



## Community Works and Their Participation in Water Conservation Programs: Case Study of Successful Villages in Drought Prone Areas of Satara District (Maharashtra)

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### Abstract:

*Rainwater harvesting and groundwater recharge programs are beneficial for the conservation, reproduction, and prudent use of natural (land, water, flora and fauna) and human resources in a specific watershed. Villages in Man, Khatav, Phaltan and Khandala tehsils of eastern Satara district were selected for present study. It is a drought prone area with only 400-500 mm of rainfall annually. Water storage structures such as continuous contour trenches (CCT), check dams, gully plugs under watershed development projects; earthen plugs etc. are made. Both CCT and check dams block the flow of water and also store water in these trenches thus increasing ground water level in the entire tehsils.*

*In the present study attempt as been made to assess the situation of water scarcity in drought prone area and study the role of community works and peoples participation in water conservation programmes and its impact in drought prone villages of Satara district. The present study is mainly based on primary data collected by conducting the intensive field work, observations, through household schedule and interviews of the respondents and secondary data is collected from the published records. Present study indicates that the role of rainwater harvesting structures is important for increasing ground water level and its impact on rural development in drought prone area.*

### Introduction

The rural economy and its development are based on its natural resources and their management for production. Therefore, management of natural resources should be a key factor for effective development of rural development and watershed development in general. Therefore, most of the rural development models have considered natural resource management as a tool for rural transformation. (Singh, 2004). The water-harvesting systems used in rural India played a very important role in empowering local communities, in creating economic wealth in poor villages, in promoting integrated village ecosystem management – a form of sustainable development which had the potential to alleviate rural poverty and unemployment – and in the overall improvement of the nation's environment (Agrawal and Narain, 1997).

Villages in Man, Khatav, Khandala and Phaltan tehsils of eastern Satara district were selected for present study. It is a drought prone area with only 400-500 mm of rainfall annually. Water storage structures such as continuous contour trenches (CCT), check dams, gully plugs under watershed development projects; earthen plugs etc. are made. CCT and check dams block the flow of water and also store water in these trenches thus increasing ground water level in the entire tehsils. Water harvesting is an ancient method of obtainign water that has received renewed interest in recent years as a visible water supply practice for many regions of the world (Frazier & et.al., 1983). The people of these villages have started using sprinkler irrigation instead of flood irrigation. In the present study attempt as been made to assess the situation of water scarcity in drought prone area and study the role of community works and peoples participation in water conservation programmes and its impact in drought prone villages of Satara district. The present study is mainly based on primary data collected by conducting the intensive field work, observations, through household schedule and interviews of the respondents and secondary data. The micro-rainwater harvesting structure and the public participation in the rainwater harvesting program make special efforts to study the socio-economic changes in the society.

### **Study Area:**

In Satara district, the drought-prone areas are primarily located in the eastern part, particularly in the Man, Khatav, Khandala, and Phaltan tehsils. These tehsils are often affected by irregular and uncertain rainfall. There are 11 tehsils in Satara district out of which sample villages of 4 mostly drought affected tehsils such as Man, Khatav, Khandala and Phaltan tehsils of eastern Satara district selected for study purpose. The average rainfall of the area is around 500 mm (Khilare & et.al., 2012). The average maximum and minimum temperature of the area is 42°C and 19°C. The rainy season is most humid than the rest of the year. The evaporation rate is high in the summer season while it is almost nil in the rainy season. Once in a five year there is frequency of drought in the area which affects the agriculture activities. In general, there is scarcity of water in the month of March to June.

### **Objective:**

- 1) To assess the situation of water scarcity in drought prone area in Satara district.
- 2) To study the community works and peoples participation in water conservation programmes and its impact in drought prone villages of Satara district.

### **Database and Methodology:**

The present study is mainly based on primary data collected by conducting the intensive field work, observations, through household schedule and interviews of the respondents. The secondary data is collected from the published records such as Socio-Economic Reviews and District Statistical Abstracts, Census Handbooks, Government Reports related to water policy issues i.e. Jalyukt Shivar Abhiyan, Report, 2016, Jalyukt Shivar Abhiyan, Report, 2019 etc. From the analysis of data we calculated before and after RWH structures various water storage tank capacity in thousand cubic meters (TCM).

