

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

Small ponds on individual farms can store rainwater for the dry season allowing households to diversify crops, produce fish, increase livestock numbers and have more water for domestic use.

The Opportunity

Bankura District, West Bengal receives 1100-1400 mm of rainwater per year. Much of the terrain is undulating with the result that there is rapid run-off and soil moisture content is low. The majority of the population, many of whom are from scheduled castes (SCs) and scheduled tribes (STs), rely on rainfed agriculture. They are only able to cultivate in the rainy season (*kharif*). Popular crops are paddy and vegetables.

Harvesting rainwater and making it available in the dry season could have major implications for agriculture and livelihoods. It will enable farmers to grow another crop in the winter (*rabi*) season. Four years ago, a program was set up to install "hapas" on farmers' land. Funded by the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), these hapas were designed to cover 5% of the land and to provide supplementary irrigation to paddy in the *kharif* season and use the residual water left in these structures to grow an additional *rabi* crop.

What are Hapas?

Hapas are small, deep ponds, dug on farmland to store rainwater. They are usually located on medium and high lands as these have less water for cultivation and greater runoff to fill ponds. Low lands benefit through seepage and runoff.

The concept was brought to Bankura District in 2006 by PRADAN, an NGO because in the dry season crops could not be grown, drinking water wells dried up and people migrated. The authorities did not know how to address the problem. PRADAN convinced the Secretary of the Panchayat and Rural Development Department to use unallocated MGNREGS funds for hapas construction and the scheme was launched.

The Research

This project investigated the impact of hapas by interviewing 64 beneficiary and 36 non-beneficiary households in three villages in Hirbandh block. Interviews were also conducted with several government officials and the implementing organization, PRADAN.

Agriculture in Hirbandh block is dominated by paddy grown in the *kharif* season and mustard grown in *rabi* season. For the district as a whole, there is very little irrigation infrastructure – no tubewells, 268 dug wells, 506 surface flow irrigation schemes and 14 surface lift structures. However, no irrigation facilities exist in the study villages.

RAINWATER HARVESTING IN WEST BENGAL

Based on a report by Partha Sarathi Banerjee



The rainwater stored in a hapa can help meet both agricultural and the household needs.

Main Findings

More land being cultivated

Initially, smallholder farmers were reluctant to give up land for rainwater harvesting but by 2010 the number of hapas was rising rapidly with positive outcomes (Figure 1).

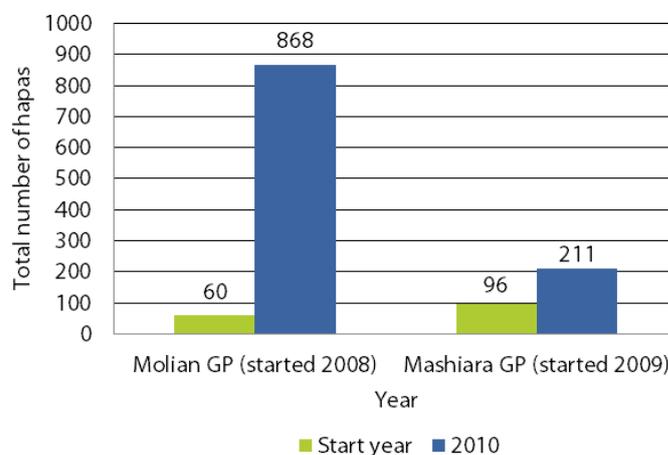


Figure 1. Expansion of hapas in Hirbandh block

Area Expansion

The cultivated land ultimately increased because farmers could irrigated fallow land and leveled sloping land with earth excavated from the *hapas*. 56 *hapa* owners (86%) increased their cultivated area. On average farmers with *hapas* increased their cultivated area by 0.31 acres per farmer, raising it to 1 ha per farmer, compared to 0.97 acres for non-*hapa* owners.

Livelihood diversification

Many *hapa* owners have diversified their crops: 78% now cultivate an additional crop and 95% cultivate multiple crops including maize, mustard and various vegetables. By comparison only 50% of non-owners cultivate multiple crops.

