IWMI International Water Management Institute BRIEF SERIES

WATER ISSUE BRIEF

ISSUE 8 2010

Putting Research Knowledge into Action

1 Water, poverty and equity

Nations need to find ways to deliver food security across regions facing water scarcity and ensure that poor farmers who underpin global food production are resilient enough to cope with future challenges.

At basin, watershed, farm and field scales, researchers aim to reduce poverty by improving water management practices to help poor farmers improve productivity and move beyond subsistence-level farming.

Key messages

- Revitalizing irrigation through new investment and new management methods is vital to meeting future food, fiber and fuel demands.
- Managing water resources effectively is known to increase rural wealth and well-being.
- Multiple-use water systems are particularly effective in reducing poverty in peri-urban and rural areas of low- and middle-income countries.
- The role of virtual water trade in global water use is modest.
- Gender is an important consideration when planning water management systems.

The context

The world's population is set to exceed nine billion by 2050, adding a third more inhabitants to the planet than today. Feeding them, taking into consideration increasing demand for diets based on fruit, vegetables and meat, will require farmers to double food production. However, with much of the land suitable for agriculture already in use, and increasing competition for agricultural water supplies from cities, industry and environmental needs, they face the challenge of increasing food production without greatly expanding farmland or increasing water use. Added pressure is likely to come from shifts in rainfall patterns as a result of human-induced climate change. Nations need to find ways to deliver food security across regions facing water scarcity and ensure that poor farmers who underpin global food production are resilient enough to cope with future challenges.

IWMI's position on water, poverty and equity

IWMI researchers work on a range of scales to address issues of water, poverty and equity. On a global scale, the aim of the research is to increase food security by helping farmers to grow more food with less water. At basin, watershed, farm and field scales, researchers aim to reduce poverty by improving water management practices to help poor farmers improve productivity and move beyond subsistence-level farming. The methods IWMI employs to increase food security range from improving the management of existing irrigation systems to understanding what happens to water resources for food production when competition arises from new crops such as biofuels, and increasing

productivity in regions that suffer from physical water scarcity. These methods include the introduction of pro-poor technologies, gathering evidence to support more equitable allocation of water and rights for marginalized groups, providing water sector investment advice for poverty reduction, and promoting multiple-use water systems, in which water is used more efficiently by combining previously separate functions such as farming and fishing.

Actions needed

Ensuring food security

IWMI's long-standing experience and extensive academic resources give it the capability to analyze water management issues at regional or global scales. Lately, trade in virtual water has been increasingly proposed as a means to mitigate local and regional water shortages. This involves water-scarce regions of the world reducing their reliance on stretched local supplies by importing food grown in places with abundant water resources. The water used to produce such traded agricultural commodities is known as 'virtual water'. However, a recent report by IWMI found that the role of virtual water trade in global water use is modest. In 1995, global crop water use would have been higher by just 6% and irrigation depletion by 11% without cereal trade. It concluded that, while potential savings may seem large, political and economic considerations are likely to limit the potential of trade as a policy tool to mitigate water scarcity.

An example of IWMI's regional-scale guidance in food security matters is given in the report, *Revitalizing Asia's Irrigation: To sustainably meet tomorrow's food needs*. Asia is forecast to have 1.5 billion more people to feed by 2050 and food demand is expected to double. The continent contains 70% of the world's irrigated area but many of its large-scale schemes were designed to deliver water solely for rice production. As more people become wealthier and move to cities, they are opting to eat more fruit and vegetables, demanding that farmers grow a wider range of crops. Being supply-driven, existing irrigation systems are performing below par and farmers are resorting to sourcing their own water supplies by pumping groundwater. The report assessed changing food trends and current irrigation methods, and recommended five strategies for reinvigorating irrigation across Asia in the coming decades to meet changing farming methods and future food demands.

Reducing poverty

Managing water resources effectively has long been known to increase rural wealth. During the Green Revolution of the 1960s and 1970s, irrigation was a key factor in unlocking Asia's agricultural potential and reducing poverty. Between 1961 and 2002, the irrigated area almost doubled, as governments sought to stave off famine. Cereal production rose rapidly; for example, in South Asia, it increased by 137% from 1970 to 2007 using only 3% more land. Meanwhile, rural poverty in intensively irrigated areas, such as the states of Punjab and Haryana in India, became much lower than in predominantly rain-fed states, such as Orissa and Madhya Pradesh. Today, IWMI's mission is to improve the management of land and water resources for food, livelihoods and the environment. Many of its projects, therefore, are aimed at showing how effective water management can also reduce poverty.

In 1997, IWMI scientists worked on a project funded by the Japan Bank for International Cooperation (JBIC) to upgrade and extend the irrigation system on the Walawe Left Bank, Sri Lanka. A study conducted in

Women collecting *Kekatiya* plants for consumption. *Kekatiya* plants are found growing abundantly in irrigational tanks of Sri Lanka (*Photo credit*: Nico Sepe, IWMI).

Lake Chilwa is one of the most productive lakes in Africa, supporting livelihoods through many ecosystem services (*Photo credit*: Lisa-Maria Rebelo, IWMI).

