



**General Secretariat**

**Economic Department**

**Technical Secretariat of the Arab Ministerial Water Council**



# **Arab Strategy for Water Security in the Arab Region**

## **to Meet the Challenges and Future Needs for Sustainable Development**

### **2010-2030**

translation by GIZ ACCWaM  
approved by Arab Ministerial Water Council (AMWC)  
Cairo, 2012

## Summary

The Arab Strategy for Water Security encapsulates the joint Arab approach to achieving sustainable development. It is a long-term program and practical mechanism for overcoming known future challenges in water resources development and management in the Arab Region. These resources are characterised by scarcity, disparate geographic distribution and increasing competition for utilisation. In addition, there are problems related to the sources, streams and estuaries of many tributaries and rivers, including major rivers such as the Nile, the Euphrates and the Tigris; as well as ground water aquifers, which are subject to various political and administrative divisions, whether among Arab states or among Arab and non-Arab neighbours. Additionally, some river sources and water resources are under foreign occupation.

The Strategy is the framework guiding and channelling the work of the Arab Ministerial Water Council, which was founded in response to new variables in the levels of food and water security and in response to climate change development and their impacts on the region. In 2009, the Council was tasked by the Arab Economic Summit held in Kuwait to develop a water security strategy to meet the challenges and future needs of sustainable development.

**The Arab Ministerial Water Council (AMWC)** commissioned the Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) to draft a strategy for water security, and following circulation by the Technical Secretariat of the Council, to review and coordinate feedback from Arab States and from Arab, regional and international organizations concerned with the document. The draft Strategy was presented to the first meeting of the Arab Ministerial Water Council held in Algeria during June 2009, and subsequently submitted to the meeting of the Executive Bureau in Cairo in January 2010. It was then submitted to a committee of experts from Arab States and organizations to make appropriate amendments, improve the document text, and prepare the draft for final adoption by the Arab Ministerial Water Council in its second session held in Cairo in July 2010. The Council approved the draft Strategy in principle, but resolved to make some linguistic amendments prior to submission for final approval at the special session of the Council on 23 September 2010, and has issued the following resolution:

- 1- The Consultative and Scientific Technical Committee at a senior level of responsibility will hold an extraordinary meeting on 10-11 November 2010 to discuss the comments of the member states, which will then be sent to the Technical Secretariat on the Arab Strategy for Water Security in the Arab Region for Meeting the Challenges and Future Needs for Sustainable Development for final approval.
- 2- Mandate the Technical Secretariat of the Council to disseminate the Strategy in its final form to the concerned institutions in the Arab States and ask each concerned institution to provide the Technical Secretariat via written form approval for the Arab Strategy for Water Security in the Arab Region for Meeting the Challenges and Future Needs for Sustainable Development by at least 10 December 2010. In case no reply is provided, it is then considered as approval.

The Arab Strategy for Water Security aims primarily at **achieving sustainable development** that responds to future requirements, thus achieving a set of key objectives which can be grouped under three headings:

- I. **The economic and developmental** domain related to the provision of water services for drinking, agriculture and sanitation, including financing and investment, technology transfer,

the application of the principles of integrated management of water resources, and the development of non-conventional water resources.

- II. **The political domain**, especially in relation to the protection of Arab rights to water in the occupied territories or waters shared with regional neighbours, promoting cooperation among Arab states for the management of shared water resources, and the implementation of the commitments of Arab States under the Millennium Development Goals.
- III. **The institutional development domain**: including human and technical capacity development, the promotion of social and individual awareness of water issues in the region, scientific research, and the promotion of civil society participation in decision-making regarding environmental impacts, and other measures.

The Arab Strategy for Water Security is based on key themes and refers to the characteristics of water resources in the region. It takes into consideration that around two-thirds of available resources originate in areas outside Arab borders, and that the region is clearly facing a water deficit that is increasing in severity due to population growth, climate change and other development demands. The Strategy is based on and compliments several frames of references adopted by joint Arab action, including the Joint Arab Economic Action Charter; the Arab Strategy for Sustainable Development for 2005-2025; the Sustainable Development Initiative in the Arab Region, which is based on the obligations arising under the Earth Summit in Johannesburg in 2002; the Millennium Development Goals; and other national or regional strategies.

The Strategy indicates that the Arab Region is facing common challenges and similar problems which transcend national borders. These problems require the collection and enhancement of Arab potentials within the framework of pursuing Arab integration, reduction of relative disparity between Arab States, and the activation of joint institutions. Implementation of the Strategy requires voluntary and actual contributions from all parties, as progress will only be achieved through coordination and cooperation with national institutions and ministries concerned with water in the Arab States; specialised joint Arab action organizations; regional and international organizations; and civil society organizations relevant to the water sector.

The Arab Strategy for Water Security is not a rigid structure, but rather a guide for joint Arab action covering the timeframe until 2030. It shall be reviewed every five years according to precise, measureable and monitorable performance indicators.

## 1. Introduction

Water is a right for all human beings on this planet. Therefore, world summits on the environment have called upon all nations to ensure the provision of safe drinking water to all their residents, in successive phases according to the **Millennium Development Goals (MDGs)**.

Water is a cornerstone of economic and social development for the entire world. This is especially true of the Arab Region, as most of its territory stretches across arid and semi-arid areas characterized by scarce rainfall and thus a dearth of available water resources, in addition to frequent cycles of drought resulting from climate changes which have begun to occur around the world. The Arab Region is not immune to the resulting lack and fluctuation of rainfall, which negatively impacts both water resources and agricultural production. This, in turn, further exacerbates the water crisis, as well as the socio-economic crisis already afflicting a number of Arab States, especially in rural areas. As a result, poverty among the rural population is on the increase, forcing migration to the cities in search

of jobs. This in turn results in an agricultural labour shortage, and a decline in agricultural production due to the neglect of agricultural land which furthers its vulnerability to desertification and erosion.

