

water

Communicating international development research

2005

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Protecting forests can improve water management

Forests play an important role in the water cycle; they stimulate rainfall, protect soils from erosion and regulate the flow of water. It is therefore important to preserve forests for water management.

Previous efforts to protect forests in Ecuador have relied on controlling land use and excluding local people. These methods often have limited success, because of problems such as corruption and a lack of law enforcement. A new approach is to pay people to protect the forests. People who benefit from the services the forests provide – such as clean water – make payments to those who look after the forests.

Ecuador has the second fastest deforestation rate in South America, because of logging, agriculture and cattle ranging. There is plenty of legislation to prevent this, but it is hard to enforce these laws. Deforestation causes serious soil erosion, leading to large quantities of sediment entering the rivers. In the dry season, this can dramatically reduce water levels. These changes in highland forests may affect the flow of water in rivers as far away as the Amazon basin in Brazil and the Ecuadorian Pacific Coast.

Two different areas of the country have been experimenting with payment for environmental services. In Pimampiro in the Andes Mountains, landowners are being paid to protect a forested area in the upper part of the river. In Cuenca, Ecuador's third largest city, the municipal water company has been buying land and working with communities to reforest and manage their natural resources more sustainably, as well as controlling industrial and domestic wastewaters. The city is evaluating the possibility of paying landowners not to deforest in a watershed where a new drinking water plant will be established.

The research shows that:

- The benefits from these forest protection measures are assumed, and there is limited data available to support these claims.
- Buyers and sellers have little information about the benefits and it is difficult to make decisions as to how much money the watershed services are worth.

- The focus of payment mechanisms so far has been on drinking water and hydropower generation because their economic value is clearly recognised. However agricultural use is the main and most inefficient use of water. Irrigators should be brought into payment systems, through schemes such as property tax, which could be based on the crops' water consumption.

Protecting forests to support water management has many benefits, but it is a complex challenge. However, in situations

where payments encourage greater responsibility over water use and create incentives to protect forests, they should be encouraged. When considering future schemes, policy-makers should

consider the following:

- Water is not just a commodity; it is also a right. Payment schemes should not prevent poor people from getting enough water to meet their basic daily needs.
- Pricing systems should be organised so that payments go up as consumption increases.
- Payment systems must be realistic and sustainable, and organised in a way that is suitable to people in rural areas.

Payment systems cannot solve all problems associated with forest and water management. There needs to be other policies, such as environmental education programmes, to create awareness of the issues and increase support from the people involved.

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Balancing the water demands of agriculture and conservation

People consume between 2000 and 5000 litres of rainwater and irrigation water per day – this is the average amount used to grow food. As the global population grows, the demand for food – and therefore water – increases. In many places, this means less water for the environment. Water must be managed to meet food security, poverty reduction and environmental objectives.

Water security is essential to food security and poverty alleviation, allowing people dependent on agriculture to move beyond subsistence farming. However, increased use of water for agriculture can have serious impacts on the environment. It is possible to minimise the trade-offs between the environment and agriculture. Six pathways are proposed for managing water scarcity:

- Changing eating patterns towards foods that use less water in production. People should be made aware of the environmental consequences of their eating habits. However, it is unlikely that large numbers of people will change the way they eat. Furthermore, a more varied

diet is a benefit for many undernourished people.

- Importing food reduces the use of water to grow food in a country. By trading food, countries are also trading water. Trade in food and therefore water (also known as 'virtual water') from water-rich to water-poor countries could reduce water shortages. Water does not usually enter into trade decisions, so it is unlikely that the full potential of virtual water trade has been considered.
- Using waste and saline water for agriculture is a useful option, but usually occurs because there is not enough freshwater available after urban use. This approach does not produce extra freshwater that could benefit the environment and there are also concerns about health risks and salinization (the accumulation of salt in agricultural soils).
- Preventing leakages from irrigation systems may be good for farmers, but the amount of wastage is less than commonly thought. This is because leaked water is often returned to ecosystems or available for other uses.
- Growing more food with less water remains a potential solution in many places. A number of actions – improved farm practices, reducing land and water degradation, improving irrigation service and policies that give incentives – can improve water productivity. Assistance should be directed to water scarce, poor producers.

