# COMPENDIUM OF BEST PRACTICES

## WATER MANAGEMENT IN TRIBAL AREAS

2021

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# FOREWORD

Water security is one of the primary challenges that rural communities experiences. This further becomes a driver for other challenges like food security, health and livelihoods. Most conversations with a rural household will indicate the seasonal stress they face, calling it out to erratic and bad monsoon. Erratic monsoons are now a reality, as much as true, is the fact that, there is lack of management of water, watershed and irrigation.

There are enough examples of engineering marvels of water conservation around us, including the traditional systems of water harvesting, such as, the bawari, jhalara, nadi, tanka and khadin. Even today the traditional knowledge and wisdom is used as part of water crisis solution. Livelihoods for rural communities are more intricately linked to water and face higher risk from water-related challenges. To evolve a solution, and one which can be linked to improved livelihoods, we need a multi-pronged approach involving the revival of traditional structures, as well as, creating new infrastructure for water conservation. Further, there is a need to recharge the groundwater level in watershed areas, increase water-use efficiency in agriculture by ensuring the adoption of water management techniques and conserve fertile soil through soil and moisture conservation.

Confronted with this reality, Axis Bank Foundation realizes that, focusing on the issue of water, and integrating this to other activities, is a key to sustainable development. Axis Bank Foundation, along with its partners, works in some of the most socio-economically backward regions of Central India, especially with higher tribal populations. Axis Bank Foundation seeks to create systems and opportunities, which would ultimately lead to better income generation and self-sustenance. Water is one of the key areas of the interventions, and water-related elements transcends through most of Axis Bank Foundation supported projects.

This report highlights the importance of water management, and practices in Central India, and is part of a project anchored by AKRSP(I), to influence policies for enhanced water control by tribal communities. While it is important to allocate more resources for water control in tribal areas, it is also critical that, studies provide options of how the resources need to be used for greater effectiveness. Hopefully this report provides options for policy-makers, practitioners and donors, as they try and enhance water security in some of the poorest regions of India, the Central-Indian tribal belt.

**Dhruvi Shah**
Chief Executive Officer
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May 2021

# FOREWORD

Amongst all the vulnerable communities in India, tribal communities are the poorest with 47% of tribal communities below the poverty line. They are also the most predominantly rural community, (the other vulnerable community, the scheduled castes, have made a major transition to urban areas over the last two decades).

A large number of NGOs have been working for a long time in tribal areas; evolving solutions to enhance their livelihoods. Many of the agriculture solutions are based on access to irrigation, and large-scale studies of 'small farmer, prosperous farmer', show that water control has become a necessary, but not sufficient condition for tribal prosperity. It is also very clear, that while individual efforts by many NGOs have been effective; it is essential for both state and markets to be influenced, to scale up water control interventions for tribal communities. The percentage of area under irrigation in tribal areas is half of that in non-tribal areas: and therefore the potential to scale up is high.

Given this context, AKRSP(I), with the support of Axis Bank and Axis Bank Foundation, has initiated a research and policy initiative to enhance water control for tribal communities. One question, which is often raised is that, water interventions are dependent upon the geographical conditions (soil,slope,rainfall etc.) to be effective and therefore, how can we argue for interventions for a community, rather than a geography? The response to that is based on the fact that, tribal communities in India are in two distinct geographies; the North East (coming under Schedule 6) and the Central India Belt (coming under schedule 5). AKRSP(I) is largely focussing on this Central India region, which has 70% of the tribal population of the country. And here the overlap between geography and community becomes clear: the tribal communities are located in geographies, which have the following common characteristics:

1. Forest land between 10-50% of the total land
2. Undulating hilly and mountainous terrain; slopy agriculture land
3. Reasonably high rainfall (700-3000 mm)
4. Geology not conducive to high groundwater storage and access;depletion in summer months affecting drinking water availability.
5. Region traversed by small streams, rivulets, rivers during monsoon
6. Cultivable land at some height from the flowing rivers.

7. Small land holdings: >90% marginal and small farmers
8. Lack of reliable electricity, with power lines not reaching inner villages/farms or being damaged during heavy monsoons.
9. Stored water and streams/rivulets being used for multiple uses: drinking water, fishing, agriculture etc.

Research also shows that most irrigation investment by the state has been in the application of technologies, which work in the plains. Large Dams, large lift irrigation schemes, large number of well schemes, and water-focused schemes, which are delinked to land development are most common government interventions. These have become partially or fully non-functional because they have not addressed the unique characteristics of the tribal geographies.

