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Role of Jalyukta Shivar Abhiyan and NGOs in Integrated Watershed Development Programme: A Case Study of Semi-Arid Man Tehsil (Maharashtra)

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Abstract:

Semi-arid regions of Maharashtra, including Man Tehsil, experience chronic water stress due to erratic rainfall, recurrent droughts and weak decentralized water governance. The Integrated Watershed Development Programme (IWDP), supported by the Jalyukt Shivar Abhiyan (JSA) and facilitated by Non-Governmental Organizations (NGOs), seeks to address these challenges through integrated physical and institutional interventions. This study examines the role and convergence of JSA and NGOs in shaping watershed development outcomes in Semi-Arid Man Tehsil of Satara District, Maharashtra. Using a case study–based mixed-methods approach, the research draws on household surveys, field observations and stakeholder interviews to assess both infrastructure outcomes and governance processes. The findings indicate that JSA has significantly enhanced water availability through the rapid creation of conservation structures such as check dams, farm ponds and percolation tanks. However, the effectiveness and sustainability of these interventions are strongly influenced by NGO involvement, particularly in community mobilization, participatory planning and local institutional strengthening. The study concludes that integrated watershed development is fundamentally a governance-driven process, where the synergy between state-led initiatives and NGO-led community engagement is critical for long term sustainability. The Man Tehsil experience offers important policy insights for improving watershed programmes in drought-prone regions.

Keywords: Jalyukt Shivar Abhiyan, IWDP, NGOs, Semi-Arid Regions, Man Tehsil

Introduction:

The Watershed Development Programme (WDP) aims at the protection, restoration, and sustainable utilization of natural resources within watershed regions through an integrated ecological approach encompassing land, water, vegetation, fauna, and human systems. In drought-prone regions, environmental degradation and economic vulnerability often reinforce each other, leading to over-exploitation of natural resources and persistent poverty. WDP seeks to reduce this environmental stress while enhancing rural livelihoods, particularly in rain-fed and semi-arid areas. In Maharashtra, one of India's most drought-affected states, watershed development has assumed critical importance, with both governmental initiatives and non-governmental organizations (NGOs) playing complementary roles in improving water security and agricultural sustainability.

Integrated watershed development emerged as a holistic framework in response to water scarcity, land degradation, and livelihood insecurity, especially in developing countries. Early conceptual contributions by Chambers (1988), Uphoff (1992), and Farrington et al.

(1999) emphasized that watershed programmes must go beyond physical conservation structures to incorporate community participation, local institutions, and long-term sustainability. Subsequent empirical studies by Kerr (2002), Wani et al. (2003, 2009), and Joshi et al. (2005) demonstrated that participatory and scientifically planned watershed interventions significantly improve groundwater recharge, soil moisture, and agricultural productivity.

In India, watershed development gained policy prominence through programmes such as the Integrated Watershed Development Programme (IWDP). Studies by Hanumantha Rao (2001), Reddy (2005), and Narayanamoorthy (2013) confirmed the effectiveness of watershed interventions in drought-prone and rain-shadow regions by stabilizing rural livelihoods through decentralized rainwater harvesting and land treatment measures. Further research by Shah (2007) and Deshpande and Reddy (2010) highlighted the role of watershed management in addressing groundwater depletion and enhancing climate resilience in semi-arid agro-ecosystems.

Maharashtra has been a major focus of watershed research due to recurrent droughts and uneven rainfall. Studies by Patil and Tare (2014), Kulkarni et al. (2016), Pawar and Patil (2017), and Jadhav et al. (2018) documented improvements in water availability, cropping intensity, and rural incomes following integrated watershed interventions. Geospatial studies by Unde and Telore (2012) and Telore (2016) demonstrated that morphometric analysis, land-use/land-cover mapping, and GIS-based prioritization significantly enhance watershed planning and site selection in semi-arid basins of western Maharashtra.