Farmer report that crop yields have increased. On some farms mustard yields have doubled and paddy has increased by 20%.

Hapas are used not only for agriculture but also for gardening, livestock, domestic purposes and fish culture (Figure 2).

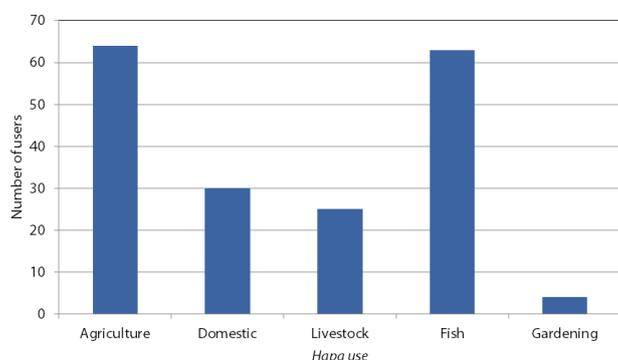


Figure 2. Uses of *hapas*

All but one farmer has introduced fish to their pond. Farmers were supplied with fish-seeds but now they invest their own money. The practice has improved the nutritional and social status of households because fish is usually only eaten by rich households.

The number of livestock owned by farmers with *hapas* increased, which may be a result of water or fodder availability or the general improvement in the economic situation. Cattle numbers grew 9%, goats 57% and ducks 35%.

The ponds have reduced the distance that people, usually women, must walk to obtain domestic water.

Higher incomes

On average, the annual incomes of *hapa* owners are higher than non-owners in the study sample. This is significant as the current owners were previously more likely to be below the poverty line (BPL) than non-owners (Figure 3).

The average additional net annual income amounted to INR 6,918, generated from increased agricultural production (INR 5,792) and fish culture (INR 1,126). The income from agriculture alone was 34% higher than pre-*hapa* incomes.

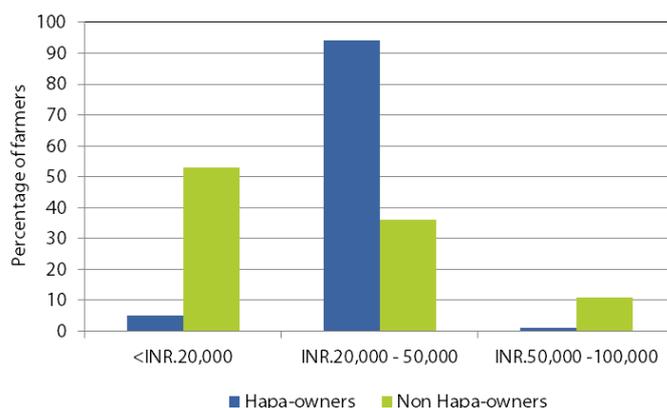


Figure 3. Annual income of the respondents

Social benefits

Of the households that own *hapas*, 69% say that they no longer migrate in the dry season. As a result, more children are attending school.

The programme has generated jobs in *hapa* construction and agricultural labor, and landless farmers are renting more land to cultivate with *hapa* water.

People report that groundwater levels are increasing and the area is greener. This vegetation will help to control soil erosion.

Benefit-Cost Analysis

The benefit-cost ratio of *hapas* is 3.03. The internal rate of return on the cash flow calculated over 15 years is 24.8%.

Solutions

- Involve all villagers from design to implementation.
- Involve all political parties, to minimize politicization of the approach.
- Train implementing agencies in planning and implementation, i.e. how to involve all parties and stakeholders.
- Ensure access to water lifting technology to maximize the benefits of *hapas*. In the survey, 39% of farmers use their own pump and 44% hire a pump.
- Support pump rental markets
- Encourage other districts to use MGNREGS funds to build *hapas*.
- Show government officials responsible for MGNREGS funds the benefits of *hapas*.

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 "West Bengal" in the subject line.