

CHAPTER 9

Water commoditization: An ethical perspective for a sustainable use and management of water resources, with special reference to the Arab Region

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ABSTRACT: The theme of the chapter is controversial since there is no clear cut argument to advocate whether water could be treated as a marketable commodity, or as a common good and a fundamental human right “Re-thinking water and food security” presents a good opportunity to review and reflect on this question and what could be a balanced integrated approach. The chapter has chosen to investigate and analyze the current trend of water commoditization in the Arab Region from an ethical perspective. The main objective is to call for a *water strategy*, that emphasizes basic ethical principles, and help improve on the design of the water and food security system. Water shortage and scarcity is becoming a major problem the world will face in the coming decade, and especially in relation to the Arab Region. The problem has been exacerbated by natural and manmade factors such as aridity, high population growth, degradation in water quality, institutional and policy aspects, public involvement and awareness, and other socio-economic complicating factors. There are many negative and positive effects due to the shift to *neo-liberal market-led economies*, which have surfaced in the past decade and a half throughout the Arab Region and the developing world at large. The question is turning towards how it will possible to mitigate the negative effects of increased levels of poverty and worsening environmental degradation.

Keywords: commoditization, pricing, ethical framework, sustainability, social equity, efficiency, virtual trade

1 INTRODUCTION

Among Earth’s natural resources, water has always been perceived as a special natural resource essential for the whole existence of life. Globally, most of freshwater is used for agriculture (69%), while industrial use accounts for 23% and domestic human use accounts for just 8% of the total withdrawals. However, the Earth’s hydrologic cycle has been profoundly altered and various components of this cycle are being torn apart and exploited making freshwater ecosystems severely fragile and threatened. The consequences are devastating to the environment, with serious and irreversible threats to aquatic ecosystems. Moreover, these activities have had severe social impacts in several regions around the globe, such as the loss of livelihoods and human displacement.

The Arab Region is no exception. The situation is becoming no longer sustainable, due to the high costs and negative environmental consequences associated with the deterioration of water resources and the resulting deteriorating livelihoods in the region.

The chapter – apart from the Introduction– addresses the following parts: Section 2 presents the various *aspects of water commoditization*, the debate on whether water is a commodity or a common good to be fairly distributed, our stand in this debate, and the premises of commoditization and marketization of water, as shown in the emerging processes of: a) coining water rights; b) having water pricing schemes, cost recovery approaches; and c) water privatization

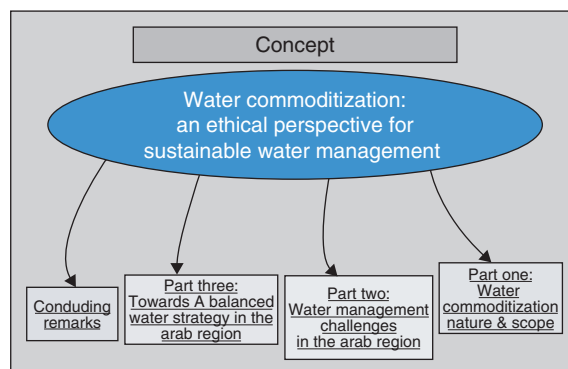


Figure 1. Concept of the Chapter.

and/or involving private sector investments in its development; as well as d) water in relation to trade which is called virtual water. Section 3 illustrates *water management challenges* in the Arab Region, giving due consideration to the water complexity and uncertainty question, major water challenges or *the gaps* in the development of the Arab water and agricultural sector, and reforms needed. Section 4 is calling for a *balanced water strategy* for the Arab Region. The strategy would be based on a comprehensive, integrated system approach that embraces the interface between major elements of the system: environment-technology-human, with emphasis on the basic ethical principles. This may improve on the design of the water and food security system, in relation to the Arab Region. Section 5 gives concluding remarks. Figure 1 shows the concept applied in the chapter.

2 WATER COMMODITIZATION: NATURE AND SCOPE

2.1 Introduction

It is usual to view water by nature as a common good of mankind. Water resources – both surface and groundwater – occur naturally and provide an open access to all. Thus water is considered *as a common good*, especially since it is an essential requirement for life. A common good is defined by three characteristics: 1) Non-rivalrous – one person does not deprive others from using it; 2) non-excludable – impossible to restrict others from using it; and 3) users are non-rejectable to use it – individuals cannot abstain from its consumption even if they decide to (Bannock *et al.*, 1987).

At the United Nations, the *Universal Declaration on Human Rights* was declared in 1948, where water was considered as a fundamental right, which is guaranteed an international legislation. The right to water was only expressed in the *Convention of the Rights of the Child* (Gleick, 1999). However, in 2002, the United Nations Committee on Economic, Cultural and Social Rights issued a General Comment, which openly expressed that “the concept of water management is not to be limited to its economic dimension only, and that access to water should be considered as a human right”. The *Comment* clearly states that everyone is entitled to sufficient, affordable, accessible, safe and acceptable water for the purpose of personal and domestic usage (UNESCO, 2003).

However, the debate around water as a commodity started with the issuing of *The Dublin Statement* in 1992¹.

¹ A statement was issued in Dublin in January 1992 to emphasize that water should be recognized as an economic good. This was in preparation to the Rio Conference in 1992, and out of this preparatory meeting came *the Dublin Principles*.

- Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
- Water development and management should be participatory –involving users, planners, and policy makers at all levels.
- Women are central to providing, managing, and safeguarding water.
- Water has an economic value in all its competing uses and should be recognized as an economic good.

Meanwhile, the trend has evolved towards increased commoditization and marketing of water, and water rights are presently being examined and implemented in the UK and Australia. Policy and regulatory frameworks of these countries and others have taken example of *the American West* for more leadership in marketing of water rights (Turner, 2004)².

The question that raises itself here: will water become a commodity like oil one day in this 21st century? In my view, water is essential for life, whereas oil is not. Oil is fungible and can be replaced, but water cannot. Oil is the main focus in the globalization of the world economy, free trade, and market forces. Oil is favouring mechanisms of privatization and pricing in the debate, but water is life and it is a social and economic resource that needs to have special considerations for the poor and the marginalized people in society.

According to Hardin (1968), over-exploitation of a common good occurs due to the phenomenon called the *tragedy of the commons* where users ignore the impacts of using the resource on its current and future availability for other uses and users. Economists' prescription to solve the *tragedy of the commons* is to clearly define private water rights and establish water markets.

This can be difficult since basic water needs should be universally provided for all, and consequently water is not a typical private *economic good*. Private institutions working only under market rules cannot provide such goods because, once produced, they benefit the whole public and not specific individuals (Johansson *et al.*, 2002). The only complete and viable solution to prevent the *tragedy of the commons* is by full recognition of the above-explained concepts of human rights, equality, and solidarity by water decision makers, managers, and users through Integrated Water Resources Management (IWRM) approaches within a societal ethical framework for good and rational water governance.

2.2 *The trend and its development*

The trend now is increasingly to deal more and more for dealing with water as a tradable good, something for sale. The privatisation of water services, that is taking place on a global scale, has opened the door for the concept of water as a service, and as a good. In this context, water is no longer perceived as a gift from God (or the State), but a commodity for which one has to pay. The following development emphasizes this trend:

2.2.1 *Bilateral water deals are concluded*

On March 25, 2004, Israel and Turkey concluded an agreement for the sale of 50 Mm³/yr of water for 20 years. The water will be taken from the Manavgat River in Turkey, purified in Turkey and then transported in converted oil-tankers to Ashkelon in Israel. This shows that the idea of importing fresh water is not an academic one. In the future, this trend will, no doubt, increase due to increasing water scarcity worldwide. Jonathan Peled, spokesman for the Israeli Foreign Ministry said that “this landmark agreement turns water into an internationally accepted *commodity*”.

