

This briefing note summarises the preliminary case study findings for discussion and comment.

Encouraging smallholders to build their own tanks to conserve monsoon rainwater for irrigation has reaped widespread benefits in one area of Madhya Pradesh.

The Opportunity

Irrigation has long been at the centre of agricultural development strategy in India. However, despite major investment in panoply of measures, only 40 percent of the net sown area in the country is currently irrigated. Where irrigation does take place, the dependence on groundwater has increased to the extent that more than 60 percent of the net irrigated area in India as a whole relies on it. In the absence of any effective regulation or monitoring of extraction, subsurface water tables in several parts of the country have been falling, in some places at the rate of more than one meter per year. There are even areas of the country which have been declared “dark” where no further exploitation of groundwater is permitted.

In Madhya Pradesh, a number of existing tubewells have gone dry and efforts to install new ones or deepen existing wells have either yielded no water or a limited supply of poor quality water unfit for irrigation. The water tables in some parts of the region have over the years declined to almost 200-300 feet below ground level.



Fast Facts

- Often called the Heart of India, Madhya Pradesh is a state in Central India. Its capital is Bhopal and Indore is the largest city.
- Until 1 November 2000, Madhya Pradesh was the largest state in India. It borders the states Uttar Pradesh, Chhattisgarh, Maharashtra, Gujarat and Rajasthan.
- The state has an area of 308,252 km².

RAINWATER HARVESTING IN MADHYA PRADESH

Based on a report and recommendations by Ravinder P. S. Malik

- Agriculture accounts for about 21 percent of gross domestic product.
- Madhya Pradesh is the highest producer in India of pulses, gram and soybean, and ranks second in oilseed production.
- There are 7.36 million holdings which operate 16.37 million hectares of land. Of the 15 million hectares of net sown area, about 38 percent is irrigated.
- Surface water sources account for less than 20 percent of the net irrigated area and the remaining is provided by groundwater.
- Poverty levels in the state are quite high. Depending on what measure of poverty one employs, the percent of population below the poverty line varied between 28 and 38 percent in 2004-05.

The Research

In 2006, an enlightened District Collector in Dewas District launched a campaign to promote rainwater harvesting amongst farmers. The initiative quickly took hold and became the Rewa Sagar Bhagirath Farmers' Movement.

The results of this campaign form the basis of this research. We have examined the experiences of the farmers who have already invested, and have quantified the benefits and costs associated with adoption. We have also researched into the concerns of non-adopters to identify the barriers for other farmers in the area.

The research is based on detailed primary data collected from a random sample of 90 farmers who have been harvesting rainwater for irrigation and 30 farming households who have not. Data was also gathered from local government.

Main Findings

More than 4000 tanks have now been constructed in Dewas District without any financial assistance from the government. Initially, farmers with larger holdings built tanks that varied in size from 0.5 to 10.0 acres with a depth ranging from 6 to 25 feet.

The primary reason for investing in water harvesting structures is to store rainwater available during the wet (monsoon) *Kharif* season and use the water for crop irrigation in the dry *Rabi* season. This water can also be used for supplemental irrigation of Kharif crops during long dry spells between rainy days in the wet season. Now, the proportion of area cultivated during Rabi has increased from about 23% to 95%.

Better irrigation brings an increase in cultivation patterns, so farmers have more to do in the time available. This has often led to switching the methods for land preparation and sowing from bullocks to tractors, both owned or hired.

Farmers with livestock, have been using extra profits to invest in improving the quality of their herd, replacing existing low milk yielding stock with better milkers. Milk production in Khategaon has increased by about 34 % and by 11% in Tonk Khurd.



Benefit-Cost Analysis of Investing in Water Harvesting Structures

- Varies between 1.48 and 1.92 with no government subsidy. Pay back period 2.5 to 3.1 years
- With government subsidy of Rs 80000, B-C Ratio varies between 1.72 to 2.39 payback 1.9 to 2.6 years

In addition, there has been a substantial increase in wildlife such as deer, wolf and other similar large animals, and birds, including peacocks, ducks and wildfowl, and the return of migratory birds to the region. This is because the construction of water tanks has brought about a change in the micro-environment.

Finally, drinking water is becoming more readily available from open wells, which is an indication that there has been a small rise in groundwater tables.

For those farmers who have not invested in rainwater harvesting, the barriers are neither technical feasibility nor financial viability. The principle reasons for their reluctance to build their own tank are as follows:

- Most farmers have only a small area of land and a large family to support. They find it difficult to part with a portion of their cultivable land for a large pond.
- For the majority of farmers, the costs are prohibitive and they have no access to either owned or borrowed capital for investment.
- Although there is a Government grant available for up to 50% of the cost of construction, this can act as a constraint. There is a cap on how many such grants can be given in a year and so many farmers find they have to wait a year for their turn.

Solutions

Identify suitable areas - rainwater harvesting is likely to be more successful in those regions where there are similar bio physical conditions to the study area.

Show farmers the benefits of building their own tanks and give them the relevant information.

Garner the support of the district administration. A responsive, understanding, and supportive local level bureaucracy is absolutely essential.

Provide access to loan capital.

Offer an appropriate subsidy. To partially compensate the farmers for the high cost of building water harvesting structures the government subsidy should be increased and made easily available.

Provide technical support such as engineering expertise and construction advice.

Potential impact

By increasing the availability of irrigation water and improving farming practices, farmers who have invested in water harvesting structures, have seen real increases in both crop yields and their incomes.

Providing access to loans, subsidy and technical support will enable more farmers to benefit from harvesting the rainwater that falls on their land in the monsoon season.

These findings and recommendations are preliminary and are reproduced here for the purposes of discussion. The AgWater Solutions Project welcomes all comments and suggestions. These should be directed to AWMSolutions@cgiar.org, please write "MadhyaPradesh" in the address line.