Based on the importance of water in the Arab Region, the Arab Economic and Social Summit held in Kuwait in 2009 adopted resolution No. 8 d. P. (1) - C - 4, dated 20/1/2009, tasking the Arab Ministerial Water Council with the development of a water security strategy to meet future challenges and requirements for sustainable development. In turn, the Arab Ministerial Water Council commissioned the Arab Centre for the Studies of Arid Zones and Dry Lands to prepare a draft strategy document, which was presented to the Arab Ministerial Council for Water at the meeting of its first regular session in Algeria in mid-2009. The Council amended the document and submitted it for review to the Executive Office of the Arab Ministerial Council for Water held in Cairo on 27-28 January 2010. The Council recommended the formation of a committee of Arab experts to re-draft the document and prepare a final version.

The Strategy is a framework of joint action that brings together available Arab expertise and national water institutions in order to tackle the water crisis faced by the Arab Region, and to support Arab States in achieving their water and food security. All parties will work under the umbrella of the Arab Ministerial Council for Water that will oversee the implementation of this Strategy and secure its success in coordination with the Secretariat of the League of Arab States, the Economic and Social Council, regional and national Arab financing institutions, as well as international and regional organizations, and civil society organizations concerned with the water sector.

This Strategy represents a transition stage between national water policies and a comprehensive Arab water policy. The eventual aim is to achieve Arab integration and reduce the relative discrepancy between Arab States in the provision of natural, financial and human resources to face the challenges and future requirements for achieving sustainable development in the Arab Region, which in the end contributes to the protection of Arab national security.

It must be emphasised that the success of the Strategy requires that the Arab States and the Arab Ministerial Water Council are fully convinced of the importance of joint Arab action needed to achieve an Arab water security which would benefit the whole region. This makes it incumbent on all Arab bodies concerned to cooperate fully in providing the appropriate atmosphere and implementing all tasks and plans required to achieve this strategy.

## **2. Justification for the Strategy**

The Arab Region faces several challenges in light of the rapid developments occurring in today's world. One of the most important of these challenges, which could affect the ability of Arab States to counter all others, is the issue of water in all its aspects, whether in relation to quantity, quality, legal, or administrative. These challenges can be summed up as follows:

### ***2.1 Inability to secure water needs***

Most studies agree that Arab States will face a significant water deficit in the future. The per capita share of available water resources will decline in almost all Arab States to about 500 m<sup>3</sup>/year or less (noting that the individual share for total water use in some Arab States currently stands at around 150 m<sup>3</sup>/year). If the current rate of population increase continues unabated, the Arab Region will need to secure approximately 550 billion m<sup>3</sup> of water in 2025 in order to achieve full food security. If the

current rate of population growth decreases, 500 billion m<sup>3</sup>/year would be required, compared to the maximum that could be achieved in terms of water resources, which will not exceed 258 billion m<sup>3</sup>/year.

The above shows that available water resources, no matter how they may be developed in the future, will not be able to fully meet all food production needs. In the case of status quo, the food security rate has been estimated at only 24% for 2025: this estimate does not take into account the potential impacts of global climate change-

## **2.2 *Exacerbation of social and political impacts of the food crisis and increased poverty***

It has long been clear that the ongoing crises resulting from shortages in food supplies and production of basic food commodities have a powerful impact on nations and their sovereignty and independence, in addition to increasing the spread of poverty, especially among rural populations. The United Nations Food and Agriculture Organization (FAO) statistics indicate that 36 countries around the world are currently facing a food crisis, and that these countries are likely to be at the mercy of international aid which is controlled by economic powers and food producing countries. Thus, food supplies become a political tool for exerting further pressure on import-reliant countries for political purpose. It is reasonable, therefore, for states to seek self-reliance and increase food production, particularly with respect to food staples, so as to better meet political and economic challenges, especially in light of the global trend of foodstuff usage for bio fuel production, which further aggravates the food crisis and supply scarcity on international markets.

If the Arab Region wishes to ensure its food security, it must look for multiple ways to secure the maximal potential level of self-sufficiency through a rational use of water and realization Arab economic integration.

## **2.3 *Low water usage efficiency***

Traditional irrigation methods consume larger quantities of water than are needed by cultivated crops. The percentage of losses from surface irrigation in most Arab States is estimated to be approximately 61% in the Arab East, 65% in the Arabian Peninsula, 62% in the Central Region (the Nile Valley), and the 57% in the Maghreb. Thus, of all water resources used for irrigation in the region, around 62% is wasted.

There is no doubt that increasing water productivity in agriculture can be achieved through the introduction of modern irrigation systems that have proven to save significant amounts of water. Studies show that the application of modern irrigation methods can reduce water usage by 50%, while increasing productivity by up to 35% and reducing labour needs by over 50%.

The water and agriculture policies adopted by some Arab States in the past two decades have led to an irrational use of water resources. Also, the prevalence of traditional irrigation methods has led to wastage of substantial quantities of water compared to the agricultural production achieved.

## **2.4 *Shared water resources***

As is widely known, around two-thirds of surface water resources in the Arab region come from major rivers, namely the Nile, Tigris, Euphrates, and Senegal, all of which originate outside the Arab Region. The estuaries of these rivers, however, are located in Arab States: thus, the utilisation of these waters is a matter of political dispute among the various countries involved. Most, if not all, of these

rivers remain without clear agreements governing the sharing of their waters, and failure to reach just and equitable agreements with source countries will continue to be a problem threatening stability in the Arab Region. Even the Arab States that share among themselves surface water and groundwater basins remain without clear agreements governing their investments.

