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# Watershed – A Means Of Survival For The Villagers Of Chaprak Of Hazaribagh; Jharkhand

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**Abstract:**

This paper is an attempt to focus on the importance of water conservation and its various aspects of Natural Resource Management (NRM), its sustainability and economic enhancement for the community. The initiatives aim, at reducing the ill effect of nature that the region is facing, the scarcity of rainfall and drought like situation during the summer season. Hazaribagh is one of the districts of Jharkhand, which is geographically part of the Chottanagpur Plateau. The climate is generally dry with average rainfall data of 1250 mm, annually (Ref: Table-1).

The rock type of the Hazaribagh is Archaean–Proterozoic Granite- gneiss, Schists, Phyllites, Granites, Amphibolite, Basic and Ultrabasic Lavas, and Gondwanas. The district can be divided into three divisions namely the Central Plateau, The lower plateau and the Damodar valley. The Central plateau is situated in the central part of the district. Hazaribagh town lies in this part having an average elevation of 600m.The lower plateau is situated all around surrounding the central plateau. The height of the lower plateau averages to 450m.

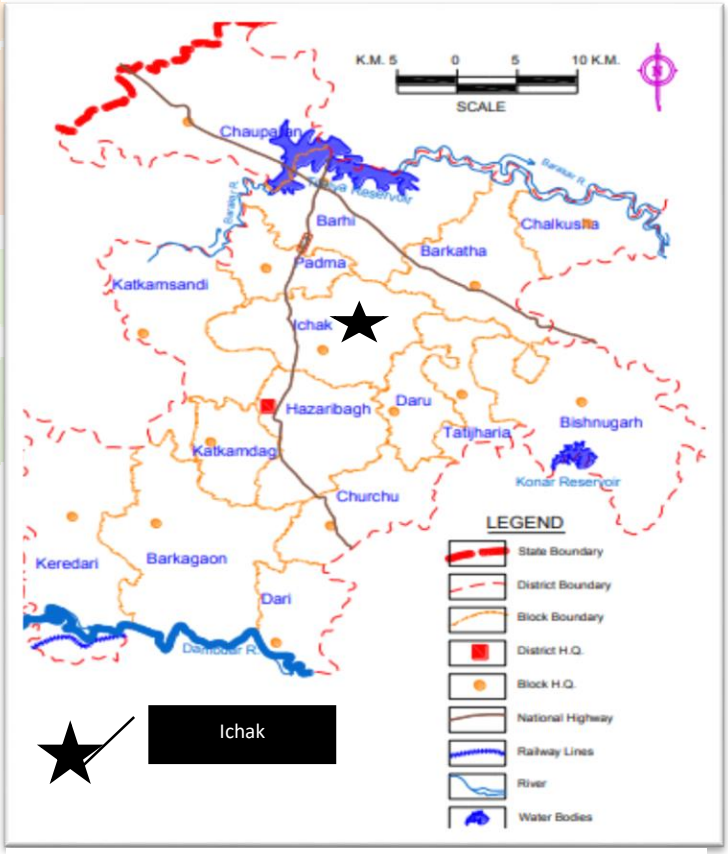


*Figure 1 Map of Hazaribagh Showing Political Boundaries and Water Bodies*

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The Damodar valley region is situated in the southern part and extends through the blocks of Keredari, Barkagaon, Patratu, Ramgarh and Gola blocks. The area of study Ichak Block lies in the lower plateau region and thus has very scanty rainfall with an average of 1234 mm annually. The area is often faced with recurrent drought during the summer season.

**Table: -1**

| Rainfall (mm) Data of Hazaribagh District for Pre & Post Monsoon Season | | |
|---|---|---|
| **Pre-Monsoon (March - May)** | **During Monsoon (June-September)** | **Post-Monsoon (October-December)** |
| **Not Known** | **1234 mm** | **214 mm** |

Ground Water level in the state of Jharkhand varies considerably depending upon the terrain, hydrogeological conditions and stage of Ground Water Development. Due to the recurring drought like situation in the area, often the standing crops in field die before maturing, leaving no options for the farmers and the community to migrate and depend upon the Forest Produce (FP) & Non- Forest Produce, for their livelihood options. The primary source of water in the area is wells & ponds with very few hand-pumps and tube wells.

Due to the hard rocks present in the underneath such as Granite, Gneiss, and ultrabasic Lavas, there are perched aquifers[3] where the water gets accumulated underneath by percolating through cracks and crevices between the hard rocks. But this water is also very limited and not available at all the places beneath the earth surface. The un-controlled extracting of water from these aquifers have made them dry, even worse during summer.