### **Results and Discussion:**

From the data analysis, field survey, observations and discussion with villagers and administrative officers following successful stories of village's micro level case studies findings have emerged. These findings may be more focused and tuned in the perspective of objectives of the study. Tondale and Mograle Village in Man Tehsils

The forest department has constructed nine cement dams on the stream flowing through the forest boundary of Tonadale and Mograle villages in Man tehsils. Due to the storage of water in this dam, human life and wildlife in Man and Phaltan tehsils have been enriched. A total of 10,000 cubic meters of water has been made available in all these cement check dams. The water level of 25 wells in the catchment area of this dam has increased by two to five meters. Before the construction of these nine cement check dams, all the rain water was drained away from the stream of Tonadale and Mograle villages and these villages had to be supplied with water tankers in every summer.

A total of 9 chain cement dams were constructed in the year 2015-16 within the limits of Tonadale village in Man tehsils and 2 within the limits of Mograle village with the help of government of Maharashtra scheme. Due to the rains in the year 2016, all these dams were filled to full capacity and as a result 10,000 cubic meters of water was stored in the suburbs of these villages. The visual impact of this work done by the Forest Department is now well visible. The problem of drinking water in the catchment villages of these dams has been solved permanently. Also, due to increase in ground water level by 2 to 5 meters, it is utilized for the purpose of agricultural development.



**Photo: 1 Cement Check Dam in Tondle Mograle Village  
Inchbav Village in Man Tehsils**

In the small village of Inchbav in Man tehsils, many water conservation works were carried out with the participation and hard work of the people. There is a stream called Shirsai from this village. The length of this stream is only 1.5 km., and width is 25 to 35 meters. A total of 6 cement check dams have been constructed on this stream. Also, many water conservation works have been done on the hills around the village. Due to artificial recharge of 11 wells, ground water level of wells has increased by 1 to 2 meters.

**Table - 1 Rainwater Harvesting Structures and its Area**

<b>Rainwater Harvesting Structures Constructed</b>	<b>Area/Number</b>	<b>Unit</b>
1. Compartment Bunding	675	Hector
2. Nala Bunding	8	Number
3. Cement Check Dam	6	Number
4. Deep CCT	40	Hector
5. Gabion Structure	2	Number
6. Farm Pond	4	Number
7. Recharge Wells	11	Number
• Before Construction of RWH Structures Water Storage Capacity	20	TCM
• After Construction of RWH Structures Water Storage Capacity	504	TCM
• Increase ground water level	3 to 5	mbgl

**Source: Field Survey and 'Jalyukt Shivar Abhiyan' Report (2019)**





Photo: 2 Cement Check Dam at Inchbav Village (Man)

#### **Mardi Village in Man Tehsils**

The villagers of Mardi established Mardi Gram Vikas Pratishthan. Mardikar completed the work of 65 km CCT in the government's 'Jalyukt Shivar Abhiyan'.



Photo: 3 Deep CCT Impact on Dug Well Water Level Increased,  
(Source - Jalyukt Shivar Abhiyan, Report - 2016)

Due to the pre-monsoon rains that fell in the year 2016, its visible effect was seen. The village of Mardi, which is constantly facing drought and scarcity of water, so, the peoples collected public fund of Rs. 10 lakhs for this water conservation work and started the work. The villagers carried out large scale water conservation works with the help of peoples and government of Maharashtra. 22 check dams were constructed through Employment Guarantee Scheme, Art of Living and Integrated Watershed Development Program. As a result, 2180 hectare area has come underirrigated. Due to



these water conservation works, the ground water level of the wells increased by one and half to two meters.

#### **Mirgaon Village in Phaltan Tehsils**

In the year 2015-16, under the 'Jalyukt Shivar Abhiyan', a large number of earthen nalla dams were constructed in Mirgaon village through public participation. A total of 7 cement dams were constructed under the Integrated Watershed Development Program. The old dams were deepened and widened through various schemes of the government and public participation. As a result, 65,000 cubic meters of water was stored in the outskirts of the village. The water level of 27 wells in this village has increased by 9 to 10 meters. As a result, cultivation of cash crops like vegetables, pomegranate, sugarcane and maize has increased.



Photo : 4 Water Conservation Structures Constructed by Maharashtra Govt. (2016)

**Table - 2**

**Water Conservation Structures Constructed by Govt. of Maharashtra (2016) in Mardi**

<b>Sr. No.</b>	<b>Water Conservation Structures</b>	<b>Unit</b>	<b>Area/Number</b>	<b>Water Storage Capacity (TMC)</b>
1	Earthen Boulders	Numbers	23	48.3
2	Deep CCT	Hectors	133	33.25
3	Compartment Bounding	Hectors	75	33.75
4	Farm Ponds	Number	7	15.40
5	Cement Check Dams	Number	7	67.50
Total				245

