



water

Communicating international development research

August 2006

In this issue

Linking water management and poverty reduction

Can market forces guide the use of irrigation water?

Do water policies reflect the priorities of poor people?

How can dry countries manage water shortages?

Linking sanitation, water and livelihoods in Nairobi slums

Rain, a global resource for fighting hunger

Nearly one billion people worldwide are malnourished. The majority of these people live in developing countries, where increasing water scarcity complicates efforts towards food self sufficiency. Huge amounts of water are needed to produce more food and eradicate hunger among increasing populations. How should this demand be met?

Each person needs over 4,000 litres of water each day to produce enough food for a healthy diet. Farmers face increasing competition for water from industry, forestry, fibre production and fisheries.

However, most water management policies only consider liquid 'blue water', which is the water available in rivers, lakes and aquifers. This neglects the invisible 'green water', for example the naturally infiltrated rain accessible as the soil moisture taken up by plants.

Research from the Stockholm International Water Institute, Sweden, shows that when green water is considered as well, there is plenty of water to meet agricultural needs, even in hunger-stricken and poverty-stricken areas.

The research shows:

- Over 60 percent of the world's food is produced from green water. In sub-Saharan Africa this figure reaches 95 percent.
- Changes in land use affect green water flows. This determines the generation of runoff and therefore the blue water flows available downstream.
- Further increases in withdrawal from blue water sources may trigger a massive ecosystem collapse and cause social unrest, especially in coastal areas.
- Reducing the loss of green water through non-productive evaporation and making it accessible to plants as productive transpiration (so-called vapour shift) has the potential to supply large amounts of water for forestry products, grain farming and market food needs.
- Climate change will make the management of water even more difficult, with increased frequency of water-related events such as dry spells, droughts and floods.

Achieving the Millennium Development Goals (MDGs) will require new policies for coping with

the dry climates in most developing countries. The central issue is how to manage water for all the different functions for which it is needed. An important step is to distinguish between blue water and green water flows, by changing the current view of the world's water resources.

The limited current approaches to increasing demands for water will not be enough to eradicate hunger, especially in areas with growing populations. The link between hunger, poverty and water management must be made clearer, especially within the MDGs.

The research recommends an approach that:

- accepts there is not enough blue water left to meet competing food, water and environmental needs
- raises awareness of the difference between blue water in rivers and aquifers and green water in the soil
- recognises the importance of both types of water in agriculture
- promotes the potential of green water to contribute to global food production
- introduces both green water issues and land-use issues into water resources management practices and governance
- broadens approaches to water management so that it maximises benefits to agricultural communities, particularly in water-scarce regions.

Malin Falkenmark and **Johan Rockström**

Malin Falkenmark, Stockholm International Water Institute, Drottninggatan 33, SE-111 51 Stockholm, Sweden
T +46 8 522 139 60 F +46 8 522 139 61

Malin.Falkenmark@siwi.org

Rain: The Neglected Resource, Swedish Water House, Policy Brief, No. 2, by Malin Falkenmark and Johan Rockström, 2005

www.siwi.org/downloads/Reports/2005_Blue_Green_Policy_Brief.pdf



Linking water management and poverty reduction

Ensuring poor people have access to drinking water is important for achieving the seventh Millennium Development Goal. But the contribution of water to poverty reduction goes beyond safe drinking water. Effective water management is critical for improving health, ensuring environmental sustainability and eradicating hunger.

Research from the Stockholm Environment Institute outlines the different ways that water management can reduce poverty. In some cases, improving access to water is a precondition to achieving the other Millennium Development Goals (MDGs).

Therefore investing in water management is a good way of investing in poverty reduction. But this link is not always well understood and water management strategies are poorly represented in national and international poverty reduction policies.

Water management must be approached in an integrated way. This means having a clear understanding of how different water management actions contribute to poverty reduction. It also involves greater cooperation and coordination between water management and other related sectors, such as agriculture, health, industry, energy and trade.

The researchers identify four key dimensions

Integrated water management involves greater cooperation and coordination with other sectors, such as agriculture, health, industry, energy and trade

of poverty and how water can play a key role in each of these four dimensions:

- Poor people must be able to use resources in a secure and sustainable environment. Ensuring continuous water flows and minimum levels of water quality maintains the ecosystems on which many poor people depend. In particular, securing water supplies for agriculture is vital for poverty reduction.
- Providing access to safe and sufficient water and sanitation is the most

effective way to improve health. Water-borne and water-related diseases are the main killers in many developing regions. Integrating water, sanitation and hygiene promotion is an effective

strategy for reducing poverty.

- Water-related disasters, such as droughts, floods and storms, all undermine development efforts. Actions to reduce the risk of such events are an important part of effective poverty reduction strategies.
- Enhancing economic growth means increasing the possibilities for poor people to escape poverty. Water management can stimulate economic growth by providing inputs to local activities and creating opportunities for small entrepreneurs.