Increasing water productivity is the key to reducing global water scarcity in the next 25 years

- Much of the potential for productivity gains is in rainfed systems in the semi-arid tropics, where yields are low and poverty persists. There are many strategies for using a little water to overcome drought that increase productivity. For example, low cost pumps and drip kits can be used for small-scale irrigation.

Increasing water productivity is the key to reducing global water scarcity in the next

25 years. This allows water to be made available for the environment and for urban uses. Interventions should target poverty through assisting the poorest people, reducing vulnerability to short-term

drought and improving women producers' access to irrigation. Institutional support is important: tenure rights are vital incentives for farmers to make long-term investments to improving productivity. If poor farmers are to improve their livelihoods without ecosystems being destroyed, there must be changes to the ways in which water is managed.

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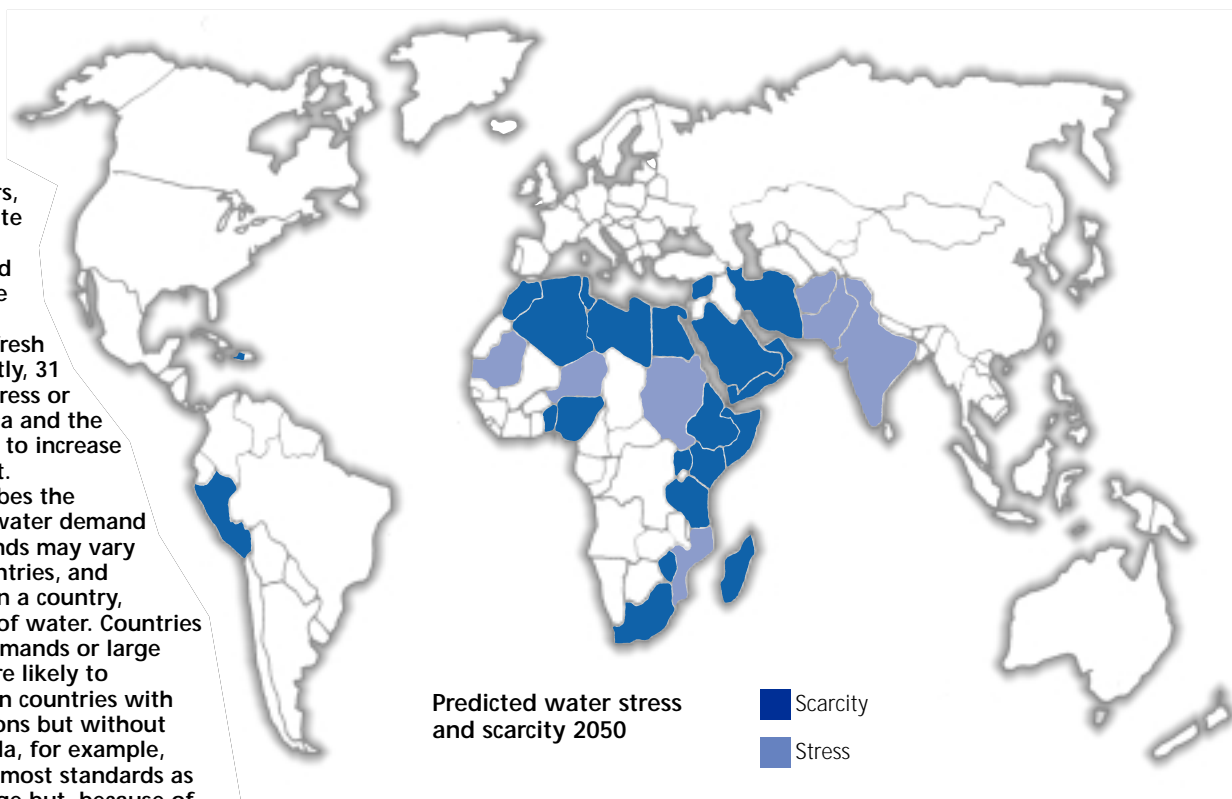
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Water stress and scarcity

Global water consumption is doubling every 20 years, more than twice the rate of population growth. According to the United Nations, more than one billion people on earth already lack access to fresh drinking water. Currently, 31 countries face water stress or scarcity, mostly in Africa and the Near East. This is likely to increase if current trends persist.