2000 and 2002 assessed the impact this development had on poverty. In 2005, irrigation was extended to a further area. An additional analysis of the whole area was carried out in 2007 and 2008. The study found that access to irrigation provided families with opportunities to diversify their livelihood activities and thereby potentially increase their incomes. For example, those with land were able to reliably grow rice or vegetables instead of working as agricultural laborers or relying on rain-fed cultivation. Those without land could benefit by working within new inland fisheries. Within the extension area, poverty levels declined between 2002 and 2007. Within the project's control area, 57% of households were below the poverty level in 2002, compared with 43% in 2007. Lessons from this work have been used to inform future investments in poverty reduction.

How irrigation systems are planned and installed can greatly influence their ability to reduce poverty. Often, a drinking water provider will install supplies for consumption by villagers and an irrigation department will provide resources for farming, but no attempt will be made to link the two. However, if water management systems are planned to allow for multiple uses, they can be much more productive. Such multiple-use water systems (MUS) are particularly effective in peri-urban and rural areas of low- and middle-income countries, where water is needed for a wide variety of uses, including watering livestock, horticulture, growing trees, irrigating crops, supporting fisheries, making pottery and bricks, butchery, washing cars and ceremonial purposes.

IWMI, International Water and Sanitation Centre (IRC) and International Development Enterprises (IDE) carried out the project, *Models for implementing multiple-use water supply systems for enhanced land and water productivity, rural livelihoods and gender equity*, in eight countries between 2004 and 2009. The aim of this project was to encourage sectors to work together and to identify, test, study and scale-up opportunities for multiple-user water management systems. The study created a 'multiple-use water ladder' to show the links between a given level of access to water and the uses and livelihoods that can be achieved from it. The ladder set 20 liters per capita per day (lpcd) around homesteads as being sufficient for basic domestic use, 20-50 lpcd for a basic MUS, 50-100 lpcd for an intermediate MUS and more than 100 lpcd for a high-level MUS. It found that when people moved from having access to a basic quota of water to intermediate MUS level, their productive output increased sufficiently to pay for the associated investment and operational costs within three years.

Understanding smallholder farming systems

IWMI is now embarking on a project to map the gendered divisions in smallholder farming systems across parts of the developing world. This mapping exercise will shed light on the largest production areas of smallholder farming to inform governments and development agencies of the characteristics of how farms are run. Gender is an important consideration when planning water management systems in developing nations. Women have different roles than men; and female villagers might manage fruit trees, while men manage crops in the fields. If a government or development organization comes to install an irrigation system and cuts down the trees, they inadvertently dispossess women of their livelihood. Also, if they only ask the headman of the village for advice on water requirements, their actions may inadvertently disadvantage the livelihood activities of women. By understanding the characteristics of smallholder farms, interventions to help support farmers can be structured to take into consideration the division of farming activities between men and women, farming preferences and other unique features.

Source

This Water Issue Brief is based on the following publication:

van Koppen, B.; Giordano, M.; Butterworth, J. (eds). 2007. *Community-based water law and water resource management reform in developing countries*. Wallingford, UK: CABI. 280p. (Comprehensive Assessment of Water Management in Agriculture Series 5).

Related IWMI publications

Open access (electronic version freely accessible via the internet)

Hussain, I.; Perera, L. R. 2004. *Improving agricultural productivity for poverty alleviation through integrated service provision with public-private sector partnerships: examples and issues*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 31p. (IWMI Working Paper 066).

Upadhyay, B. 2003. *Poverty, gender, and water issues in irrigated agriculture and irrigation institutions: mainstreaming gender in water resources management*. Gujarat, India: IWMI-TATA Water Policy Program. 5p. (Water Policy Research Highlight 4).

van Koppen, B.; Parthasarathy, R.; Safiliou, C. 2002. *Poverty dimensions of irrigation management transfer in large-scale canal irrigation in Andhra Pradesh and Gujarat, India*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 31p. (IWMI Research Report 061).

Weligamage, P.; Godaliyadda, G. G. A.; Jinapala, K. (eds.). 2010. *Proceedings of the National Conference on Water, Food Security and Climate Change in Sri Lanka, BMICH, Colombo, Sri Lanka, 9-11 June 2009. Vol. 1. Irrigation for food security*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 60p.

Citation:
International Water Management Institute (IWMI). 2010. *Water, poverty and equity*. Colombo, Sri Lanka: International Water Management Institute (IWMI). 4p. (IWMI Water Issue Brief 8). doi: 10.5337/2010.221

Keywords: water resource management / food security / poverty / farming systems / irrigation systems / gender

Content Contributors: Mark Giordano, Theme Leader - Water and Society; Carolyn Fry, Writer

Credits: Managing *Editor*: Terry Clayton; *Editing*: Mahen Chandrasoma; *Layout*: Nimal Attanayake

IWMI International Water Management Institute

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Comments and questions are welcome. Please contact us at: IWMI-Publications@cgiar.org
Publications Unit, International Water Management Institute, PO Box 2075, Colombo, Sri Lanka
Tel: +94 11 2880000 Fax: +94 11 2786854

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