Water is sold as a *good* by Lesotho to South Africa at the rate of 88 m³/sec. Iran has finalized a US\$ 2,000 million deal with Kuwait (June 2001) to pipe water from Northern Iran to Kuwait. Israel negotiated the price of water to be tankered from Manavgat in Turkey to Ashkelon. International tankering of water takes place in the Caribbean and the Philippines.

² Dr. M. Turner operates the Water Bank website [www.waterbank.com].

Intense controversy exists in Canada over the exportation of bulk water, but as a member of NAFTA and the WTO, Canada has to abide by the same rules, since both Organizations consider water to be a tradable good like any other good, and cannot claim that water is not a good. To cite here Maude Barlow (2001), has made it clear that “the cat has been out of the bag for years”³. And *Global Water Corporation* of Canada has contracted to ship 58 Mm³/yr of Alaskan glacier water by tanker to be bottled in a free trade zone in China. They openly concluded that the venture “will substantially undercut all other imported products” because of China’s cheap labor.

2.2.2 Staggering debate at the WWF 5⁴

The advent of Fifth World Water Forum at Istanbul in Turkey, March 2009, represented a kind of conferences diplomacy that brought together intergovernmental groups, ministers level, and parliamentarians, as well as non-governmental organizations on a joint summit. This time, the set-up of the crowded agenda and program consisted of six themes. The main theme of WWF5 was *Bridging Divides for Water* and under this theme, there were six sub-themes⁵.

The Forum ended-up with a *Public Declaration*, which called for water conservation, especially for agriculture, as well as water harvesting and recycling of agricultural drainage and for clean water for health. The *Declaration* is not binding and therefore, is regarded as recommendations, which could be considered or neglected by decision-makers. France, Spain and many countries of Latin America tried to introduce an amendment to the Declaration, and to add a sentence: “access to safe drinking water was a human right rather than a need”, but without success, to the degree that led some twenty countries to sign a statement of protest, including France, Spain, Switzerland, South Africa and Bangladesh.

The Declaration was also criticized by French Ecology Secretary, Chantal Jouann, who has announced and described this as a lack of political will, which is necessary for ensuring adequate water for drinking, at a time when about 80% of all diseases in developing countries are due to contaminated water.

There was another parallel Forum represented by *The Alternative People’s Forum* that includes organizations of the rural poor, as well as organized labour movements. They have pronounced and aired their views on radio and television, as follow⁶:

- a) Demonstrating and shouting “water for life, not for profit”. Two activists from the non-governmental organization *International Rivers* were deported after holding up a banner just before the conference began that read “No Risky Dams?” The security was tight, with Turkish police was firing tear gas and detaining protesters.
- b) Criticized the official World Water Day, during the Forum, as an non-inclusive, corporate-driven, event, a fraud pushing for water privatization and called for a more open, democratic and transparent forum.
- c) The Forum is a big trade show, where decisions are made about who gets water and who doesn’t get water. Strategies are developed and that’s what it is all about. “They’ll put on sessions on gender and water, but they don’t mean any of it. This is really about one development model for water, and that is the privatization model. And that is what they are promoting, and that is what their consensus is, and they refuse to include the notion of the right to water. They set the agenda for the world.

³ Maude Barlow is the National Chairperson, Council of Canadians.

⁴ 25,000 of experts have participated in the forum in Istanbul (Turkey), which is considered to be the largest number of the forums witnessed for years. This is representing various sectors dealing with water, other than the governmental and non-governmental organizations, including politicians, parliamentarians and officials from drinking water in rural and urban areas, journalists and various media outlets.

⁵ The six sub-themes are: 1) Global Changes & Risk Management; 2) Advancing Human Development and the MDGs; 3) Managing and protecting water resources to meet human and environmental needs; 4) Governance and management; 5) Finance; 6) Education, Knowledge and Capacity Building.

⁶ Democracy Now! [democracynow.org], “The War and Peace Report”.

- d) Privatization is not more efficient. It's more expensive. It causes more environmental problems. And the incentive is not conserve water, but to use as much water as possible.

Maude Barlow⁷ stated during the wrapping-up of the Forum, that “the World Water Forum is bankrupt of ideas and have no new ways to address the growing water crisis in the world, because they have maintained an adherence to an ideology that is not working, that has dramatically failed. What is happening here is no longer about the World Water Forum. So we will be less concerned – I mean, if they want to go to Marseilles, let them go to Marseilles next time. It won't matter. It really won't matter. The change has been here. It's been a transfer of power”.

2.2.3 *At Stockholm water symposium*

At the 10th Stockholm Water Symposium (August 2000), participants came to a conclusion and agreed in their statement, that “a growing movement of people believe that the imperatives of economic globalization –unlimited growth, a seamless global consumer market, corporate rule, deregulation, privatization, and free trade– are the driving forces behind the destruction of our water systems. These must be challenged and rejected if the world's water is to be saved”.

The human race has taken water for granted and massively misjudged the capacity of the earth's water systems to sustain the demands made upon it. Our supply of available fresh water is finite and represents less than 0.5% of the world's total water stock. 31 countries are facing water stress and scarcity and over 1,000 million people lack adequate access to clean drinking water.

In their consensus statement, participants recognized the terrible reality that “by the year 2025, as much as two-thirds of the world's population will be living with water shortages or absolute water scarcity”. They have also acknowledged that “instead of taking great care with the limited water we have, we are diverting, polluting, and depleting it at an astonishing rate, as if there were no reckoning to come. But there is profound disagreement among those in the *water world*, around the nature of the threat and the solution to it”.

3 PREMISES OF WATER COMMODITIZATION: GLOBAL AND IN THE ARAB REGION

3.1 *Economic globalization*

Economic globalization integrates the economies of nation-states into a single unified market and carries industrial production to new levels. It intensifies natural resource exploitation and exacerbates every existing environmental problem. The imperative of globalization is unlimited growth, making it impossible for participating countries to make preservation a priority (Maude Barlow, Council of Canadians). Economic globalization has also resulted in the exponential increase in the use of fossil fuels, dams and diversions, massive transportation systems needed to carry out global trade, and roads carved out of wilderness.

In the new economy, everything is for sale, even those areas of life once considered sacred, like seeds and genes, culture and heritage, food, air, and water (Maude Barlow). As never before in history, the public space, the vital commons of knowledge and our natural heritage, have been hijacked by the forces of private greed. It was often stated, on different occasions, that “given the current corporate practices, not one wildlife reserve, wilderness, or indigenous culture will survive the global economy. We know that every natural system on the planet is disintegrating. The land, water, air, and sea have been functionally transformed from life-supporting systems into repositories for waste. There is no polite way to say that business is destroying the world” (*ibid.*).

⁷ Barlow is the senior adviser on water issues to the United Nations General Assembly and chair of the Council of Canadians, speaking out against the World Water Forum in Istanbul, Turkey.

3.2 *Water rights*

In general water right is frequently considered to be a *legal right* to abstract and use a quantity of water from national source (river, stream, and aquifer). Water rights may confer a legal right to impound or store special quantity of water in natural source behind hydraulic structure for abstraction or hydropower generation. Those and other activities are generally regulated by *water rights regime* and specific legal and administrative rules.

Beside water rights based on abstracting and using of water from natural sources (surface or groundwater), there are other categories of *Water Rights*, such as *contractual water rights*, such as giving legal rights to receive a quantity of water at a specified time from e.g. an irrigation canal, generally in return for payment. There are few advocates of tradable water rights, water sales and leasing, and other market based concepts, which are not common and are rarely used (except cases like e.g. Chile and New Zealand).

In areas with plentiful water and few users, such systems are generally not complicated or contentious. In other areas, especially arid areas where irrigation is practiced, such systems are often the *source of conflict*, both legal and physical. Some systems treat surface water and groundwater in the same manner, while others use different principles for each.