Water scarcity describes the relationship between water demand and availability. Demands may vary between different countries, and different regions within a country, depending on the use of water. Countries with high industrial demands or large scale irrigation are more likely to experience scarcity than countries with similar climatic conditions but without these demands. Rwanda, for example, would be classified by most standards as suffering water shortage but, because of low industrial and irrigation use, would not be classified as water scarce.

Water stress is the consequence of scarcity, which may be evident in many ways, such as increasing conflict over water usage, a decline in service levels, crop failure or food insecurity. This is equivalent to the term 'drought'.



Text adapted from 'Thirsty Planet', Zed Books, by C. Hunt, 2004 and 'The Water Page' www.thewaterpage.com

Map adapted from 'International Freshwater Conflict: issues and prevention strategies', Green Cross International, by S. Samson and B. Charrier, 1997

Management reforms needed in the Yellow River Basin

Management of China's Yellow River Basin is at a critical stage. Decreasing water supplies, increasing demand for water and a rapidly growing economy have added new challenges to a management agenda that has traditionally focused on flood control and irrigation development.

The Yellow River is often associated with catastrophic floods at scales unimaginable in much of the world. From ancient times to the present, Chinese administrations have made flood control the number one priority in Yellow River management. Major achievements have been made in this respect, especially since the founding of the People's Republic of China in 1949. However, while flooding is still a major issue, changing circumstances have brought new challenges to the management of this river.

Residents and managers of the Yellow River basin are facing critical issues. Ultimately, water scarcity is expected to dominate future management priorities. The research shows:

- Water resources within the Yellow River Basin are fully allocated at present. Water shortages are becoming a critical issue in many areas.
- The risk of floods in the Yellow River Basin remains and the cost of these floods have increased with development.
- Water quality is worsening in many parts of the river, and the problem is increasing in scale.
- Environmental uses of water are only now being considered and will place additional pressures on current uses.

The previous need by river basin managers to focus on flood control has meant that institutional, legal and technical resources

Water resources in the Yellow River Basin are fully allocated and shortages are becoming a critical issue

to address new water management challenges have yet to fully develop. River basin institutions must shift from a focus on water development and control to water management. To achieve this, the research makes the following recommendations:

- New water allocation systems, based on realistic estimates of supply and demand, must be developed.
- Mechanisms to address growing industrial, domestic and environmental demands must be devised which consider the welfare of farmers, one of China's poorest population sectors.
- While technology to control erosion should be pursued, broader social strategies must also be examined.
- Legal and institutional reforms are needed to better control pollution.
- Additional research is needed on inter-sectoral water allocation, the potential for water savings in irrigation, pollution control and treatment, environmental use, data issues and institutional reform.

The Yellow River Basin faces a range of threats and opportunities. To manage these threats and capitalize on the opportunities will require substantial changes in institutional policy and practice. Given China's dramatic success in a variety of reforms over the last 25 years, there is every

reason to believe China will also be successful in reforming Yellow River Basin management. The key is political will backed by sound information and research.

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Programmes to tackle India's rural water crisis

Problems with drinking water amongst rural communities in India are increasing, especially during the summer months. Water shortages and poor water quality are affecting the health and farming activities of the rural poor. New approaches to water management are helping to address natural resource management problems and conflicts over access to water.

Watershed development involves introducing measures for the conservation of soil, water and plants in both farmer-owned and community land. These measures increase the supply of water to local people and ensure the most efficient use of the water resources available in a region.

The number of watershed development programmes is increasing, and the Indian government invests over US\$500m per year. Previous schemes have focused on developing water resources for improved irrigation and crop production. These have not been coordinated with efforts to improve domestic water supplies and sanitation. Combining these programmes could promote better water management at local levels and help to reduce rural poverty.

The Bharatiya Agro Industries Foundation

(BAIF) Development Research Foundation has introduced watershed development programmes in six states in India. These projects have shown that:

- The main causes of water scarcity are overuse of groundwater sources and a lack of measures to recharge these supplies. Groundwater is used for both drinking water and irrigation, and there is little control over its use in many areas.
- There has been a focus on short-term relief measures rather than long-term solutions.
- Most schemes do not address water service issues, despite rural people identifying a lack of water and sanitation as the most important issues.
- Sanitation has not been a priority: outside defecation remains common even where watershed development projects have been running for several years.

BAIF's programmes have produced positive results: in the areas in which they have operated, drinking water is now widely available. There have been increases in crop production, agricultural income and the amount of land under irrigation. The need to bring water in by tanker during droughts has been reduced. Rainwater harvesting, groundwater recharge measures and farm ponds have improved surface water storage and groundwater levels.

