

Virtual Water in the MENA Region

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Presented at the

International Expert Seminar

ORGANIZED BY

THE German Development Institute

Water - a vital element for life, economic prosperity, and environmental well-being has varying shortage level in the Middle East and North African Countries (MENA). Although water shortage is a worldwide problem, nevertheless, our region remains the most arid in the world, particularly since three-quarters of the MENA region's land area is arid, receiving less than 200 mm of rain per annum.

Likewise, water demand in the region is rapidly increasing; noting that MENA countries contribute about five percent of the world's population yet have less than one percent of the world's annual renewable freshwater.

Not discounting the fact that population, had already more than doubled over the past 30 years to about 310 million people in 2004, and is anticipated to double again in the next 30 years.

This situation has greatly contributed in further strain the already limited water supplies, consequently freshwater resources became scarce. About 45 million of the region's people -- 16 percent -- lack safe drinking water, and more than 80 million lack safe sanitation. For example, in Jordan, Yemen, the West Bank and Gaza, per-capita availability of renewable water today is less than 175 cubic meters per year, already far below the projected regional average for the year 2025. The per-capita availability of renewable water in these countries by the year 2020 will be less than 100 cubic meters, if no regional projects implemented by then.

Moreover, some countries destroy their precious resources through over mining of groundwater, knowing that groundwater resources throughout the region are overexploited, and shortages are compounded by pollution. Contamination by fertilizers and pesticides, dumping of municipal and industrial wastewaters into rivers and lakes, solid waste deposits along river banks, and uncontrolled seepage from unsanitary landfills -- all these factors are degrading freshwater resources and imposing health risks, especially for children, the primary victims of waterborne diseases.

Regulating water use and riparian allocations is of great importance to enhance cooperation among the parties. Noting that the Middle East and North Africa countries are the most affected when it comes to regional water conflicts, as this matter had been discussed, written about, collectively and individually either by politicians or scientists. A common denominator among them is the absence of comprehensive riparian agreements that regulate the rights and responsibilities of each in water sharing, environmental protection, inefficient use, exchange of data and the avoidance of inflicting appreciable harm upon co-riparian. International agencies and donor countries are invited to play a more active role in assisting countries resolve their problems and enhance regional cooperation.

In view of the fact that MENA countries face major water management challenges since demand has been exceeding supply which, if left unchecked, will constrain their efforts to achieve higher sustained rates of economic growth. The need for immediate financial resources, if not provided in the immediate term, will cause public health problems due to either lack of domestic water supplies or lack of appropriate wastewater collection and treatment systems available.

In response to the water problem, and to meet the challenges, MENA countries are requested to manage water in an integrated manner to meet national objectives-economic, social, security, environmental-rather than as an input into certain sector. Institutional policy reforms and capacity building are critical to sustaining policies, programs and projects. Efficient utilization of water resources through new technologies, private sector participation and proper pricing mechanisms is essential for sustainable use of resources and good services to the consumers. Finally, international water issues and regional cooperation should be given particular attention. Several governments have demonstrated their commitment to tackling water issues in a coordinated and comprehensive manner as in the case of Tunisia, Jordan and Morocco. .

In order to enhance the current water supply and sanitation coverage of the region, MENA countries need to increase their investment in water and wastewater projects significantly. Jordan, for example, which stands in the middle of the MENA region with respect to the

number of population served with water supply and wastewater systems requires about \$4 billion for the coming 10 years (till the year 2011) or \$0.4 billion per year to implement its water projects. In the same token, Iraq needs about \$20 billion for its water supply and sanitation projects over the coming 10 years. Consequently, simple calculations show that the requirements of the MENA region could be in the order of \$15 to \$20 billion per year in order to meet the population needs for basic and essential services. It is rather difficult for regional countries to generate those amounts from water revenues or by borrowing from conventional donors.

On another note, the world food production has been tremendously increasing over the past decade whereas food prices have been declining. Yet the MENA region, one of the most sacred regions in the world is considered food insecure.

There are two main reasons for the low food prices. First, crop productivity has increased. New and hybrid species have been created, which responds well to large amounts of fertilizers commonly used in commercial farming. So effective have these productivity increases been, that world food output has risen by more than 25 percent per capita from 1961 to 1998.

