
SUCCESS STORIES OF RAINWATER HARVESTING AND ARTIFICIAL RECHARGE IN CHHATTISGARH

Chhattisgarh state covers an area of 135000 Km² with a population of nearly 2 crore. Over 80% of the entire populace in the state are dependent on agriculture and allied activities.

Geologically, the state is a part of Central Indian Shield consisting of lithounits ranging in age from Archaean to Recent. Nearly 60% of the state is covered by crystalline and metamorphic rocks. Precambrian Chhattisgarh Supergroup of rocks occupies nearly 27% area of the state. Semiconsolidated rocks and others occupy only 13% area of the state. By and large, these lithounits have limited ground water potential.

Average annual rainfall in the state is nearly 1200mm. The ground water resource estimation carried out jointly by CGWB and the State Ground Water Survey indicated that the annual available ground water resources in the state is 13.38 billion cubic meter (bcm). Ground water draft (as on 31st march 2004) is 2.8 bcm with a stage of ground water development of 20.5%. Out of the 146 blocks in the state, 138 have been categorised as safe and the remaining 8 have been categorised as semi-critical from ground water development point of view. There are no critical or over exploited blocks in the state.

SUCCESS STORIES

Though there are several organisations involved in rainwater harvesting and artificial recharge in the state, a reliable monitoring system to test their efficacy is practically non-existent. The following success stories based on reliable field data and feedback are included in this report.

Gujra sub-watershed (block: Patan, District: Durg)
Rainwater Harvesting under Joint Forest Management
Water Conservation measures by AFPRO, Raipur

DISTRICT: DURG

Name of the Scheme: Rainwater Harvesting and Artificial Recharge Gujra Sub-Watershed (Block: Patan, District: Durg)

Location: Gujra Sub-Watershed, Block, Patan. The watershed lies in Patan block of Durg district within north latitudes 21°04'30" and 21°14'30" and east longitudes 81°23'00" and 81°34'00".

Implementing Agency: Public Health Engineering Department (PHED) and funded by the centrally sponsored accelerated rural water supply programme of Ministry of Rural Development, Govt. of India.

Year of Completion: 2003-05

Cost of the Project: Rs 2.67 crore

Average annual rainfall: 1200 mm.

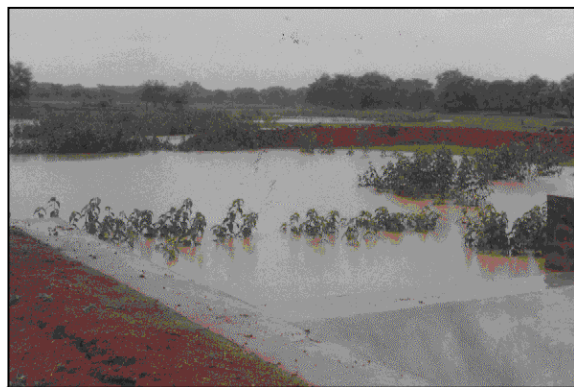
Type of Structures

Types and numbers of structures constructed in Gujra sub-watershed		
Sl. No.	Type of structure	No. of Structures constructed
1	Masonry stop dam	23
2	Percolation Tank	12
3	Boulder Check dam	25
4	Silt trap/Nala bund	13
5	Desilting of pond	28
	Total	101

Table 3: Salient aspects of the engineering structures constructed in Gujra sub-watershed	
Type of Structure	Salient features
Masonry dams: Stone masonry dams were constructed on 2nd and 3rd order streams.	Span 10 to 12m Height 1 to 1.5 m Foundation (cement concrete) depth 1 to 1.2
Boulder Check Dams: Constructed on 2nd order stream.	Span 6 to 10m Height 1 to 1.2m
Silt trap: These are simple masonry structures	Height 0.5 to 0.7 m
Percolation Tank	With masonry west weir and earthen side bunds
Desilting of Ponds	Existing village ponds were desilted



Check dam at Mehra kala



Percolation tank at Tarri

IMPACT: Water Level Conditions (Before and After the Implementation of the Project)

A set of 8 observation wells was established in the watershed to monitor the effect of the project. During the first three years (2001-2004), pre-monsoon water levels were in the range of 17 to 31m in all the observation wells. In the next three years (2005-2008), pre-monsoon water levels in these wells remained within 5 to 13m. Similarly for the post monsoon period, water levels recorded in the initial two years were in the range of 14 to 23, which improved to 5 to 8m in the 3rd year. During the last 3 years, post monsoon water levels were recorded to be in the range of 2 to 6m. Variation of monthly water levels in a representative well (at Achanakpur) is shown in Figure.