3.3 *Water pricing mechanisms*

Policymakers have been compelled to try new approaches to improve the management of water resources. Among these approaches are measures of *water pricing reform* aiming at encouraging water conservation and improving the efficiency of water use (Dinar, 2000). This is due to the increasing growth of world population, and the unequal spatial and temporal global distribution of water. By 2025 nearly 3,000 million people may be living in *water stressed* countries. Furthermore, nearly 1,000 million of the world population will be living in the Arab Region with less than 650 m³/yr of water available per person, which is considered a severe water stress situation by all standards (Johansson *et al.*, 2002; Postel, 1996). Yet, the notion of an optimal water-pricing policy does not command consensus among economists and policymakers, as there is still disagreement regarding the appropriate means by which to derive the *right* water price.

3.3.1 *Basic assumptions for water pricing*

It has been argued that the *optimization of water allocative efficiency*, which is an effective tool to control water wastage, would maximize benefits to society from the available water supply, using water pricing mechanisms to enhance the efficiency of water use. However, ethical concerns for *human equality* and *fairness* of water allocation across economically disparate groups in society, could necessitate the acceptance of sub-optimal allocation efficiency for the sake of sustaining livelihoods and expanding access of the poor to water services (Dinar & Subramanian, 1997). Water-pricing mechanisms do not aim at *redistributing income*, but in general it is in the governments' natural interest to increase water availability for all sectors of their citizenry. Consequently, based on ethical considerations of *solidarity*, it could be necessary to provide differing pricing mechanisms to account for disparate income levels so that affluent sectors of society would in effect subsidize the water supply for poor sectors.

An important factor also in pricing water is that, in principle, *long term sustainability* of water supply services is achieved only by fully recovering all the incurred costs of infrastructure, operation, maintenance, administration, and development of the needed facilities (Budds & McGranahan, 2003). Consequently, proponents of *water pricing cost-recovery mechanisms* claim that efficiency gains benefit all service users, including the poor who will gain by becoming connected to a reliable and sustainable system. The ability of governments or other service providers would be improved, with cost-recovery gains, to provide water and sanitation services for the poor. According to Abu-Zeid (2001), huge investments have been made globally in terms of physical water supply infrastructure, as well as institutional management organisations, to ensure access to water and sanitation. It is therefore very important to sustain these facilities through *water pricing cost-recovery*

mechanisms in order to continue the provision of water and sanitation services, particularly for the poor and marginalized populations that lack any political clout.

3.3.2 *Water pricing in the Arab region*

The value of water in the Arab Region is given in Islam and relevant Islamic traditions and customary laws and should be duly respected. As water is vital for life, it is considered as a basic human right for all, its value should not be in economic terms only, but should also reflect the social, environmental, cultural, and religious morals placed on it. With respect to cost-recovery, different mechanisms can be adopted that are suited to the administrative, social, and economic conditions of various Arab societies into which water pricing is applied.

According to ESCWA (2003b), the implementation of an efficient water pricing policy requires the modification of existing water laws and regulations, taking into consideration water market requirements, privatization schemes, and enforcement mechanisms. However, in order to ensure equitable cost sharing, important considerations should be implemented regarding socio-economic standards and income levels. Moreover, ethical measures should be taken into consideration, such as respecting the human right to water, especially when it comes to lower income groups, as well as inclusiveness in water and sanitation services and transparency in water pricing mechanisms. Currently, water-pricing schemes in some Arab countries are not leading to water conservation and improved water use efficiency. Setting water prices at lower than production costs is still common in some of these countries. In Lebanon for example, the government still subsidizes water supply for agricultural, domestic, as well as industrial sectors (Abdurazzak & Kobeissi, 2002). In fact, in the irrigation sector, water is still highly subsidized and provided at a minimal cost in several Arab countries, in spite of the widespread water over-consumption in the agricultural sector throughout the region (ESCWA, 2003b).

Nevertheless, other Arab countries are already implementing efficient water pricing schemes, which take *ethical issues* of societal solidarity and equitable access to basic needs of water into consideration. In Jordan, for example, a water pricing scheme has been implemented using the concept of the *lifeline rate schedule* (ESCWA, 2003b). The scheme is designed to recover the service costs while keeping *lifeline* basic needs affordable for the poor. While cost recovery was included in the water *tariffs* to cover the operation and maintenance costs, these tariffs were structured in a way that guarantees the needed household minimum consumption at a subsidized fixed price. Subsidies are recovered from households with higher water consumption assuming that such consumers are wealthier. These tariffs have achieved basic financial objectives for the water authority and reduced the general demand for water. However, one main shortcoming in the Jordanian system is that it does not differentiate between urban and rural users, and no effort for raising awareness have been undertaken to address issues of social resistance (ESCWA, 2003b; Taha & Bataineh, 2002).

Other Arab countries also apply a *progressive block rate for water pricing*. In Tunisia, a progressive and selective pricing for drinking water has proved efficient in cost recovery, as well as a means to enhance equitable water use. Nevertheless, the system is not without limitations. The Tunisian tariff system has brought pressure to bear only on major consumers, while sparing—to a great extent—small and average consumers. As a result, the small and average consumers have been paying a subsidized price for water with only a weak water conservation incentive. It is important to not totally sacrifice water demand management considerations for the sake of equitable access, in order to induce commitment to water conservation among all users (Linam, 2002).

3.4 *Water privatization in the Arab region*

Concerns over transparency, reduction of costs, and productivity improvement have been addressed, albeit most of the time unsuccessfully through privatization plans in the Arab Region. On the other hand, as mentioned above, the commoditization of water in general is fraught with social and ethical problems, since water pricing mechanisms based on full cost recovery and total removal of subsidies lead mostly to unfair distribution of service costs. As such, lower-income people suffer

the most from privatization schemes that do not account for social considerations and, consequently, do not provide for full access to water and sanitation.

In recent years, policy makers in most Arab countries have chosen privatization as a strategic decision that involves major reforms in line with overall structural adjustment programmes aimed at reducing budget deficits and meeting increasing demand for water and sanitation services. As such, privatization contracts are being implemented in Gaza, Jordan, Lebanon, Qatar, and Yemen; while in Bahrain, Egypt, Kuwait and Saudi Arabia, privatization agreements are being seriously considered (ESCWA, 2003b).

In Jordan, Lebanon, and Yemen, privatization has been initiated in the past few years to address the pertinent water supply problem. In Jordan and Yemen, increasing water demand has led to mining of groundwater resources; whereas in Lebanon, increasing water demand is expected to render the water balance negative, if present consumption and management practices continue. In all these countries, enabling legislative and institutional measures have been taken to promote the implementation of privatization schemes for water and sanitation (ESCWA, 1999b).

However, the region still suffers from many problems related to water privatization. Most of the countries have relatively little know-how in privatization planning and implementation. This means that significant *capacity building* of local institutions and expertise is needed at both the national and regional levels, if positive results are sought through privatization. Moreover, knowledge and information regarding the expected results of the chosen privatization scheme(s) should be made clear and available for local communities and societies throughout the region in order to avoid any marginalization or distrust among the public.

Moreover, while in some countries of the region there is strong political will and acceptable public adaptation to implementing water privatization, other countries are facing severe resistance to this process. Opponents to privatization are accusing the governments of selling off public assets cheaply and putting responsibility for a vital scarce resource in the hands of the private sector. Therefore, *dialogue with stakeholders is necessary* to create a better understanding of the issues at stake and to mobilize local support, which is necessary for the success and sustainability for the privatization of water service delivery (ESCWA, 2003b).