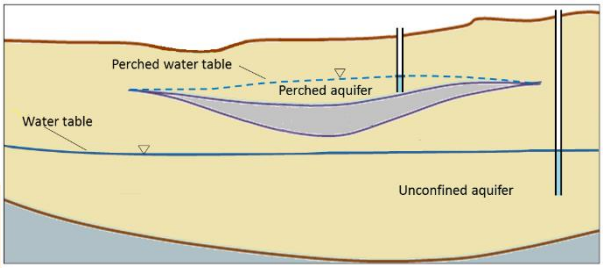



*Figure 2 A diagram representing a perched aquifer*

The methodology used to document the importance of the watershed structure is participatory research in nature. This method involves the use of various tools and techniques to record the qualitative research with the user group.

[3] Perched Aquifers-A perched aquifer is a body of groundwater that sits above the regional water table, separated from it by an impermeable layer of rock or sediment (like clay).

The tools used were FGD, individual discussion/ interviews and Participatory Research Appraisal (PRA)[4] tools such as trend analysis & Seasonality and transact walk. An opinion poll was taken from the user group members on the benefits of the water conservation structure, that has been represented in the paper. The focus of the paper is to analyse the utility of the water conservation structure for the community, its benefits and the sustenance of the modal for long term ceaseless use for the community.

**Key words:**

Watershed, Natural Resource Management (NRM), Water Absorption Trench (WAT), Trench cum Bond (TCB), Percolation Pond (PP), Earthen Check Dam (ECD), Loose Bolder Structures (LBS), Water Harvesting Structure (WHT) Continuous Contour Trench (CCT), Gully Plugging (GP) Forest Produce (FP) & Non- Forest Produce (NFP), Sustainable Integrated Farming System (SIFS) and Jan Jagran Kendra (JJK).

**Background:**

Ichak is the block where the intervention has been executed. It lies in the sadar block of Hazaribagh district. Ichak is a Granite Gneiss formation and lies in the central zone of the district. Ichak, in Jharkhand faces a water crisis, with villagers relying on hand pumps and wells for drinking water, whereas some areas experiencing water scarcity, particularly during the dry season. Because of the hilly terrain and the geography of the area leaves no other option but to go for water conservation by engaging the local communities and harvest the rain water rain runoff water naturally in the form of watershed[5]. One such initiative has been carried out by Jan Jagran Kendra (JJK) a NGO, working in the district for more than 43 years on various issues of water conservation. The project has been supported by NABARD –IRDF[6] and the duration of the project was (2017-2022), by engaging the community for better maintenance and operation of structure. The example has been set in the Ichak Block, Hadari Panchayat, in Chaprak Village with farmer Suresh Prasad Mehta and other kin residing in the village. The community residing in the village Chaprak is primarily farmers and belonging to Mehta community. It is said that the Mehta community own a significant piece of land in the village and do farming as their primary occupation.

Suresh Prasad Mehta and their kin have around 20-25 households in the village with land holding in acres[7]. Their forefather did agriculture and vegetable cultivation in the past as there was enough water available for cultivation throughout the year. But over the years this scenario has changed due to the rapid deforestation and very little water conservation structures present in the village. There are only two wells present in their hamlet with very little water in the wells up to 3-4 feet. This often runs dry during the summer season. Because of the hard granite rock beneath the top layer of the soil and irregular distribution of the aquifers very little hand pumps are there in the village. During the summer the situation becomes grim with the wells going dry, with the one community pond present in the village is dirty and muddy.


*Figure 3 Showing a Watershed diagram*

The villagers are left with no other option but to tarp the runoff water from the rain to use it for their crops and other utilities. The structure is based on the local saying about the runoff water that goes waste. The saying **is "KHET KI MITTI KHET ME, KHET KA PANI KHET ME, GAUN KI MITTI GAUN ME, GAUN KA PANI GAUN ME".** A detail meeting with the JJK team was held and the problem was discussed in detail. The community sat together for meetings several times to discuss the problem of water crises and its probable solution. The team of JJK along with the villagers after the meeting

[4] Participatory Rural Appraisal (PRA) is a method of involving local people in the planning and management of development projects. It's a systematic approach that uses interviews, group work, and visualization techniques

[5] Watershed as per the definition of hydrology refers to an area of land that comprises a set of streams or rivers that drain into a larger water body like a pond or a river

[6] NABARD-IRDF: A major policy initiative for rural infrastructure development has been the setting up of RIDF in NABARD in 1995 for financing rural infrastructure projects. RIDF was set up to fund infrastructure projects in States, which are incomplete due to lack of financial resources.

