Photo: Jan Lundqvist, SIWI

Feeding Everyone: A Case for Water Governance Reform

"If we continue to go on with business as usual in the agricultural water sector, we will not have enough water to feed the expected 9 billion people on the planet in 2050".

This is the assertion of 700 scientists and water professionals who contributed to the authoritative 2007 publication "The Comprehensive Assessment of Water Management in Agriculture". The 2008 food crisis has since thrust food security to the fore. World food reserves dropped significantly and millions were thrown further into poverty because of steep hikes in food prices. This crisis is likely to be replayed in future years with increasing frequency as populations rise and both climate and market forces shift more suddenly and violently.

It seems too obvious to mention: without sufficient water we can not meet food security targets. Many people in India and China already threatened by water scarcity are acutely aware of the scale of the problem. Unfortunately, this knowledge does not seem to have permeated into the agricultural aid donor community. Despite widespread promotion of integrated water resources management and a holistic approach to all water issues from the scientific and professional communities, many donor countries still perceive water supply and sanitation as separate from agricultural water within donor agencies and developing country governments alike. As they focus water-related aid on water supply and sanitation, agricultural water is often ignored.

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The thirstiest sector in a hungrier world

As a rule of thumb, many countries with agriculturally based economies utilise about 70-80 percent of their developed water resources in irrigated agriculture. As populations urbanise and economies transform, increasing demand for water comes from competing sectors of the economy: growing urban centres, bioenergy production, and higher demand for water intensive foods (e.g meat and dairy products) from growing and richer populations in the developing world. While the demand rises, water supplies may diminish due to climate change. Agriculture may have to produce almost twice as much food and animal feed from a smaller share of water. Instead of using 70-80 percent share of the water, it may be left with a 60-70 percent share. Yet, there is little evidence of new investment in the agricultural water infrastructure and improved rainfed water productivity needed to ensure that this can actually be achieved.

To deliver more food and feed from less water across the developing world is possible. But it will require the kind of sustained annual increases in productivity seen in many western countries over the last 50 years. The green revolution underpinned similar gains in the 1960s and 1970s in much of Asia and Latin America, but passed Africa by. Plant scientists advocate that advances in biotechnology can bring about the required improvements in productivity and increased tolerance to drought, insect attack and weed competition. They claim this can

be done with and without the use of genetically modified organisms.

This is highly likely, but it will require a lot of water to deliver on these promises. Assuming that it requires one litre of water to produce one calorie of food (and taking into account crop/water productivity gains, post-production losses and food wastage) feeding 2.5 billion more mouths 2,500 calories per day will require between 2,500 and 6,000 cubic kilometers of additional water that will be evapotranspirated each year.

It is inevitable that more land and water will have to be used in production. Unless we can learn how to grow more food more productively than at present, the environmental consequences may be catastrophic. The challenging question here is whether rainfed agriculture can be significantly expanded and its productivity dramatically increased. Greater and improved use of water harvesting and supplementary irrigation may be part of a solution to reduce the need for increased water use for irrigation.

The hard part

Technological and engineering solutions to double food and feed production are the easier part of the equation to solve. Overcoming the social, economic and sometimes environmental impediments and obtaining the needed financial investment is the hard part. Institutional and governance arrangements often were designed in the middle of the last century based on inappropriate colonial models where water was viewed as an infinite resource.

Even if they are renewable, water resources are finite. A new governance paradigm is needed to meet the challenge of feeding growing populations (Figure 1).

If the challenge to feed more with less was not great enough, the shift from planned and regulated (albeit inadequately) surface irrigation systems to anarchic pump-based irrigation systems based predominantly on groundwater that has occurred in South and East Asia threaten to literally dig us into a deeper water hole. The inability of governments to regulate water use in such systems can create the scary scenarios of groundwater overdraft and exhaustion. These can in turn lead to regional food crises and social disruption.

Open Basins	Closed Basins
Exploiting water resources	Managing Demand
New allocations	Reallocating water
Who is included and excluded	Safeguarding right to water
Developing groundwater	Regulating groundwater
Instutions for single sectors	Institutional frameworks able to deal with cross sectoral issues
Within system conflicts	Cross sectoral conflicts

Figure 1. Changes in water resource governance expected as basins move from open to closed

More crop per drop: Incentives needed

Governments lack incentives to implement the reforms necessary to ensure more productive and equitable use of water. Fear of potential political repercussions for those who push reform permeate the water and agricultural sectors from top to bottom.

To develop incentives and support for reform, water has to be seen as something that can be valued, and ultimately priced. It can not continue to be treated as a "free" good. This does not mean that the human right to water is overlooked in the process. Few would argue against access to clean

Photo: Griszka Niewiadomski/SXC

Many countries with agriculturally based economies utilise about 70-80 percent of their developed water resources in irrigated agriculture.

water for drinking and sanitation being a fundamental human right that must be protected in any wholesale change to the way water is governed and managed. However, this human right accounts for a very modest amount of total water use. The rest, probably about 90 percent, goes to beneficial uses and the environment. The biggest beneficiary is clearly agriculture.

Measures that governments can take to drive up agricultural water productivity are non-existent in many countries. Clearly the first measure has to be the development of effective water allocation policies, which can be used to reduce allocation as the total pool shrinks or when demands for water resources from other sectors increase. However, allocation policies depend on good water availability measurements, historical data and models and defined water rights. Reduced allocations must be accompanied by support mechanisms for farmers that can improve on-farm efficiency. Currently, if a farmer invests in improving productivity, he or she can keep the water saved and use it to increase the area irrigated. While this may increase food production, it does not solve the problem of reallocation of water to other economic sectors, or to the environment. A real challenge here is to try and develop incentives that link broader society to farmers and lead to broader society paying farmers for the improved environmental services and other benefits that result from improved on-farm water savings.

"A new governance paradigm is needed to meet the challenge of feeding growing populations."

Rising to the challenge

In the search for improved governance, we must examine the potential solutions that have been and are currently being developed. In parts of Australia and several other countries, a series of mechanisms are used to regulate water use and allocation that depend on seasonal available supply. In the Murray-Darling Basin of Australia, a new system of separation of water and land rights, water trading and water pricing based on supply and demand, has evolved through a combination of market and political forces. The result: water is traded from low to high value uses, which can potentially allow for a market mechanism for trade out of agriculture into urban areas. It is a model worth exploring elsewhere. So long as individual water rights and allocations can be defined, it provides farmers with opportunities and incentives to sell temporarily or permanently. It also gives governments the opportunity to buy out system tail-end users, improve overall system efficiency and to buy water for environmental flow purposes.

Water scarcity is an increasingly urgent challenge to the developing world. It can be combated, but it needs politicians and policy makers to develop some enthusiasm for reforming the water sector. Developing appropriate market-based and other incentives is vital to reform in the water sector. Better definition of water rights and better measurement of water are needed to even contemplate better systems for valuation, pricing, and trade. Without these improvements, there will be few incentives to improve productivity, whether by the use of economic or regulatory instruments.

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Photo: Mats Lannerstad

Further Reading

Comprehensive Assessment of Water Management in Agriculture. 2007. Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture. London: Earthscan, and Colombo: International Water Management Institute.

Shah, Tushaar. 2009. Taming the Anarchy: Groundwater governance in South Asia. Washington DC: Resources for the Future, and Colombo: International Water Management Institute.