Tribal communities, being poor and largely rural, have less political representation and voice. Hence resource allocation for them is less than that for non-tribals. Poor access to bank credit and liquidity crunch leads to lack of private investment in irrigation(individual wells/borewells) and, given the poor groundwater availability in these geographies, it is also less rewarding.

Therefore there is need for the following:

A. Highlighting the evidence to enhance the investment for water control/irrigation in tribal regions, so that larger number of tribals access water control, and the area under irrigation and kharif water support, increases substantially.

B. Ensuring that the increased investment is effective: i.e. providing participatory technology options, which are proven to be effective in tribal areas by tribal communities.

This study focusses on Part B. This series of best practices shows, how tribal communities and NGOs have evolved solutions, which are effective in the tribal context, and for/by tribal communities.

Each of the best practices mentioned in the compendium, while given for a specific geography, can be applied to other tribal geographies as well. For example, the case studies on Participatory irrigation Management(PIM) approach, or the Diversion based Irrigation schemes (DBIS) have application across the entire Central India tribal belt. Hence these best practices can be shared with tribal departments /Rural development departments/Irrigation departments across all these states and districts, and included in the technology options when the district irrigation plans have to be operationalised for tribal communities. This will ensure that when funds are allocated by the state or other non-state players, they are used effectively to enhance water control.

**Apoorva Oza**
Chief Executive Officer
Aga Khan Rural Support Programme (India)
May 2021

# ACRONYMS

| | |
|---|---|
| ACT | Arid Communities and Technologies |
| ACWADAM | Advanced Centre for Water Resources Development and Management |
| AKRSP(I) | Aga Khan Rural Support Programme (India) |
| ASA | Action for Social Advancement |
| BJ | Bhujal Jankar |
| CAMPA | Compensatory Afforestation Fund Management and Planning Authority |
| CARD | Centre for Advance Research and Development |
| CIS | Canal Irrigation Society |
| CSO | Civil Society Organisation |
| CWMI | Composite Water Management Index |
| DBI | Diversion-based Irrigation System |
| DPAP | Drought Prone Areas Programme |
| DSC | Development Support Centre |
| FES | Foundation for Ecological Security |
| FFS | Farmer Field School |
| HLA | Hamlet Level Association |
| HUF | Hindustan Unilever Foundation |
| IC | Irrigation Cooperative |
| ID | Irrigation Department |
| IMT | Irrigation Management Transfer |
| IWMP | Integrated Watershed Development Programme |
| KVK | Krishi Vigyan Kendra |
| LIC | Lift Irrigation Cooperative |
| LIS | Lift Irrigation System |
| MARVI | Managing Aquifer Recharge and sustaining groundwater use through Village-level Intervention |
| MCM | Million Cubic Metres |
| MGNREGA | Mahatma Gandhi National Rural Employment Guarantee Act |
| MOA | Memorandum of Agreement |
| MOSPI | Ministry of Statistics and Programme Implementation |
| MOU | Memorandum of Understanding |
| NABARD | National Bank for Agriculture and Rural Development |
| NGO | Non-Governmental Organisation |
| NIWCYD | National Institute for Women, Child and Youth Development |
| NRLM | National Rural Livelihood Mission |
| O&M | Operations and Management |
| PEC | Project Execution Committee |
| PGWM | Participatory Ground Water Management |
| PIM | Participatory Irrigation Management |
| PRA | Participatory Rural Appraisal |
| PRADAN | Professional Assistance for Development Action |
| PSI | People's Science Institute |
| RKVY | Rashtriya Krishi Vikas Yojana |
| SC | Scheduled Caste |
| SRIJAN | Self Reliant Initiatives through Joint Action |
| SRLM | State Rural Livelihood Mission |
| ST | Scheduled Tribe |
| TADP | Tribal Area Development Plan |
| TMC | Tank Management Committee |
| TSP | Tribal Sub Plan |
| UHM | Undulating Hilly and Mountainous |
| USGS | United States Geological Survey |
| WASSAN | Watershed Support Services and Activities Network |
| WUA | Water User Association |

# ACKNOWLEDGMENTS

This compendium is a result of the collective wisdom of grassroots organisations working for the betterment of tribal communities. The best practices shared here are the result of learnings from years of implementation experience in selected geographies of the Central Tribal Belt.

A product of the Corona *Kal,* it was made possible by people patiently answering tons of questions over lengthy phone conversations. AKRSP(I) would like to extend its thanks to all the people who contributed their inputs and time to make this compendium possible.