In general, countries opting for the privatization of water service delivery in the Arab Region should stress *transparency* and *effectiveness* in setting up the needed institutional frameworks. It is necessary also to *recognize social and ethical considerations* while developing the needed legal and regulatory frameworks to guide the implementation of privatization schemes. In addition, it is very important to achieve full coordination and consultation among various ministries and water institutions and authorities, as well as civil society structures. This allows for greater transparency and justice both during the planning and implementation processes, whether in utility selection, contract negotiations, monitoring of the bidding process, or the performance of private investors (Budds & McGranahan, 2003; ESCWA, 2003b).

Coordination and cooperation amongst various public and private sector institutions and other stakeholders is necessary to make these preparatory steps. These are certainly worthwhile in order to bring about a successful water and sanitation delivery operation that respects the human right for water, takes into consideration the socio-economic needs of various communities at stake, and protects the wise use of water, for it is certainly a scarce resource in the Arab Region (ESCWA, 2003b).

3.5 *Water in relation to trade (virtual water)*

The concept of *virtual water* has been introduced by Tony Allan in the early 1990s (Allan, 1993; 1994). It took nearly a decade to get global recognition of the importance of the concept for achieving regional and global water security. The first international meeting on the subject was held in December 2002 in Delft, the Netherlands. A special session was devoted to the issue of virtual water trade at both the Third and Fourth World Water Forums (Hoekstra, 2003). The *virtual water* content of a product, as often defined, is the volume of water used to produce the product, measured at the place where the product was actually produced (production site specific definition).

The virtual water content of a product can also be defined as the volume of water that would have been required to produce the product in the place where the product is consumed (consumption site specific definition) (Hoekstra & Chapagain, 2004).

It is not intended, here, to discuss the concept of virtual water nor the method used to calculate virtual water content of products. The concern is with the possibility of using the concept as a *planning tool* and to present issues that need to be tackled before considering virtual water trade as a policy option. This would be explained next in articulating a *water strategy* for the Arab Region that emphasizes basic ethical principles and help improve on the design of the water and food security system.

4 WATER MANAGEMENT CHALLENGES IN THE ARAB REGION

4.1 Introduction

Renowned water sciences institutes and eminent scholars (Abu-Zeid & Hamdy, 2004; El-Kady, 2003; ESCWA, 2003a) in their recent studies concur on certain factors that shape the Arab water crisis, especially in its management dimension. On the governance scale, Arab countries have been suffering from serious capacity gaps at various levels that hinder their ability to face the social, economic, and political challenges needed in water management. The general lack of familiarity with participatory and integrated management approaches; fragmented institutional structures; inadequate pricing schemes; imbalanced sectorial water allocation; persistence in resorting to expensive water supply augmentation projects; and centralized administrative structures are some of the problems facing effective water governance in the Arab Region.

In fact, some Arab countries have already embarked on the implementation of IWRM approaches in response to this current situation. It should be noted, nevertheless, that most of the national efforts in the region for IWRM implementation have been dominated by neo-liberal economic policies and, as such, interventions mostly constitute decentralization schemes; privatization of water services; insuring service cost recovery through water pricing; sectorial water (re)allocation; and expanding access to water and sanitation, as well as water quality management. Table 1 shows an identification and explanation of IWRM tools addressing governance failures.

Reviewing recent literature, one finds resources that can assist mapping out the key factors that make the Arab water crisis, and explain its complexity. These factors in their interaction are illustrating the complexity of the management dimension and its magnitude (Hefny, 2007). Reflecting on these sources can draw the attention and bring together the big picture, as shown in Figure 2, which reflects the complexity and interconnectedness among various factors that shape the crisis (Figure 2 shows mind mapping of the Arab water crisis in its complexity).

4.2 Gaps in water and food production

4.2.1 Severest water scarcity in the region

The Arab Region represents 10% of the world's surface; its population represents 5% of world population. However, it possesses only 0.5% of world renewable fresh water resources. This is due to the fact that arid and semi-arid weather dominates 82.2% of the whole region. Rainfall precipitation estimated to be 2,228 km³. The losses amount to 90.4% due to evaporation. The Arab Region is home to 5% of the world's people. Meanwhile, water demand in the region is growing fast. The population has more than doubled in the past 30 years to about 280 million, and could double again in the next 30 years. So, the *population nexus water* makes the Arab Region to suffer from more and more water scarcity.

4.2.2 Water availability is falling to crisis levels

The Arab world draws its water resources from rainwater; rivers and underground water sheets as well as sources that are non-conventional (desalinated water and treated waste water). The quantities

Table 1. Soft Path of IWRM. IWRM Tools Addressing Governance failures.

IWRM Tools	Governance Failures
Policies	– Failure to correct market distortions
Economic instruments	– Inappropriate price regulation
Financing and incentive structures and polluters	– Perverse subsidies to resource users
	– Inappropriate tax incentives and credits
	– The existence of upstream and downstream externalities (environmental, economic and social)
Regulatory instruments	– Over-regulation or under-regulation
Institutional capacity building	– Conflicting regulatory regimes
	– No independence and impartiality of regulatory organisations
	– Provision of water services as natural monopolies
Information management	– Imprecise reflection of consumer preference systems
Water campaigns and awareness raising	– Short-sightedness
	– Voter ignorance and imperfect information
	– Special interest effects, including political weaknesses and vested interests
Role of the private sector	– Little entrepreneurial incentives for internal efficiency
Institutional roles	– The inability of the government to control and regulate the sustainable water use
Social change instruments	– The non-payment of services linked to water
	– Bureaucratic obstacles or inertia
	– Lack of an overall responsible authority
Water resource assessment	– The lack of effective knowledge of the resource, the demands imposed on water and the current uses that are made of it
Plans for IWRM	
Legislation	– Ill defined property rights, unclear ownership
Water rights	– Absence of or inappropriate legislation
	– Unclear ownership of property rights
Water resource assessment, risk assessment and management	– Ignorance and uncertainty about water markets, droughts, floods, etc., leading to inability to set prices correctly

Source: Rogers & Hall (2003).

that can be obtained from these sources differ widely from one country to another and from one location to another within a single country. Rainfall is inexistent in some countries and heavy in others, for example (over 1,000 km³/yr in Sudan). Similarly, countries such as Sudan, Egypt, Syria, Iraq, Lebanon, Jordan and Morocco have large and small rivers but other Arab countries have neither rivers nor lakes.

Where water resources are rare and financial resources permit, the abundant water found underground is exploited (the East Al Jazira underground sheet covering 1.6 million km², and the Nubian underground sheet covering 2 million km²). Other non-conventional sources are being promoted, with the result that Arab countries are at the forefront in the development of water desalination techniques, producing over 5 Mm³/day, that is, over 70% of the world production (see Figure 3).

Meanwhile, population growth in Arab countries is the major factor for the increase in food consumption; such growth has almost doubled between 1970 and 1990 (Figure 4), and the projections for future growth are even more alarming. The rate of population growth is among the highest in the world. In addition, the economic development and the change in aspirations and standard of living due to oil revenues in the last few decades leads to a very high percentage of immigration to

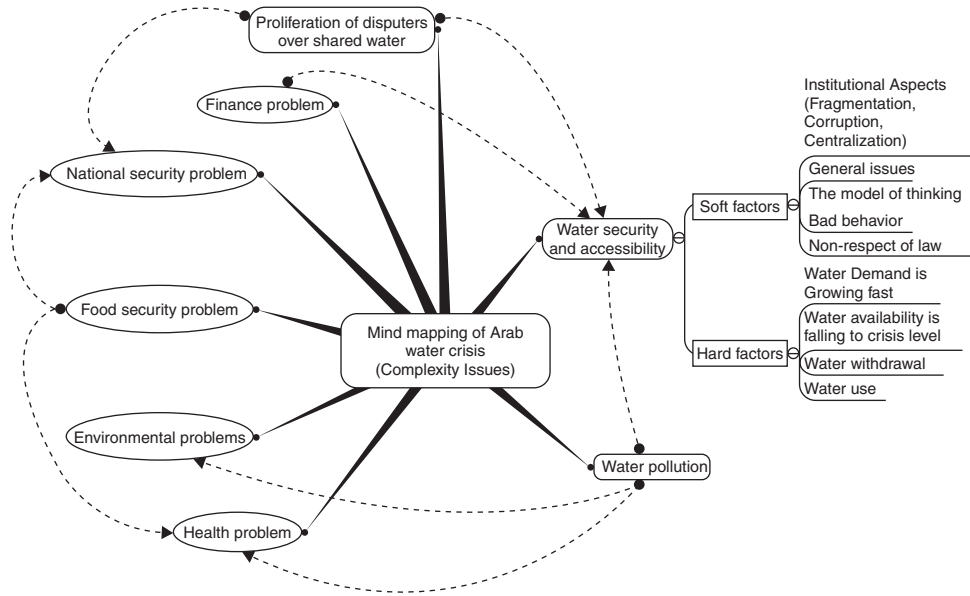


Figure 2. Mind Mapping of the Arab Water Crisis.

