilateral acts to joint action. In the water-scarce ESCWA region, cooperation is focused on ensuring the basic needs of States, which translates as the need to ensure the essential livelihood of a population. Once those needs are secured through by “right”, the remaining resources can be allocated by “benefit” in order to help develop other sectors of the economy.

In the shared basins of the region, this can best be achieved through formal cooperative institutional frameworks. Even if, as in the case of the Disi Aquifer, some of the positive results of cooperation were achieved without formal structures, the essential need to involve upstream riparian States requires clear institutional arrangements. In order to be well funded, such institutional arrangements could rely on a mix of revenue sources either in-basin or through donor agencies. In practice, funding should be relatively easy to obtain, given the comparatively low cost of financing cooperation compared to the high cost of reaching an agreement on shared water resources.¹⁸⁴ This would allow institutional mechanisms to focus on ensuring basic needs, with clear allocation mechanisms based on agreed-upon formulas. It is possible that the need to involve upstream riparian States could lead to more extensive cooperative structures, such as basin organizations, given that they can provide the right framework to allow high-level political involvement, strong basin governance and mechanisms to adjudicate disputes.

¹⁸³ Article 10 of the Agreement Concerning the Utilization of the Yarmuk Waters.

¹⁸⁴ A. Nicol et al., *op. cit.*

VII. CONCLUSION

While the ESCWA region is one of the most arid areas in the world, it is blessed with noteworthy volumes of fresh surface water and groundwater, both crossing neighbouring countries within the ESCWA region (intraregional systems) and across the border of the region (interregional systems). In addition to perennial rivers and large aquifer systems, smaller-scale wadis and alluvial aquifers often constitute locally important sources of freshwater. Shared water resources play a significant role in the stability and development of the region, creating hydrological, social and economic interdependencies between riparian countries, both Arab and non-Arab. It is therefore crucial for the respective countries to acquire accurate and up-to-date information on all surface and groundwater systems across political borders if management of shared water resources in a sustainable manner is to be attained.

ESCWA member countries suffer from a growing scarcity of water resources. Accordingly, competition over shared water resources has been intense and has often contributed to regional conflicts. These challenges have intensified over time, with rapidly growing population and subsequently increasing water demand; while still large quantities of water resources are allocated to the agricultural sector. Chronic energy shortages in some countries of the region as well as the need to ensure stable food supply in face of the global food crisis have also negatively compounded the water challenges of the region. While climate change is expected to exacerbate the water-scarcity conditions, the existing institutional and human capacities are inadequate to address these challenges.

Countries of the ESCWA region have responded to the water challenges by applying IWRM principles and tools, investing in the development of non-conventional water sources, improving water resources allocation and examining other policy tools. Moreover, the region has started to improve and protect water quality and to build the knowledge base, particularly for shared water resources of the region where several joint investment projects have been identified. Stakeholder and civil society participation in decision-making processes for shared water resources, however, remain limited. These efforts have not been sufficient to solve the severe water challenges of the region, and several tasks remain to be addressed in an effective manner, particularly those connected to the allocation and management of shared water resources, which are considered a critical factor in achieving water security for sustainable development.

For centuries, local communities in the ESCWA region managed water resources through informal institutions, relying on different types of customs, traditions and legislations that varied from the Code of Justinian and Roman Law, the Old Testament, Egyptian Pharaonic Water Regulations, Islamic Law and the Code of Hammurabi. They included provisions aimed at regulating waterworks, water allocation and water use. Currently, water legislation in the majority of Arab countries is governed by a combination of Sharia principles and some traditional and customary practices, in addition to some elements of modern water codes. While updating the water laws of some countries is needed, particularly in the area of implementation and enforcement, many of these modern laws are based on or are in accordance with internationally accepted norms and principles. Despite the trend towards managing water resources at the basin level, management of shared water resources falls usually within the responsibility of national governments, which are responsible for concluding agreements with other riparian countries. More efforts need to be exerted to reach common consensus on the management concepts and factors that define and determine the allocation of shared water resources on the basis of fair and equitable principles, among which some had been practised and are mentioned in customary laws and international water laws.