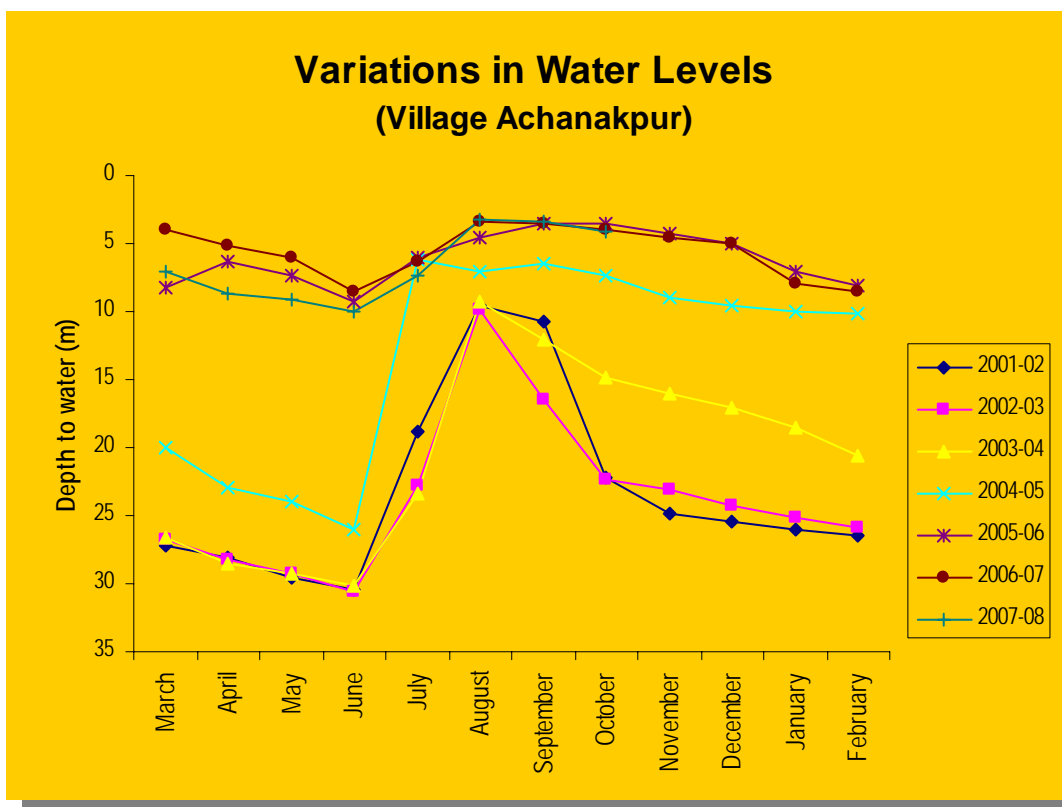


Fig: Monthly variations in water levels in different years in a representative observation well at Achanakpur in Gujra sub-watershed

Irrigation, Agriculture and Other Aspects

The significant improvement in water level conditions, in turn, resulted in improvement of soil moisture conditions and agricultural production. The sustainability of the ground water abstraction structures was ensured because of this project. Due to rise in water levels, the dug wells in the area, which were rendered useless prior to the implementation of the project because of lowering water levels, got revived. People started constructing new dug wells as well. In spite of groundwater abstraction has significantly increased in the area., water level have not further deteriorated.

RAINWATER HARVESTING UNDER JOINT FOREST MANAGEMENT PROGRAMME

(Implemented by Department of Forest)

A few achievements of forest department under this programme are given here.