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# CONTENTS

# INTRODUCTION

The Central Indian tribal belt covering over 100 districts in 8 states and extending from Banswara in Rajasthan to Purulia in West Bengal is the largest concentration of tribal population in Asia and accounts for 70% of India's tribal population (Sah, Bhatt, & Dalapati, 2008; Baviskar, 1995). The belt alone is home to 214 scheduled tribes out of the 573 scheduled tribes of India (Ahluwalia, 1978).

Geographically speaking, the central tribal belt is located between 18 degrees and 25 degrees North latitude (Phansalkar & Verma, Improved Water Control as Strategy for enhancing tribal livelihoods, 2004). About a third of the geographic area is under forest cover and the region is well-endowed with natural resources. It is therefore ironic to note that despite the abundance of forests and rivers, the central tribal belt is the one of the largest concentrations of poverty in the world facing lack of food and water security (Ibid).

The region receives medium to high rainfall and forms the catchment of some of the major river systems of the country. Notwithstanding this, the agricultural productivity of the region is low and the agriculture is primarily rainfed with very low infrastructural investment in the way of canals and major irrigation projects. In contrast, the non-tribal districts in the region have a high percentage of area under irrigation and higher irrigated landholdings. In Madhya Pradesh for instance; irrigated land holdings for 30 non-tribal districts are 59%, which is a lot more than the average land holdings (41%) of 22 tribal districts.

The table below compares irrigated land holdings and groundwater development level among tribal and non-tribal districts of Madhya Pradesh and Gujarat.

| Region | Cropped area under irrigation | Level of groundwater development |
|---|---|---|
| Gujarat | | |
| Districts having all Tribal blocks (4) | 44% | 32% |
| Districts having Tribal and Non-tribal blocks (10) | 59% | 58% |
| Districts having No tribal blocks (19) | 51% | 76% |
| Madhya Pradesh | | |
| Tribal Districts (22) | 41% | 43% |
| Non-tribal Districts (30) | 48% | 65% |

The maps on the following pages (page 12 and 13), showcases the Central tribal belt and the percentage of irrigated land holdings in the belt. The central Indian tribal population is concentrated in geographically remote and inaccessible locations. This was not always the case.

The tribal population which is now sequestered in the resource-constrained hilly tracts of Central India once flourished over a large region of central India, having under their control the vast plains. The flourishing kingdoms of the central India were ruled by the Gond, Chero, Munda and Bhil Kingdoms in the medieval period, which fell prey to the marauding Mughals. Thereafter, subsequent rule and oppression by the British reduced the tribal peasants to tenants and bonded labour on their own lands. The British appetite to draw revenue income from land led to the tribal community losing control of their land to other immigrant non-tribal caste such as the banias.

The 'zamindari' system perpetrated great injustice and cruelty to tribal farmers. Most of them fled to remote and inaccessible regions of Central India, which were free from rulers and their non-tribal counterparts. The geographical remoteness led to their alienation from most development programmes and infrastructural projects of the post-independence era (Sah, Bhatt, & Dalapati, 2008). Geographic remoteness has cost the tribal community dearly, as it leads to underdeveloped credit, land and output markets. It also results in delay in technology adaption.

Agriculture in the central tribal belt is marked by use of traditional farm tools, lack of mechanization, resource-poverty, remoteness from market, poor access to agricultural and irrigation schemes of the state, and predominance of rainfed cultivation (Phansalkar & Verma, 2004). The primary livelihood for a majority of tribal households is agriculture followed by Livestock rearing and collection of forest produce.

While some tribal communities such as Gonds, Oraons, Santhals, Mundas and Bhils have had a long engagement and experience with agriculture, others such as Kokams, Kohls and Baiga kondhs, are relatively new to agriculture, as they were traditionally dependent upon forests for their food requirements (Ibid).

# REHABILITATION OF TRADITIONAL TANKS

## RATIONALE - THE WHY

In ancient and medieval India, the water management was undertaken by the community themselves, the kingdoms were responsible only for providing monetary support (Centre for Science and Environment, 2001).Grand water harvesting structures were built across the country funded by different kingdoms. 8000 Chandela and Bundela Tanks were built between 800 to 1200 AD in the Bundelkhand region (IGG & BIWAL, Baseline Report, 2020).

