REVIEWED PAPER

33rd WEDC International Conference, Accra, Ghana, 2008

ACCESS TO SANITATION AND SAFE WATER:
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS

Sustainable water security in the Thar Desert, India: Blending traditional wisdom with modern techniques

Deepak Malik, India

With a population of 30 million people, the Thar Desert is one of the poorest areas of India primarily due to the chronic aridity of the region. A perpetual crisis situation exists in the area due to the increased impact of both the human and livestock population which continues to put tremendous pressure on land, surface and groundwater resources. The acute problem of water scarcity, particularly the low rate of annual rainfall and subsequent lack of crops grown in the region, have made it difficult for people to develop agricultural land and survive solely off the income it provides. Although measures have been taken by the government to address the mentioned crises, none of the measures had a long lasting impact as these did not incorporate indigenous knowledge that helped the local people to survive for centuries. In the drive for development, and due to indifference to local know-how, much of the traditional wisdom have been forgotten. This paper explores the efforts made by HEDCON and GRAVIS in reviving traditional technology and blending it with modern techniques to provide sustainable water security in the Thar Desert.

Background

Situated in North-Western India, Rajasthan is the second largest state of India in terms of area. The Human Development Index (HDI) developed by UNDP[1] ranks India 115 amongst the world's nations and places Rajasthan in 12th position amongst the major India States.[2] The Thar Desert situated in the west of the State, covers over 60% of its area and includes 12 of its 31 Districts. The frequency of droughts in Rajasthan is an alarming reality. The analysis of rainfall data from 1901 to 1999 indicates a drought once in every 2-3 years. There are indications that a crisis situation is developing particularly due to the increased impact of both the human and livestock population which continues to put tremendous pressure on land, surface and groundwater resources.

The situation of ground water in the Thar Desert is also alarming. Safe, drinkable ground water is become increasingly scarce. More than half of the total ground water in the desert region is brackish, highly saline and unsuitable for human consumption. Due to the loss of natural watersheds, poor mining practices and large-scale tube-well exploitation for agri-business, the water table continues to fall at an unprecedented rate.[3] The emergency provision of drinking water and food by the Government of India and international donors during the 2000-2001 drought also signals an impending crisis for the rural people of Rajasthan. Although not officially declared as a famine zone, there are pockets in the 12 western districts where rainfall over the last year was less than 30 mm and where near famine conditions now prevail.

Most groundwater is saline with sweet water being found only at very great depths. The villagers are dependent on rainwater, which meets their needs for about 3 to 4 months of the year. The rest of the year, they bring water from distances of between 3 and 40 kilometers. Water is collected by private water tanks or by purchasing water from water carriers using tanks on camel carts or tractors. Water costs are extremely high (for sweet water Rupees 300-500 (Euro 5-10) for 500 litres – sufficient for one family of 5 for 2.5 days).

Table 1. Status of groundwater level in Rajasthan, India		
Category	**Average depletion**	**District**
Most critical	More than 0.40 m per year	Alwar, Jaipur, Jalore, Jhunjhunu, Jodhpur, Nagaur and Pali
Critical	0.20-0.40 m per year	Ajmer, Bhilwara, Chittorgarh, Dausa, Dholpur, Karauli, Rajsamand, Sawai Madhopur, Sikar, Sirohi and Tonk
Moderate	0.10-0.20 m per year	Baran, Barmer, Bharatpur, Bundi, Dungarpur, Jhalawar, Kota and Udaipur
Marginal	Less than 0.10 m per year	Banswara and Churu

Providing water security

The strategy

GRAVIS and HEDON are two organizations in Rajasthan that have done extensive work in providing water security to the people of the Thar through sustainable means. While GRAVIS is more focused on implementation of rainwater harvesting structures at the grassroots, HEDCON does the vital job of advocacy of water sustainable water security through local solutions. HEDCON advocates with government and non-government agencies, and also with the community based organizations so that water security is achieved in the means best suited to the local people, customs, and the environment. Both GRAVIS and HEDCON believe that a revival of the traditional rain harvesting systems is essential to the survival of the people of the Thar Desert. These structures are technologically sustainable and can be built at a low cost. Moreover, by using these structures the people are able to achieve water security and therefore self-reliance. GRAVIS has been assisting the people of the Thar Desert to achieve water security since its inception and uses the majority of its resources to this end.

