

## WATER MANAGEMENT AND AGRICULTURAL TRADE

BY: THE WATER FOR FOOD TEAM

Within two decades, one-third of the world population will live in countries afflicted by water scarcity. In some areas, part of the increased demand may be met through investments in irrigation and water supply systems and in nontraditional sources of supply. In other areas, such as the arid Middle East and North Africa region, the economic and environmental costs of developing water resources constrain expansion of supply. There, development of water supplies will not meet growing demands. There will be a push for investments in water policy and water management reforms that increase the water use efficiency of existing systems. However, even with substantial increases in the efficiency and productivity of water use, many countries will not have enough water to satisfy minimum water requirements for domestic uses and at the same time meet industrial, environmental, and agricultural demands for water. Since agriculture consumes by far the largest percentage of water, most countries will take water from agriculture, allocate it to other sectors, and rely on increased food imports to meet their domestic needs.

Hence, agricultural trade is linked to food security and to water management. Declining water availability in some regions may be offset by openness of agricultural markets. Indeed, global trade liberalization by developed and developing countries would encourage water-scarce countries to expand imports of agricultural water-

intense products (such as cereals), consequently ensuring them food security, and to pay for these imports with exports of less water-intensive, higher value added cultivations (such as horticultural products). Likewise, water-rich regions could grow water-intensive products (such as rice and cereals) and sell them to water-scarce countries. This would lead to an increased economic efficiency in the agricultural sector worldwide. This is often referred to as "trade in virtual water."


More open trade in agriculture smoothes out the bumps in the market, rather than aggravating them, as many believe. More open trade allows food to move from places where it is in surplus to deficit areas and enhances the capacity of deficit regions to feed themselves.<sup>1</sup>

### POTENTIAL AREAS FOR INVESTMENT

The linkages between agricultural trade, water, and food security have important implications for agricultural development and water resources management strategies. The issues are broad and complex and do not readily translate into investments. As water becomes increasingly scarce, more investment resources are allocated to augmenting supply. These investments (for instance in groundwater mining, desalinization, irrigation scheme expansion, and transport of water through long pipelines) are less productive than others, both at the national and at the household level. They also have negative environmental implications.

Trade will reduce this rising tide of allocative inefficiency by switching incentives to less water-intensive crops in water-short countries and by directing increasingly costly investments to more cost-effective uses within the same sector. This reduction presupposes an environment that enables rising public and private investment to switch from older water-intensive technologies to new knowledge-intensive ones. Such a switch will be helped by building new research and development (R&D) in skill-intensive responses in research and extension capacities, farming skills, infrastructure to develop alternative crops, water manage-





ment techniques, marketing and supply enhancement, and agro-processing. It entails shifting to a market-based agriculture that is more water and resource efficient and that can therefore grow and absorb labor.

**AGRICULTURAL PRODUCTIVITY.** Meeting national and global food security needs will require significant increases in water productivity. Key areas of investment will include the following:

- Agricultural R&D (crop breeding for drought and salinity resistance)
- Rainfed agriculture
- Crop diversification and creation of an enabling environment for high-value agriculture
- Agricultural risk management

**WATER RESOURCES MANAGEMENT.** Enhancing water conservation in agriculture is already imperative in many countries to meet demands from increasing urbanization and other sectors. Water resources development will continue to be important in some regions (such as Africa) but in other regions, increasing water use efficiency at the field and basin levels will be critical to moving water to high-value uses. Key recommendations include:

- Modernizing irrigation systems
- Inducing investment through public-private sharing
- Institutional and policy reforms
- Promoting Integrated Water Resources Management (IWRM)

**TRADE FACILITATION.** Trade facilitation will be important for countries that need to increase their competitiveness, as well as for water scarce regions that need to ensure food security. This “behind-the-border agenda” includes anything from institutional and regulatory reform to improving customs and port efficiency. It is intricate and costly to implement. The World Bank attaches great importance to trade facilitation—as reflected by its portfolio of 80 active projects totaling US\$4.6 billion. Box 1 offers a sample of Bank-financed projects for trade development in agriculture.

## POTENTIAL BENEFITS OF REFORM

Improved water management practices and trade in “virtual water” can help alleviate water scarcity, release water for more efficient uses, increase productivity, and ultimately reduce food prices for consumers. Investments in these areas can therefore drive growth and poverty reduction, both directly and indirectly—because they may reduce food costs and supply uncertainties, improve the diets of the rural and urban poor, raise and diversify incomes, provide employment and entrepreneurial opportunities both inside and outside cities, and induce small-holder farmers’ productivity gains, which would increase their opportunities for wealth creation and better integrate them into local, national, and international markets.