While commonalities in culture, history and language in the Arab region have facilitated some formal and informal sharing agreements on transboundary water resources, relationships with non-Arab riparian countries, where such common ground does not necessarily exist, have not always been successful owing to many factors, including the sense of vulnerability that stems from being the downstream riparian countries. This situation led the League of Arab States, through AMWC, to adopt the Arab Water Security Strategy aimed at enhancing the concept of “Arab solidarity” in order to mitigate the effect of water-related tensions with non-Arab countries and, potentially, between Arab countries. The Strategy makes reference to existing

and potential tensions resulting from the absence of bilateral or multilateral water treaties and agreements that can assist riparian countries in regulating water allocation; and emphasizes the need for clear tools and guidance in order to facilitate concluding agreements between riparian countries on the basis of fair and equitable allocation mechanisms.

In parallel over the past few years, different regional and international institutions and organizations have attempted to assist Arab countries in their endeavours to manage jointly their shared water resources and conclude fair and sustainable agreements. These institutions work at different levels and range in format from official bilateral or multilateral commissions to organizations of civil society, academic researchers or random community groups. Arab countries need to encourage these institutions and provide them with every necessary support given that their work revolves around developing water directives, raising awareness and sharing lessons learnt on issues related to the management of shared water resources, which are generally considered beneficial to the region.

At the global and regional levels, an exclusive reliance on customary international rules and norms to allocate surface or groundwater between riparian States has not been very successful owing to its informality, lack of defined operational procedures, and the lack of effective institutional arrangements and enforcement mechanisms. It is unrealistic to presume that international customary law alone can resolve the problems related to the management and allocation of shared water resources, with all of its complex and interrelated factors and specificities. Of all international legal instruments on shared water resources, the Helsinki Rules is considered the first comprehensive set that tackles the uses of international drainage basins; and while they are non-binding, these Rules influenced the preparation of the Watercourse Convention and the Law of Transboundary Aquifers, which are considered the prime efforts by the United Nations to codify international customs for water at the global level.

While international legal instruments do not explicitly specify the management concepts to be used in managing shared water resources, the adoption of different hydrological physical limits of shared resource has a direct implication on the inclusion or exclusion of water to be considered as part of the shared water resource. The adoption of the “drainage basin” to delineate shared water resources coincides with the principles of IWRM and addresses all water within the drainage basin, which may lead to higher water shares to dryer downstream riparian countries.

Of all the principles that dictate the direction of international legal instruments on shared water, the equitable and reasonable use, the no significant harm and the general obligation to cooperate are considered the most important. Under the equitable and reasonable-use principle, each riparian State is entitled to a reasonable and equitable share of the beneficial uses of a shared water resource. While this principle is widely considered and accepted as the main guidance for the allocation of shared water resources, it falls short of identifying a practical approach that quantifies the rights of the various riparian countries.

The inclusion of the no significant harm as a separate principle was viewed as a victory by delegates of downstream countries during the negotiations of the Watercourse Convention. Other delegates, mostly from upstream countries, did not consider the inclusion of the no significant harm as a defeat since the text stipulates that preventing harm is bound by taking “all appropriate measures”; the recognition that “significant” may be tolerated; and conflicts are not settled by applying the no significant harm rule alone, rather by also including articles that relate to the equitable and reasonable use. It has been proposed to define significant harm in accordance with the tangible injury or loss that it inflicts on human public health, the economy or the environment. Translating such injury and loss into a financial value helps to facilitate the compensation process if deemed necessary.

The various formal or informal bilateral agreements on shared water have led experts to consider shared waters an element of cooperation rather than a cause for conflict. The Watercourse Convention incorporates many cooperative features, such as promoting the establishment of joint institutional arrangements and joint management mechanisms; and requiring the exchange of data and information and

the prior notifications of planned measures. While the Law of Transboundary Aquifers follows the Watercourse Convention in incorporating all the cooperative features, the inclusion of sovereignty as a separate principle is expected to empower the position of individual riparian countries at the expense of mutual and collective approaches, thereby making it a lesser cooperative framework compared to the Watercourse Convention.

The limited reliance of international legal instruments on penalties or sanctions, and their focus on justificatory processes and concrete means to promote cooperation and compliance should not be considered a sign of weakness of international law, but rather of its flexibility and strength. While the Watercourse Convention does not preset a definite institutional setup for the follow-up of its implementation, it is the only viable legal instrument that has the potential to guide cooperation over shared water resources at the international level; and once it enters into force, it is expected to form the reference legal base on the management of shared water resources.