Rainwater harvesting structures

Water brings life and is vital for our survival. Without water, a human can perish in only three days. Drinking water in the Thar Desert is a precious commodity. Thus, GRAVIS for the last 23 years has been promoting rainwater harvesting structures by reviving and improvising the traditional structures. There are three kinds of rain water harvesting structures for drinking water supply: *Beri*, *Taanka,* and *Naadi*.

***Beri*[1]:** A *beri* is a large naturally occurring underground '*taanka*' shaped reservoir (Figure 1). Their exact location is based on local knowledge. They are found infrequently and are scattered. A large community owned *beri* / underground reservoir can hold more than 400,000 cu litres, and a smaller one about 100,000 cu litres. This capacity is sufficient to keep a 4-5 families drinking water for several months. *Beris* are found in impermeable rock areas and are lined with naturally occurring clay.

Most *beris* have not been maintained for many years and have silted up. Desilting involves the community working together to remove all the silt, and then constructing a concrete 'cap' access area and hatch.

To desilt an existing *beri* costs, it costs about Euro 303 (INR 16,665). Beneficiaries contribute their labour free of charge; and meet the cost of the concrete structure and access hatch.

For example: The Jaalwah dhani *beri* holds 3,500,000 cubic litres of water. Desilting took 35-40 days and involved 8-10 members of the community, including 2-3 women. While donors contributed met the cost of 'capping', the beneficiary labour cost was met by the beneficiaries themselves. GRAVIS field staff supervised all construction. The village drought agreement makes sure the community will take full responsibility for all future maintenance, and will take all necessary action to stop their *beri* silting up again.

Desilting of community village ponds: A *naadi* or village pond is used to harvest and store rainwater. All settlements in the arid zone have one or more ponds. They are used for drinking purposes by human beings as well as livestock, generally for 4 to 6 months per year (July – August to October – November) depending on the extent and intensity of rainfall. A *naadi* catchment area is called *agor*. Care is taken to keep it clean especially before the onset of the rainy season. Nobody is allowed to defecate or contaminate that area. When *naadi* water is exhausted, villagers start using water stored in individual *taankas*.

[1 Beris can be replenished from local groundwater (Figure 1) or by harvesting rainwater (Figure 2) ed.]

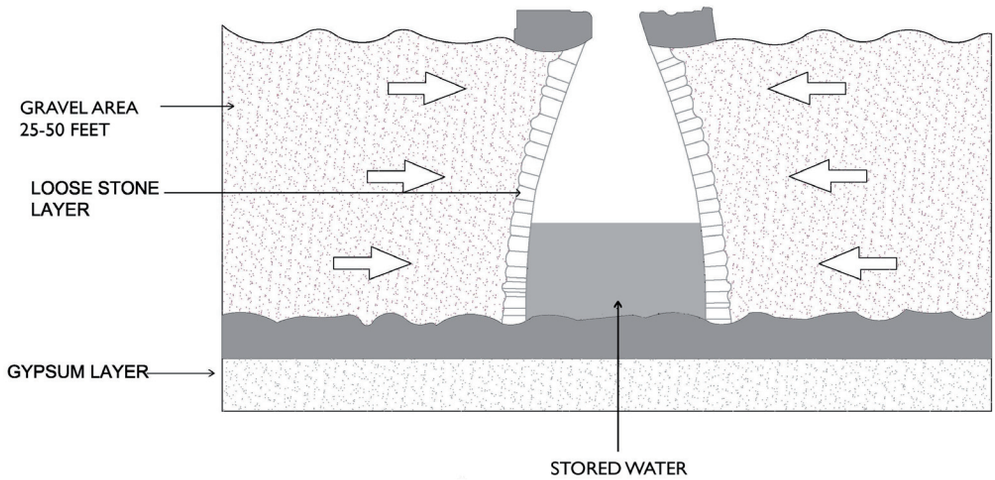

Figure 1. A percolation Beri

With the focus shifting towards government provided water supply, the upkeep of *naadi* has suffered. A number of *naadis* have been allowed to silt up. GRAVIS motivates the communities to revert to traditional self-reliant methods of water harvesting, desilt these ponds and restore them to their original capacity. Desilting leads to an increase in capacity (water stored) and also percolation. The actual work carried out by beneficiaries depends upon the condition of each pond. However work is likely to include:

