Rainwater harvesting: its time has come

John Gould

This technology, which *Waterlines* first covered in its first issue in 1982, is now an international prize winner. But why hasn't it taken off in Africa with the success it has in Asia?

It was in the very first issue of *Waterlines* (Vol. 1 No. 1) back in 1982 that I first read about rainwater harvesting and the revival of this ancient technology, which seemed to offer such promise both for domestic water supply and supplementary irrigation. Times have certainly changed and almost 25 years on it seems at last that this most fundamental of water sources has finally come of age. For the first time 'aerial' water is beginning to be considered on equal terms with ground and surface water sources.

The recent awarding of prestigious water prizes to organizations that have championed rainwater harvesting within their own countries is a clear sign that this widely applicable technology has finally reached the mainstream. In 2003 the grand prize at the 3rd World Water Forum in Kyoto, Japan, was awarded to the Gansu Research Institute for Water Conservancy for their central role in researching and developing rainwater harvesting and thereby greatly improving water and food security for over 2 million rural householders. The article here by Zhu and Li on the resulting 1-2-1 programme in Gansu Province, China, provides a rare opportunity for regular *Waterlines* readers to track over 10 years' progress on what is probably the world's largest and one of its most successful rainwater harvesting initiatives. Previous articles co-authored by Professor Zhu appeared in 1995 and 2000 (see *Waterlines* Vol. 14 No.2, pp5–7 and Vol. 18 No. 3, pp11–14).

Last year the Centre for Science and Environment in India secured the 2005 Stockholm Water Prize mainly for their efforts to focus attention on rainwater harvesting through two landmark publications *Dying Wisdom: Rise, Fall and Potential of India's traditional water harvesting systems* in 1997 and *Making Water Everybody's Business: Practice and Policy of Water Harvesting* (see Waterpoints, p.26).

Successes and failures

Over the years there have been numerous articles in Waterlines covering different designs and approaches to rainwater harvesting for household supply. Some of the designs highlighted such as the Thai jar (Vol. 5, No. 4, 1987) have been very successful and widely replicated with literally millions constructed in Southeast Asia alone. Other designs, such as the Ghala basket (similar to the Thai jar but using organic reinforcement) introduced in the very first issue in 1982 turned out to be a complete failure, as fungi, bacteria and termites attacked the 'reinforcement'. Through documenting both the successes and failures, important lessons have been learnt leading to improvements in both design and implementation strategies. Some regions such as north-east Thailand have been completely transformed since the household rainwater jars and tanks were first introduced, and areas which once faced severe seasonal shortages and poor-quality water supplies now have a clean, reliable supply in every household.

Constraints in Africa

Despite the significant increase around the world in the direct utilization of rainwater for household water supply, only a fraction of the full potential of this resource is currently being exploited. Nowhere is this more so than in Sub-Saharan Africa, in spite of the fact that potentially household rainwater supplies could transform the lives of hundreds of millions of people across the continent. However, with a tank plus gutters typically costing far more than a household might earn in a year, the obstacles to implementation are formidable. In his article Terry Thomas outlines some of the key constraints that have prevented the more rapid uptake of roofwater harvesting systems in Africa as well as giving some examples of areas where steady progress is being made.

In Southern Zimbabwe, an ongoing long-term household rainwater tank programme I recently visited illustrates the challenge well. In this programme being implemented by the Zimbabwe Council of Churches, women's groups are trained in ferrocement tank construction. On the face of it the programme is impressive with around 10 000 people having benefited from getting a private water supply. The 6m^3 tanks provide sufficient storage for the drinking and cooking water needs of the household throughout the dry season and there is even sufficient to water a few fruit seedlings. The problem is the tanks require a US$700 donor subsidy, resulting in only relatively small numbers being constructed and little scope for replication without donor support. Compared to the great need for tanks in the semi-arid districts of southern Zimbabwe, the 2000 tanks constructed to date are just a drop in the ocean. Clearly, a much cheaper and inevitably smaller tank design is needed.