In view of the fact that external renewable water resources constitute more than half of the renewable water in Arab countries, securing the rights to those resources becomes an element of national and regional security. A common vision and a unified understanding of the legal basis to manage shared water resources, whether internally between countries of the region or externally with neighbouring upstream non-Arab countries, can constitute a major step towards achieving water security in the region. Realizing the importance of both interregional and intraregional shared water, AMWC passed a resolution inviting regional institutions, led by the Centre for Water Studies and Arab Water Security and ESCWA, to prepare a draft legal framework on shared water in the Arab region. This has been pursued through an intergovernmental consultative process involving Arab countries that has benefited from the support of regional organizations, including BGR, ACSAD, CEDARE and SIWI.

It can be argued that the special characteristics or specificities of the Arab region play a determinant role in how intraregional, and interregional water resources are allocated, managed and used. Some of these specificities include the growing water scarcity (compounded by the potential further adverse impacts of climate change), large economic variations between the various Arab countries, a tradition of agricultural-based economies and employment, unclear national and regional food security policies, limited institutional capacity to manage effectively national and shared water resources, general insecurity of water rights to shared water resources and a sense of vulnerability stemming from being often a downstream riparian country, political tensions and instability in some Arab countries, and a power imbalance and water hegemony. These issues, among others, determine the way in which Arab countries view and manage both national and shared water resources.

Any legal instrument that aims to regulate shared water resources in the Arab region would need to clearly characterize those resources in terms of their physical and hydrological properties as well as the concept used in their management. Given the large diversity of the Arab region in that it includes a number of major international rivers and some extensive and local transboundary aquifers, it becomes important for a regional legal instrument to include and address the conjunctive use of surface water as well as renewable and non-renewable groundwater resources within the wider hydrological physical boundary limits of a drainage basin. Despite the common perception that specific allocation rules should override any legal instrument on shared water in the Arab region, it should be realized that provisions to prevent and reduce pollution and protect water quality need to be included within any legal instrument. Of all guiding principles, cooperation should form the backbone of the regional legal framework and should be viewed as a necessary predicate to the effective implementation of the other proposed basic principles. Other principles to be incorporated in terms of the regional legal instrument include the regular exchange of data and information, timely notification of planned measures, dispute settlement, environmental protection, reasonable and equitable use, and the obligation not to cause significant harm.

The AMWC resolution calls for the preparation of a legal framework, which needs to take a specified legal format that reflects its purpose and function. While in principle, the regional legal framework can

adopt either a binding or a non-binding format, given the regional specificities and the relevant factors that justifies its preparation, a binding legal instrument in the form of an agreement or convention is recommended.

For any legal instrument to be effective, it is important to develop a suitable institutional arrangement that can monitor its implementation. While the proposed legal framework in this case includes only directional provisions that do not involve many operational actions, it remains essential to develop or identify an appropriate institutional arrangement that follows up its provisions. In that regard, it is possible to use the existing institutional structures of AMWC. Another alternative is the establishment of a new separate specialized technical secretariat to assist AMWC in following up the implementation of such a legal framework.

Cooperation is better defined by a “continuum of cooperative options” that extends from unilateral acts to joint action. The actual level of cooperation will be defined by the State’s key interests and such practical factors as the resource limitations faced by cooperating countries. Once basic needs are secured, any expansion and progress of cooperation is then defined by the national vision in terms of development needs and goals. In the water-scarce ESCWA region, basic needs often means ensuring essential livelihoods, which is often related to agricultural activity on which, in some countries, a comparatively large proportion of the population depends. Once this socio-economic imperative is secured, through cooperation that strives to secure an allocation by “right” and also allows the determination of when to start allocating by “benefits”, other sectors of the economy can be developed, thereby ensuring sustainable development. This is best done through clear and formal institutional arrangements and legally binding instruments, even if there are cases in the ESCWA region where some of the positive results of cooperation were achieved without these requirements.