### ***2.5 Absence of a holistic approach to water sector management***

Water and agriculture policies adopted over the past decades did not take into account basic modern principles, such as the environment, sustainability and distributive justice. This is in addition to an absence of a holistic and economic approach to the management of the water sector, and the non-involvement of users in the various stages of planning for water projects. This failure has led to the current state of the depletion and contamination of water resources, thus making it even more difficult to deal realistically and speedily to meet the growing demand for water.

### ***2.6 Population growth and increase demand for water***

One of the most important causes behind the water crisis which the Arab Region has been witnessing for over a decade is the population increase throughout the 20<sup>th</sup> century. The increase in population, from less than 100 million at the beginning of twenty century to around 300 million people at its end, has intensified the burden of providing enough water for drinking and other needs. Estimates indicate that the population of the Arab world will reach almost half a billion people towards the end of the first quarter of this century.

A result of this accelerated population growth is a low per capita share of the natural, renewable water resources available, declining from around 3500 m<sup>3</sup>/year per capita in the 1960's to around 1000 m<sup>3</sup>/year today. Over ten Arab States register figures even below this level.

### ***2.7 Lack of individual and societal awareness of water issues***

People remain the basis for any human development. Humans are the main consumers of water: while they benefit first and foremost from its use, they are also responsible for its waste and contamination. Safeguarding the water rights for future generations is the responsibility of each individual.

Therefore, people must be educated to look at water from an integrated environmental perspective; i.e. water is one of the main components of the ecosystem and a resource that is subject to depletion. Any imbalance in its usage would give rise to significant problems detrimental to the environment and to future development as a whole.

### ***2.8 Impacts of climate change***

Global climate change has become a reality. Most of its manifestations, affecting different regions of the world, had previously been attributed to random changes in the climate affecting different regions of the world, such as the Arab Region where intermittent bouts of drought were prevalent but difficult to link with any specific system.

The recent assessment report of the Intergovernmental Panel on Climate Change (IPCC), issued in 2007, indicates that the Arab Region will be significantly affected by climate change. Future projections in most global climate models indicate that the next fifty years will witness a quantitative decrease of rainfall volume, which will negatively affect the water balance in water basins. At the same time, population growth will increase the demand for water, while rising temperatures will lead

to increased evaporation and increase of agricultural demand for water. All of these impacts will further exacerbate the water crisis.

The IPCC report also points to an increase in the frequency of abnormal climate changes, such as droughts and floods, as well as sea-level rises resulting in inundation of coastal places and increased salinity of groundwater in these areas.

### ***2.9 Water in occupied Arab territories***

International conventions stipulate that it is illegal for any military occupation to control and exploit natural resources available in any occupied territory and deprive the state to which the land belongs from investing in those resources. Israeli practices in occupied Arab territories, whether in the Syrian Golan Heights, occupied Palestine or southern Lebanon, are totally incompatible with international legitimacy. Israel invests in the rich water resources of the Golan to obtain a significant proportion of its annual water needs. The situation is no better in the occupied Palestinian territories of the West Bank and Gaza Strip, where Israel dominates water resources use, even while preventing resource access for Palestinians.

### ***2.10 Increasing role of water in economic development***

Although the agricultural sector is the main consumer of water in the Arab Region, many states have now begun to re-prioritize. As is the case in Jordan, Tunisia and Morocco, other sectors are given greater priority in development policies. Substantial amounts have been invested in the industry and tourism, and consequently these sectors are now of great importance in delivering financial income to the state. In turn, these economic activities require the provision of additional water resources. Above all, however, the provision of drinking water remains the top priority in all Arab States, and this need will only increase due to accelerated population growth.

### ***2.11 Finance of water projects and private sector participation***

Water projects are costly in financial terms when compared with their direct economic returns, as shown in projects related to construction and maintenance of dams, irrigation systems, and desalination plants. Until recently, such projects were a monopoly of the public sector with no regard to their financial returns. However, due to the fiscal deficit which is affecting several Arab states, many planned water projects have been put on hold, including the construction of desalination plants and water treatment stations. In addition, the public sector often lacks effective management of water projects, which has led to deterioration in irrigation projects and drinking water systems due to their poor management and maintenance, thus further exacerbating the water crisis. Some Arab States have recently initiated private sector involvement in the financing and administration of water projects, as in Morocco, Jordan and Tunisia. Others countries are studying the results of this private sector participation.

### ***2.12 Insufficient institutional and human capacity in the water sector***

Achieving sound management of water resources requires the provision of qualified technical cadres and the appropriate institutional and legislative structure. However, due to varying circumstances, Arab States have neither the necessary personnel nor structures required. The existing water crisis is thus further aggravated due to the inability of national institutions to effectively respond to the evolution of the water situation, such as in monitoring and controlling water usage and in developing

appropriate policies. As a result, a number of Arab States are facing a severe water crisis, with deteriorating conditions in terms of both water quality and quantity.

### ***2.13 Inadequate role and contribution of scientific research and technology transfer in the water sector***

Despite the presence of several research institutions, the Arab Region as a whole suffers from limited levels of scientific research. It is worth noting that one of the most important means in technology development and transfer is the support of scientific research across all sectors, including the water sector. For example, water desalination and treatment technology is now considered a strategic option in addressing the water crisis; but despite over half a century of use in the Arab Region, this important technology continues to be imported from abroad.

### ***2.14 Weak legal and legislative frameworks***

A number of Arab States still lack the legal and legislative frameworks necessary to achieve balanced water policies that ensure sustainable development. Such frameworks, if they do exist, are not properly applied in accordance with their purpose. This lack of enforcement is due to either a want in the legislation and laws to comprehensively address all issues, or to a weakness of the implementing instruments to guarantee proper application. There is no doubt that strong legal and legislative frameworks are of great importance to ensure the proper implementation of policies to achieve a balanced development.