This issue is common to many parts of Africa and is mainly due to the much higher costs of construction than in other parts of the world. Nevertheless, if rainwater collection is to contribute towards meeting the water supply needs of rural Africa, in areas where suitable alternative sources are unavailable, more affordable designs will be needed and the scale of implementation will need to be stepped up. Hundreds of thousands (even millions) of tanks need

to be built annually. Currently, the crux of the problem lies in the high cost of the tanks and low incomes in rural Africa, which mean they will never be affordable to householders without donor subsidy. In order for tank construction programmes to really take off they need to be self-replicating and not depend on large external handouts. Even if there is a case, especially amongst the most vulnerable communities, for some external subsidy, if this is extended too widely to incorporate the whole community it quickly creates a donor dependency.

The challenge for Africa is to develop an affordable equivalent to the Thai jar which typically costs around $12–16 per cubic metre of storage in Southeast Asia. While it is unlikely that the costs will ever get as low as in Asia, due to the higher cost of labour, transport, cement and other materials, they could probably be made significantly more cheaply than at present. They could also be made much more affordable if implementation programmes included a mixture of revolving funds, credit and savings schemes and income-generating activities.

Finding workable ways to finance household rainwater tanks is a key to encouraging their widespread implementation in Africa. In the article by Hans Hartung, some successful case studies of financing mechanisms for household rainwater tanks in the Oruchinga Valley region of Uganda are outlined.

In rural Africa millions of women still face the daily chore of collecting their family's water from distant and/or unsafe sources. Over a year this task involves clocking up hundreds even thousands of kilometres typically moving up to 10 tons of water or more. This is a huge waste of time and energy, which could be put to far more productive purposes, and would be saved simply by installing a rainwater tank and gutters under a corrugated iron or tiled roof. If household rainwater tanks can be successful and replicated in their millions in Asia, why not in Africa?

About the author

John Gould is Projects Co-ordinator, Christian World Service, New Zealand.

webwatch

Rainwater harvesting

- **Rainwaterharvesting.org**
  The Centre for Science and Environment, India, has a rainwater harvesting web page, featuring a number of different research tools, FAQs on implementation and techniques, newsletters, case studies and current news. WATER LINKS-2 is a contact directory of individuals and organizations involved in water harvesting in India and abroad, to which users can submit their details.
  http://www.rainwaterharvesting.org/

- **The Domestic Roofwater Harvesting Research Programme**
  Based at the Development Technology Unit, Warwick University, the Domestic Roofwater Harvesting Research Programme offers a useful introduction to the technology and styles of RWH, as well as links to specific related project pages and reports, conference papers and references.
  http://www.eng.warwick.ac.uk/DTU/rwh/index.html

- **RWH electronic discussion list**
  A list to promote information exchange between academics, NGOs, government agencies and others on applied research relating to the subject of roofwater harvesting. Archives of discussions and documentation dating back to 2000 are available.
  http://www.jiscmail.ac.uk/lists/rwh.html

- **International Rainwater Catchment Systems Association (IRCSA)**
  The IRCSA aims to promote rainwater catchment systems technology, establish an international forum for those working in this field, disseminate information and support international programmes. The IRCSA brings together researcher and practitioner members from over 70 countries to share experience and form policy, with the aim of mainstreaming RWH. Membership offers access to Raindrop, a newsletter covering recent activities in rainwater catchment worldwide, reduced conference fees and full copies of proceedings.
  http://www.ircsa.org

- **Texas Manual on Rainwater Harvesting**
  A comprehensive rainwater harvesting guide by the Texas Water Development Board, covering all aspects including components, water quality and treatment, water balance and system sizing and costs.
  http://www.twdb.state.tx.us/assistance/conservation/Alternative_technologies/Rainwater_Harvesting/Rain.asp

- **Rainwater harvesting systems**
  A selection on rainwater harvesting of some of the documentation available through IRC's online library database (IRCDOC). For more titles go to http://www.irc.nl/docsearch/search
  http://www.irc.nl/page/14666

- **Rainwater Harvesting**
  This site is by the Tamilnadu Water Supply and Drainage (TWAD) Board outlines both traditional and modern methods of rainwater harvesting. Several examples of successful initiatives are given, with information on the history of RWH, costs and benefits, regional rainfall statistics and a government implementation programme.
  http://www.aboutrainwaterharvesting.com/

Compiled by Julie Fisher, Water, Engineering and Development Centre, UK for WELL. WELL is a resource centre network providing access to information and support in water, sanitation and environmental health for the Department for International Development (DFID) of the British Government.