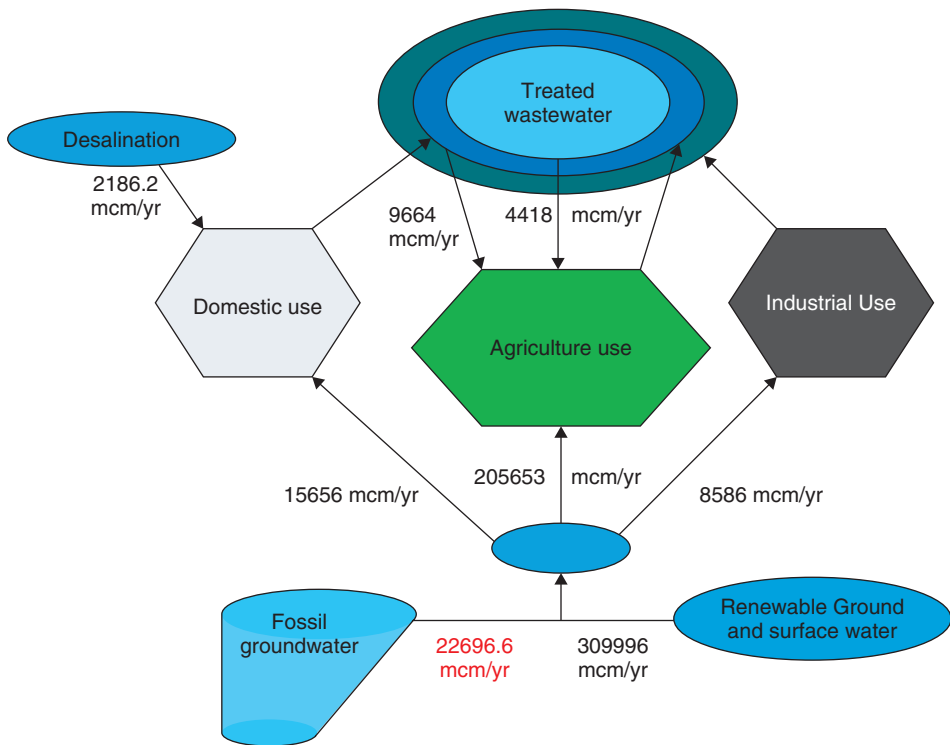


Figure 3. Water Resources Balance in the Arab Region.

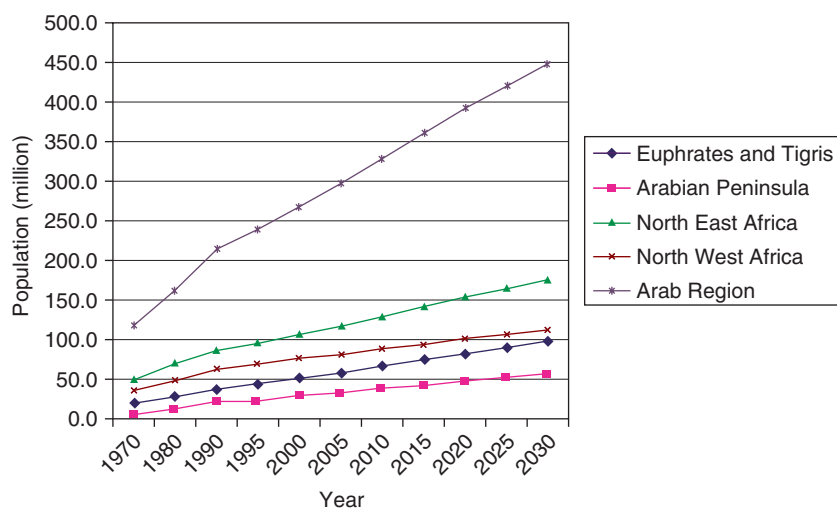


Figure 4. Population growth in the Arab Region.

Table 2. Food Security in Arab Countries, 1993–1997.

Food security	Group countries
Insecure (74)*	Sudan, Yemen
Neutral (51)*	Algeria, Egypt, Iran, Jordan, Kuwait, Lebanon, Libya, Morocco, Syria, Tunisia
Secure (37)*	United Arab Emirates (UAE)

Source: Diaz-Bonilla *et al.* (2000: 55–57).

*The numbers in brackets show the total number of countries in the world that belong to the group.

oil rich Arab countries. The total population is expected to continue increasing to reach 450 million by 2030 (Hamouda & El-Sadek, 2007).

As population has grown against a background of finite freshwater resources, so the water available to individuals has fallen dramatically. About 45 million of the region's population (16%) is lacking safe water, and more than 80 million lack safe sanitation. The most seriously Arab countries affected by water shortages are: United Arab Emirates (UAE), Saudi Arabia, Libya, Qatar, Kuwait, Oman, Bahrain and Jordan.

4.2.3 Food security in Arab countries

Diaz-Bonilla *et al.* (2000) have made an analysis to classify the countries of the world into three different groups: food insecure, food neutral, and food secure. For most countries, their analysis was based on data for 1993–1997. Table 2 shows the classification of Arab countries covered by their analysis. Their definition of food security is based on the following indicators: food production per capita (measuring the ability of a country to feed itself); the ratio between total export earnings and food imports (showing its ability to finance food imports); calories per capita and protein per capita (important explanatory variables for changes in malnutrition); and the non-agricultural population share (aimed at showing the extent of immunity from global changes in trade and agricultural policies) (Diaz-Bonilla *et al.*, 2000: 6–9). Trade-stress (high food imports relative to export earnings) tends to contribute to a lack of food security in the Arab Region more than in other regions. In another paper, Lofgren & Richards (2003) showed that in the second half of the 1990s, available indicators suggested that food insecurity at the national and household levels was

Table 3. Situation and future Projection of water resources and requirements in the Arab world.

Year	1990	2000	2025
Resources ($10^3 \text{ Mm}^3/\text{yr}$)	257	274	278
Individual's share (m^3/yr)	1,431	1,142	801
Requirements ($10^3 \text{ Mm}^3/\text{yr}$)	154	190	281
	+130 (surplus)	+84 (surplus)	-3 (deficit)

a serious problem in Iraq, Sudan, and Yemen, countries that also are likely to have the highest poverty rates in the region. At the household level, the performance for food security indicators was more positive up to the mid 1980s than in more recent years.

For national-level indicators, the picture is mixed. For the region as a whole, some of these indicators (per-capita food production and food import stress) show stronger gains since the mid 1980s, whereas others (including per-capita calorie consumption) improved less strongly in more recent years. Finally, the influence of political instability and conflicts (internal and external) on food security is obvious. Continued strife makes the challenge of improving food security much greater for the cases of Iraq and Sudan.