### ***2.15 Lack of service provision for clean drinking water and sanitation***

Despite all the efforts made by Arab States towards the provision of drinking water and sanitation, such services are still not comprehensively available throughout all towns and cities, with a prominent lack seen in the countryside. Currently, almost 83 million people in the Arab Region have no access to safe drinking water, while around 96 million people lack access to proper sanitation. Most of those so affected live in either low-income countries or under occupation. Therefore, achievement of the third millennium development principle remains far from complete in some states, and will require significant investment alongside the provision of adequate water resources. The same applies to sanitation service provision.

## **3. The terms of reference for the development of the Strategy**

As the proposed Strategy provides a framework for joint Arab action in achieving Arab water security, it must be based on a number of key references.

### ***3.1 Joint Arab Economic Action Charter and Strategy***

The Joint Arab Economic Action Charter, adopted at 11th Arab Summit meeting (Amman 1980) stated that achievement of Arab national security and Arab development objectives must be sought under a framework of coordination and integration between Arab national and pan-national efforts, and in the promotion of Arab economic integration. The Riyadh Summit (2007) further reiterated the importance of achieving safe and decent living conditions for the Arab people pursuant to an approach based on an integrated strategy for development and reform.



### **3.2 *Millennium Development Goals and the Initiative for Sustainable Development the Arab Region***

These goals were the result of the Earth Summit, held in Johannesburg in 2002, which called for sustainable development as its central goal. Water management and protection was one of five key themes of the Summit.

The Council of Arab Ministers Responsible for Environment (CAMRE) confirmed its commitment to achieving the Millennium Development Goals which call for a reduction of the proportion of the population without access to clean drinking water by half by 2015, and also in sanitation services. The Arab environment ministers also adopted the Initiative for Sustainable Development-launched by the Emirate of Abu Dhabi as an approach towards achieving sound and balanced management of natural resources, environmental protection and reversal of desertification in the Arab Region.

### **3.3 *Adopted water management strategies for Arab States***

Arab States have recently realized that they will face a substantial water crisis if they continue with unreasonable depletion trends, rather than take the action required to reduce the quantitative and qualitative depletion of their water resources. They have thus set in motion the development of strategies and policies to reduce such resource deterioration, and have taken practical steps by setting priorities for water use in various sectors on the basis of water quota allocation. Arab States have also enacted water-related legislation and launched large scale awareness campaigns, in addition to efforts at restructuring water institutions in line with the principle of integrated management of water resources.

Arab Gulf states have focused their water strategies on the expansion of desalination to ensure the provision of clean drinking water, and the strategic future option of recycling treated water for agriculture.

The national water strategies of the Arab States can provide a basic foundation to support the Arab Water Strategy.

### **3.4 *Arab Sustainable Agricultural Development Strategy: 2005 to 2025***

This strategy was submitted by the Arab Organization for Agricultural Development to the Riyadh Summit in 2007, and provided the true start for the activation and expansion of joint Arab action in Arab agricultural development.

### **3.5 *Regional and international water strategies and programs adopted in the Arab Region***

In light of the water crisis faced by the region, and its impact on neighbouring countries and on the overall situation, many regional water management strategies have been launched. These include the Mediterranean Water Strategy (under the Barcelona Convention for Euro-Med Cooperation), the Management of Water Resources in Islamic Countries (prepared by ISESCO) and the International Hydrological Program, supervised by UNESCO and ISESCO. Other programs are carried out by regional and international institutions, such as the Arab Water Council and the Arab Academy for Water. All of these initiatives can be of benefit and support to the Arab Water Strategy.

## 4. Objectives

### *Main objective*

Achieve Arab Water Security to meet the challenges and future requirements for sustainable development.

### *Specific objectives*

- Optimize use of available water resources of all kinds.
- Provide safe drinking water and sanitation services in line with the Millennium Development Goals.
- Protect ground and surface water resources against pollution and depletion.
- Confront potential impacts of climate change on available water resources, and take appropriate adaptation measures.
- Establish the principles of integrated water resource management as a key element in water policies in Arab States.
- Development and qualification of human resources in the Arab water sector.
- Protect Arab water rights in waters shared with non-Arab states.
- Protect water rights in occupied Arab territories.
- Strengthen cooperation among Arab States to manage shared water resources.
- Attract Arab capital for investment in Arab water projects.
- Exploit the comparative advantages of Arab States in the field of water resources.
- Localise and support industries of modern technologies for desalination and water treatment, with the aim of expanding their use in the Arab Region.
- Strengthen the role of scientific research in water resources management.
- Develop traditional and non-traditional water resources.
- Enhance cooperation and exchange of experiences and information between Arab States.
- Raise awareness among all segments of society, including civil society organizations, on issues of water and the environment, involve them in decision-making processes related to water projects, and deepen the culture of environmental protection.

## 5. Key themes of the Strategy

The Strategy is based on the clear foundations of determining both the existing situation and future needs in light of available resources and all relevant constraints. Appropriate plans are then developed to address these issues, as well as identification of possible alternatives for the provision of water resources to meet the water deficit.

Bearing in mind that the listed order does not reflect priorities, but rather future action orientations, the main themes of the Strategy can be summarised as follows:

### ***5.1 Follow-up of regional studies on the status of water resources in the Arab Region and establishment of an integrated Arab water information system***

Information is the cornerstone of sound planning and the development of appropriate policies to manage natural resources in general, and water resources in particular. Because water resources

experience constant change secondary to climatic factors and development activities, follow-up work is necessary to monitor the evolving water situation in the Arab Region.

Moreover, over the past ten years global technological development has made available suitable tools to collect, store and process data and information, and to present the results in appropriate forms to decision-makers. This then enables the follow-up of the evolving status of natural resources and provides integrated database software linked to the geographic information system (GIS).