Similarly, Keres tanks in Karnataka, Eri tanks in Tamil Nadu, and Chevuru tanks in Andhra Pradesh and Orissa were erected during ancient and medieval India Bihar had the famous Ahar Pynes to store water and Gond Kings funded huge Katas; three-sided reservoirs, in Gondwana (Agarwal, 1997) comprising Madhya Pradesh, Maharashtra, Orissa and Andhra Pradesh. According to official estimates, there were 15.13 lakh tanks in India in 1986-87 (Centre for Science and Environment, 2001).

However, the arrival of British signalled a death knell for such tanks and other traditional structures due to the shift from produce-based rent to fixed rent system. Post Independence too, tanks took a back seat as most of the public investment was used for development of major and medium canal irrigation projects.

During the 1960s, the contribution of three major sources of irrigation; the canal, tanks and wells was 36%, 38% and 24% (Asian Development Bank, 2006). By 2013-14, the scenario had greatly shifted and skewed towards groundwater resources. The contribution of the major sources stood thus; Canals 24%, Tanks 3% and Wells 62% (MOSPI, 2017).

Some reasons for the decline in the tank-irrigated areas are; the siltation in feeder channels, encroachments in tank bed, interruptions in catchment, lack of maintenance of tanks and development of well irrigation in the command area of the tanks. (Gomathinayagam, Sakthivadivel, Sundarsen, & Sophia, 2005). However, the key reason behind the derelict condition of traditional tanks is the disappearance of village-level tank management institutions (Asian Development Bank,2006).

## RELEVANCE FOR THE CENTRAL TRIBAL BELT

In the central tribal belt, the Gond Kingdom had a practice of encouraging the construction of water harvesting structures. The Gondwana land abounded in Katas; three sided reservoirs, and their intricate system of channels (Agarwal, 1997). Similar such structures called the Mundas and Bandharas were also built in the region to harvest rainwater. Most of these water harvesting structures lie in a state of disrepair today. The rehabilitation of these tanks has a lot of potential as they are multi-use assets and can be used to ensure livelihood security in the tribal belt.

## TANK REHABILITATION - THE WHAT

Tank rehabilitation majorly involves desiltation of the tank bed and feeder channels to allow for optimization of storage capacity and recharge of groundwater through infiltration. It also includes repair of waste weirs, feeder channels and embankments, removal of accumulated waste, and removal of encroachments in tank beds. But the most important component in rehabilitation of tanks is not the physical works, it is the establishment of strong community-led institutions, which will eventually manage and maintain the restored infrastructure.

## IMPLEMENTATION PROCESS - THE HOW

This section shares the process to rehabilitate traditional tank systems.

1. Tank Identification and selection
2. Participatory Planning process
3. Removal and transportation of silt
4. Capacity building of Tank Rehabilitation Committee (TMC)
5. Handover of tank to TMC

### Tank Identification and Selection

The most important considerations for the selection of tanks for revival are; a) the community around the tank be interested in repair of the structure and b) the community be willing to take up the tank maintenance responsibilities post rehabilitation.
It is recommended that in the initial phase, single-village structures of manageable size, and those under the jurisdiction of Gram Panchayat be selected. Priority should be given to multipurpose tanks and also such structures which are relatively free of encroachments.

Source: Process Documentation: for BIWAL: Atal Bihari Institute of Good Governance and Policy Analysis (2020).

The tank selection is finalized and formalized in the form of a Memorandum of Agreement signed by the Sarpanch and Secretary of the panchayat. In the same meeting, a Tank Management committee (TMC) is constituted to enable participatory planning of rehabilitation works.

**Participatory Planning process**

After the tank selection, detailed problem analysis is conducted to identify problems with the tank. Based on the findings, an action plan is prepared which includes list of interventions to be carried out.

**Removal and transportation of silt**

The silt is removed with help of excavators selected in consultation with the TMC. TMCs also play an important role in silt transportation to farmer fields. Decisions regarding hiring tractors for silt transportation, deciding upon timings and shifts of silt removal, development of norms to ensure equity in silt distribution, etc. are undertaken by the TMCs.

**Capacity building of TMCs**

Trainings are provided to community members and TMCs on tank maintenance, water distribution, water-use planning, well-water monitoring, maintaining records, book-keeping and conducting meetings.

**Handover of tank to TMCs**

Post the rehabilitation and capacity building of the TMC, the tanks are handed over to the community. The village community members form a cooperative society for ease in undertaking livelihood operations such as fishery or irrigation.

This is done as only a cooperative can apply for lease to panchayat incase a collective fishing enterprise is to be initiated. Registration as a cooperative is also required by various government departments, such as; the electricity department, if commercial connection is sought for electricity to install a lift irrigation pump house.