4.2.4 Agricultural policies

In the past 20 years Arab countries were aiming to achieve greater food self-sufficiency and accordingly the majority of Arab countries provided generous *subsidies* to the agricultural sector. Given the arid climate of these countries, production can only be increased by escalating the area of land under irrigation, by improving irrigation efficiency, or a combination of the two. Agricultural subsidies are given in several *forms*, for wells, canals, fuel, and other inputs, price support programs, trade protection in some countries, and lack of controls on groundwater extraction or charges.

These subsidies drastically increased the irrigated areas and are contributing to the depletion of aquifers (Hamouda & El-Sadek, 2007). Besides, these subsidies distort costs and revenues, and many of the agricultural activities in the Arab countries are financially profitable only because of Government subsidies and incentives. Although agriculture consumes about 80–90% of the available water in most Arab countries, it contributes to less than 10% of Gross Domestic Product (GDP) in most of these countries. The employment in the agricultural sector, as a proportion of total employment in 2003, ranged from 1% in Kuwait, Bahrain and Qatar to 58% in Sudan.

4.3 Water resource balance in the Arab region

The United Nations Environment Programme and a number of water and development experts have assessed the *individual's water requirements* at around $1,000 \text{ m}^3/\text{yr}$. This includes drinking water, agriculture, industry and other development sectors. Water is seen as being one of the main factors that determine the growth rate in most Arab countries. It is used domestically (drinking water), agriculturally (food production) and industrially, as well as for energy production, transport of people and goods, leisure, and environment conservation.

Regarding existing water potential in the Arab world, it appears that four countries are at present suffering from a lack of water and that, in the year 2025, eight countries will be in this situation (Table 3). This is because of the anticipated rise in water requirements resulting from demographic growth, from the extension of irrigated areas to feed those people, and from the consequent growth of industrial and commercial activity. It also springs from the rising rates of individual consumption due to an increase in living standards. Thus the problem of a water deficit and the need to guarantee permanent water resources will constitute the main challenge to be addressed to assure the future of coming generations.

4.4 *The need for sustainability measures*

The progressing developments and water policies in Arab countries resulted in the current difficult water shortage situation. Figure 3 shows a general picture for the current water balance or *cycle* in the whole of the Arab countries. It is clear that the huge amounts of water used for irrigated agriculture are leading to abstracting large amounts of non-renewable *fossil* groundwater. This creates real threats for the sustainability in the whole region. In order to restore and/or improve this imbalance, focus should be given mainly to the reduction of demands from the agricultural sector, and also to create additional sources of water to reduce groundwater abstractions. Achieving these objectives needs considerable efforts to reform both water and agricultural policies, and also significant cost to enhance the capacity of wastewater treatment as a safe and reliable source of water for irrigation (Hamouda & El-Sadek, 2007).

4.5 *The need for water and agricultural policy reform*

Agricultural policies in Arab countries also need to be reformulated to serve the purpose of increasing efficiency and conserve the already depleted water resources. As previously elaborated, subsidies are one of the major drawbacks of current agricultural policies. In addition to their burden on the general budget, agricultural subsidies lead to poor resource allocation and the depletion of aquifers which disregard the high opportunity cost of water and the contribution of groundwater aquifers to the sustainability of ecosystems (Hamouda & El-Sadek, 2007).

Reforming agricultural policy aims at: a) Conservation of water resources; b) Reduction of direct and indirect subsidies attributed to the agriculture sector; c) Water quality preservation; and d) Improved crop water productivity. It is vital that a number of steps be taken to economize on water consumption and protect water resources from pollution. These steps are, inter alia:

- Exploiting rainwater by building dams and reservoirs.
- Provision only of water needs, with guaranteed drinking water as a priority.
- Promoting water distribution and use techniques to monitor the modes of operation and upkeep.
- Setting water rates in a way that will avoid waste.
- Recycling water after it has been treated in the appropriate way suitable for reuse in urban use and irrigation.
- Developing water desalination techniques, especially since the Arab world is surrounded by seas and oceans and solar energy is available throughout the year.

These policy reforms include the following:

- i. Limiting subsidies to technologies which promote water conservation. The strategic objective should be to optimize water productivity, since water is the limiting factor, rather than to maximize crop yields.
- ii. Supporting the current policy of waiving charges for the use of treated wastewater in irrigation.
- iii. Apply demand management principles to both municipal and irrigation water.
- iv. Create efficiency indicators to monitor and evaluate water and agricultural policies.
- v. Continue research efforts for the development of salt-tolerant and drought-resistant crops, and investigating additional water sources.
- vi. Upgrade the assessment of existing water resources and demand projections.
- vii. The promotion of a market-oriented policy through the cultivation of crops with high water productivity and low-water content.
- viii. Progressively move from a policy of food security to a policy of water security and thus import crops with high water content (*virtual water*), and increased integration with global markets.
- ix. Set up a legal/technical framework for surface and underground water allocation –Water Rights Adjudication Process– based on sound hydrological criteria. This should be used as a water management mechanism to approach resource sustainability (demand management),

- providing a legal safeguard at the same time to farming investments (assurance of water availability).
- x. Expanding the use of treated wastewater and drainage water which offer the opportunity for substituting part of the conventional water used in irrigation. However, three important bottlenecks still demand a solution: 1) building infrastructure for wastewater collection and treatment; 2) building infrastructure to store and transport treated wastewater to areas where it can be used; 3) upgrading national standards for treated wastewater reuse to encourage crop diversification.
 - xi. Adopting integrated policy between different elements influencing water resources management.
 - xii. Encourage private sector investment in developing water resources within the framework of national plans.
 - xiii. Enhancing the role of participatory water management in operation and maintenance.
 - xiv. Creating social and economic incentives for water conservation.
 - xv. Activating the role of education, training and information management in the field of water resources and management (for water users and officials).
 - xvi. Raising awareness regarding relevant water conservation and environmental issues.
 - xvii. Create regional initiatives to improve desalination technology, use of brackish water in agriculture, and investigate opportunities for import water.

4.6 *Virtual water as a policy option*

4.6.1 *Introduction*

It is now well recognized that Arab states are facing surmounting water/food challenges as a water-scarce region. This is evident by accounting the volume of virtual water that is embedded in the food imports of the countries concerned. There is a close relationship between water endowment and food import dependence. Studies have shown that although virtual water trade is going on in the region, it is yet to be considered as a policy option in planning and allocating water resources (Hamouda & El-Sadek, 2007).

However, virtual water as a policy option is often faced with skepticism and fear of economic or political control. The culture of the Arab Region constitutes an important element when discussing the need for change in current planning methods to accommodate virtual water trade. In this context, there are three important points to be considered: a) food imports are imperative for compensating water resource deficiency; b) cultural and behavioral changes are necessary for adapting to the current water scarce situation; and c) it is imperative that planners tackle the sources of skepticism first before introducing virtual water trade as a policy option (Hamouda & El-Sadek, 2007).

Having established the need for policy reform in all water consuming activities, it is important to investigate policy options provided by the virtual water trade concept and the suitability of such options to the Arab Region.

4.6.2 *Virtual water policy dimensions*

More often than not, scholars in the Arab Region contradict the political argument that has been put forward by Tony Allan from the beginning of the virtual water debate, that virtual water trade can be an instrument to solve geopolitical problems and even prevent wars over water (Allan, 1997). The contradiction is simply based on the perception that food exporting countries are mostly western countries, and the relationship between the Arab states and western countries is dominated by skepticism and fear of domination. Thus, looking at the bigger picture it is perceived by the Arab states that by depending on food imports they are giving in to foreign domination (Hamouda & El-Sadek, 2007).