1. BELARBAHRA VILLAGE (Block: Nagri, District: Dhamtari)

Belarbahra village is adjacent to a protected forest in Dhamtari District. In addition to other development activities like facilitating honey culture etc. providing better irrigation facilities were also the priorities of the joint forest management committee. To start with they deepened a village tank named Dhau talab. Risai Jharan, a spring flowing from the hills used to fall directly to the paddy fields there by destroying the crop and the field. The villagers constructed a canal of 1 Km length and channeled the spring flow to Dhau talab. It solved two purposes, routing the stream through the canal saved the paddy fields from being degraded and the water thus transported to Dhau Talab was stored and used for irrigation. This resulted in 37% (to 150 ha) increase in total irrigated area (Kharif) and nearly 19% increase in total production.

2. ALEKHUNTA VILLAGE (Block: Nagri, District: Dhamtari)

In Alekhunta village of Dhamtari district, the Forest Management Committee has set an example in water resources Management. Alekhunta village, home to 64 families with a total population of 267 was almost entirely dependent on forest. Under JFM Programme, a stop dam of 10m width was constructed along Futhamuda stream. The stored water was then distributed to different parts of the village with construction of 2 canals, one of 4 Km length and the other of 3 Km length. There was 350 acres of arable land and there was no irrigation facility. This construction provided irrigation facilities to the entire 350 acres (during kharif only) of land and resulted in 80% increase in agricultural productivity in the village.

3. JHUNJHRAKASA VILLAGE (Block: Nagri, District: Dhamtari)

Jhunjhrakasa village is on Birgudi-Ghattasilli road in Dhamtari district. The village has a population of 503. Paddy cultivation in the village used to be completely dependent on monsoon rain. Under the Joint Forest Management Programme, the Forest Management Committee has constructed a stop dam across Jhura Nala as a result of which 200 acres of land could be brought under assured irrigation. In addition to this the Forest management Committee has also constructed 18 sluice gates thereby facilitating irrigation in additional 90 acres. The villagers in Jhunjhrakasa are now started taking the second crop in 80 acres of land.

WATER CONSERVATION MEASURES BY AFPRO (ACTION FOR FOOD PRODUCTION)

DISTRICT: BILASPUR

KHONDRA VILLAGE, Block: Masturi, District: Bilaspur

Pre-project scenario

There was severe soil erosion by streams in the agricultural lands in foothill areas, rendering marginal farmers landless. No source of irrigation except one water harvesting structure that provided critical irrigation to approximately 30 acres of kharif crop i.e. paddy

There were only two water harvesting structures (ponds) in the village that were utilised for washing, bathing, drinking water for cattle etc.

Type of Structures Constructed:

1. Gabion: One stream which is used to cause erosion to about 12 acres of land, one gabion has been constructed to reduce the runoff velocity of stream water, divert a part of it while letting the rest to spill over it.

One diversion canal was constructed to let the runoff diverted by the gabion to a pond that was constructed with the objective of storing the diverted water.

Cost of the Structure: Rs.15,000/-

Impacts: Reclamation of 12 acres of land that was rendered unfit for cultivation thus providing livelihood option for the seven farmers who had virtually become landless because of erosion.

Creation of a water body (pond) that is used to provide critical irrigation for paddy in about 25 acres of land. In addition, it is also used for pisciculture by women Self Help Groups (SHGs).

Indirect benefit to about 50 acres of land in the form of protection from soil erosion the intensity of which has been reduced after the construction of the structure. About 15 families are benefited by it.

2. Gravity Irrigation Scheme:

There was an existing water harvesting structure across one of the streams which was used for washing clothes, bathing and to meet drinking requirement of animals. A sluice gate installed at one side of it provided water for kharif crop in about 30 acres of land.

It was planned to increase the storage area of the structure and to install a gravity irrigation mechanism in it. Increase in the storage area would further reduce the intensity of soil erosion that the overflow from the structure was causing.