Technology is also providing water information systems, and decision support systems for country-level water resources management. Linking these systems to an Arab water information system will allow for monitoring the evolution of the water situation in the Arab Region, and all related issues regarding various development sectors and interconnected social conditions. In addition, conditions developing with regards to major river basins shared with non-Arab states can be monitored.

## ***5.2 Scientific research and transfer and localisation of modern technology***

In recent years, the world has witnessed a great technological revolution in all areas relevant to the water sector, whether in terms of provision, distribution, use, exploration of additional groundwater aquifers, or provision of tools for the integrated management of water basins. These global technological advances are the end result of considerable efforts, both past and ongoing, in the field of theoretical and applied scientific research. Yet, water-related scientific research in the Arab Region remains below expectations, and has negatively impacted the sound management of water resources.

The development of scientific research in the Arab Region, alongside a mechanism to coordinate research centers concerned with water resources, agriculture, drinking water, sanitation and energy, is considered as the key to tackling water shortages in the region. Additional benefits would be localising appropriate technology to resolve water sector challenges and improvement of water management in an integrated and sustainable manner.

Desalination, especially of sea water, is one of strategic solutions currently employed by many Arab states to address the shortage in drinking water supplies. However, desalination remains an imported technology, despite the fact that the technique was already introduced to the Arab Region, especially in the Arab Gulf, in the 1950s. Paradoxically, the increased construction of desalination plants has resulted in other environmental problems that now require solutions achievable only through scientific research.

The agricultural sector represents a key component of national income and absorbs the largest proportion of the labour force in many Arab States. Yet, agricultural production remains below desired levels, and yields per hectare are much lower than of many countries, including developed countries and others such as India, Turkey and China.

The agricultural sector is the biggest consumer of water in the Arab Region, (at around 85% of total water use). Scientific research is needed to address the crisis of rising food prices around the world, to achieve an acceptable level of food security within the limitations of available water, and to reduce poverty among the rural population who predominately work in the agricultural sector. Scientific research must be developed and supported in order to develop seed varieties resistant to drought, climate change and salinity, while providing high productivity per unit area and per cubic meter of water used in irrigation. There is also a need to expand modern cultivation methods, such as alternative soil agriculture and organic farming.

There are many other areas in which scientific research can make contribution to address water shortage: for example, technologies for sewage and agricultural wastewater treatment, artificial cloud seeding, and gathering of evaporated blue water. All these technologies (including various types of water related equipment, such as pumps, membranes, water and weather monitoring equipment, and modern irrigation systems) still rely on imported know-how and equipment in most, if not all, Arab States. The Arab technological industry remains unable to provide such equipment.

From a different perspective, energy, particularly the use of alternative and clean energy, has become a focus of countries around the world in light of climate change and the impact of carbon dioxide emissions from fossil fuels. Therefore, ways must be found to use the alternative clean energy sources available in the Arab Region, such as wind and solar energy, and develop the related scientific research to use such energy in water desalination and treatment. These types of alternative energy sources are widely available in the Arab Region.

### ***5.3 Tackling climate change impacts on water resources in the Arab Region, and adopting adaptation measures***

Climate change is exacerbating the water crisis in the Arab Region. Most climate models indicate a potential decline in rainfall rates in various global areas, including most Arab States. The repetitive droughts predicted by these models will increase the pressure on available water resources and lead to an increase in demand for water to meet the varied development requirements. As a result, competition will increase for all types of available water resources.

The issue of climate change is currently a high priority of global scientific research. There is a need within the Arab Region to develop research in this field, especially in developing scenarios associated with expected climate changes and their potential impact on the Arab Region, which is considered vulnerable to such changes, particularly those associated with repeated periods of drought or floods. This is in addition to research into implications for water resources, especially with regards to agricultural production, in order to develop appropriate policies and plans for adaptation.

### ***5-4 Establishing principles for integrated water resources***

Because water is a main focus of any development plan, its quantitative and qualitative management and conservation are required in all activities related to water use. There is no longer room for what was formerly known as supply management; rather, the emphasis has now shifted to water demand management to deal with water resources from all origins (rainfall, surface water, groundwater, desalination, sewerage and agricultural drainage). It is imperative to realize the maximum economic benefit from these sources, and to safeguard them in quantity and quality in order to meet the various development requirements. This can be achieved through retrieval of water provision costs; through the study of economic alternatives for water usage in the context of economic and social conditions; and through the implementation of projects for rainwater storage and artificial replenishment of groundwater. All relevant sectors and segments of society, including water users, NGOs and the private sector, should participate in water resource management in a holistic and complementary manner. In doing so, the principle of sustainability should be taken into consideration, as well as recognizing the environment sector as a water user.

Ensuring success of this approach would require the defining of responsibilities for each actor involved, so as to avoid conflict and achieve integration. Such an outcome cannot be reached without the necessary conducive atmosphere and enabling environment provided by formulating policies and legislative frameworks for the institutional development for the water sector. This is necessary to

achieve distribution justice, transparency, participation in decision-making and access to information for all stakeholders, all of which are collectively known as water governance. Modern technology also plays a major role in ensuring sound and integrated management of water resources: it allows monitoring of the evolving water situation at local, national and regional levels through the use of water databases, geographic information systems, and the development of thematic maps. All these allow decision makers to identify water resources, spatial distribution, investment potential, and the evolution of water conditions over time.

### ***5-5 Achieve the Millennium Development Goals***

One of the pillars of implementing the integrated management of water resources in the Arab Region is to realize the Millennium Development Goals in terms of providing clean drinking water and sanitation services to the population, especially in rural areas. This should be according to the phases adopted in the MDGs and the rights of all segments of Arab society to access clean drinking water and sanitation systems without discrimination.

