

International Water Management Institute

Success Stories 2000-2009

1. Innovative smallholder solutions improved food and livelihood security in South Asia.

Six low- cost smallholder solutions developed by local communities in India and Nepal have improved the livelihoods and food security of poor farmers across South Asia. With funding from DFID, IWMI evaluated the six practices used by these communities over a three year period, beginning in April 2000. Local development organizations worked directly with smallholders at grassroots level to implement the practices, which are all environmentally acceptable. The good news is that these technologies can be replicated in other areas with similar conditions.

The six solutions included:

- **Reviving *paals* to harvest rainwater**

In Alwar, Rajasthan, farmers restored *paals*, which are traditional water harvesting structures constructed across seasonal water courses (*nalas*). These *paals* capture water during periods of heavy rainfall. During the period of massive irrigation development, many existing *paals* fell into disuse but the practice was revived by the PRADAN (Professional Assistance for Development Action), a local NGO. The *paal* revival has generated more income for farmers, and considerably improved livelihoods and food security within the community. *Paals* can be built in locations where constructing a dam or building a surface reservoir is not possible, or is too costly.

- **Storing water using Five Percent Pit Technology**

Farmers in the Purulia district of West Bengal face uncertain weather patterns which put their crop yields at risk. 'Five Percent Technology', promoted by the PRADAN, helps eliminate the risks. A pit representing five percent of the total area of a farmer's land is dug at the most upstream part of the plot. This pit collects runoff water and stores it for use during dry spells. Each pit is around 1.5 metres deep and water is lifted manually and applied to crop fields. This technology improves water availability, minimizes soil erosion and improves land productivity during times of low rainfall.

- **Integrating land and water management practices for better livelihoods**

Farming communities in arid and semi-arid areas of Rajasthan are severely affected by land degradation, frequent droughts and scarcity of water for drinking and for agriculture. In Udaipur, Rajasthan, less than 20% of the land is cultivated. Remaining land belongs to the State but supports farming communities by supplying fodder, grazing land and wood for fuel. The *Seva Mandir*, a community- based NGO, integrated rainwater harvesting with afforestation, rejuvenation of grazing lands and improved watershed treatment. More reliable supplies of water resulted in better land quality and improved crop yields.

- **Rejuvenating *ooranis* for drinking and domestic water**

Ooranis are traditional village tanks dug below ground level and used for collecting rainwater and runoff. They are a major source of water for drinking and domestic use, where groundwater is not available in adequate quantities, or not potable. The *DHAN*

Foundation, a local development organization helped to restore previously defunct tanks, in Tamil Nadu. Before the restoration, women walked long distances for water and children missed school because they had to collect water. In villages where *ooranis* were restored, families have saved 45 working days per household per year.

- **Using wastewater in a safe and productive way**

Along the Musi River in India, between Hyderabad and Secunderabad, an estimated 100,000 acres of land is irrigated with domestic and industrial wastewater flowing from these cities. Although wastewater carries health risks, poor farmers depend on it as it is nutrient-rich. There are ways of using it in a more safe and sustainable way. Farmers have successfully switched from rice to growing non-edible cash crops like para grass (a type of fodder) which require little attention. Wastewater is also used for jasmine and banana leaf cultivation, for livestock, fisheries and toddy production, which bring in more income and improve the livelihoods of the poor.

- **Increasing water savings, food security and household income with low-cost drip irrigation**

In Nepal and India, numerous farmers are growing crops using low-cost irrigation kits. These systems were developed by *International Development Enterprise (IDE)*. The drip systems are divisible and sold in kits that farmers can install and maintain themselves. They are also expandable so that farmers can start small and scale up as their income increases. As a result of this technology, many farmers, especially women, are growing high value crops for sale. The impacts of this technology are seen in higher household incomes, better nutrition, improved standards of living and education opportunities. Crops irrigated by drip, show water savings of up to 50 percent and yield increases of 30 to 50 percent.