[7] As per oxford dictionary is the measure of land which is 0.405 part of hectare.

went to the site to have an overview of the probable solution.

A land was identified for the collection of the runoff water, as the land was low lying and had depression. On the other hand, it had a large catchment area on the higher gradient, which can make the rain water collect easily in the pond. The catchment of the structure was in the green land of the village. The villagers wanted to dig and remove soil from the pond to make it a structure that can hold maximum water and is enough for irrigation during the lean period, when other options are not available.

The team with an civil engineer went for a transact walk[8] of the site and the catchment area of the water-harvesting structure. After carefully observing the site and simultaneously discussion with the community, the site was finalised for the harvesting structure. A pons of dimension 100 feet x 100 feet and depth of 10 feet was decided. The engineer suggested that since the catchment area is large huge volume of runoff water will be drained and it can damage the bunds of the pond and the area will get silted.

To control the runoff water as the gradient is very high and simultaneously the velocity of the water. It was decided to make continuous contour trenches and gully plugging with small earthen/ boulder check dams. Four small percolation ponds will be excavated on the way of runoff water before the main harvesting structure.

The identified area for the pond lies on the land of Suresh Prasad Mehta. He happily agreed to help the community to build the structure. After the finalization of the structure another meeting with the community was held to form the user group committee. The name of this committee was Krishi Asthiai Samati Hadari (KASH). Three members of this KASH samati were selected as the post holders (President, Secretary and a member from JJK). A bank account was opened in the name of the samati to put the operation & maintenance amount.

Along with this a detail plan for water uses and maintenance of the structure was made with the consensus of the community. No user fees were, imposed since all the expenditure regarding the structure was leveraged from the NABARD-RIDF project. The structure was constructed on Rayati land[9].

A detail study on the benefits has been captured in the section case study over a period of five years.

**The Initiative:**

JJK team members along with the community started to implement the action plan. The amount into the bank account was transferred only when a substantive work was done. The amount that was to be transferred to the bank account was 5% of the total budget of the project. The other money that the samiti received from the project was Rs. 1125/- for conducting meeting of the user group on monthly basis. The total life of the project was of five years (2017-2022) under NABARD-RIDF-HZB-01. The total cost of construction of the water harvesting structure was approximately Rs. 2.50 Lakh. The amount was transferred to the bank account of the KSSH as per the progress of the work executed by the NGO, JJK.

The user group started the excavation of the water harvesting structure with the dimension calculated by the civil engineer of JJK. The structure was 100 feet X 100 feet X 10 feet (100x100x10). The volume of water in the peak of the monsoon season in the structure will be approximately 1 Lakh cubic feet of water.

**Formula used to calculate the volume of the structure: 100X100X10 will be**

**Volume: L x B X H[10] = 100*100*10 = 100000 cubic feet of water in the structure.**

The water in the structure was enough for the user group of the Chaprak village to irrigate the agricultural field of 15 - 20 farmers, approximately 25-30 acres of land. The work was planned in a way that it is completed before the start of the monsoon season. The community participated in the excavation work and tractors were used to remove the excavated earth from the site to build the bunds of the water harvesting structure. The excavation work took place for approximately 2-3 months. After the main structure was completed another similar structure was built in contiguous to the water harvesting structure.

The utility of the structure was designed in such a way to provide the family and other user members with a modal of Sustainable Integrated Framing System

[8]A transect walk is a systematic, participatory method of gathering data about a community or area by walking along a defined path, observing, asking questions, and listening to local people.

[9] Rayati Land: A raiyat was defined as someone who has acquired a right to hold land for the purpose of cultivating it, whether alone or by members of his family, hired servants, or partners.

[10] The volume of water contained in the structure is calculated by the formula L*B*H; where L= length, B = Breadth and H = height.

(SIFS)[11]. With SIFS modal in place it brought many fold benefits for the villagers of Chaprak.

The advantage of the structure brought with it the concept of Integrated Farm Management, where Climate, Nature, Economy and Society was integrated. As the structure was completed and monsoon approached the structure was filled with water. In the first year the water was used for irrigation purpose. The structure could provide enough water for irrigation throughout the year.

This was the year that the farmers of the village cultivated crops in all the three season, Rabi, Kharif and Zaith. Due to the water harvesting structure their standing crop could receive water from the structure to mature on time. This brought relief on the faces of the farmers, who were struggling to cultivate.