The launch of the Jalyukta Shivar Abhiyan (JSA) in 2014 marked a mission-mode shift in drought mitigation policy in Maharashtra. Impact assessments by Salunkhe et al. (2017), Shinde and Mane (2018), and Patil et al. (2019) reported improvements in groundwater levels, surface water storage, and reduction in drinking water scarcity. However, critical evaluations by Joy et al. (2018), Aditya et al. (2019), Telore (2022) and Narain et al. (2020) emphasized the need for hydro-geological suitability, equity, and long-term monitoring to ensure sustainability.

Alongside government efforts, NGOs play a vital role in watershed development through community mobilization, capacity building, and participatory governance. Theoretical insights by Ostrom (1999) and Pretty and Shah (1997) underscored the importance of social capital in resource management, while empirical studies highlighted NGOs' effectiveness in post-project sustainability. Despite extensive research, limited micro-level studies examine the combined role of government programmes and NGOs. Therefore, the present study of Man Tehsil seeks to bridge this gap by analyzing the integrated contributions of Jalyukta Shivar Abhiyan and NGOs towards sustainable watershed development and rural resilience.

Research Methodology:

The present study of Man Tehsil is based on an integrated analysis of topographic maps, remote sensing data, GIS techniques and field verification. Survey of India (SOI) topographic sheets bearing numbers 47K/5, 47K/6, 47K/9, 47K/10, 47K/13, and 47K/14, at a scale of 1:50,000, form the primary spatial database for the study. These toposheets were georeferenced using Global Mapper 11 to ensure spatial accuracy and consistency. The drainage network of the Upper Man River Basin was delineated and digitized from the georeferenced toposheets. A 100 m contour interval was used to accurately extract drainage features and basin boundaries. The basin was subdivided into ten sub-basins based on the catchment areas of the major

tributaries, namely Andhali, Dahivadi, Devapur, Divad, Gondavale (Bk.), Mhaswad, Palshi, Ranand, Waki, and Wawarhire. These sub-basins were mapped to facilitate detailed morphometric and watershed-level analysis.

Morphometric characteristics of the drainage basin were analyzed by evaluating linear, areal, and relief aspects. Stream ordering was carried out following Horton's (1945) laws of drainage composition and the Strahler (1964) stream ordering system, using a 1:50,000 scale topographic base map. This approach enabled systematic assessment of drainage texture, stream frequency, bifurcation ratio, and basin geometry.For terrain analysis, Shuttle Radar Topography Mission (SRTM) elevation data with a spatial resolution of 90 m were obtained from the United States Geological Survey (USGS) database. The Digital Elevation Model (DEM) was generated using ArcGIS software and further processed to visualize the three-dimensional terrain of the Upper Man River Basin. The DEM illustrates a pronounced westward escarpment with steep slopes, transitioning into gentler and lower relief towards the eastern part of the basin. The average elevation of the study area ranges between 700 and 800 m above mean sea level.

Various cartographic and statistical techniques, including line graphs, bar diagrams, and divided circle diagrams, were employed to analyze and present the spatial and quantitative data. Field observations were used to validate interpretations derived from topographic and digital datasets. The SOI toposheet index maps served as a reference framework for map preparation and for interpreting drainage patterns, river flow direction, and relief characteristics of the basin.

Data Collection:

The present study is based on a systematic examination of existing conditions related to watershed development in the Upper Man River Basin. To achieve the stated objectives, both primary and secondary data sources were utilized. While secondary data provided a broad contextual and historical understanding, it was found to be insufficient for micro-level analysis; therefore, primary data collection formed a crucial component of the study. Primary data were collected through extensive field observations, structured schedules, and questionnaire surveys. After acquiring an in-depth theoretical understanding of watershed development and institutional frameworks, detailed field surveys were designed and conducted within a stipulated time period. The primary data represent first-hand information gathered directly from stakeholders involved in watershed development activities, including farmers, village-level functionaries, and local institutions.

A random sampling technique was adopted for selecting villages and respondents to assess the role of non-governmental organizations (NGOs) and the Jalyukta Shivar Abhiyan in watershed development. Man Tehsil comprises 88 villages, of which 13 villages (approximately 20%) were selected to examine NGO-led watershed initiatives, based on the intensity and extent of watershed-related activities undertaken in these villages. From each selected village, 10 percent of farmers were chosen as respondents for the sample survey.