The need to involve upstream riparian States is therefore essential, and can best be secured through clear institutional arrangements. Funding of these institutional arrangements has been a limitation at the present time (as is the case of the joint commissions on the Yarmuk and Nahr al-Kabir Rivers), but it need not remain an issue in the long term, given that it could rely on a mix of revenue sources either in-basin or through donor agencies. In practice, funding should be relatively easy to obtain given that the cost of financing cooperation is lower compared to the high benefits of reaching an agreement on shared water resources. Depending on funding, such institutions could be as simple as joint committees tasked with planning and monitoring implementation of the provisions of an agreement. In the ESCWA region, the cooperation institutional modality has to a large extent been limited to joint commissions, as in the case of the cooperation on NSAS, the Yarmuk, and Nahr al-Kabir. In those cases, the joint commissions have been working on knowledge-building through information exchange and planning. However, they have not been empowered to carry out monitoring or dispute settlement.

Going forward, the need to involve upstream riparian States could require more extensive cooperative structures, such as basin organizations. They can provide the right framework to allow the involvement of high-level political support, thereby strengthening basin governance and helping to adjudicate disputes. Cooperation on shared water could then optimally secure basic needs and subsequently be expanded, based on a joint vision or strategic plans, and implemented through a properly supported legal and institutional framework that engages all riparian States.

Annex

**DRAFT LEGAL FRAMEWORK ON SHARED WATER RESOURCES
IN THE ARAB REGION¹⁸⁵**

PREAMBLE

The Arab States signatories of this Legal Framework,

Noting the natural, geographical, climatic, agricultural and economic conditions that characterize the Arab region from other regions and continents,

Taking into account that the growing water scarcity, whether surface water or groundwater, is due to the growing demand on these resources,

Recognizing the importance and the need for effective management of shared water resources, and sharing these resources on a fair and equitable basis,

Reflecting on the aptitude of the Arab region in dealing with water scarcity in time and space,

Recalling the leading role of Arabs in the development of water engineering and technologies, that paved the way for the emergence of important civilizations in the Arab region,

Affirming their solidarity in facing water challenges,

Seeking to promote Arab economic integration,

Taking into consideration international trends and developments related to shared water resources,

Emphasizing the irrefutable, legitimate and historical rights of Arab countries in shared international water resources, and considering water security an essential element of Arab national security,

Reaffirming the indisputable and legitimate right to Arab water in the occupied Arab territories, notably in Palestine, the Syrian Golan and South Lebanon,

Referring to the Charter of the League of Arab States that calls for supporting and consolidating Arab relations in view of securing their future and achieving their hopes and aspirations,

Reaching the set goals related to shared water resources in the Arab region as mentioned in the strategy for “Water Security in the Arab Region to Meet the Challenges and Future Requirements for Sustainable Development”,

Pursuant to the Arab Ministerial Water Council resolution in its second session (Res 20 – Regular Session 2 – 2 July 2010) related to the preparation of a draft legal framework for shared water resources in the Arab region,

Have agreed as follows:

¹⁸⁵ The original “Draft Legal Framework on Shared Water Resources in the Arab Region” was drafted in Arabic. It was prepared by ESCWA and the League of Arab States Centre of Water Studies and Arab Water Security in response to the resolution adopted by AMWC at its second session (Cairo, 1-2 July 2010). This draft was reviewed and finalized by the Intergovernmental Consultative Meeting (Beirut, 24-26 May 2011) for submission and consideration of the AMWC at its third session (Cairo, 15-16 June 2011) and officially translated into English by ESCWA.

PART I. TERMINOLOGY AND SCOPE

Article 1: Use of terms

The following terms shall have the meanings assigned to them hereunder:

- a. "Surface water" means water on the earth's surface, whether contained in a defined course or wadi, or falling on the earth's surface as precipitation before infiltrating into the ground;
- b. "Groundwater" means water contained in a shared aquifer, whether or not the water is the result of contemporary water recharge;
- c. "Aquifer" means one or more hydro-geologically connected permeable water-bearing geological formations underlain by low permeable layers, whether or not the formation receives significant amount of contemporary water recharge;
- d. "Shared aquifer" means one or more aquifers of which parts are situated in more than one Arab State;
- e. "Shared water basin" means a geographical area extending between two or more Arab States determined by the watershed limits of surface water and/or underground aquifer;
- f. "Shared water resource" means surface and/or underground waters, in a shared water basin;
- g. "Sharing State" means any Arab State in whose territories any part of a shared water resource is situated;
- h. "Water pollution" means any detrimental alteration in the composition or quality of water in the shared water resource, which results directly or indirectly from human conduct.