Increasing resources for water management can have positive impacts on poverty and health, and benefit social, environmental and economic development. The researchers make recommendations to increase the effectiveness of investments in water management:



Women and children wash clothes at a stream in Kibera, Africa's largest slum in Nairobi, Kenya.

© 2006 Felix Masi/Voiceless Children, Courtesy of Photoshare

- External financing of the water sector is important, but it is also vital to generate more money from the private sector and from poor people themselves.
- Water should be integrated into all Poverty Reduction Strategies and programmes working towards all of the MDGs.
- Local governance of water management should be decentralised and decision-making should include poor people.

John Soussan, Stacey Noel and Joakim Harlin

John Soussan, Stockholm Environment Institute, York Centre, University of York, Heslington, York, YO10 5DD, UK

T + 44 (0)1904 434745 F +44 (0)1904 432898
js47@york.ac.uk

Linking Poverty Reduction and Water Management, Poverty Environment Partnership, by John Soussan, Stacey Noel and Joakim Harlin, 2006
www.who.int/water_sanitation_health/resources/povertyreduc2.pdf

Can market forces guide the use of irrigation water?

Some people argue that water is a basic human need that should remain free from market controls. But others believe that market forces are the best way to meet all the competing demands on this resource.

Access to water, particularly for irrigation, can reduce food costs, support economic development in rural areas and provide jobs. However, uneven water allocation can lead to income inequality and food shortages. Research from LEI-Wageningen UR, in the Netherlands, uses case studies from Egypt, Morocco, India, Indonesia and Ukraine to examine the different policies for managing scarce water and a shortage of funds for irrigation.

There are several policies for managing irrigation, including rationing quotas, charging by water volume, tradable water rights, and crop-based or area-based charges. Some policies are better for resource management, while other policies are better for financial management.

The choice of policy depends on certain conditions being in place.

The most common method for managing scarce water is through quotas. In India and Morocco, surface water is successfully allocated through quotas, although both countries suffer from excessive groundwater use. However, quotas limit the ability of

market forces to set a price for water. The research shows:

- The value of water to farmers is often higher than the amount they pay in charges.
- A large increase in the price of water is usually needed to balance supply and demand. This can affect the livelihoods of farmers.
- The technology and administration needed for measuring water is often complex.
- Water rationing encourages farmers to seek the most productive use of water.
- Tradable water rights can also improve the efficiency of water reallocation.
- Simple crop- or area-based charging systems with low costs and a high degree of transparency are best for recovering the costs of water for agriculture.

Market-pricing and tradable water rights

Policies for managing irrigation include rationing quotas, charging by water volume, tradable water rights, and crop-based or area-based charges

can allocate water efficiently, but in reality this rarely happens. The market often fails to meet other environmental and social concerns, such as waterlogging or the exploitation of aquifers. No single policy meets all irrigation needs, so a combination of policies will usually be required. The case studies suggest that policymakers should:

- charge for the service to provide water for irrigation, but not for the water itself
- avoid using market-pricing to balance supply and demand where it affects the welfare of farmers and their families
- define rights for groundwater use in India and Morocco
- intervene when cost is the only factor blocking the introduction of market-pricing or tradable water rights.

Petra Hellegers and Chris Perry

Petra Hellegers, LEI-Wageningen UR, PO Box 29703, 2502 LS The Hague, The Netherlands
T +31 (0)317 484788 F +31 (0)317 484490
petra.hellegers@wur.nl

'Can Irrigation Water Use Be Guided by Market Forces? Theory and Practice', *International Journal of Water Resources Development*, Vol. 22, No. 1, by Petra Hellegers and Chris Perry, March 2006

Do water policies reflect the priorities of poor people?

Improved access to safe drinking water is one of the Millennium Development Goal targets; governments allocate considerable funds to achieving this every year. South Africa is on schedule to deliver universal free water access by 2010. However, there is mixed evidence that water policies respond to the priorities of poor rural communities.

Water is central to human development. The South African National Water Act identifies a Basic Human Need Reserve (BHNR) of 25 litres per person per day within 200 metres of every home. The government has provided significant financial and human resources to meet this challenge. This is partly due to the political need to transform past social injustices in a water-stressed country with competing demands for water and highly uneven access to water.

Managers must make objective decisions about water-use priorities. One approach that allows for experimenting with trade-off scenarios is 'stated choice methods'. This approach overcomes some of the constraints of observed data methods by evaluating community preferences to future or planned interventions. Research by the University of Newcastle-upon-Tyne, UK, investigates which domestic water interventions are most valued by rural communities in South Africa that are still waiting for delivery of the BHNR.