2. Sustainable Groundwater Management in India

The irrigation systems that once saved millions of rural poor in Asia from droughts and famines are now not only based on surface water but also on a scattered system of tubewells that draw groundwater without restraint. While many poor communities have benefited from groundwater, overexploitation threatens the resource. IWMI together with the Sir Ratan Tata Trust in India, founded the IWMI-Tata Water Policy Program (ITP), a partnership which focuses on practical solutions to protect the massive welfare gains that groundwater has created, while minimizing the costs associated with its intensive use. Groundwater research is carried out in India, Bangladesh, Pakistan, Nepal, Sri Lanka, China and more recently, in Africa.

Several success stories have emerged. Farmers in Uttar Pradesh, India, for example, channel monsoon water through earthen canals to irrigate wet-season crops. Seepage water from the canals and fields recharges underground aquifers. With the additional water provided by recharge, farmers have expanded the irrigated area from 1,251 hectares to 35,798 hectares in less than 10 years and reduced pumping costs. In December 2006, IWMI presented some ideas from their groundwater research to the Finance Minister offering a program to take advantage of some 9 million farmer-owned dugwells as recharge structures in 100 of India's most groundwater-stressed districts. This encompassed 7 western and peninsular states. The Finance Minister accepted the proposal in principle. Thereafter, IWMI scientists worked with the Government of India's

Ministry of Finance and the Central Ground Water Board to develop a scheme with an outlay of Rs 18 billion (US \$ 450 million at 2006 exchange rates) which the Finance Minister announced in March 2007 as part of Government of India's union budget. The Scheme is now in the first year of implementation.”

3. RIPARWIN: Reviving the Great Ruaha for irrigation, people, and biodiversity

RIPARWIN (Raising Irrigation Productivity and Releasing Water for Intersectoral Needs) was a four –year action research project launched to investigate water management in the water stressed catchment of the Great Ruaha River in Tanzania. The Great Ruaha river is one of Tanzania's most important waterways. It flows through the country's main rice growing area which produces up to 24% of the nation's rice. Water from the Ruaha provides 50% of Tanzania's installed hydropower capacity. The river also flows through an important wetland in the Usangu Plain and through a national park. The main objective of the project was to improve understanding of water competition, management and productivity in the Great Ruaha basin and determine how the Government of Tanzania could keep its promise made in 2001, to return the river to year-round flow by 2010. This project was implemented by the Soil Water Management Research Group, University of Sokoine, Tanzania, the Overseas Development Group, University of East Anglia, U.K. and IWMI. It was funded by DFID and IWMI. The project also worked closely with local partners including the Basin Water Office.

The project findings are relevant to catchments in developing countries where there is competition for water by different users. By improving irrigation efficiency, it was possible to free up water for other uses. The project showed that water should be treated as both an economic and a social good. It was successful in improving community involvement in water management through Water User Associations. These associations built on local water management approaches that enhanced the services provided and reduced conflicts.

4. The Accra Consensus: promoting the safe and sustainable use of wastewater in agriculture

Rapid urbanization, escalating water scarcity and mounting demands for food and livelihood needs are driving the increasing demand for using untreated wastewater and excreta in agriculture. IWMI's research, in part funded by the Challenge Program Water and Food (CPWF), assessed and validated several practices which mitigate the risks of wastewater irrigation in developing countries. IWMI works closely with the International Development Research Center (IDRC) and the World Health Organization (WHO) in this initiative. Although much progress has been made since the Hyderabad Declaration of 2002, significant challenges remain, to make the use of wastewater and excreta in agriculture safe, economically viable and sustainable. In October 2008 a group of top experts from 30 international , regional and national research institutes, multi-lateral and bilateral bodies and universities based in 17 countries, met in Accra, at the invitation of IWMI, the IDRC and WHO. They discussed wastewater -related risk assessment, risk reduction and wastewater governance. This meeting was also attended by the Gates and Google Foundations.