Article 2: Scope of the Legal Framework

The provisions of this Legal Framework apply to the use of shared surface and ground water resources in the Arab Region, and measures of cooperation, protection and management related to those water resources.

Article 3: Agreements on shared water resources

1. For the purpose of managing a particular shared water resource, sharing Arab States are encouraged to enter into bilateral or multilateral agreements, or arrangements among themselves. Such agreements or arrangements may be entered into with respect to the entire shared water resource, or any part thereof, except insofar as an agreement or arrangement adversely affects, to a significant extent, the utilization of other sharing States of the water in that resource without their express consent.
2. Every sharing State is entitled to participate in the negotiations of and to become a party to any agreement that applies to the entire shared water resource, as well as to participate in any relevant consultations.
3. Arab States parties to this Legal Framework encourage non-Arab neighbouring countries to enter into negotiations aimed at reaching durable and equitable agreements on international/transboundary shared water resources.

Article 4: Rights and obligations of parties to shared water agreements

1. In the absence of an agreement to the contrary, nothing in the present Legal Framework shall affect the rights or obligations of a sharing State arising from agreements in force on the date on which it becomes a party to the present Legal Framework.
2. Where some but not all sharing States of a particular shared water resource are parties to an agreement, nothing in such an agreement shall affect the rights or obligations under the present Legal Framework, of sharing States that are not parties to such an agreement.

PART II. GENERAL PRINCIPLES

Article 5: General obligation to cooperate

Sharing States shall cooperate on the basis of good faith and neighbourliness in order to attain mutual benefit and the maximum possible sustainable utilization, adequate protection and effective management of the shared water resources.

Article 6: Regular exchange of data and information

1. Sharing States shall, on a regular, direct and efficient basis and in a timely manner, exchange readily available data, information and forecasts on the condition of the shared resource, in particular data and information on climate, and of geological, hydrological, hydro-geological and ecological nature, as well as those related to water quality.
2. Sharing States shall, individually or jointly, employ their best efforts to collect and generate complete data and information on the shared water resource, taking into account established practices and standards.
3. In the absence of an agreement or arrangements, sharing States are encouraged to develop institutional arrangements that allow, where possible, joint monitoring and follow-up on the shared water resource.

Article 7: Notification of planned measures

1. Sharing States shall consult each other and, if necessary, negotiate on eliminating or mitigating the possible effects of planned measures on the shared water resource.
2. Before a sharing State implements any measures which may cause significant harm to other sharing States, it shall provide those States with a reasonable timely notification thereof. Such notification shall be enclosed with available technical data and information, including the results of any environmental impact assessments, on the possible effects of the planned measures.

Article 8: Equitable and reasonable utilization

1. Each sharing State is entitled, within its territory, to benefit from a reasonable and equitable share of the quantity and quality of the shared water resource.
2. In fulfilling their obligation to cooperate on the protection, use and management of a shared water resource, sharing States agree to take all appropriate measures to ensure that this water resource is utilized in an equitable and reasonable manner by all sharing States. Utilization of shared water should take into account evaluation of relevant factors and circumstances to facilitate the allocation process of shared water resources among sharing States on a case-by-case basis.

3. In the absence of an agreement or a custom to the contrary, human drinking needs and basic domestic uses shall have priority over all other uses of the shared water resource. Priority for other uses such as for irrigation, industry or the environment shall be jointly determined by the sharing States.

Article 9: Obligation not to cause significant harm

1. Sharing States shall, in utilizing a shared water resource in their territories, take all necessary measures to prevent causing significant harm to all other sharing States. Where significant harm is caused to another State, the State which causes such harm shall, in consultation with the affected State, take all appropriate measures to eliminate or mitigate such harm and, where appropriate, negotiate on adequate compensation.
2. Harm shall be considered significant when the action of one State leads, directly or indirectly, to losses or consequential negative effects on public health, economic productivity or the environment of another State.