## POLICY AND IMPLEMENTATION ISSUES

**AGRICULTURAL PRODUCTIVITY.** Some of the core areas to be addressed for increased water productivity are integrated farm resources management and agricultural research and extension.

Agricultural research shows that significant and sustainable improvements in water productivity are attainable only through integrated farm resources management. Water use-efficient on-farm techniques coupled with improved irrigation management options—such as supplemental irrigation, deficit irrigation, and water harvesting; better crop selection and appropriate cultural practices; improved genetic make-up; and timely socioeconomic interventions—can help achieve this objective.

Scientific research has allowed global food supplies to outpace increases in demand. Evidence from China and India shows that public expenditures on agricultural research and extension have the largest impact of all possible rural investments on growth in agricultural productivity and generate large benefits for the rural poor. However, investment in research usually pays dividends only years, if not decades, after the decision. Some important research areas include crop breeding to improve adaptation to moisture and temperature stress, and promotion of effective risk management.

### Box 1: Trade-Related Lending

The two largest categories of World Bank trade-related lending in 2002 were loans for (1) export development (such as the Foreign Investment and Export Facilitation Project in Armenia) and competitiveness, and (2) trade financing. In Mauritania, the Bank will provide support through livestock and agricultural competitiveness projects (that address standards issues) as well as port modernization and airfreight projects to expedite trade. In addition, the Bank participated in the Standards and Trade Development Facility, an interagency partnership with the World Trade Organization, Food and Agriculture Organization, and World Health Organization, which will deliver technical assistance for food safety and related standards.

Source: Tang 2003.



A necessary complement to scientific research for increased food production is the development of a market for the additional products and/or quantities, to ensure that increased productivity is translated into increased income for farmers. Hence, agricultural trade is fundamental in ensuring the dividends of research. Moreover, enhanced investment in education, training, and rural infrastructure to improve the adaptive ability of farmers and the rural economy generally is of paramount importance in complementing agricultural research and extension.

**WATER RESOURCES MANAGEMENT.** In most regions, only new conservation efforts, and new policies promoting it, can send the signal that water is scarce. The appropriate combination of investments in hardware and in policy reforms varies. Water policy reforms should balance improved management at the river-basin level with decentralization to the private sector or community-based user groups at the subbasin level. The policies needed to improve water management include making resource allocation in agriculture more flexible by removing subsidies and taxes that distort incentives and encourage misuse of resources, as well as by establishing secure property rights in land and water.

**TRADE FACILITATION.** The greatest benefits from agricultural trade will come from a tandem of reduced policy distortions in domestic markets coupled with increased access to the developed countries' market. This will also necessitate reforms in marketing and market organization. Box 2 presents an example of how Mali has successfully exported mangoes to Europe, displacing traditional exporters such as India, Israel, and Brazil.

Trade facilitation may, on the other hand, pose new challenges. Meeting these challenges will involve, among other things, creating a framework that encourages the private sector to offer risk management tools such as microfinance and insurance. Modernization of agriculture may well require joint and collaborative efforts with the International Finance Corporation (IFC), specifically with regard to industry and sector competitiveness assessments; design and support of schemes that allow the integration of smallholder farmers into commercial supply chains; and the development of market-based-financing and risk management instruments in selected countries.

Trade liberalization is likely to have impacts on the environment and poverty intermediated through its effects on water demand.<sup>11</sup>

## LESSONS LEARNED

The social and political implications of food security and trade cannot be overstressed. Visible and effective opposition to global trade and investment liberalization from civil society has mushroomed from Seattle (1999) to Prague (2000) and Genoa

(2001). Perceptions of national interest in food self-sufficiency too often lead governments to hoard food stocks, artificially encourage production, and limit imports. Even where the international market offers an alternative source of food, the idea of dependence on external sources is anathema to many policy makers and their constituents in the North and South. Food self-reliance and independence from foreign interference, even at demonstrably higher costs to the nations involved, are popular forms of nationalism (Runge, et al. 2003). However, these attitudes are gradually giving way to the more enlightened view that food insecurity is a problem caused mainly by poverty and the consequent inability of the poor to buy food, not by insufficient national production. It follows that insecurity is increased by tariff and nontariff barriers to food imports and therefore cannot be resolved without an effective poverty reduction strategy.

The distributional consequences of global agricultural trade liberalization are complex and country specific. Managing the transition politically, economically, and socially is the main challenge.