Similarly, the Jalyukta Shivar Abhiyan has been implemented in 24 villages within Man Tehsil. Out of these, 5 villages (approximately 20%) were selected for detailed analysis of Jalyukta Shivar Abhiyan interventions. From each of these villages, 10 percent of farmers were randomly selected to assess the impacts of watershed development before and after the implementation of the programme. This comparative approach enabled a clearer understanding of changes in water availability,

agricultural practices, and socio-economic conditions.

Secondary data were collected from both published and unpublished sources, including reports, statistical handbooks, government records, and project documents. Key sources included the Gram Development Offices of the selected villages, Talathi and Circle Offices, Tehsil Office, Panchayat Samiti, Sub-Divisional Office, Krushi (Agriculture) Office, Man, Office of Soil and Water Conservation, Satara, District Statistical Office, Satara, and the Groundwater Surveys and Development Agency (GSDA), Satara. These data sources supported spatial, administrative, and temporal analysis of watershed development activities. The collected data were systematically processed and analyzed, and the results were presented using maps, tables, graphs, and diagrams to ensure clarity and effective interpretation.

Study area:

Man Tehsil is one of the prominent administrative units of Satara District, Maharashtra, located in the eastern part of the district (Fig. 1). The tehsil headquarters, Dahiwadi, lies at approximately 17°40′ N latitude and 74°30′ E longitude on the right bank of the Man River, a tributary of the Bhima river system. Dahiwadi is about 64 km east of Satara town and is well connected by road, situated near the junction of the Satara–Pandharpur and Pusesavali–Shingnapur roads. Settlements in the tehsil are largely linear and distributed along the river course, reflecting dependence on surface water resources.

The total geographical area of Man Tehsil is about 1,440 km², making it one of the largest tehsils in Satara District. Despite its administrative and political significance, the region continues to face chronic water scarcity, indicating a gap between policy initiatives and effective water resource management. Climatically, Man Tehsil experiences an inland semi-arid climate characterized by high temperature variability. Summer temperatures range between 38°C and 45°C, frequently exceeding 40°C, while winter temperatures remain moderate, between 15°C and 25°C. High evaporation rates during prolonged summers intensify water stress.

Man Tehsil lies within a drought-prone zone, with arid and semi-arid conditions more pronounced in its southern and south-western parts. Low and erratic rainfall, coupled with limited surface water storage, aggravates water scarcity. In response, several non-governmental organizations (NGOs), including the Paani Foundation, Man Deshi Foundation and local voluntary groups, have been actively involved in watershed development, water conservation, and community mobilization. These NGOs work in collaboration with government programmes such as the Jalyukta Shivar Abhiyan, focusing on soil and water conservation, participatory planning, and sustainable agricultural water management. Their interventions have played a crucial role in enhancing local resilience and strengthening integrated watershed development efforts in Man Tehsil.

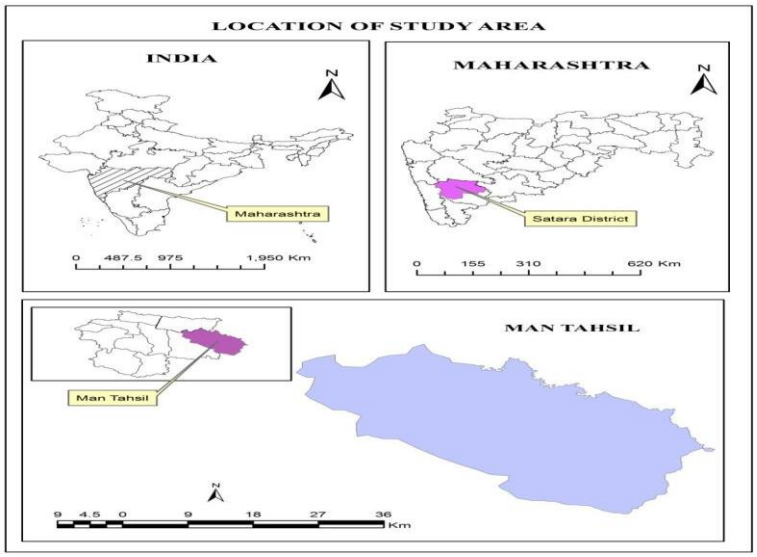

Fig. 1: Location map of the study area

Analysis:

