GROUND WATER

Editorial

Virtual Water: A Strategic Resource
Global Solutions to Regional Deficits

by J.A. Allan[a]

Is there a water deficit in the MENA economies:
Accessing global soil moisture as traded virtual water?

Water is very short
The hydrologist insists
Short for whom?
Ask the knowing economists
For they detect virtual water
In food embedded
And wondrous subsidies
For importers added

Because the population too fast grows
The answer to the question posed—
Is "Yes, there's a regional deficit"
But for the water stressed
A solution also does exist
Through trading to "entitlement."

—J.A. Allan, 1997

Defining Water Deficits

Water deficits can be experienced by individuals, by communities, by national political economies, and by major regions. Today, the Middle East /North Africa (MENA) region is extremely water deficient. Water demand began to exceed supply in the early 1970s for the region. Some countries in the region have faced deficits since the 1950s.

An individual is short of water if he or she cannot access one cubic meter of high quality water for drinking each year. For domestic purposes, the amount needed depends on the type of economy in which the individual lives. In poor, rural Africa, the individual can make do with less than four cubic meters per year; in the industrialized north, an individual uses about 100 cubic meters per year. These waters are, however, small in volume. Compared to the volume of water he or she drinks, an individual needs about 1000 times more water to raise the food he consumes.

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Water for food production, by nature of its volume, is the strategic water in any economy. Water in soil profiles usually occurs naturally as the result of rainfall infiltrating the soil profiles of cultivable tracts. Less than 10% of an individual's, and concomitantly of a national economy's water, is devoted to drinking and domestic use. More than 90% is devoted to food production.

The demand for water in an economy is directly related to two factors. First, water demand is driven by demographic trends. Secondly, it is driven by trends in the patterns of food consumption. Political economies that are doubling their population in 25 to 30 years double their water demands at the same rate. Should the patterns of food consumption change further (for example, if people consumed more meat), then the demand for water will proportionately increase. It requires about 16 times as much water to produce a kilo of meat as to produce a kilo of wheat.

The Water-Food Nexus

Some notion of the relationship between water and food—the water-food nexus—can be grasped from the following relationship: to produce one tonne of grain, you need 1000 tonnes (cubic meters) of water. Should an individual run out of water, it would be much easier to access one tonne of grain than the 1000 tonnes of water required to produce it. Effective and efficient international trading systems for grain have operated for more than 2000 years.

Water embedded in commodities such as grain is known as "virtual water" (Allan 1996).

International trade moves the "virtual water" from comparatively advantaged regions, where there is a surplus of soil water in soil profiles, to comparatively disadvantaged regions such as the MENA region, where water is scarce. The U.S. Department of Agriculture and the European Community export to the MENA region as much water as flows down the Nile into Egypt for agriculture each year. The volume is more than 40 billion tonnes (cubic kilometers), embedded in 40 million tonnes of grain.

Strategic Waters and Politics

Virtual water has a number of advantages apart from the strategic one of solving the current and growing water problem of the region. The main political advantage for the politicians leading the MENA economies is that the solution is silent and therefore not politically controversial. Movements of virtual water have a low economic and political profile during the current unavoidable transition to increasing the MENA water deficit. The low profiles have major political and economic significance.

First, virtual water is crucial politically, because it enables the political leaderships to avoid confronting the water deficit. Virtual water provides a political solution at the same time as solving an economic problem. Water is politically strategic because the people of the region have had sufficient water, despite occasional droughts, to meet their needs for all of recorded history. The MENA nations believe there will be sufficient water in the future. For a leader to contradict these deeply held beliefs would be tantamount to admitting unfitness to govern. The availability of a totally effective but nonevident solution in the form of virtual water could not be more timely.

Secondly, the virtual water embedded in grain is being traded at less than its production cost. The (constant) price of cereals has fallen on the world market for about a century. The price spiked in 1996 to $240 per tonne but fell back to $140 per tonne by May 1997. The cost of producing a tonne of wheat is about $200. Those economies that import grain are getting a subsidized bargain. Water-deficient economies receive a double benefit through accessing embedded virtual water at an incalculably advantageous price.

Thirdly, virtual water prevents water crises from becoming water wars. There is no need to resort to lethally expensive armed conflict when the remedy to a water deficit is so easily gained by importing wonderfully subsidized grain with inexpensive embedded water.

Will Global Water Meet MENA Needs?

The political economy of water in the deficient MENA region is subordinate to the political economy of the global trade in cereals. This last is in turn subordinate to the global fresh water hydrology system, a physical system that is notoriously difficult to monitor and define.

To determine the volumes of soil water in the global hydrological system with sufficient precision and regional texture would cost at least a billion dollars. No sponsor is likely to offer such resources to test the Malthusian assumption that the world's population will run out of water.

Global water sufficiency also depends on the two socioeconomic factors already mentioned. Population increases in and beyond the MENA economies determine water demand, as will the types of food preferred and consumed. Those wishing to argue that there is some inevitable water doomsday must examine the population growth scenarios and look at the possible differences of water demand which might arise from the consumption of food with low or high water content. Both of these trends are susceptible to social policy interventions rather than to water engineering or even economically sound water allocation.

Whether the world runs out of water or not depends on the pace at which socioeconomic development impacts communities in nonindustrialized economies, first to reduce population growth and second to influence patterns of food consumption to reduce water-intensive food consumption.

Reference

Allan, J.A. 1996. Policy responses to the closure of water resources. In *Water Policy: Allocation and Management in Practice,* ed. P. Howsam and R. Carter. London: Chapman and Hall.