### ***5.6 Provide necessary funding for water projects***

The achievement of integrated management of water resources rests on the provision of adequate funding. This applies to the implementation of projects to develop and increase water supplies, sanitation projects and installation of new drinking water networks, as well as to the continuous maintenance of existing water distribution and sanitation networks in order to reduce waste. The need for proper funding also pertains to the deployment of modern irrigation techniques, including the implementation and maintenance of suitable irrigation networks to reduce losses and waste.

### ***5.7 Increase the efficiency of water use***

Given that agriculture is the largest consumer of water in the Arab region (around 85%), increasing the irrigation efficiency from around 40-50% (the average efficiency of existing irrigation systems in the Arab states) to a reasonable and achievable target of 80% will lead to the provision of water quantities sufficient, in theory, to expand an irrigated area by over 50%. Consequently, these savings could bridge the current water deficit. Studies and research have shown that introducing modern irrigation systems can save over 50% of irrigation water and increase productivity by 35%. Furthermore, modern methods for estimating water demand can save approximately 50% of water, according to current estimates of crop irrigation needs.

The efficiency of drinking water distribution in cities and urban areas is very low (estimated at an average of 50%), but distribution costs are high, especially for water produced from desalination plants. Improving the performance of such networks can provide additional water resources to cover some of the shortfall existing in a number of Arab States.

The introducing of the rationing principle in both water resource management and water demand management through the recovery of provision costs for drinking water, sanitation and irrigation, and the utilisation of financial returns in maintaining sewage systems and water distribution networks in urban, rural and agricultural areas, constitute a basic element for raising water use efficiency and reduce wastage. In addition, studying economic alternatives for water use, mainly in agriculture sector through the development of national agricultural policies and integration of policies for agricultural between Arab States according to their national comparative advantage constitute also additional basic factor for raising water use efficiency.

## **5.8 *Protection of water rights for Arab States***

### **1...Water shared with non-Arab States**

Water resources shared with non-Arab States, especially of major rivers, form an important part of total available water resources in the Arab Region. A large proportion of these shared resources remain without clear agreements to govern their fair and equitable allocation between the riparian states, particularly those operating high dams upstream of the river basins. Even those rivers that are governed by agreements have become subject to political tensions as a result of the geopolitical conditions dominating the Arab Region. Therefore, efforts must be made to support Arab States concerned with those resources, whether through the provision of any available information on water use in upper reaches of these rivers or through political pressure on source reservoir countries to conclude final agreements for a fair and equitable allocation of the resources of these rivers.

### **2...Water rights in the occupied Arab territories**

In the occupied Arab territories, Israel is depleting the water resources without regard to the water rights of the inhabitants of those areas, which include the occupied Syrian Golan Heights, the occupied Palestinian territories and occupied southern Lebanon. This requires coordinated Arab efforts to energise and manage talks, to provide the data and expertise required by Arab States, and to harness international support for obtaining water rights in the occupied territories.

### **3...Water shared between Arab States**

Many Arab States share surface water and groundwater, most of which remain without clear agreements to ensure sound exploitation. All such resources are the subject of substantial investment to meet the development needs of riparian Arab states, which then impacts on the overall quality and quantity of the water resource. This situation requires the establishment of sound management principles to safeguard both quality and quantity of the shared resource, especially as many underground water aquifers are non-renewable. Thus, the means must be found to enable those countries to reach clear agreements that regulate fair allocation to the benefit of all concerned.

The provision of a legislative and legal database should include the principles for allocating the waters of shared rivers and groundwater. This will strengthen Arab expertise in the field of international law in general, and shared water law in particular which is primarily based on the International Convention for the Use of International Rivers for non-Navigational Purposes, as well as the International Convention on Groundwater and other similar Arab and international conventions. The general principles provided by the United Nations conventions on shared rivers and aquifers, as well as analyses of similar cases on other parts of the world, will support Arab States concerned in their efforts to reach final, fair and equitable agreements.

## **5.9 *Build institutional and human capacity in the water sector***

Despite all the efforts by Arab States to provide qualified and trained technical cadres to manage all aspects of the water sector, the number of such personnel remains below the required level. Arab educational institutions fall short in providing the quantity and quality of Arab technicians required to

bear the burdens of the water sector and its management. This situation requires a clear educational strategy to connect the needs of the cadres with the curricula of universities and educational institutes.

Additionally, training programs for personnel in the water sectors of Arab States remain below the required standard: programs which do exist lack integration and continuity.

#### ***5.10 Raise awareness of water and environmental issues among all members of the community***

People are the main water users, so efforts to achieve the proper use of water resources and reduce waste should focus on all available means to increase awareness of water issues in the Arab Region and on the importance of water to overall development. Unfortunately, due to a lack of awareness and the general culture, many Arabs still view water as an inexhaustible natural resource. This is in contrast to the religious teachings and cultural traditions which call for reducing the wasteful use of water. All efforts to date, to increase awareness among all social groups of the importance of preserving water resources and reducing wasteful usage, have failed to achieve their desired objectives. This situation requires an overall reconsideration on ways to best influence Arab awareness and to change behaviour towards this vital resource. There is a need to develop a comprehensive plan and to focus on a return to traditions and religious teachings, in addition to the continual study and development of water legislation and enforcement methods which ensure the protection of water resources and environment against quantitative and qualitative degradation.

#### ***5.11 Protection of the coastal aquatic environment***

Focusing greater attention on the protection of the coastal water environment in the Arab Region can only be achieved through the sustainable management of these areas and the development of appropriate legislation. These coastal areas are important because they span thousands of kilometres and are home to over half the population of the Arab world, hosting a large proportion of residential and urban areas. Additionally, much of the populations' sources of economic livelihood, such as desalination plants, fishing and tourism, are centred on the coastline, as is the case along the Arab Mediterranean and the Arabian Gulf.