Work of Jalyukta Shivar Abhiyan in Selected Villages:

The Jalyukta Shivar Abhiyan (JSA) has been extensively implemented in the selected sample villages of the upper Man River basin with the objective of enhancing water conservation, groundwater recharge, and sustainable agricultural development. Village-wise analysis of JSA works during 2022–23 (Table 1) reveals considerable spatial variation in both the number and type of interventions, reflecting differences in local physiography, water availability, and administrative prioritization. Among the selected villages, Mardi recorded the highest number of works (114), followed by Injbav (104), indicating a relatively higher intensity of watershed interventions in these villages.

Table 1: Work of Jalyukta Shivar Abhiyan in Selected Sample Villages, 2022-23

Sr. No.	Name of Village	Compartment bunding in Ha	No. of New Cement Concrete Drainage Dam	Continuous Counter Trenches in Ha	No. of Drainage deepening	No. of Earthen drain dam	No. of Farm Pond	No. of To replenish the well	No. of Repair of Percolation Tank	No. of Gabion Bandhara
1	Injbav	876	6	108	1	28	6	4	0	0
2	Kulukjai	32	22	6	0	4	2	11	0	0
3	Khutbav	54	15	8	1	24	2	7	0	0
4	Tondalc	66	0	5	3	17	0	11	1	0
5	Dahiwadi	651	7	6	0	14	1	0	2	0
6	Divad	0	16	4	2	4	2	2	2	0
7	Didwaghwadi	0	22	10	1	2	0	2	1	2
8	Narvane	299	7	87	11	23	0	1	1	0
9	Paryanti	0	5	52	1	2	0	4	1	0
10	Palshi	444	16	0	0	13	0	6	11	2
11	Pangari	285	6	51	0	5	0	5	11	0
12	Panvan	0	0	0	0	4	2	6	6	0
13	Mardi	932	9	90	7	12	1	12	9	0
14	Pingali Kh	70	5	0	0	7	0	0	3	1
15	Pingali Bh	0	24	0	0	0	0	0	4	5
16	Mahimangad	25	5	39	4	1	0	2	6	1
17	Valai	52	4	0	7	0	0	6	4	0
18	Waki	0	1	0	0	0	0	6	0	0
19	Varugad	174	1	102	0	2	1	0	3	0
20	Virali	367	6	0	1	6	0	6	15	0
21	Hawaldarwadi	0	8	84	0	1	0	3	3	0
	Entire Study Region	**4327**	**185**	**652**	**39**	**169**	**17**	**94**	**83**	**11**

Source: Rural Development and Water Conservation Department, Satara

Compartment bunding emerged as the most widespread soil and water conservation measure, with a total of 4,327 hectares treated across 21 villages. Mardi (932 ha), Injbav (876 ha), and Virali (367 ha) accounted for the largest treated areas, highlighting their extensive agricultural land and suitability for in-situ moisture conservation. In contrast, villages such as Kulukjai, Khutbav, and Tondale reported limited coverage of less than 100 hectares. A total of 185 new cement concrete drainage dams were constructed in the study area, contributing to surface water storage and groundwater recharge. Kulukjai and Didwaghwadi recorded the highest number of such structures, whereas Injbav and Tondale had comparatively fewer dams

CCTs, designed to intercept runoff and improve infiltration on sloping terrain, covered 652 hectares across the basin. Injbav and Varugad, each exceeding 100 hectares, showed the highest extent of CCT implementation. Drainage deepening, an important intervention for enhancing recharge in semi-arid regions, was undertaken at 39 locations, with Narvane village alone accounting for 11 deepened streams, followed by Mardi and Valai.