A trench was dug for laying the pipe about 4m below the ground level and the strata was rocky. Every family contributed its own share of digging and time limit was fixed for it. It was interesting to note that the mechanism for controlling the flow of water through the pipe is an innovative approach where an iron rod has been fixed with concrete and a mechanism for lifting / bringing down has been built up. It has reduced its cost and time required for construction.

Impact: The scheme provided irrigation to 100 acres of paddy. When sowing was delayed in rest parts of the area, Khondra people could do it on time due to the scheme. The structure is expected to initiate second cropping in the village. About 75 farmers would get the benefit of the structure.

DISTRICT: KANKER

VILLAGE GUMJIR AND PUSAGHATI , Block: Antagarh, District: Kanker

Types of Structure:

1. Rain water Harvesting

Gumjir and Pusaghati villages were not having even a single water body prior to the implementation of the project. Under the present project, total eight ponds have been constructed. These ponds are used by the community for washing clothes, bathing and for drinking purpose of the cattle. The common pond at Pusaghati is also used for fishery purpose.

2. Diversion channels

The area is subjected to heavy soil erosion due to the intense runoff and sandy nature of the soil. Another problem prevalent in the area is that the runoff coming from the hill fills the agricultural fields with sand thus affecting the crop yield drastically.

Stream cause of soil erosion and sand filling in the agricultural fields. The interventions were planned in series – first a gabion was constructed at the foothill. This gabion reduced the velocity of runoff and divert a part of it to the uplands & provided the much needed water for irrigation to it. Then further down of it four loose boulder structures have been constructed at suitable places. Finally, the above mentioned diversion channel has been constructed to divert the runoff from the fields. The channel is connected with the main stream flowing through the village. Thus the sand and excess water is safely diverted to the main stream.



It was a very low cost watershed treatment and the results were wonderful in the monsoon that followed. Later three more diversion channels were constructed. These diversion channels have been very successful in diverting the excess runoff and also prevented the entry of sand into the agricultural fields.

DISTRICT: BASTAR

VILLAGE AMADONGRI, BLOCK: JAGDALPUR, DISTRICT: BASTAR

Types of Structures:

1. **Bunding** : In the village Amadongri a large portion of cultivable land was lying fallow due to poor water retention capacity of the land. The farmers used to grow paddy in the low lying land which were properly banded and leave the other areas. During the planning phase it was decided to improve the condition of the uplands by constructing field bunds in them. This activity has been very successful in improving the land condition and thereby bringing additional land (approximately 300 acres) under cultivation. The field reports say that the yield of paddy has increased approximately from 1.5-2 qtls per acre to 4-5 qtls per acre.

2. **Pond construction:** The village was having only one pond during beginning of the project. This was the community pond that used to dry up in summer. It was deepened and now it holds water for the entire year fulfilling the domestic need of the community like bathing, washing etc and drinking water requirement of the cattle.

Besides this, three more ponds have been constructed, two of which are on personal lands of beneficiaries. The purpose of these ponds is to provide water for their animals and benefit the lands at the downstream through percolation.

The pond at the field of Manglu has been constructed only for Rs.10,000/- approximately and its size is 18m*18m*1.75m.

The ponds constructed for Madda and Manglu are personal but their access is open for all so far as the requirement of cattle or domestic needs of the human beings are concerned. The owner may practice fishery in their ponds and enjoy exclusive rights over it.

3. **Contour Bunding:** The idea of constructing contour bunds was new to the community of Amadongri. The community was taken for an exposure trip to Mariguda watershed area in Jagdalpur where they were exposed to the benefits of contour bunding. Secondly community was convinced that the height of the bunds would be kept less and provisions for disposing excess water would also be there that would prevent their crops from any possible damage due to water logging condition.

The land selected for contour bunding was upland that was undergoing severe soil erosion because there were no bunds in it at all. The community was taking maize, and some local cereals called as kodo, kutki in it. But after the construction of contour bunds, they are now able to take paddy in it and also some second crop like gram, mustard etc that can grow in the moisture present in the soil naturally. About 113 acres of land has been covered under contour bunding.



Fig.7: Pond at the field of Manglu



Fig.8: Manglu on his paddy field