The research examined two communities in Limpopo province. These are both dependent on groundwater or rivers for drinking water. The researchers used two years of qualitative and quantitative data into water and poverty problems in the wider Luvuvhu catchment, as well as consultations with several stakeholders, including national and provincial governments, traditional community leaders, local civics (community-based groups) and the wider research community, to design the experiment.

The research shows:

- Rural people gain the greatest welfare benefits from water access in the home.
- Upgrading groundwater access by public taps outside homes does not improve welfare.
- Increasing water quantity is more strongly associated with increasing welfare than improving water quality.
- The loss of access to river water results in little welfare loss and may provide opportunities for increasing allocations upstream and downstream.
- Irrigation of a kitchen garden from domestic water provides small but positive welfare gains.

What rural people want and what policymakers think they want, are not necessarily the same. While the BHNR policy has received wide support and praise from many researchers, it does not fully address the problems of water access. The limiting factor for people in the study communities

is how much water they can carry, not how much water is available from a communal tap.

Even well intentioned water policies may not address people's needs if they do not carefully evaluate alternatives. Policymakers and donors should consider:

- Where water access is a significant problem, investments in water access outside the home may be wasted.
- Providing mixed levels of water services may be more appropriate and sustainable than funding 'free water for all'.

What rural people want, and what policymakers think they want, are not necessarily the same. While the BHNR policy has received wide support, it does not fully address the problems of water access

Rob Hope

Centre for Land Use and Water Resources Research, Devonshire Building, University of Newcastle-upon-Tyne, NE1 7RU, UK
T +44 (0) 191 246 4884 F +44 (0) 191 246 4882
robert.hope@ncl.ac.uk

'Evaluating water policy scenarios against the priorities of the rural poor', *World Development* 34 (1), pages 167-179, by Robert A. Hope, 2006

How can dry countries manage water shortages?

By 2025, around four billion people will live in conditions of severe water stress. But the seventh Millennium Development Goal aims to halve the number of people without sustainable access to safe drinking water by 2015. How can policymakers make this happen?

In recent decades, many countries have reformed legislation relating to water resources and rights. In 1992, the United Nations hosted a conference that developed some basic principles which came to be known as 'integrated water resource management'.

Later, this approach developed further to embrace land management. Although integrated approaches to water and land management feature strongly on international policy agendas, the governance of water is in a state of confusion in many countries, with conflicting views on the best approach to managing water resources.

A common view is that planting trees improves water availability by attracting rainfall and storing water yet research conducted under the UK Forestry Research Programme, challenges this.

Relationships between water resources and land use are poorly understood. A common view is that planting trees improves water availability by attracting rainfall and storing water. India's national water policy is based on the premise that forest cover conserves water in a catchment. However, research conducted under the UK Forestry Research Programme challenges this argument.

The research involved several projects in South Africa, Tanzania, Grenada and India. Researchers used mathematical modelling and Geographic Information Systems to produce detailed predictions about the relationship between vegetation and water flows and quality. The researchers in these projects also analysed local people's response to a range of water management options, all

of which involve trade-offs.

The research shows:

- In Limpopo Province, South Africa, upgrading water supply to private homes would make the greatest impact on the welfare of rural people. Allocating water for smallholder irrigation schemes promotes food self-sufficiency but in semi-arid conditions, improvements in rainfed farming may benefit more people under water scarcity.
- In India, rural areas are under the jurisdiction of different ministries, so it is hard to determine what is happening at the watershed scale. Mixed messages are being sent to government ministers working on land use and water management.
- In Grenada, farmers use pesticides, herbicides and fertilisers and clear land for agriculture. These activities may contaminate water supplies. The research tested two schemes which offer farmers payments to reduce these activities and manage water quality. Development workers and policymakers who set frameworks for water resource management need support systems to assist them in decision-making and in negotiations between water users and managers. These findings have important implications for the water managers and policymakers:
- If water shortages are a problem in dry countries, limits should be imposed on forest plantations, especially of fast-growing evergreen species.
- If upland forests are cleared for cultivation, farmers should be provided with guidelines on best agricultural practice.
- Models and decision support systems that evaluate the impact of alternative land management options on water resources exist and should be used by policymakers.

Becky Hayward, Robert Hope, Mark Mulligan, Sampurno Bruijnzeel and Ian Calder
Forestry Research Programme, Natural Resources International Limited, Park House, Bradbourne Lane, Aylesford, Kent, ME20 6SN, UK
T +44 (0) 1732 878 692 F +44 (0) 1732 220 497
k.rothschild@nrnt.co.uk

From the mountain to the tap: how land use and water management can work for the rural poor, Natural Resources International, by Becky Hayward, 2005
www.frp.uk.com/assets/Water_book.pdf

Linking sanitation, water and livelihoods in Nairobi slums

Nairobi's slums are among the most unsanitary in the world. These conditions affect women more than men. Kenyan policymakers are becoming more aware of women's role in providing, managing and safeguarding water and sanitation services. However, they lack knowledge about how access varies by gender and across wealth groups.