#### ***5.12 Expansion in the use of non-conventional water***

Non-conventional water includes desalination water, treated wastewater, and agricultural drainage water. The quantities produced by desalination plants have reached 3 billion m<sup>3</sup>/year, with Arab States being among the largest producers of desalinated water in the world.

In the light of the water deficit expected in the Arab Region, water desalination will become an irreplaceable strategic option for the future. Localising the manufacturing, operation and scientific research of this technology will reduce the cost of production and is key to addressing the expected water deficit. Treated wastewater in the Arab Region, which has reached around 10 billion m<sup>3</sup>/year, constitutes a significant renewable water source. Technical and technological efforts must be made to localise its use, whether in agriculture or the artificial recharging of groundwater. There is a need to improve the quality of treated wastewater in order to overcome obstacles that limit its current use.

Many Arab States have adopted health and environmental standards for the reuse of treated water. There is no doubt that promoting the exchange of experience and knowledge in this area, especially in the field of specifications and research, will expedite the exploitation of these resources, which are potentially renewable.

Brackish water is also an important source of water, whether resulting from ground water or agricultural drainage. Quantities of the latter are estimated at over 10 billion/m<sup>3</sup>, and if regulated can be used in agriculture, in irrigation of salinity tolerant crops and in combating desertification.

### ***5.13 Institutional development and water legislation and laws***

Water legislation is the key to ensuring successful implementation of water policies. On the one hand, legislation helps to achieve equality between the various segments of water users; on the other, it protects water resources from pollution and depletion. While most Arab States have water related legislation, on-the-ground implementation still faces several obstacles. Therefore, an examination of means to apply water legislation properly will help Arab States achieve sound management of water resources.

It should also be taken into account that proper application of water legislation requires support for national institutions involved in the management of water resources, so that these institutions may be able to coordinate together as they apply and amend legislation to achieve rational management of water.

The success and continuity of any water development project is achieved through the participation of local populations in all steps preceding project completion (planning and execution phases), followed by their direct local administration. Being the ultimate beneficiaries of such projects, local communities will do their best to ensure sound management.

On this basis, international financial institutions require the involvement of representatives of local populations in all stages associated with any project, as local members constitute the main guarantor of success. This requires encouraging local people to organize through associations or unions in order to defend their water rights and interests in the face of major corporations, in particular agricultural companies that promote large-scale projects and whose financial resources cannot be matched by owners of small-tenures. Involving the latter can help protect the interests of the local population.

Planning and analysing means to organize the participation of local people in various development projects, and to raise their awareness of how to defend their rights and interests, will have a significant impact on the success of water development projects in the Arab Region.

In light of the inability of governments and the public sector to provide funding for the implementation of water projects, including sewage systems, water resources management and the construction of sewage treatment plants, the concept of inviting the private sector to contribute to such projects has emerged. Several Arab States have begun to work with the private sector. While this approach can help improve performance and efficiency, there is also a need for clear and transparent legal requirements in all dealings and contracts.

Finally, it is important to have qualified technical personnel in government institutions to monitor and directly supervise the private sector work and ensure quality and a proper operation. Analytical studies can be conducted to develop sound foundations for private sector involvement and its positive impact in accelerating the implementation of water projects.



### ***5.15 Integration between the Arab Strategy for Water Security and relevant Arab strategies***

At the Arab level, there are a number of strategies related to water that have been adopted by national institutions or institutions of joint Arab action. Coordination between the Arab Strategy for Water Security program and other strategies will help to unify efforts, avoid duplication in implementation, and increase the efficiency of and prospects for achieving the strategy goals.

## **6. Means and mechanisms for implementation**

The implementation of the proposed Arab Strategy for Water Security will be done through the ministries and national institutions concerned with water in Arab States. The Strategy should be considered as a support to national strategies and a complement to ministry efforts, and to be conducted in full cooperation with existing specialized Arab organizations and all regional, international and civil society organizations working in the Arab Region. The objective is to enhance Arab and international cooperation, as well as the transfer of -expertise and know how between Arab States since they have similar natural environments of arid and semi-arid climates. The Arab States are sharing the same driving forces that have influenced and contributed to the creation of their respective water crisis and deficit. These influential factors include a dry climate and rapid population growth; high water consumption in agriculture and low agricultural productivity per unit area and per cubic meter of water; wastages in water usage; low awareness of water issues; insufficient regard for environmental impact; as well as climate change and its effects.

The implementation and financing of the Strategy and all its programs fall under the remit of the Arab Ministerial Water Council and its technical secretariat, i.e. the General Directorate for Economic Affairs of the Arab League. There is also the possibility of obtaining funding from Arab States and regional and international finance institutions in accordance with standard adopted at the League of Arab States procedures. It should be noted that the mechanism for implementing the Strategy does not prevent Arab States from cooperating among themselves, or with any Arab or international body, to achieve the desired goals of achieving water security and meeting the future challenges associated with the water deficit.

There is a need for creating a coordination and follow-up unit for the implementation of projects covered by the Strategy. Tasks of this unit would be to coordinate these projects throughout the Arab States, develop documentation to secure financing for these projects, and conduct studies requested by the Council.

Since the Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD) is an organization working under the umbrella of the League of Arab States and has over 40 years of technical expertise in implementing water studies and projects in the Arab Region, as well as having qualified technical Arab experts and a network of Arab and international counterparts, it is proposed that ACSAD would function as a coordination and follow-up unit and to be the technical arm of the Technical Secretariat of the Arab Ministerial Water Council and its Executive Bureau and working under their supervision.

The Center for Water Studies and Water Security should be in charge of the follow up and coordination of projects dealing with Arab water rights.

Associated with ACSAD will be another unit dealing with information and hosting the integrated database on water and natural resources in the Arab Region, linked to the geographic information

system. This unit will document and analyse all available information on water resources, as well as the findings of studies and research conducted in the Arab Region and around the world. These findings would positively impact the Arab States in achieving sound management of water resources. This unit should be linked to the country information centres and could be established at ACSAD headquarters, since they already possess the core of such a data base.