Earthen drainage dams constituted a major low-cost intervention, with 169 structures constructed across the study region. Injbav (28), Khutbav (24), and Narvane (23) recorded the highest numbers, indicating emphasis on eco-friendly and locally adaptable measures. Farm ponds, although limited in number (17), played a crucial role in runoff storage and supplementary irrigation, particularly in Injbav and selected villages such as Kulukjai, Khutbav, and Divad.

Groundwater recharge through wells was another significant component, with 94 wells recharged across the basin. Mardi village recorded the highest number (12), followed by Kulukjai and Tondale (11 each). Additionally, 83 percolation tanks were repaired, with Virali village alone accounting for 15 repairs, strengthening traditional water harvesting systems. Gabion bandharas, suitable for high-runoff zones, were constructed at 11 locations, mainly in Pingali Bk., Palashi, and Didwaghwadi.

Overall, the JSA has facilitated large-scale implementation of diverse watershed interventions in the upper Man River basin. Despite village-level variations, the cumulative impact of these works has significantly improved surface water storage, groundwater recharge, and agricultural sustainability, thereby strengthening drought resilience in this semi-arid region.

Work of Non-Governmental Organizations: Role of Paani Foundation in Man Tehsil Watershed:

Non-governmental organizations play a crucial role in strengthening watershed development efforts, particularly in semi-arid regions where government resources alone are often insufficient. In Man Tehsil, the Paani Foundation has emerged as a major contributor to water conservation and watershed management, especially in the upper basin of the Man River. During 2017–18, the Foundation implemented a range of structural and participatory interventions aimed at improving surface water storage, groundwater recharge, and long-term agricultural sustainability (Table 2).

Table 2: Work of Paani Foundation in Man Tehsil Watershed, 2022-23

Sr. No.	Name of Village	Earthen Dam (Cubic Meter)	Farm Pond (in Cubic Meter)	C.C.T. (in Cubic Meter)	Counter Bundings (in Cubic Meter)	Gabion Bandhara (in Cubic Meter)	Nala Width and Depth (in Cubic Meter)	Soak Pit (in Number)
1	Bhandavali	123683	64561	858.89	962.52	20306	6840	108
2	Kasarwadi	75774.15	14233	722.8	4453.89	11909	9630	73
3	Bidal	135383	37214	912.9	3241.9	12375	32803	115
4	Hastanapur	72235.21	17384	830.8	2312.3	17802	12810	69
5	Mardi	127560	43219	720.1	2526.8	19803	37309	95
6	Shindi kh	68390	13524	915.3	972.9	7515	11603	72
7	Takewadi	142384	65312	925.9	4320.8	22540	42260	120
8	Valai	103212.9	18284	625.12	3240.9	8270	7340	83
9	Virali	97263.81	12415	623.6	1530.8	7380	7460	87
10	Pangri	32691.8	13231	537.8	715.9	6265	6270	65
11	Bhatki	137309	45309	968.19	3450.9	18390	32860	56
12	Karkhel	57267	21537	635.16	2320.2	11335	11320	47
13	Andhali	122312	68382	812.6	3275.4	19938	32209	109
14	Vadjal	107373	14512	703.9	1830.9	12375	18316	77
15	Divad	148213	41316	521.2	2615.3	14228	27803	85
Entire Study Region		**1551052**	**490433**	**11314.26**	**37771.41**	**210431**	**296833**	**1261**

Source: Paani Foundation, Satara

Earthen dams represent the most significant intervention undertaken by the Paani Foundation, with a cumulative storage capacity of over 1.55 million cubic meters across the study region. Villages such as Divad, Bhatki, Bidal, and Mardi recorded the highest storage volumes, reflecting favorable site conditions and active community participation. Farm ponds, another key component, contributed a total storage capacity of nearly 0.49 million cubic meters, with Andhali, Takewadi, and Bhandavali leading in implementation. These structures have enhanced water availability for irrigation, livestock, and supplementary farming.