Strongly influenced by the results and outputs of those projects which IWMI is either leading or participating in (15 of the 27 presentations), the participants agreed on a consensus statement to support policy makers around the world. This would help them to make informed decisions leading to cost-effective interventions that improve public health, promote sustainable sanitation, protect the environment and support food security and economic development. The Consensus is a follow-up to the Hyderabad Declaration of 2002, which strongly influenced several international guidelines such as those of WHO and USAID, on wastewater use.

5. Improving Irrigation Performance in Africa (IPIA / APPIA)

IWMI and national partners in Ethiopia and Kenya developed and implemented the APPIA / IPIA project from 2003-2007. They developed a methodology named PRDA (Participatory Rapid Diagnosis and Action Planning) for improving performance of farmer-managed irrigation schemes. This methodology was field-tested in 18 pilot irrigation schemes in Ethiopia and Kenya. Data showed that one of the tremendous achievements of the project was achieving much success with less resources, when compared with other irrigation investments in the region. This was attributed to good collaboration with stakeholders on the ground. It also noted the considerable benefits for farmers within the schemes, compared to those outside.

In particular, the report highlighted the following: downward production trends were reversed in most sites, and post-intervention data showed significant increase in yields in most of the schemes, including a three-fold increase in one site. There was improved water application enabling profitable crop diversification and significant technical and institutional capacity building, leading to improved performance of water user associations. Moreover, field level results have convinced the Kenyan government to use the APPIA approach in other centrally managed schemes to improve performance, and to incorporate APPIA's approach in the new (and first) national irrigation policy prepared by the Ministry of Water & Irrigation in 2007.

6. Promoting the Multiple Use water Services approach at local and global scales

IWMI introduced 'multiple-use water services' (and coined its widely used abbreviation of 'mus') as an innovative approach to use water for poverty alleviation and gender equity in rural and peri-urban areas. Research conducted by IWMI offers many illustrations of how water infrastructure can be planned to facilitate multiple uses of water. For example, a system designed for a single use, like irrigation, often ends up being used for other purposes like washing, bathing and fishing. Designing a multiple use water service or MUS opens up new opportunities to provide better, more efficient water services and creates livelihood opportunities for people. As lead institution of the first global comparative study on implementing and upscaling 'mus' under the Challenge Program on Water and Food (CPWF), IWMI and partners compiled over 100 national and

international outputs, including IWMI Research Report 98. Pro-active debates on these outputs in district- and national-level workshops in Bolivia, Colombia, India, Nepal, South Africa, Ethiopia, Thailand and Zimbabwe led to several outcomes, tracked by the project team. (See www.musproject.net.)

In Ethiopia 'mus' was adopted by Catholic Relief Services (CRS) as its "core strategy" for promoting integrated water resource management, and partnership with IWMI has led to the spread of 'mus' across CRS regions and country programs. In South Africa 'mus' was adopted in the local government's Integrated Development Plan for Bushbuckridge Ward 16; national guidelines for municipalities on 'Provision of water for small-scale multiple use systems', Department of Water Affairs and Forestry (DWAF); the Water for Growth and Development initiative; and research on 'mus' initiated by the Water Research Commission. Influence on DWAF's national guidelines is supported by explicit reference to IWMI in the Guidelines.

7. Rejuvenating degraded soils in northeast Thailand with bentonite clays

IWMI research is helping to reverse soil degradation in Asia through clay-based technologies that rejuvenate degraded soils. The research, carried out by IWMI and partners in structured field trials, focused on the use of bentonite clay by farmers in Northeast Thailand. This environmentally-friendly technology dramatically reversed soil degradation and resulted in positive economic impacts, with higher yields and higher output prices. Several studies carried out by the research team during the research phase conclusively demonstrated that introducing clay-based materials such as bentonite and termite mound materials have a significant and persistent impact on the productivity of degraded, light-textured soils.

