

Water harvesting in India

by Derek Ray*

Derek Ray researched some techniques of collecting rainwater in India, and summarizes his conclusions here, with reference to their possible application in the drought-stricken Sahel.

TECHNOLOGIES for water harvesting and rainwater collection used in run-off farming in India are of various kinds, but particularly notable are inundation tanks (called *khadin* in Rajasthan), percolation tanks (often associated with Maharashtra) and village tanks (long established in South India and Sri Lanka and now being introduced into areas of north India such as the Siwalik hills).

Several features of these tanks are noteworthy. First, they are appropriate investments for Indian villages because they use local labour rather than capital in construction, require and use traditional rainwater collecting skills and can be readily managed by a village self-help organization. Initial capital requirements need not be high – for example, Rs5,000 per hectare irrigated seems feasible in the Siwalik hills. This can be readily offset against the extra revenue received from growing two crops or making one crop much more reliable. The investment ought to be able to repay its costs from agriculture alone.

Prospect of profit

Thus the second feature of water harvesting is the bright prospects for increased profits from farming. However, the tanks of South India do not seem to be fulfilling their potential for profit, with tank beds often overfilled with silt, while villagers' water management skills are frustrated by over-bureaucratic authorities. Measures to improve the profitability of South Indian tanks should emphasize ownership by smaller groups and more local control over use and maintenance of the water. The introduction of tanks to the Siwalik hills is following this line of approach. Those who actually farm the land beneath the tank bund pay for and supervise the release of water and maintenance of the catchment area, the bund and the channels.

This leads to the third feature of water harvesting, the need to have a

pool of village skills, talent and capital to draw on. Local control and freedom from bureaucracy is all very well but it makes outside finance more difficult

to obtain and pushes farmers back to relying on their own capital and skills. A village needs seed capital, perhaps livestock which can be sold or used as collateral, or perhaps relatives in town who are prepared to invest in the village. The villagers also need at least some literate farmer who can look after making arrangements, book-keeping and running the water association. This is more likely to be possible with villages in India than in many parts of Africa.



With the help of the Gram Gourav Pratisthan organization in Maharashtra, a group of shoemakers co-operated to blast out a large well and put a flight of six check-dams down the culvert (See also below)



Progress was so good that they had installed three standpipes by 1983. The land irrigated in this scheme is luckily quite close to the pump. This work requires capital, and a unified community

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A question for those concerned with introducing water harvesting to villages in the Sahel, is how far the technology can be adopted without the villagers already being skilled in co-operating over the use and maintenance of facilities. By its nature, water harvesting requires the agreement and co-operation of a number of farmers, and holding a group together requires skills and mental resources. Developing and training group leaders in such skills must have as great a priority as training in the techniques of water harvesting.

The fourth feature of water harvesting is the wide range of complementary benefits for villagers and the environment. As noted above, increased farming profits alone should justify water harvesting.

Encourages reforestation

However, the system encourages (and usually requires) the planting of trees in catchment areas as well as the control of grazing there. New sources of income linked to trees include fruit, timber and fuel wood from the forest; and hay, rope and baskets woven from grasses planted on catchment slopes which are too steep for growing trees, and are now protected from livestock. These products offer income and employment for families whose land is not near enough to irrigate their crops with the collected rainwater. The trees and grass on the catchment stem erosion, increase the biomass in the area and significantly improve the water-holding capacity of the land.

For some villages it makes sense to rotate crops with grass leys which can be used to feed cows (and in India

buffaloes) or goats for milk production. This also increases the complementary benefits of water harvesting because the tethered livestock (for their access to the catchment area must be restricted) provide new sources of income and employment, offer improved nutrition for farm families and have the added advantages of producing dung and being available for draught power and transport.

Summing up, water harvesting and collecting technologies in India are appropriate, profitable for farming, make full use of village capital and skills and benefits the land-poor and the environment. At the same time, they demand a high level of commitment and co-operation from villagers.

We are presently witnessing a tremendous expansion of projects based on rainwater harvesting/collecting in Sahelian countries. The critical factor that decides whether these activities are successful or not will surely be the willingness of villagers to submit to the discipline of community effort and their willingness to share the benefits and continuing costs of maintenance and management. The Indian experience demonstrates there are few technical obstacles in the way of water harvesting. The problems to be overcome are social, political and economic.

Reference

1. Ray, D. *The socio-economics of rainwater harvesting, Volume II: India*. ITDG and Wye College. Photocopies are available from Derek Ray, price £3.00 (60pp), at the address given at the beginning of this article.



A group of shepherds and goat-herds in Maharashtra saw that pastures were being eroded and enclosed in their area. They sold their stock (above) to raise money to build a rock lagoon by the river, and became farmers. The lower picture shows their pump-house. The scheme was assisted by the Gram Gourav Pratisthan organization

Photos: Derek Ray



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