- Removing silt from the pond bed, leading to increased storage
- Repair of embankment where it has been breached
- Plantation and earthwork in the catchment to stabilize it and reduce soil erosion
- Digging of wells in the pond, if the strata is suitable, to get drinking water even in the peak summer months.

It costs about Euro 3700 (INR 203,500) in total to desilt a medium size 3,000,000 litre village pond.

For example: The Sanwaragaon village pond or *naadi* involved desilting an area 100 ft long, 50 ft wide and on average 5 ft deep; or excavating 700 cubic metres. When full, the village pond holds 30,000,000 cu litres water. The pond was completely silted up due to neglect and silt run off from the surrounding catchment area. After GRAVIS' intervention, 100 people including 40 women worked for 3 months on de-silting the pond.

Household *taanka*: A *taanka* is a traditional water harvesting structure (Figure 2) designed to collect and store annual monsoon rainwater and transported water (by camel / cattle carts, and tractor tankers) adjacent to the family house in dry areas. The *taanka* is a cylindrical underground storage tank made primarily from local materials and cement mortar. They are 10 ft deep with a 10 ft diameter and have a catchment area of 70 ft. The roof protrudes 0.5 m above ground and has two openings. One faces towards a large open catchment. During rainfall runoff generated by the catchment area is efficiently funneled through a small inlet. *Taankas* have a water storage capacity of about 20,000 litres. Collected water is easily accessed through a small metal door on the *taanka* roof using a bucket tied to a rope. This allows a family to easily fetch safe drinking water for a large part of the year. Each *taanka* has wire meshes fitted in the outlet and inlet to prevent rodents, insects and garbage from entering. Before the onset of the monsoon each year, meticulous care is taken to clean the catchment area of *taankas*. Cattle grazing or entry with shoes into the catchment area is strictly prohibited.

Taankas are an important element of water security in arid regions. Most households have their own small *taankas* constructed from local materials, but their capacity is limited. Only the rich can afford masonry *taankas*, which are large in size. People who do not have access to their own *taankas* have to depend on others. This dependence has been a source of exploitation.

GRAVIS provides *taankas* giving priority to the neediest households. Village Development Committees select settlements and households based on the following criteria:

- Those not having a water storage facility

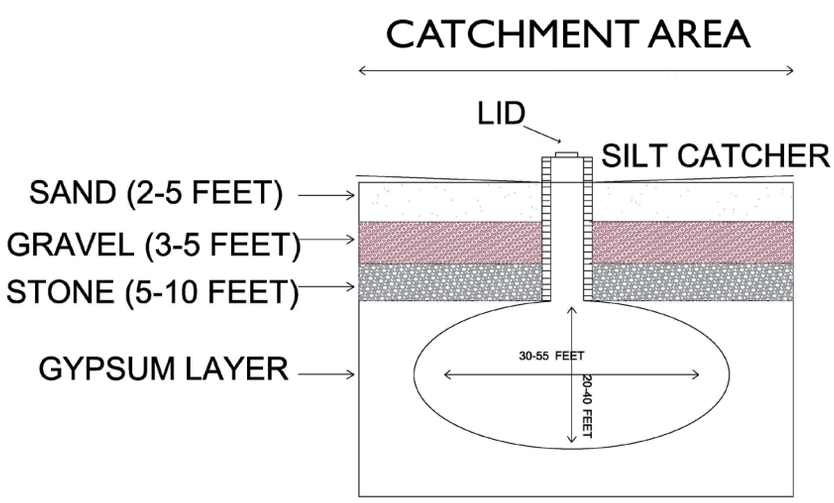

Figure 2. A water harvesting beri

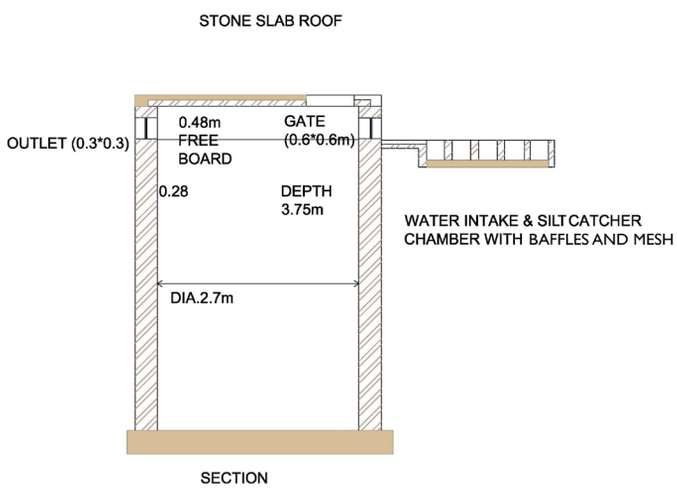

Figure 3. Taanka (household water storage tank)

- Those living below the poverty line
- Those where women travel more than 1.5 km for water
- Widows and elderly having no support

The benefits derived from *taanka* include:

– Provides drinking water for 4-8 months in a year by harvesting rainwater
– *Taankas* can act as storage units once the harvested rainwater has been used
– Prevents further depletion of ground water
– Ensures taste, cleanliness, and quality of water; preventing water borne diseases
– Saves time and money spent on fetching water from faraway places
– Relieves women from the drudgery of fetching water from distant sources of water
– Relieves the local people from the tremendous emotional stress due to water shortage
– Provides scopes of employment to rural artisans possessing relevant traditional masonry skills
– Improves self-reliance of the rural populations
– Improves the standard of living in the areas with poor ground water resources

– *Taanka* is a cheaper alternative to piped water supply

It costs about Euro 290 (15,950) to construct a 20,000 liter household *taanka*. For example: Pabupura village has 40 *taankas* with a storage capacity of 20,000 liters. To construct a *taanka*, it took 10 days to excavate the area, and then a further 10 days to construct the holding tank and catchment area. The village drought mitigation agreement makes sure the household/community takes full responsibility for all future maintenance, and takes all necessary action to stop the *taanka* silting up.

The advocacy

Advocacy is organized on behalf of the villagers through events, visitors, and publications. The events organized by HEDCON bring together an unique group, including village communities, NGOs, and government organizations. These events serve as an important part of raising awareness of the problems in the Thar and discussing current and future initiatives. Encouraging visitors from partner organizations, government agencies, and other NGOs is another important part of the advocacy work because these visits allow others to gain first hand experience of the desert and meet the villagers with whom GRAVIS and HEDCON work. HEDCON publishes newsletters, books, and training manuals on a regular basis to add to the knowledge base for developers. These publications are developed in both Hindi and English so they can reach a variety of readers, both national and international.

Conclusion

Bringing new water technologies and neglecting the old proven can't bring sustainable solution to water problems. It is better to study the traditional technologies and make changes in them as per the environmental and demographic changes in the region. Models created at local level must be scientifically studied and advocated at local, national and international level for its wider use and adoption. The technologies detailed in the text were diminishing but field and advocacy efforts by GRAVIS and HEDCON have rejuvenated them and there is vast acceptance of these technologies in Thar part of Rajasthan.

Acknowledgements

The author/s would like to extend thanks to the team at HEDCON and GRAVIS, and the partners of both the organizations

References

UNDP: Human Development Report (2001): *Making New Technologies Work for Human Development*. Oxford University Press, New York.

Rajasthan in Indian Economy (1999). Directorate of Economics and Statistics, Government of Rajasthan.

HEDCON (2001) *Drinking Water Crisis in Rural Rajasthan*. Reprographic, Jodhpur, Rajasthan, India.

Keywords

water, rainwater harvesting, thar desert, water rights advocacy

Contact details

Deepak Malik
67/145 Pratap Nagar Housing Board, Jaipur
Tel: 91-141-2790800
Email: dmalik123@yahoo.com