Following the field trials, estimates showed that some 200 and 400 farmers in NE Thailand and Cambodia adopted the technology and a further 20,000 farmers were exposed to it in those countries. In addition, it generated interest among bentonite producers in South Africa and Australia. In 2008, to quantify the impacts of this intervention, IWMI and partners completed an ex-post impact assessment three years after the research ended. From an agronomic perspective the average output price for farmers using clay technologies was 18% higher than that for non-clay users.

8. Reversing low productivity in Central Asia through "Bright Spots"

Conditions for crop production in Central Asia have deteriorated considerably, It is estimated that 289,000 hectares are affected by medium to high salinity levels. This has led to crop yield losses exceeding 30%. In 2005, the Asian Development Bank began funding a project called "Enabling communities in the Aral Sea basin to combat land and water resources degradation through creation of "Bright" Spots". These "Bright Spots" are areas where land degradation and low productivity have been successfully reversed through soil remediation technologies and best practices. The Bright Spots project covered three countries of the Aral Sea region, namely Kazakhstan, Turkmenistan and Uzbekistan. The project was implemented by IWMI, ICARDA and ICBA, in partnership with NARES, and came under the scope of Regional Technical Assistance Programs.

Declining agronomic productivity associated with salinization and elevated water tables have also contributed to the development of endemic poverty in rural agrarian-based communities in the region. These poor communities have to grapple with reduced incomes and livelihood insecurity. Since 2005, the project has adopted innovative local practices at 28 “bright spots”, testing 12 technologies at field trials and conducting several training courses. These innovations were successfully tested in controlled environments and the project adapted knowledge sharing methods, based on farmers’ participation.

9. Helping the Ferghana Valley countries in Central Asia share water resources

In Central Asia’s Ferghana Valley ,shared by Kyrgyzstan, Tajikistan and Uzbekistan, thousands of farmers, water user groups and rural households have benefited from Integrated Water Resources Management (IWRM) –based reforms. IWMI and its major regional project partner, SIC- ICWC successfully developed and introduced IWRM–based reforms to the valley. In the past, water management in Central Asia has been deeply rooted in the centralized management systems of the former Soviet Union. The effects of poor water management were evident in a deteriorating and ineffective irrigation infrastructure, water scarcity and land degradation There was also a lack of proper institutional frameworks for managing water resources.

The project was put in action, adopted and promoted for wider dissemination in each country at three major operational levels: farmer, water user association and main canal. With entire pilot canals and their structures re-shaped, IWMI and its project partner have employed the principles of integrated water resources management to meet the specific needs of each project country, This won the firm support of the governments and their respective ministries responsible for water management. As a result, the project’s approach to IWRM is now very much known among the valley’s decision makers and major international donors. Through intensive capacity building, the provision of Management Information Systems (MIS) tools, concepts, and best practices for improving water management, the project maximized opportunities for improving land and water productivity within existing resources, and provided guidance for policy makers.

10. IWMI’s water scarcity map for the Comprehensive Assessment of Water Management in Agriculture (CA)

Water scarcity is high on the development agenda. IWMI’s work through WaterSim for the Comprehensive Assessment on Water Management in Agriculture (CA) on “Future water scenarios defined and explored”, influenced this agenda by creating greater awareness on water scarcity, both within and outside the water community. In particular, a global map depicting water scarce areas, with statistics on people in water scarce basins and suggestions for tackling water scarcity, provided a geographical context and focus to dialogues and development agendas. For example, the theme of the UN World Water Day in 2007 was ‘coping with water scarcity’, and IWMI’s water scarcity map featured prominently in its main brochure

The map and the CA messages also featured in top national and international media, during the World Water Week and thereafter. In addition to the water and development sectors, several newspapers, news websites, and radio/TV broadcasts featured in-depth articles on water scarcity using IWMI's work. IWMI's reprint request process, by granting copyright permission to potential user requests, also indicates how the broader awareness created by the media coverage is being adopted by a diverse group of users to reach an even more diverse audience from policy makers to research institutions and from other educators to the private sector, at global and national scales.