Soil and moisture conservation measures, including CCT and counter bunding, were widely adopted to reduce runoff and soil erosion. Gabion bandharas were constructed in areas with higher runoff velocity, collectively contributing over 0.21 million cubic meters of storage, while nala deepening works excavated nearly 0.30 million cubic meters to improve channel storage and groundwater recharge. In addition, 1,261 soak pits were constructed across villages, strengthening localized recharge mechanisms.

Beyond physical structures, the Paani Foundation emphasizes behavioral change and capacity building through community training and participatory planning. Villages participating in the Satyamev Jayate Water Cup witnessed not only improved water availability but also the emergence of local water leaders and sustained collective action. Overall, the integrated watershed interventions implemented by the Paani Foundation have significantly enhanced water security, improved groundwater conditions, and strengthened agricultural resilience in Man Tehsil. The observed spatial variation in interventions reflects differences in terrain, hydrological suitability, and levels of community engagement.

Work of Man Deshi Foundation in Man Tehsil Watershed:

Mandeshi Foundation's water conservation initiatives in the upper basin of river Man from 2012 to 2019 include the construction

of a 980.62 km dam with a water storage capacity of 904.86 TCM. This has led to 571 wells benefiting, enabling surplus crops on 1,346 hectares and supporting 3,426 farmers directly and 35,600 indirectly. In 2019, only 60 meters of embankment were constructed.

Table 3: Construction of Banadara in Man Tehsil Watershed, 2022-23

Sr. No.	Embankment Completed Year	Embankment Length in mts.	Water storage in TCM	No. of benefited wells	Area under cultivation in ha	No. of farmers directly benefited	No. of people indirectly benefited
1	2012	135.17	106.17	75	118	395	1800
2	2013	60.35	50.29	22	55	180	1700
3	2014	67.9	61.9	35	65	225	2500
4	2015	127.2	111	52	117	400	900
5	2016	110	150	62	310	575	20000
6	2017	235	250	135	453	912	4100
7	2018	185	153	86	148	419	3000
8	2019	60	22.5	50	80	320	1600
Total		**980.62**	**904.86**	**517**	**1346**	**3426**	**35600**

Source: Man Deshi Foundation Office, Satara

Work of the Art of Living Foundation in Man Tehsil Watershed:

The Art of Living Foundation has made a significant contribution to watershed development and water conservation in Man Tehsil of Satara District through community-based and cost-effective interventions. During 2022–23, the Foundation implemented several water harvesting structures aimed at increasing surface water storage, improving groundwater recharge, and supporting agricultural sustainability (Table 4).

Table 4: Work of Art of Living Foundation in Man Tehsil Watershed, 2022-23

Sr. No.	Name of Village	Type of Work	Estimated Cost in Lakh	Actual Cost in Lakh	Water Storage Capacity in Crore litre	Benefited
1	Dahiwadi	Cement Bandhara	100	32	25	20000 people
2	Ranmala	Gabion Bandhara	40	13	7	1000 Hectors
3	Ranmala	Stone Bandhara	25	8	9	
4	Ranmala	Cement Bandhara	35	11	10	
5	Mardi	Cement Bandhara	20	8	7.5	350 Hectors
6	Gondavale Kh.	Cement Bandhara	25	8	10	300 Hectors

Source: Art of Living, Dahiwadi, Dist. Satara

Major interventions included the construction of cement bandharas, gabion bandharas, and stone bandharas in villages such as Dahiwadi, Ranmala, Mardi, and Gondavale Khurd. These structures were strategically located across streams and drainage channels to regulate runoff and enhance monsoon water storage. A prominent example is the cement bandhara constructed at Dahiwadi, which created a storage capacity of 25 crore litres. Although initially estimated at Rs.100 lakh, the project was completed at an actual cost of Rs. 32 lakh, demonstrating efficient utilization of resources and benefiting nearly 20,000 people.