In the coming season the family of Suresh Prasad Mehta, planned to go for SIFS. He put fish fries in the pond and also brought crop diversity by planting lentils,


*Figure 4: Sustainable Integrated Farming System*

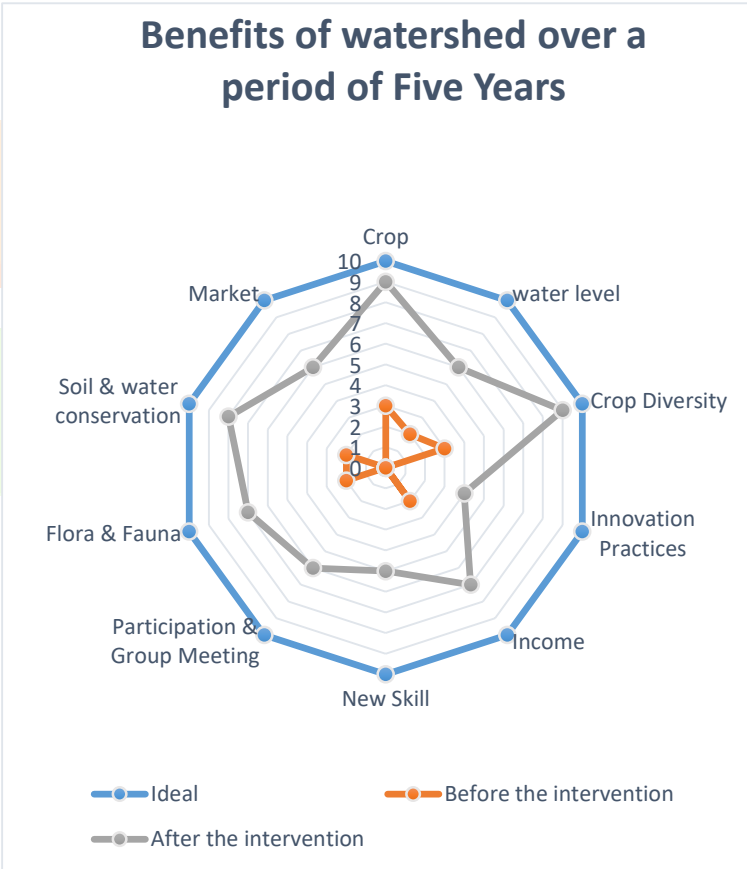
creepers, and other timber and fruit species trees on the water harvesting structure bund. He also introduced poultry and ducks to feed on the weeds and other insects in the pond and on the bunds. The droppings of the poultry and ducks became the feed of the fish in the pond.

Apart from Suresh family other farmers that were getting water from the pond and were very happy from the outcome of the efforts that they have done collectively. The farmers were getting the water for irrigation free of cost, but occasionally they have to provide their services in the operation and maintenance of the structure. The farmers were able to cultivate three crops in a year. The farmers after self-consumption of the produce from the field were able to sell it in the local market. This increased the income of the family and enhanced their economic status.

**Case Study:**

The water though it was used by other members of the village, but the land on which the structure was built was of Suresh Prasad Mehta. The benefits of the structure were maximum to Suresh family. A trend analysis was conducted to understand the benefits with the members of his family. The discussion reviled that the ponds has brought a holistic benefit to the family and the overall ecosystem of the village.

The web diagram[12] performed with the member of Suresh family describes the benefits over a period of five years from 2017 to 2022.



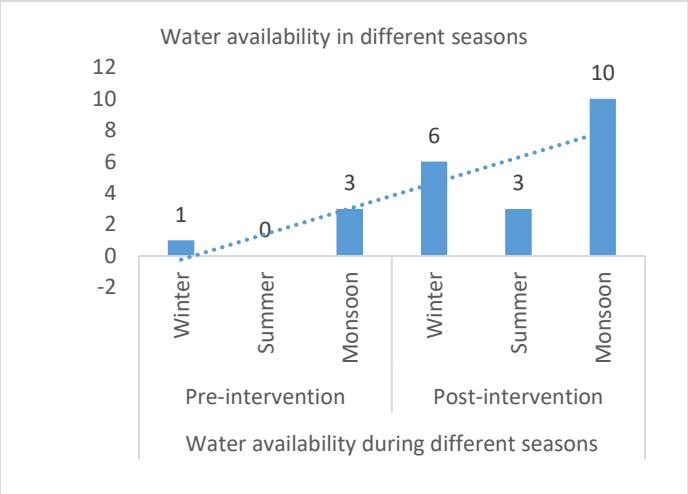

The structure has brought a multi-dimensional benefits to the village and family. The benefits are as follows:

- Crop in all the three season throughout the year, as water for irrigation is available. The villagers have switched from one crop to three crop in a year.

[11] SIFS: it a modal of sustainable and Integrated farming system, where the product of one sub- system becomes the utility for other system.