Communities are encouraged to implement and manage their own schemes. User groups were established to

The main causes of water scarcity are overuse of groundwater for drinking water and irrigation and a lack of measures to recharge groundwater supplies

manage new projects, but their responsibilities did not include the management of groundwater – the key resource. There is no legal control over the use of groundwater resources. As a result, the positive impacts

of water harvesting on domestic water sources are often only short-term.

The BAIF programmes show that it is possible for projects to increase the availability of rural water supplies and improve the quality. To continue this success it is necessary to:

- focus on improving wells for purposes other than just irrigation
- ensure that watershed development programmes carefully evaluate the impacts of irrigation on local people's water supplies
- improve the efficiency of water supply when increased irrigation affects domestic water supplies
- build water harvesting structures in places where they can contribute to household domestic water needs.

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Counting the cost of clean water

Research estimates that one-fifth of the world's people do not have access to safe drinking water. The seventh Millennium Development Goal (MDG) aims to halve this number by 2015. New policies are needed for these demands to be met, particularly ensuring access for poor people.

Research from the Organisation for Economic Co-operation and Development (OECD) shows that water pricing structures can recover the costs of water supply, provide incentives to water users to conserve water, and ensure access to affordable water. Wider use of market-based approaches (such as water use charges and tradable permits for water use) can help to solve many management problems.

These measures provide economic incentives for increasing efficiency. Metering, where suppliers charge based on how much water is actually used, is needed for these approaches to work efficiently. Politicians should use pricing measures to meet environmental and social objectives, rather than just to raise money. A range of

mechanisms can be used to ensure affordable access to water: free or subsidised minimum levels of water, refunds or reduced water charges for poor people and using block tariffs, which apply low charges to the first units of water used and higher charges for larger amounts.

In the former Soviet Union countries, the extensive water infrastructure is rapidly deteriorating. Unlike much of the developing world, the challenge here is not to extend water networks, but to maintain existing ones. The research shows that:

- Household water use is very high – between 200 and 500 litres per day. Metering is not widely used, so there is little incentive for efficient use.
- Water suppliers receive less than half the cost of operating and maintaining water supplies. There is not enough money available for expanding, maintaining or upgrading services.
- There has been a rapid increase in water prices over the last decade. In Ukraine, water prices rose 16 times faster than prices for other goods. Despite this, funds are still insufficient to cover operation and maintenance costs.
- There is strong political resistance to increasing water prices, and this is a serious obstacle. While many consumers are willing to pay for better quality water and a more reliable service, there is a lack

of trust that the money from increased tariffs would be used efficiently and effectively.

If the MDG is to be met, mechanisms to improve water supply must not exclude people who cannot afford water, but should still providing incentives for efficient water use amongst those who can. To achieve this:

- Water suppliers need to study people's opinion and preferences. They should provide information about water quality, methods of water treatment, and ways to conserve water.
- Clear legal frameworks for service provision needs to be introduced.
- Donors should target their funds in supporting governments to improve damaged infrastructure.
- Income support is the most effective way to support poor people. Many governments provide subsidised water, but the subsidies often do not target poor people.
- Support through water tariffs is possible, but these solutions are sophisticated and require wide-spread metering to allow effective targeting of poor people.

Mechanisms to improve water supply must not exclude people who cannot afford water

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useful websites

International Water Management Institute
www.iwmi.cgiar.org

International Institute of Environment and Development
Environmental Economics Programme
www.iied.org/eep/index.html

Water, Households and Rural Livelihoods
www.nri.org/WSS-IWRM

The Center for Sustainability, Environment, Equity and Partnership
www.seepwater.org

Bharatiya Agro Industries Foundation – Water Resources Development
www.baif.com/water.htm

Development Gateway – Water
<http://topics.developmentgateway.org/water>

InterWater – Gateway to Water and Sanitation Information
www.wsscc.org/interwater

International Water Association
www.iwahq.org.uk

UNICEF Water, Environment and Sanitation
www.unicef.org/wes/index.html

Water Supply and Sanitation Collaborative Council
www.wsscc.org

World Water Council
www.worldwatercouncil.org

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2005 ISSN 1746-8655
Printed on paper produced from sustainable forests



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