The second reason is that agricultural sectors of the large food exporting countries receive subsidies. These are in the form of restrictions or taxes on imports, direct payments or subsidized inputs to farmers and export subsidies. The World Bank estimates that two thirds of annual grain exported on international markets comes from the countries of North America and the European Union.

Given the food insecurity in the MENA region, it becomes important that some attempt should be made to look beyond the current shortages. Since water is an important variable in crop production, it is advisable to consider how much water is needed to produce the food the region requires. When a country imports one ton of wheat, it is in effect, also importing the water it required to produce that crop. This is known as virtual water, as defined by Professor

Allan, J A, *The Middle East Water Question: Hydropolitics and TheGlobal Economy*, London: I. B. Tauris.

In international and regional economies, vast quantities of virtual water are present in the international cereal market. For instance, it takes about 1,000 tons of water to grow one ton of grain. This is the virtual water value of grain. Similarly, to produce one ton of rice, 2,000 tons of water are needed; one ton of wheat requires 1,000 tons of water; and approximately 1,200 tons of water are needed to produce one ton of maize. Because virtual water is embedded in the international political economy, every country in the international political system is subjected to trade in virtual water.

Almost all countries have to trade in food products because they cannot produce all their food locally. This is especially true in the case of the MENA region. Virtual water can therefore be an important aspect of a country's food security. This infers that as countries trade in agricultural commodities, they are actually also importing and exporting water in a virtual sense.

In this globally increasing market, the MENA countries are at a great disadvantage when attempting to compete in the international food market. First, they do not have the resources to compete against the agricultural subsidies provided to farmers in the North. This means that their cost of production will always be greater than the international market prices. Second, their climatic conditions are not conducive to the large-scale production of temperate-zone crops, such as wheat. They will have to mobilize large volumes of water for irrigation, often at great economic, social and environmental cost.

Jordan as an example, imports about 5 to 7 billion cubic meter of virtual water per year. Due to the comparative scarce resources, Jordan imports products that require a lot of water in their production such as wheat and to some extent exports products or services that require less water so as to relieve the pressure on the nation's own water resources. Yet, Jordan allocates approximately 65 percent of its water for agricultural use.

As such, if Jordan, and similar MENA countries, was to reduce its water allocations to agriculture and its levels of support, the viability of a food import strategy may be negatively affected. Food prices would rise, resulting in fewer calories for the poor, and developing countries, like Jordan, may find it hard to raise the foreign currency to cover the cost of imports.

Currently, Jordan's foreign reserves amount to US 4.6 billion Dollars. With the lack of natural resources, oil and water, Jordan will be in a sensitive economic and political position to use a good portion its foreign currency to import all of its water intensive commodities in order to save domestic water resources.

There are other complexities, political and economic, that constraint the MENA countries from applying the concept of virtual water and in reallocating their water from agriculture to other sectors, most importantly the fact that in rural societies old farmer families are by tradition politically influential which will prohibit new policies for water allocation. Agriculture and rural life in village life have historically played central roles in the life, economy and culture of those people. Reallocating the water resources will make the farmers take a huge burden without any benefits especially when a large portion of those farmers use their land for their own food consumption which happens to be their only source of food supply.

Approximately 20 percent of MENA's population is employed in agriculture. Within this context, virtual water being used would force families to migrate to the cities in order to look for alternative income generating modules. This would be hindered by the fact that they are neither well educated nor skilled to compete with their peers in the labor market.

Another major factor that would constraint the effective implementation of the virtual water concept is the fear that importing food could pose the risk of further political dependence. The notion of "self sufficiency" has always been the pride of the MENA region, and therefore, any talks related to water scarcity is always politically sensitive.

Justifiably pricing would be subject to the policies dictated by the food producing countries – governed by their own advantage, countries on the other side of the span (the water importing countries) would be vulnerable, for instance, in the event that food producing countries cut subsidies to their farmers, potentially leading to significantly higher prices.

Likewise and from political and national security point of view, some food producing countries might build dams and control the international water sources and courses so as to utilize them to produce more Agricultural products, which in turn would leave less water for the neighboring countries that could be dependant on those rivers or water channels for their daily use. Such a situation will encourage regional conflict on shared water resources which is already an issue in the MENA countries.