Next to the political dimension, there is the economic dimension, equally stressed by Allan (1997; 1999; 2001). The economic argument behind virtual water trade is that, according to international trade theory, nations should export products in which they possess a relative or comparative advantage in production, while they should import products in which they possess

a comparative disadvantage (Wichelns, 2001). In addition, growing food (i.e. feeding oneself) has other important aspects aside that of the economic or political ones; they are of major influence on the decision whether to grow a certain crop or not.

Hoekstra & Hung (2002; 2003) argue that –while pricing and technology can be a means to increase local water use efficiency and reallocating water at basin scale to its higher-value, alternative uses a means to increase water allocation efficiency– virtual water trade between nations can be an instrument to increase *global water use efficiency*. From an economic point of view it makes sense to produce the water-intensive products demanded in this world in those places where water is most abundantly available. In those places water is cheaper, there are smaller negative externalities to water use, and often less water is needed per unit of product. Virtual water trade from a nation where water productivity is relatively high to a nation where water productivity is relatively low implies that globally real water savings are made.

As mentioned before, past food security policies were based on area expansion to support the objectives of food self-sufficiency and to enhance exports. These expansions proved to be unfeasible with respect to available water resource and lead to real threats to the sustainability of current developments. In fact, the future increase in agricultural production must come from increased land and water productivity both in terms of higher yields and cropping intensities for which scope still exists. This will lead to greater water savings by reducing wasteful water losses to low economic value crops and achieving more efficient water use and better agronomic practices.

Before adopting the virtual water policy option, Arab countries need to be assured that they can have fair and secure trade with water-abundant nations. An advantage for the Arab countries is that they export enough to earn the foreign exchange required to purchase the food imports they need.

In short, the concept of virtual water is well founded, provided countries have a more transparent picture of its comparative advantage and accordingly they can translate this into a competitive advantage. The second issue pertains to the level of the economic base, i.e. whether the economy of the country is well developed and diversified to take the decision of reallocating water from cereals, which provide subsistence living to large sections of rural population.

Regional cooperation on this subject is of paramount importance as it would allow countries in the region to assess and analyze the situation on a broader basis, taking into consideration common strategic issues.

Beside the direct financial cost, other costs to be considered are related to imports by water deficit countries to solve food deficiency like (World Water Council, 2004): 1) increased dependency on main exporting countries; 2) local agriculture may be damaged because of importing food if it is not able to compete or adapt; 3) the exporting country may start interfering in the internal affairs of importing country; and 4) imports may result in foreign reserve depletion if there is no export compensation of less water intensive or higher value commodities.

5 TOWARDS A MORE BALANCED STRATEGY IN RESPONSE TO WATER MANAGEMENT CHALLENGES IN THE ARAB REGION

5.1 *Introduction*

In articulating water strategies, it is important to strike a balance that advocates water as a common good and a fundamental human right, and at the same time, recognizing that water has an intrinsic economic value, and must be used sustainably. In this case, it is important to recall the main principles of IWRM and its tools, and recommend some general guidelines for implementing such tools within an ethical framework for water management. These guidelines entail, inter alia: a) the implications of declining water resources and how to maximize the benefits of water under condition of increasing scarcity; b) the necessity for starting a process of re-thinking water and food security paradigms for allocating water to the most beneficial use as one of the basic elements of any water strategy; c) the increasing cost of water development, compounded by increasing cross-sectorial demand on the limited water resources, is forcing policy makers in the region; and

d) to focus on the economics of water and its efficient use and allocation among competing users. The economics of water is now considered one important aspect of water management.

Most notably, here, it is important to stress that “the cultural and socio-economic values of water are still a very elusive subject. Several learned meetings stressed the economic value of water, while others stressed its social and cultural values. The importance of one or the other will vary from one society to another and from time to time, depending on the specific historical background, cultural heritage, extent of fresh water availability and the socio-economic conditions of the concerned region. *Developing a unified approach is required*, with clearly defined associated conditions and limitations for its applicability, which should accommodate the diversity of the world’s regions” (Mahmoud Abu-Zeid, 1998)⁸.

I fully agree, with such recognition on the importance of the socio-economic and environmental factors. The soft factors and soft approaches are no less important than the hard hydrological engineering factors, in achieving a well balanced water strategy, as well as in following a more integrated and comprehensive approach (Hefny, 2006a; 2007).

There is simply no way to overstate the water crisis of the planet today. No piecemeal solution is going to prevent the collapse of whole societies and ecosystems. A radical rethinking of our values, priorities, and political systems is urgent and still possible. The answers lie in emphasizing a whole new water strategy that is based on ethical guidelines, and to declare clearly that, *inter alia*:

- Water belongs to the earth and all species, and is sacred to all life on the planet. All decisions about water must be based on ecosystem and watershed-based management. We need strong national and international laws to promote conservation, reclaim polluted water systems, develop water supply restrictions, ban toxic dumping and pesticides, control or ban corporate farming, and bring the rule of law to transnational corporations who pollute water systems anywhere.
- Water is a basic human right. This might sound elemental, but at the World Water Forum in The Hague, it was the subject of heated debate, with the World Bank and the water companies seeking to have it declared a human need. This is not semantic. If water is a human need, it can be serviced by the private sector. You cannot sell a human right.
- Water is a public trust to be guarded at all levels of government. No one has the right to appropriate it at another’s expense for profit. Water must not be privatized, commoditized, traded, or exported for commercial gain.

Above all, we, as human beings, must change our behavior. We must emphasize identifying the capacity of our watersheds and, as communities, identify the limits we can place upon them. The world must accept conservation as the only model for survival, and we must all teach ourselves to live within our environment’s capacity. The insidious problem with pricing and conservation by commoditisation is that actually undermines environmental science and activism, as well as governments’ responsibility to protect their citizens and the environment by buying into the argument that the market will fix everything.

The question that matters here is to reflect on how it is best possible to get a balanced view of a water strategy, which would be designed on a sound basis for a more sustainable use and management of the water sector. It is more widely agreed that *in decision making processes*, there is a necessity to implement an integrative and interdisciplinary approach that takes care of three basic elements as follows:

- The necessity of attaining economic efficiency⁹, which is an issue of considerable importance in economic theory, and is even more important today.

⁸ The honorary president of the World Water Council and the President of the Arab Water Council.

⁹ Economic efficiency is understood as the maximum production that can be obtained given the resources available.

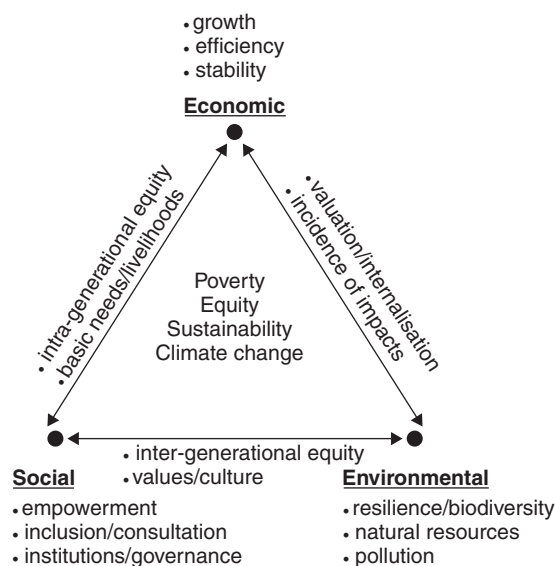


Figure 5. Sustainable development triangle –key elements and links (corners, sides, center).
 Source: Adapted from Munasinghe (1992; 1994).

- Social equity¹⁰ as well as human equality for all persons ought to be provided with what is needed on an equitable basis, having due regard to human rights and dignity, as there is no life without water, and those to whom it is denied are denied life.
- Environmental sustainability, which is centered on water conservation.