In Ranmala village, three different structures—gabion, stone, and cement bandharas—were constructed, together generating

a storage capacity of about 26 crore litres and benefiting nearly 1,000 hectares of agricultural land. Similar cost-efficient interventions in Mardi and Gondavale Khurd villages resulted in storage capacities of 7.5 crore litres and 10 crore litres, supporting irrigation over 350 hectares and 300 hectares of farmland, respectively.

Beyond these major works, the Art of Living Foundation undertook additional watershed activities in villages such as Khutbav, Injbav, Pangri, Ranand, Thadale, Danvalewadi, and Dahiwadi through community participation and voluntary labour (shramdaan). In Danvalewadi, multiple gabion embankments were constructed to control runoff and soil erosion, while stream deepening over a 5.75 km stretch at Ranmala significantly enhanced water storage and facilitated the redistribution of fertile silt over agricultural fields.

Overall, these interventions led to improved groundwater levels, increased well recharge, expansion of cultivable land, and higher cropping intensity. The initiatives of the Art of Living Foundation highlight the effectiveness of community-driven watershed development in strengthening water security and agricultural resilience in the semi-arid landscape of Man Tehsil.

Work of Cummins India Foundation in Man Tehsil Watershed:

Corporate Social Responsibility (CSR) initiatives have become increasingly important in supporting watershed development in semi-arid regions. In Man Tehsil of Satara District, the Cummins India Foundation has played a significant role in strengthening water conservation and land management practices in the upper Man River basin. During 2022–23, the Foundation implemented a range of integrated watershed interventions aimed at enhancing surface water retention, improving groundwater recharge, and increasing agricultural resilience (Table 5).

CCT formed the core intervention, covering a total area of 330,535 hectares across 22 villages. The highest extent of CCT treatment was observed in Bijawadi (16,800 ha), followed by Wavarhire (16,254 ha) and Mohi (16,000 ha). Villages such as Dangirewadi Bk. and Danawalewadi recorded relatively lower coverage, reflecting variations in slope, land availability, and site suitability. These trenches play a crucial role in intercepting runoff, reducing soil erosion, and enhancing soil moisture infiltration.

Farm bunding was another major intervention, with a total volume of 446,000 cubic meters constructed across the watershed. Khandyachiwadi, Vadgaon, and Anbhulewadi recorded the highest volumes, each exceeding 20,000 cubic meters. This measure has contributed significantly to conserving soil moisture, controlling surface runoff, and improving crop productivity during dry periods.

Gabion bandharas were constructed at strategic locations to stabilize stream channels and reduce erosion. A total of 5,446 cubic meters of gabion structures were developed, with Bijawadi recording the highest volume. Additionally, drainage shetting works amounting to 300,000 cubic meters were undertaken to increase channel storage capacity and facilitate groundwater recharge, with higher volumes observed in villages such as Kulukjai and Dangirewadi Kh.

Overall, the integrated watershed development approach adopted by the Cummins India Foundation has substantially improved water availability and soil moisture conditions in the upper Man River basin. These interventions have reduced runoff losses, enhanced groundwater levels, and strengthened agricultural

sustainability, thereby contributing to improved drought resilience in Man Tehsil.

Table 5: Work of Cummins India Foundation in Upper Man River Watershed, 2022-23

Sr. No.	Name of Village	Continuous Counter Trenches in Ha	Farm Buinding (in Cubic Meter)	Gabian Bandhara (in Cubic Meter)	D. Shetting (in Cubic Meter)
1	Wavarhire	16254	20270	250	14000
2	Vadgaon	15000	20920	235	13500
3	Dangirewadi Kh.	14500	20500	215	15000
4	Dangirewadi Bk.	13900	20800	235	13500
5	Mohi	16000	20330	245	12500
6	Shingnapur	15025	20300	240	14500
7	Rajewadi	15405	20200	250	13000
8	Bijawadi	16800	20280	360	14000
9	Jadhavwadi	15000	20300	240	14000
10	Tondale	14600	19500	220	13000
11	Yelewadi	15900	20200	255	12500
12	Shiravali	14302	19847	250	13500
13	Bothe	14704	19500	225	14500
14	Kulukjai	14805	19900	225	15500
15	Kalaskarwadi	15503	20000	236	13500
16	Ugalyachiwadi	15802	19800	240	13000
17	Khandyachiwadi	14720	20930	250	14000
18	Anbhulewadi	14803	20804	260	12000
19	Swarupkhanwadi	14500	20302	255	14000
20	Kasarwadi	14312	20807	270	14500
21	Satrewadi	14700	20302	260	13000
22	Danawalewadi	14000	20208	230	13000
Entire Study Region		**330535**	**446000**	**5446**	**300000**