The TMC organises a general body meeting of all member households to decide upon the livelihood use of the tank. Both Fishing and irrigation operations need to undertaken in a collective manner to ensure sustainability of the structure. The TMC acts as the overarching body to lead the collective decision making and to manage operations.

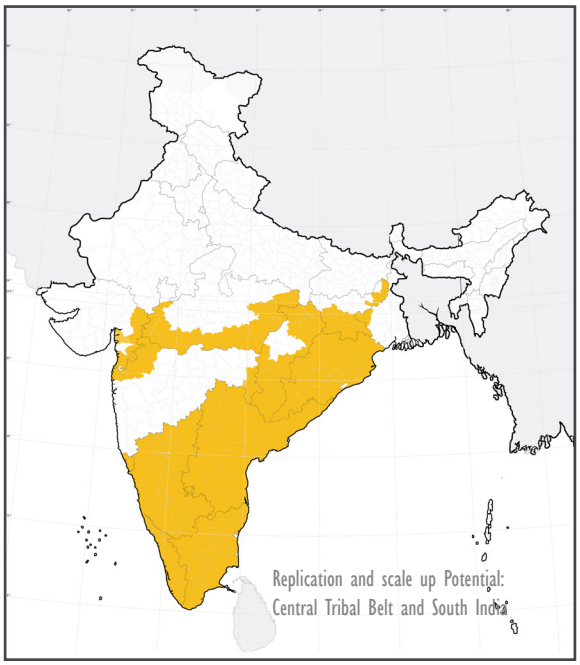
The functioning of irrigation and fishing cooperatives has been detailed in separate cases of this document. Please refer page 32-37 and 50-53 for more details.

IMPACT

1. Increase in storage capacity and groundwater recharge.
2. Increase in area under flow irrigation coverage and increase in well-based irrigation in catchment areas.
3. Increased cropping intensity in the tank command.
4. Additional income from fishery enterprise.
5. Enhanced nutritional security due to agriculture diversification and fishery activity.

## REPLICATION AND SCALE UP POTENTIAL

Given the large number of tanks spread all across the country, revival of these structures could unleash a stupendous water harvesting potential and reduce the pressure upon groundwater resources. The most important consideration for taking up revival of tanks is however, not the revival of the physical structure of the tank but restoring of tank management and control in the hands of local community members.




## LESSONS FOR REPLICATION

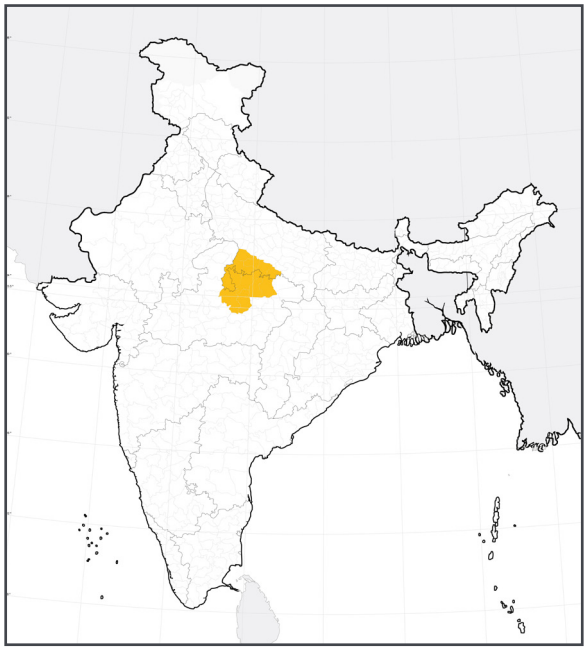
1. Tank rehabilitation programmes have been previously undertaken by state governments in South India on a large scale. However, most of these programs focus upon physical works rather than institutional strengthening. This has led the tanks to fall into a repetitive loop of rehabilitation- poor maintenance- deterioration- rehabilitation. The most crucial factor towards success of tank rehabilitation is, thus, the community ownership of the tanks.
2. Capacity building of the TMC members on various managerial as well as operational aspects of tank management is a must.
3. Alternate livelihoods such as fishing require capacity building on technical aspects such as; selection of appropriate quality of fish seed, fish feed, growth cycle, optimum harvest time and other nuances.
4. A strong leadership at the village level is a must for the success of tank rehabilitation.
5. The bye-laws of the fishing and/or irrigation cooperatives must include water distribution, benefit sharing, and conflict resolution norms.