Article 10: Environmental protection

Sharing States shall, individually or jointly, take all appropriate measures to prevent the pollution of a shared water resource that may cause significant harm to other sharing States or their environment, including harm to human health or safety, to the use of water for any beneficial purpose or to the biodiversity of the shared water resource. Sharing States shall also take appropriate steps to harmonize their policies in this regard.

Article 11: Emergency situations

1. "Emergency situation" means a situation that causes or poses an imminent threat of causing serious harm to sharing States or other States and that results from sudden natural causes, such as floods, droughts, landslides or earthquakes, or from human conduct, such as industrial accidents.
2. A sharing State shall, without delay and by the most expeditious means available, notify other potentially affected water-sharing States of any emergency that is originating within its territory.
3. A sharing State within whose territory an emergency originates shall, in cooperation with potentially affected States, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency.
4. When necessary, sharing States shall jointly develop contingency plans for responding to emergencies with other potentially affected States.

Article 12: Settlement of disputes

In the event of a dispute between two or more sharing States concerning the interpretation or implementation of this Legal Framework, or other issues of relevance to the utilization, protection or management of shared water resources, the parties shall seek the settlement of the dispute by peaceful means through negotiation, involvement of third parties, mediation or eventual recourse to investigation, conciliation and arbitration in accordance with the applicable rules and procedures of the League of Arab States.

Article 13: Shared water resources with non-Arab States

Emphasis shall be placed on the importance for Arab States, which have shared water resources with non-Arab States, to protect their legitimate and historical water rights and to maintain these water rights through agreements negotiated between the sharing parties.

Article 14: Water in occupied Arab territories

To hold on to the legitimate water rights of the occupied Arab territories, namely Palestine, the Syrian Golan and South Lebanon and ensure that the water resources in these occupied Arab territories are protected by the principles and rules of international law applicable in the case of occupation, and that they are not exploited in a way that violates these principles and rules.

PART III. INSTITUTIONAL ARRANGEMENTS

Article 15: Management and regulation

1. Sharing States shall, in accordance with the principle of cooperation, develop appropriate bilateral or multilateral institutional arrangements to manage and protect the shared water resources.
2. Sharing States shall, upon the request of any of them, enter into consultations that may lead to the establishment of joint mechanisms or arrangements to manage a shared water resource. Management in this context refers to planning, to the extent possible, the sustainable and rational utilization, protection and the regulation of the use of the shared water resource in an integrated manner.

Article 16: Institutions

1. The Arab Ministerial Water Council shall:
 - a. Protect Arab water rights in shared water resources;
 - b. Facilitate closer cooperation among Arab States in the management and protection of shared water resources;
 - c. Encourage the development of clear and integrated policies on shared water resources;
 - d. Promote and facilitate the implementation of the principles and provisions contained in this Legal Framework;
 - e. Enhance consistency between bilateral and multilateral agreements on shared water and the provisions of this Legal Framework.
2. The Technical Secretariat of the Arab Ministerial Water Council and the Centre for Water Studies and Arab Water Security shall assist the Council in implementing the provisions set out in paragraph 1 of this article.
3. Parties to this Legal Framework can establish a suitable institutional mechanism to implement the provisions of this Legal Framework.

PART IV. GENERAL PROVISIONS

Article 17: Deposition and ratification

1. This Legal Framework shall be deposited with the Secretariat of the League of Arab States for signature by Arab States.

2. Each State shall become party to this Legal Framework from the date it deposits the instrument of ratification or accession with the Secretariat of the League of Arab States. The Secretariat shall inform all signatories of the ratification instruments it receives.

Article 18: Entry into force

The present Legal Framework shall enter into force when ratified by no fewer than seven member States of the League of Arab States.

Article 19: Amendments to the Legal Framework

1. Amendments to the provisions and articles of this Legal Framework or the inclusion of clarifying or detailed annexes shall be made with the approval of a two-third majority of States parties to the Legal Framework.
2. Proposed amendments or inclusions shall be considered and discussed four months after notifying the parties to this Legal Framework.

Article 20: Withdrawal

1. Any State, party, may withdraw from this Legal Framework by a written request to be addressed to the Secretary General of the League of Arab States.
2. The withdrawal shall take effect after a period of six months as of the receipt of the withdrawal request. Rights and obligations of parties to the Legal Framework shall remain effective for those requesting withdrawal during the notification period.

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