[12] Web diagram- is a participatory tool used in the field, directly with the project participants to analyse the changes or trends in the changes happening over a period of time and then by plotting the same based on the desired indicators we get the changes happened on a ten - point scale.

- The practice of soils and water conservation among the villagers can be seen. As there are structures such as bunds, gully plugging, trenches. Percolation tanks and soil stabilization by planting trees. The soil moisture has increased, due to these structure.
- Water level, in the nearby structure especially the wells has seen increase in by 3-6 feet during the normal season and 2-4 feet during summer. Below analysis is done based on the exercise on seasonality[13] on water availability with the user group.




- Crop Diversity, the family has started practicing crop diversity. The practice is carried out on the bunds of the pond. The crops like lentils, creeper vegetables and other fruits.
- Innovation Practices; the villagers have started adopting innovation in agriculture as they are doing sustainable integrated farming system approach. Apart from crops, they have introduced fish, poultry and ducks.
- Income; the income of the family and the other villagers have increased as from one crop to three crops in a year. The excess after self-consumption is sold in the market to get money. The fish, duck and poultry also contribute to the income of the family. The family has been securing income of approximately Rs. 2 to 2.5 Lakh annually. Initially before the intervention the income was in few thousands of Rupees per household.
- New Skills; the residents of Chaprak village has acquired new skills in fish farming as they have been provided training on this subject from Agriculture Training Institute, Namkom, Ranchi. The other training received is on use of bio-pesticides for the crop and wormi-compost.
- Participation in meetings; the sense of participation in meeting and its importance has increased as a result of the success of the water conservation structure. The sense of planning and thrashing out the problems among them has increased the participation of villagers in the meeting and increased their confidence.
- Flora & Fauna; the flora and fauna has also increased in the village as before the water conservation structure the villagers could do only one crop in a year, whereas now they are doing three crops and with diversity. Even they have introduced agro-horticultural practice on the bunds to stabilize it.
- Replication; by seeing the success of the water harvesting structure the villagers have replicated the water harvesting structure and built one more new structure.

Through the case study of Suresh Prasad Mehta, it is clear that a water harvesting structure has brought a many fold changes in the lives of the Chaprak villagers. The case study reveals that there were multi-dimensional benefits in terms of society, nature, climate and economy to the villagers.

**Conclusion:**

The crux of the intervention is that with very little investment and engaging community has lead to a very fruitful result. The hand holding support from time to time by the team members of JJK was a feather to the cap.

The word cloud[14] as opinion poll from the user group members shared the multi-dimensional benefits of the water conservation structure. It reflects the opinion of the community at large. The words that are bigger in size and repeated more times by the community are more important, and the smaller words and not repeated many times are of less important for the community. The words such as: Conservation, water, diversity, skill enhancement, flora & fauna and soil are of important for the community. There are very little

[13] Seasonality refers to the tendency of certain data to exhibit recurring patterns or trends at specific times of the year or during certain periods.

[14] The word cloud is a visual tool for displaying the most frequently used words in a text or set of texts

word of less importance for the community. This clearly represent the success of the water conservation structure and its importance to the community.


*Figure 5:Word Cloud as opinion poll*

The saying of the community "**"KHET KI MITTI KHET ME, KHET KA PANI KHET ME, GAUN KI MITTI GAUN ME, GAUN KA PANI GAUN ME"** stands very true and justified as the water conservation structure has brought many positive and long term changes into the life of the community. The community has learned the power of collective effort, planning and budgeting and execution of the plan for their benefits.

By this effort has brought changes to many factors, like harvesting the runoff water, soil conservation, introducing new innovative approach in farming by adopting sustainable Integrating Framing System and increase in Flora & Fauna of the village ecosystem. The moisture content of the soil along with the water availability during the summer season is the positive aspect of the water harvesting structure.

A small investment of Rs. 2.5 Lakh to build the water harvesting structure has brought happiness and smile to as many as 25 households in the Chaprak village. With enhanced family income, new skills, and increased flora and fauna of the village. The structure has brought an overall positive change in the village environment and ecosystem.

The modal of Chaprak village of Hardari Panchayat is a success story. This could be a demonstrative modal for the state of Jharkhand and needs a policy to replicate it in the region where similar geography prevails. As we know that there are several factors that influences a modal to be successful, we need to put together the efforts into a compilation.

The whole world is experiencing the situation of water crisis in the eve of climate change and global warming. A small initiative such as the modal set in Chaprak village will be a step forward towards water self-sufficient for drinking, irrigation and daily uses, is thought to ponder and act.

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