A report from Practical Action, UK, explores the impact of sanitation and water on gender and livelihoods in Maili Saba, a slum settlement on Nairobi's outskirts. Hundreds of thousands of people in Nairobi's informal settlements pay more and travel further to get water and sanitation services than richer neighbours in recognised settlements. Projects to assist them have been unsystematic, badly coordinated and only benefited small numbers of people.

In the absence of state provision, local entrepreneurs sell water and residents collect it from wells, boreholes and roofs. Landlords build poor-quality latrines and bathrooms for their tenants. The widespread use of 'flying toilets' (faeces-filled plastic bags), poor drainage and overflowing pit latrines affect the health of all residents. Water vendors face harassment from

government and water company officials and hostility from residents, especially when they raise their prices during times of shortage.

A lack of legal tenure is a significant constraint to improving facilities. Conflicts over land and threats of mass evictions, by either the government or landlords, make residents wary of investing in permanent structures.

In Maili Saba, one of the Nairobi sample informal settlements, the researchers found that:

- not all inhabitants are equally poor: when new initiatives are planned, very poor people often find themselves unable to afford rates thought to be 'reasonable' by others

People in Nairobi's informal settlements pay more and travel further to get water and sanitation services than richer people in recognised settlements

- women are particularly concerned about the safety and cleanliness of sanitation facilities
- for women, sanitation means more than just latrines: they want safe private places with sufficient water for personal use and washing clothes and better drainage to avoid dirty water remaining in the streets
- community sanitation blocks have proven popular and provided an income for the community groups that run them: however, women and children use them less than men.

The current government policy is to withdraw from the direct implementation and management of water schemes

and instead hand these tasks over to communities, local authorities and other service providers. Although this is welcome, a greater recognition of women's particular responsibilities and needs is also required.

The researchers recommend that the authorities and non-governmental agencies do more to:

- recognise that the populations of informal settlements are not all the same and have different needs
- consider the lives of residents and seek to understand what they believe 'appropriate sanitation' to be
- share lessons and best practices so that successful pilot projects can be developed further
- regularise land tenure, at least allowing for the provision of certain types of water and sanitation systems in unplanned urban areas
- effectively implement the 2002 Water Act and work with water vendors to enable them to provide a better service
- ensure that slum dwellers have more realistic expectations of what the government can provide for them.

David Kuria

Water and Environmental Sanitation Unit, Intermediate Technology Development Group East Africa, AAYMCA Building (Second Floor), Along State House Crescent, P.O. Box 39493, Nairobi, Kenya
T +254 20 2715293 / 2719313 / 2719413
F +254 20 710083
david.kuria@itdg.or.ke

Livelihoods and gender in sanitation hygiene water services among urban poor. Maili Saba Research Report, Intermediate Technology Development Group East Africa, March 2005
www.odl.org.uk/wpp/publications_pdfs/Kenya_Report.pdf

useful websites

International Water Management Institute (IWMI)
www.iwmi.cgiar.org

IRC International Water and Sanitation Centre
www.irc.nl

Millennium Project Taskforce on Water and Sanitation
www.unmillenniumproject.org/reports/tf_watersanitation.htm

Practical Action – water and sanitation
www.practicalaction.org/?id=water_and_sanitation

Stockholm International Water Institute
www.siwi.org

Stockholm Environment Institute – Water Resources & Sanitation
www.sei.se/water/overview.html

UNICEF - Water, environment and sanitation
www.unicef.org/wes

Water and Sanitation Programme
www.wsp.org

World Water Week
www.worldwaterweek.org

Subscribe

id21 natural resources highlights are intended for those with limited internet access and are free of charge. To subscribe, please send your contact details to the address below, telling us which highlights you would like to receive: agriculture, conservation, fisheries, forestry, land, rural livelihoods and water.

id21

**Institute of Development Studies
 University of Sussex, Brighton, BN1 9RE, UK**

T +44 (0) 1273 678787 **F** +44 (0) 1273 877335 **email** id21@ids.ac.uk



Natural resource highlights are published twice a year by id21 on: agriculture, conservation, fisheries, forestry, land, rural livelihoods and water. Please photocopy and distribute them to your colleagues. They are also available at **www.id21.org/nr**

id21 is hosted by IDS and supported by the UK Department for International Development. Views expressed here do not necessarily reflect those of DFID, IDS or any other contributing institution. IDS is a Charitable Company no.877338 limited by guarantee and registered in England.

© Institute of Development Studies
 2006 ISSN 1746-8655
 Printed on paper produced from sustainable forests



DFID