The implementation of the Strategy cannot be achieved without cooperation with national institutions concerned with water in the Arab States, the specialised Arab organization of League of Arab States, and regional, international and civil society organizations involved in the water sector, such as the Arab Water Council and the Arab Water Academy. It is therefore essential that the unit for coordination and follow-up strengthens and develops flexible mechanisms for coordination. For example, an advisory committee formed from these organizations can cooperate with the Technical Secretariat of the Arab Ministerial Water Council in achieving the Strategy.

This proposed Strategy is not compulsory, but rather a guide to joint Arab action in the water sector to achieve sustainable development, protect Arab water rights, and ultimately achieve the optimal implementation of the principles of integrated water resources management. The Strategy is not a rigid template: it may be amended according to assessments conducted at later stages of the implementation of approved programs based on specific indicators.

Through the Strategy, short, medium and long-term implementation programs can be adopted in light of the objectives of each program within the framework of the Strategy itself.

## **7. Strategy time frame**

The timeframe of the Strategy shall be twenty years (2010 - 2030) with adopted indicators evaluated every five years.

## **8. Expected outcomes**

1. Provide information on all water resources in the Arab Region, including shared water.
2. Achieve sustainable development that is in line with available water resources and the effects of climate change.
3. Raise awareness of water and environmental security among all segments of society and civil society organisations in the field of integrated management of water resources.
4. Building human and institutional capacities in the Arab States in various fields of water management, particularly with regards to international law; manage negotiations on shared and other water in the occupied Arab territories; and enhance curricula and training to meet the requirements of national institutions working in the water sector.
5. Increase the amount of funding available for the water sector and build an Arab industrial and technological base in this field.
6. Provide mechanisms and frameworks for cooperation between Arab States and activate mutual agreements concerned with the management of shared water resources.

## 9. Performance indicators

Indicators for measuring the level of implementation are as follows:

### 1. Provide updated information on the status of water in the Arab Region.

- Provide a knowledge base for Arab States on climate change and its impact on water resources in particular, and on social and economic aspects in general.
- Develop mechanisms and frameworks for cooperation between Arab States in the fair and equitable joint management of shared water resources.
- Build an integrated water and legal database, containing all available data and experiences provided at the Arab and international level, in the fields of shared water, water under occupation, and Arab and international conventions for the management of shared basins.

#### Indicators:

An updated and comprehensive interactive database system exists among Arab States.

Easy access to information for Arab States

Improved hydrological monitoring networks performance

### 2. Achieve sustainable development that is in line with available water resources and climate change impacts.

#### Indicators:

- The presence and functioning of policies, legislation and institutional frameworks for the integrated management of water resources.
- Protection of water resources from and reduction of environmental degradation associated with these resources.
- Increase of the economic and social return per unit of water in all uses.
- Reduction of the water supply deficit in all sectors.
- Achievement of the Third Millennium Principles related to access to drinking water and sanitation services.
- Adoption of policies and action taken to adapt to climate change.

### 3. Raise awareness of water and environmental security among all segments of society and civil society organisations in the field of integrated management of water resources

#### Indicators:

- Increased level of civil society and private sector participation in water resources management.
- Increased education and awareness of the importance of water resources and their conservation.
- Increased interest in observance of Arab and international water days.

**4. Build human and institutional capacities in the Arab States in all fields of water management, in particular international law, and run negotiations on shared water and water under occupation.**

**Indicators:**

- Expansion of programs and centres for training and qualification.
- Increased number of qualified personnel in all areas of water management.
- Improved performance of institutions working in the water sector.
- Completion of just and equitable agreements relating to water resources shared between Arab States and neighbouring countries; and the restoration of water rights in occupied territories.

**5. Increase the amount of funding available for the water sector and build an Arab industrial and technological base in this field.**

**Indicators:**

- Increased volume of Arab investments in water sector.
- Increased private sector contribution in financing and management of Arab water projects.
- Increased volume of production and usage of Arab made products in all water related fields.

**6. Provide mechanisms and frameworks for cooperation between Arab States and activate the mutual agreements concerned with the management of shared water resources.**

**Indicators:**

- Increased number of agreements on all types of shared water in the Arab Region.

**Note:**

The Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD) has prepared the first draft of this Strategy as a working paper, and was amended in response to comments received from Arab States prior to March 2010. It was submitted once again to the Arab Committee mandated by the Executive Bureau of the Arab Ministerial Water Council at its session convened in Cairo on 27- 28 January 2010, consisting of the following experts:

- Engineer Maysoon Al Zoubi, Secretary General of the Ministry of Water and Irrigation, Jordan
- Dr Hassan Ganai, Iraq's ambassador to the Food and Agriculture Organization, Iraq
- Engineer Ahmed Yacoubi, Director of the Department of Water Resources, the Palestinian Water Authority, Palestine
- Engineer Ribhi al-Sheikh, the Palestinian Water Authority, Palestine
- Mr Issam Alguari, State Secretariat for Water and the Environment, Morocco
- Dr Abdullah Abdul-Salam, Director General of the UNESCO Chair for Water, University of Khartoum, Sudan
- Mr Omar al-Shamali, Director of Water Resources in the Governorate of Homs, Ministry of Irrigation, Syria
- Madam Shahrah Gosaiah, President, Centre for Water Studies and Arab Water Security

- Dr Safwat Abdel-Dayem, Secretary General of the Arab Water Council
- Dr Raouf Darwish, Member of the Board of Governors of the Arab Council for Water
- Dr Faisal Taha, Assistant Director General of the International Centre for Saline Agriculture
- Professor Mohammed Meselhi Meselhi, Arabic Checker, Egypt