In retrospect, some environmental damage can be foreseen upon adopting the concept of virtual water. More explicitly, by abandoning some rural agricultural land areas, then reallocating their water resources to the urban sites, would undoubtedly make the nation lose the sense of its green country side and therefore affecting the wild life, not discounting the effect this may have on oxygen/carbon dioxide level upon absence of the trees.

One crucial political factor that hinders the reallocation of water resources and the use of virtual water lies in the religious regulations for charging for water. According to the Holy Quran, *"if you find someone who needs water but is unable to reward or compensate you in any way, you must give them some for the sake of God's blessing and mercy,"* he says. Also according to Al-Bukhari, Prophet Mohammad's teachings, The Profit said: *"People are partners in three: Water, Herbs and Fire"* (referring to basic energy resources). Therefore, and because farmers are generally poor and rain water, rivers and lakes are like a gift from God, the MENA countries might find it difficult to charge the farmers the full cost for water.

With the assumption that there will be a doubling of the population in some of the MENA countries in 30 years time, with the additional population living mostly in the urban sector. Likewise, there will be a significant increase in per capita urban water consumption in such

countries, due to raised standards of living, which will result in at least a doubling if not more of the water demand in the urban sector.

Most importantly, it is worth mentioning that more than two-thirds of MENA's water goes to low-value agricultural crops, while higher value demands for urban consumers, industry and tourism go unmet. Furthermore, half of MENA's Municipal water supply is "lost" or unaccounted for somewhere in the nation's distribution network. As such, if there is no additional accessible water supply becoming available, then the only way to meet the rapidly growing urban demand would be through the reallocation of the high quality fresh portable water supplies, currently used in agriculture to the domestic urban sector.

But the solution does not lie in pushing farmers from their livelihoods by charging them for the water they use. Instead, the region should invest in more efficient irrigation systems, like drip irrigation in which perforated pipes installed just below the soil surface release small amounts of water directly to the crops' roots, a system which reduces evaporation and seepage. The challenge lies in finding the sufficient capital as in the case of MENA to finance such technological improvements.

The more logical solution for the MENA region would be to gradually transit into adopting the virtual water theory. For example, in the case of Jordan, the Jordan valley has a comparative advantage over the region due to its fertile land, warm temperatures and its suitable environment to grow crops at a relatively low cost rate. Therefore, in the case of Jordan, the Government should allocate its financial resources towards improving the Jordan Valley and introduce the farmers to the latest water saving strategies, high-value cropping patterns and equipment and planning. This way, the Jordan valley could still be productive, while the government gradually reallocates the water from the rest of the rural areas to the urban sector.

Moreover, the MENA's farmers should consider alternative options to improve irrigation efficiency, intensification possibilities, and yield enhancing alternatives in both irrigated and rain-fed agricultural production, as well as opportunities to produce less water-intensive crops

with high cash return values, such as palm trees that have a relatively high market value. The promotion of such options will make the political decision much acceptable.

It is time for the MENA region to realize the urgency to adopt and implement a long term plan and create new water policies to overcome the water scarcity problem with the underlying aim of changing the mindset of the young generation of farmers. The plan should be a well financed, well planned phased program of training and education of the younger farmers and of the farming sector to prepare them for more productive occupations in the commercial, trade, industry and tourism sectors of a modern economy as the years go by.

To make sure that virtual water is being traded fairly and securely, and to eliminate any sort of political conflicts in the MENA region, especially in regards to controlling the water resources and food prices, the United Nations is highly encouraged to endorse the virtual water theory, in the form of a UN resolution, as this will augment its credibility while guaranteeing the accurate, fair and effective virtual water trade between the world countries as well as to overcome any political or security concerns especially in the MENA region.

With the support of the donor community, the MENA region should also form a World Water Fund. The WWF will be able to assist arid countries who are in the transition stage that cannot yet generate enough foreign currency to purchase all their food product needs through virtual water trading and at market prices. This would ensure the basic adequate food supplies for such arid countries.

Most importantly, the mindset of not only the local community, but also the society at large; the media and the academia, in order to promote the effective implementation, social acceptance and political support to this vital theory, more workshops, seminars and awareness campaigns are needed, especially in the MENA and Southern Africa region.