### Box 2: Linking Farmers to Markets: Exporting Malian Mangoes to Europe

In Mali, a pilot project to export fresh mangoes to Europe put in place an efficient supply chain managed by a not-for-profit marketing agency and private business investors through the Agricultural Trading and Processing Promotion Pilot project (PAVCOPA-Projet d'Appui à la Valorisation et Commercialisation des Produits Agricoles—Cr. 2737 [US\$6 million]). Upstream, the pilot helped producers improve their production and their knowledge of the marketing channels. Downstream, it established a partnership with an export company and improved export logistics. One innovation was setting up a multimodal shipping system directly linking the Malian production center to the North European customer market; and coordinating efficiently the entire supply chain. The returns to the producers make this successful pilot a good example of how to connect farmers to ready markets, promote private investment in rural areas, and further promote multiple and cross-border partnerships, while supporting diversification and improving export logistics. Moreover, the pilot demonstrates that investments can be profitable, and that constraints to marketing and export of agricultural products can be overcome with creative, adaptive, and professional approaches.

Source: Danielou, Labaste, and Voisard 2003.

## POSSIBLE WORLD BANK INVOLVEMENT AND INVESTMENT OPPORTUNITIES

The World Bank has a variety of instruments, each of which is best suited to achieve goals related to agriculture and water.

### Agricultural productivity

- The range of investments for agricultural productivity include policy, technical, and management reforms. It is important for investments to support agricultural competitiveness, diversification and technology, planning, and feasibility studies, as well as create agricultural strategies and agricultural water strategies and improve market organization.
- Development Policy Lending (DPL) and Sector-Wide Approaches (SWAPs) can be useful for supporting agricultural reform in the areas of policy and planning.
- The more narrowly defined Specific-Investment Loans (SILs) work well for investing in methods to increase rainfed production, such as crop-breeding research; inexpensive, gender-sensitive, and pro-poor technologies; and enhanced management strategies. SILs are also useful for supporting investments in areas like infrastructure (roads, energy, water, communications) and other investments that aid in the vertical integration of agriculture into processing and local industry.
- Finally, innovative investments such as weather-based insurance contracts, can be best supported through Learning and Innovation Loans (LILs).
- Moving forward, it will be important to improve collaboration between the Bank and the IFC, the private sector arm of the World Bank Group, on issues such as competitiveness assessments; integrating smallholder farmers into commercial supply chains; and supporting market-based financing and risk management instruments in selected countries.

### Water resources management

- In water resources management, the Bank's Adaptable Program Loans (APLs) are suitable tools for supporting irrigated agriculture where a first phase can focus on feasibility analysis; a second phase can deal with construction, supervision of construction, and start-up; and a third phase can han-

dle agricultural development and technical support, including agricultural credit programs. This phasing will avoid the tendency of borrowers to emphasize the construction of infrastructure and to divert funding from later phases, such as technical assistance and agricultural development, to meet overruns for that infrastructure.

- APLs, Development Policy Loans, and SWAPs are useful instruments for helping to promote a policy environment for adopting water conservation through pricing, modern technologies, and the improvement of water quality.
- The need to compress rehabilitation costs and develop asset management strategies will increasingly drive investments in irrigation systems. The emphasis will continue to focus on selective rehabilitation to enhance the life of existing hydraulic infrastructure, and the SILs work well for this goal. Innovative approaches, like water trading and water rights (as in Chile and Indonesia) can be supported through LILs.

Finally, on *trade facilitation*, investments using, among others, tools, technical assistance, and other types of loans are recommended.

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<sup>i</sup> In an analysis of the impacts of a "pro-poor agreement" (When rich countries cut tariff peaks to 10 percent in agriculture and 5 percent in manufacturing, reciprocated by developing countries' cuts to 15 and 10 percent.) in trade implemented progressively through 2010, the World Bank's *Global Economic Prospects 2004* report indicates that by 2015 likely gains will be on the order of US\$350 billion for developing countries and US\$170 billion for rich countries (World Bank 2004).

<sup>ii</sup> A World Wildlife Fund—World Bank program (World Wildlife Fund 2004) would contribute to the international development community's understanding of the economic, social, and environmental impacts of trade liberalization.

This Note was prepared by Shobha Shetty, a Senior Economist at the World Bank, and updated by Salah Darghouth and Ariel Dinar from the Water For Food Team of the World Bank. It is based on Investment Note 1.3 in the larger volume *Shaping the Future of Water for Agriculture: A Sourcebook for Investment in Agricultural Water Management*. The book documents a range of solutions and good practices from World Bank and worldwide experience, concentrating on investments in policy and institutional reforms in technology and management to improve water productivity and farming profitability. You can download a copy of the full report at [www.worldbank.org/rural](http://www.worldbank.org/rural) or email [ard@worldbank.org](mailto:ard@worldbank.org).