A major work has been done by Muhan Munasinghe entitled “Making Development More Sustainable”. He has presented it in an *e-book of the Encyclopedia of Earth*, the sustainable development triangle with a balanced treatment of economic, social and environmental aspects. In chapter 12, he explored the question of how to make water resource management more sustainable. *Sustainomics* is introduced as a new language to explain the transdisciplinary integrative comprehensive balanced heuristic and practical framework for making development more sustainable. Figure 5 is adapted from Munasinghe (1992; 1994), to show the sustainable development triangle –key elements and links (corners, sides, center).

In this context of decision making and governance, one recognizes the trade-offs amongst the three *E*'s: water efficiency, social equity and environmental sustainability, and even conflictive issues, in water use and management, could be reconciled.

In addition, the following illustration depicts major elements of a water strategy that is based on clear identification of an Arab Water Vision for 2025 that is emanated from the Millennium Development Goals and the World Summit on Sustainable Development (WSSD, 2002). The identification of challenges with its complexities is highlighted earlier for the food water nexus. However the mind mapping of ideas below is bringing the big picture, which is necessary in articulating and formulating a *water strategy* for the Arab Region that emphasizes basic ethical principles and helps improve on the design of the water and food security system (Figure 6).

¹⁰ Social equity is understood as the redistribution that aims to reduce inequalities of income or wealth.

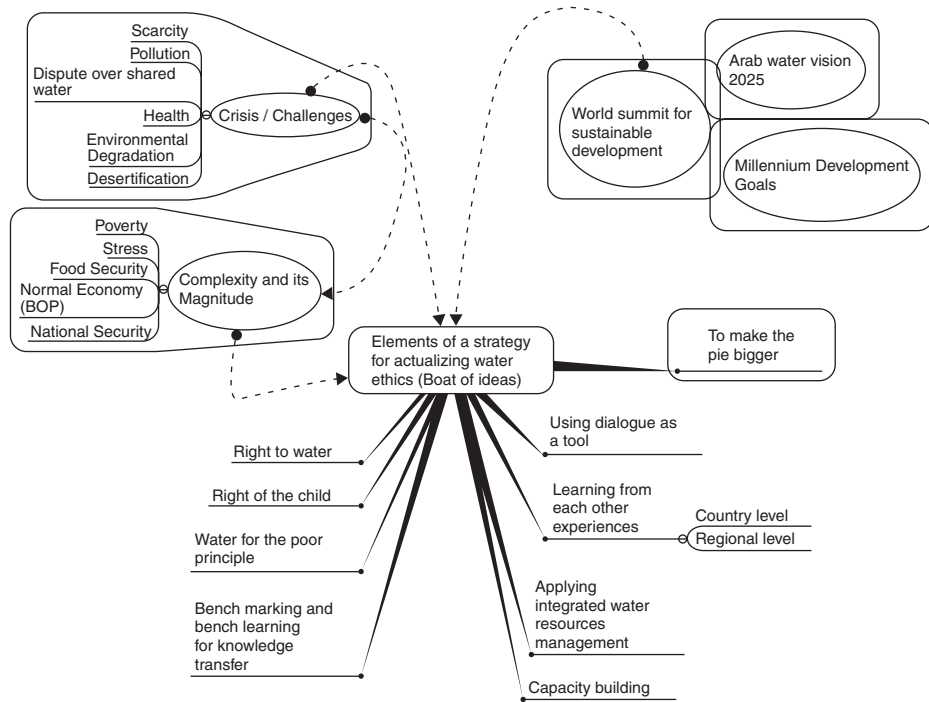


Figure 6. Mind mapping of ideas of an Arab Water Strategy.

6 CONCLUDING REMARKS: ETHICS IN DECISION MAKING AND GOVERNANCE

In decision making, water management is fundamentally a question of social and environmental justice based on three essential concepts: equity, fairness and access between and across generations. Its ethical dimensions may be perceived in the way answers are found to the following questions:

- Who participates in the decision-making process?
- Are these participants involved in formulating options or are they expected only to react to proposals that are already well-developed?
- How and what type of opportunity costs are considered?
- What kind of information is open to the public?
- How do professionals interact with non-professionals?
- Is there respect for cultural diversity and our heritage?
- How is a balance determined between the needs of human development and the need to preserve our natural resources?

Governance has to be based on shared values, and governments have to ensure that there are socially accepted moral standards on what can and cannot be done. These standards must determine what consequences of water management are or are not acceptable. For example, to what extent is damage to ecosystems acceptable? What loss to our heritage is tolerable? What impact on downstream water users is permissible? Successful civilizations have usually ensured that their water governance is rigidly enforced. When there is a breakdown of water regulation, conflict and economic failure often follow. Governments have a responsibility to ensure that an appropriate infrastructure is in place to allow these shared moral values to be debated and implemented.

According to Brelet (2004), *good water governance* is a prerequisite for ethical water management. Good water governance consists of a set of basic principles that guide water management. Most importantly, these principles include participation, transparency and equity. Accordingly, citizens should be able to have a say, directly or through civil society organizations, in decision making and policy formulation processes (UNDP, 2003).

The importance of *participation* does not just lie in being among the principles of ethical water management or good water governance. Experience shows that, with an open social structure which enables broader participation by civil society, water governance is more effective due to civil society's ability to influence government. Nevertheless, government regulations that facilitate local governance and participation are necessary for a clearer and more effective role of civil society and non-governmental organizations in enhancing water management (Rogers & Hall, 2003).

Therefore empowerment of local communities, especially remote and marginalized ones, through creating an enabling environment for more effective action by civil society is an important prerequisite to achieving a meaningful participation in water resources management. Moreover, the quality and effectiveness of government policies depends on ensuring participation throughout the policy formulation and decision making processes. This would create more confidence in the policies developed and the institutions through which such policies are formulated.

On the other hand, participation crucially depends on all levels of government following an inclusive approach when developing and implementing water policies. Inclusiveness can be achieved through social mobilization and freedom of association and speech. As such, institutions should communicate with all stakeholders and actors involved in the issues of water resources management. This entails conducting accurate and well-informed stakeholder analyses at all levels of decision-making, whether at the policy level (as mentioned above) or at the local project level that requires the inclusion, empowerment, and participation of local people.

Finally, water management should be done *in an open manner*. All decision-making processes and policy formulation should be transparent so that all involved stakeholders could follow the details of steps taken or required in policies developed in order to avoid mismanagement or misuse of water resources. For that, various roles in the legislative and executive branches need to be clear, and decision-makers, private sector, and civil society organizations should be accountable to the public. Accordingly, administrative procedures should be clear, as should the consequences for violation of policy provisions. Appropriate conflict resolution systems should also be attached for reconciliation among stakeholders through proper solutions (Rogers & Hall, 2003).

Moreover, governance institutions and systems need to communicate effectively among each other and with the public at large, because crucial to transparency and accountability is the free flow of information and direct communication. Language and communications between decision-makers and the public should be clear, accessible, and understandable for all in the interest of increasing public confidence in the relevant institutions (Rogers & Hall, 2003; UNDP, 2003).

The concept of *decentralization*, in theory, should improve efficiency, accountability, and equity because it correlates the benefits of local public services to the costs entailed. Nevertheless, in order to be considered ethical, decentralization has to be appropriately implemented because it has its own shortcomings and disadvantages, such as the possibility of elite capture that promotes clientelism instead of democratic participation.

In the Arab Region, different decentralization schemes for irrigation and domestic water supply have been adopted. Different experiences have led to different impacts, but in general they have raised to a certain extent the sense of responsibility among farmers and resulted in achieving higher water use efficiencies. It should be noted, however, that it is still too early to evaluate the overall impacts of decentralization on water management in the Arab Region because the whole idea is relatively very recent. Even in the countries that have had a good start with the process, it is still premature to claim that they already enjoy a good enabling environment based on a societal ethical framework for water management.

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