Source: Cummins India Foundation, Satara

Work of Bajaj Water Conservation in Man Tehsil Watershed:

Bajaj Water Conservation has played a significant role in strengthening watershed development and sustainable water management in the semi-arid environment of Man Tehsil, Satara District. During the 2022–23 period, the organization implemented a set of well-planned interventions across selected villages with the objective of improving surface water storage, enhancing groundwater recharge, and supporting agricultural sustainability.

Earthen dams constitute a major component of the programme, designed to arrest runoff and store monsoon water. In the study area, earthen dams with a total storage capacity of 66,896 cubic meters were constructed. Ranand village recorded the highest contribution (17,415 m^3), followed by Khadki (13,830 m^3) and Mohi (12,890 m^3), while Vadjal (6,270 m^3) showed comparatively lower development due to local site constraints. These structures have helped in moderating seasonal runoff and improving recharge conditions downstream.

Farm ponds developed under the project provide assured water sources for irrigation and allied activities. A cumulative storage of 5,740 cubic meters was created, with Khadki (1,835 m^3) and Ranand (1,241 m^3) emerging as major beneficiaries. Continuous contour trenches, totaling 2,594 cubic meters, were constructed to reduce soil erosion and promote infiltration, with higher implementation in Ranand and Mohi villages. In addition, 1,077 cubic meters of loose

boulder structures were established to slow runoff velocity and stabilize drainage lines, particularly in Mohi and Ranand.

Soak pits represent another important intervention aimed at localized groundwater recharge. A total of 287 soak pits were constructed, with higher concentrations in Ranand and Khadki villages. Overall, the integrated set of measures adopted by Bajaj Water Conservation has improved water availability, enhanced soil moisture regimes, and strengthened the resilience of agriculture in Man Tehsil.

Table 6: The Work of Bajaj Water Conservation in Man Tehsil Watershed, 2022-23

Sr. No.	Name of Village	Earthen Dam (Cubic Meter)	Farm Pond (in Cubic Meter)	C.C.T. (in Cubic Meter)	Loose Boulder (in Cubic Meter)	Soak Pit (in Number)
1	Khadki	13830	1835	350	160	60
2	Ranand	17415	1241	603	212	65
3	Pangri	8920	726	270	90	35
4	Vadjal	6270	512	405	170	27
5	Mohi	12890	807	596	255	48
6	Injbav	7571	619	370	190	52
Entire Study Region		**66896**	**5740**	**2594**	**1077**	**287**

Source: Bajaj Water Conservation Office, Satara

Conclusion:

The present study demonstrates that the Jalyukta Shivar Abhiyan, when complemented by sustained NGO participation, has played a transformative role in advancing integrated watershed development in the semi-arid Man Tehsil of Maharashtra. The comparative assessment reveals that NGOs such as Paani Foundation, Art of Living Foundation, Cummins India Foundation, and Bajaj Water Conservation have adopted diverse yet complementary strategies, addressing water scarcity at multiple spatial and functional scales. While Paani Foundation has contributed substantially to large-scale water storage and groundwater recharge, the Art of Living Foundation has emphasized cost-effective, community-driven structures. Cummins India Foundation has focused on extensive land treatment and soil–moisture conservation across wide areas, whereas Bajaj Water Conservation has strengthened localized water security through farm-centric and micro-level interventions. The case of Man Tehsil underscores that a multi-stakeholder, integrated approach to watershed development is a viable and replicable strategy for achieving water security and drought mitigation in semi-arid regions of India.

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