Source : Field Survey & 'Jalyukt Shivar Abhiyan' Report (2016)

**Table - 3**  
**Rainwater Harvesting Structures Constructed by Peoples Participation (2016)**

Sr. No.	Rainwater Harvesting Structures	Unit	Area/Number	Water Storage Capacity (TMC)
1	Old K. T. Ware Maintenance	Numbers	08	84.00
2	Old Cement Check Dams Maintenance	Numbers	5	26.00
3	Old Nala Bunds Maintenance	Numbers	8	16.00
4	Percolation Tank Deepened	Number	1	31.00
5	New Earthen Dams	Number	16	14.05
Total				171.05

**Source : Field Survey & 'Jalyukt Shivar Abhiyan' Report**

**Rajapur Village in Khatav Tehsils**

Very good water conservation work has been done in the village of Khatav tehsils, Rajapur. Due to this water conservation works the water level of wells and coupon lines increased by 4 to 5 meters. Farmers here have been using modern irrigation like drip irrigation to produce Greenpeace, common beans and Soybean crops. The area under onion cultivation in the village was earlier only 200 hectares but now it has increased to 600 hectares. Banana crop has been planted on an area of 8.60 hectare using drip irrigation system by the farmer's self-help group here.

**Table - 4**  
**Rajapur Village: Rainwater Harvesting Structures & Water Storage Capacity**

Sr. No.	Rainwater Harvesting Structures	Unit	Area/Number	Water Storage Capacity (TMC)
1	Cement Check Dams	Numbers	4	19.2
2	Deep CCT	Hectors	186	44.64
3	Compartment Bunding	Hectors	15	6.75
4	Gabion Structure	Number	1	3.8
5	VanraiBandhara	Number	3	7
Total				81.39

Source : Field Survey & 'Jalyukt Shivar Abhiyan' Report (2019)



Photo: 5 Check Dam & Recharge Dug Wells (Source - 'JalyuktShivarAbhiyan' Report - 2016)

### Conclusions

- Tonadle and Mograle villages had to be need the supplied with water tankers in every summer before the construction of these nine cement check dams. The problem of drinking water in the catchment villages of these dams has been solved permanently after construction of check dams. Also, due to increase in ground water level by 2 to 5 meters, it is utilized for the purpose of agricultural development.
- Village Inchbav in Man tehsils, many water conservation works were carried out with the participation and hard work of the people. There is a stream called Shirsai from this village. The length of this stream is only 1.5 km., and width is 25 to 35 meters. A total of 6 cement check dams have been constructed on this stream. Also, many water conservation works have been done on the hills around the village. Due to artificial recharge of 11 wells, ground water level of wells has increased by 1 to 2 meters.
- The village of Mardi, which is constantly facing drought and scarcity of water, so, the peoples collected public fund of Rs. 10 lakhs for this water conservation work and started the work. The villagers carried out large scale water conservation works with the help of peoples and government of Maharashtra. 22 check dams were constructed through Employment Guarantee Scheme, Art of Living and Integrated Watershed Development Program. As a result, 2180 hectare area has come underirrigated. Due to these water conservation works, the ground water level of the wells increased by one and half to two meters.
- In the year 2015-16, under the 'Jalyukt Shivar Abhiyan', a large number of earthen nalla dams were constructed in Mirgaon village of Phaltan tehsils through public participation. A total of 7 cement dams were constructed under the Integrated Watershed Development Program. The old dams were deepened and widened through various schemes of the government and public participation. As a result, 65,000 cubic meters of water was stored in the outskirts of the village. The water level of 27 wells in this village has increased by 9 to 10 meters.
- Very good water conservation work has been done in the village of Khatav tehsils, Rajapur. Due to this water conservation works the water level of wells and coupon lines increased by 4 to 5 meters. Farmers here have been using modern irrigation like drip irrigation to produce Greenpeace, common beans and Soybean crops. The area under onion cultivation in the village was earlier only 200 hectares but now it has increased to 600 hectares. Banana crop has been planted on an area of 8.60 hectare using drip irrigation system by the farmer's self-help group here.
- During 2019, drought had left Man tehsils heavily dependent on tankers. Its 66 villages



needed at least 166 tankers per day to meet the demand of domestic water needs. The government coughed up over Rs.9 corer for these tankers. Today, Man tehsils is tanker-free.

- It took efforts of our volunteers, commitment of our Youth Leadership Training Program leaders, community participation to change the future of Man tehsils. It is water-sufficient. Present study clearly reveals the role of rainwater harvesting structures is important for increasing ground water level and its impact on rural development in drought prone area.

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