## GRASSROOTS IMPLEMENTATION: LESSONS FROM THE FIELD

This case is based upon the learnings from the implementation of BIWAL (Bundelkhand Initiative for Water Agriculture and Livelihood) project by various implementing NGOs. The initiative was launched in 2018 to revive traditional Chandela and Bundela tanks in the Bundelkhand region.

### Location and Context

The Bundelkhand region, comprising of thirteen contiguous districts; seven located in Southern Uttar Pradesh and six in Northern Madhya Pradesh, has a recorded history of droughts and severe water scarcity. The region is bereft of any river systems and adverse geological conditions lead to suboptimal recharge. Conversant of the geohydrological context, the ancient kingdoms understood that water security could only be ensured, if rainfall was efficiently harvested. Chandela and Bundela kings financed huge tanks to harvest rainwater, which over the years, have fallen into disrepair due to shift of ownership from community to government. This has led to the over dependence upon groundwater resources and severe water scarcity in drought years.



| At a Glance | |
|---|---|
| Intervention | Rehabilitation of Traditional Tanks |
| Location | Bundelkhand region, Uttar Pradesh and Madhya Pradesh |
| Implementation | SRIJAN, CARD, Haritika, Bundelkhand Sewa Sansthan, Yuva Koushal Vikash Mandal, Arunodaya, Akhil Bhartiya Samaj Sewa Sansthan and Jal Jivika |
| Period | 2018 - Ongoing |
| Unit Cost | Rs. 7,00,000/Tank \| Rs.2,50,000/Tank Community Contribution |

BIWAL was launched in 2018 to revive Bundelkhand to its ancient glory, by reviving the traditional water bodies through community engagement.

SRIJAN and other CSO partners namely the Centre for Advance Research and Development (CARD), Haritika, Bundelkhand Sewa Sansthan, Yuva Koushal Vikash Mandal, Arunodaya, Akhil Bhartiya Samaj Sewa Sansthan and Jal Jivika initiated rehabilitation works with grant support from Hindustan Unilever Foundation (HUF) and convergence support from governments of Uttar Pradesh and Madhya Pradesh.

In the first phase, 54 tanks have been desilted, resulting in an excavation of 4.24 lakh cubic meter of silt. This has led to creation of 42.49 crore litres water storage potential. Of the 54 tanks desilted, 28 tanks were desilted in Madhya Pradesh and 26 in Uttar Pradesh.

All the tanks rejuvenated were multipurpose tanks. The major purposes served by the tanks(28 of MP) are listed below:

- Water for Livestock (28 tanks)
- Groundwater recharge (28 tanks)
- Fishery (24 tanks)
- Aquaculture – Singhara or Makhana cultivation (2 tanks)
- Lift Irrigation using private pumpsets (10 tanks – rabi, 24 tanks – summer)
- Drinking and domestic use (4 tanks)
- Flow irrigation through canal (4 tanks)

The total cost of reviving 54 tanks was Rs. 3.43 crores, out of which Rs.1.08 crore was spent upon excavation. A notable aspect of the programme is that the local community mobilised Rs.2.35 crore which is 68.5% of the total works cost.

This cost was incurred for transportation of silt from tank site to beneficiary fields and to apply silt to the fields. 2841 farmers applied to their fields covering an area of 1352.27 hectares.

Another important cost component was mobilisation and capacity building of the community. The project was implemented through participatory development processes by keeping the community at the forefront. Tank management committees were formulated for each revived tank. This was done at the beginning of the programme itself, so that the community could be involved in all matters of planning and implementation.

**Initial Impacts**

As the works got recently completed, the timescale for calculation of impact is quite small. Data of one year post completion of works reveals the following impacts, based on evaluation of the 28 tanks revived in Madhya Pradesh.

1. Increase in net storage capacity of the 28 tanks revived in MP was 230.2 Thousand Cubic Meters (TCM) which is 7.8% of original storage capacity.
2. While it is too early to accurately estimate the groundwater recharge; initial estimates show a groundwater recharge of 621 TCM or 19.6% of the present storage capacity of water bodies.
3. Flow Irrigation increased from 380 hectares to 462 hectares (21.6%) in 4 tanks, lift irrigation from 392 to 443 hectares (13%) and well irrigation from 2322 to 2698 hectares (16.2%) in 22 tanks commands.
4. A total of 3923 farmers were directly benefitted due to provision of irrigation facility.
5. Additional food production of 29,247.79 tonnes due to improved agricultural practices promoted by SRIJAN, and as a result of silt application.

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