

# A Research Paper on Jalyukt Shivar Abhiyan Assessment (Sonavade) and Design of Water-Efficient Village(Save)

Prof. V.M. Sanade<sup>1</sup>, Sandesh S. Dongare<sup>2</sup>, Vijay D. Hande<sup>3</sup>, Sainath D. Patil<sup>4</sup>, Siddheshwar D. Dhavan<sup>5</sup>, Prajakta S. Lokhande<sup>6</sup>

<sup>1</sup>Department of Civil Engineering, Tatya Saheb Kore Institute of Engineering and Technology, Warananagar, Maharashtra, India

<sup>2,3,4,5,6</sup>Student, Department of Civil Engineering, Tatya Saheb Kore Institute of Engineering and Technology, Warananagar, Maharashtra, India

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**Abstract** - JYS is the Government of Maharashtra's program to provide water for all and make villages scarcity-free. Maharashtra has been witnessing increasing agricultural and drinking water stress in recent years. JYS promotes an integration and coordination between various government agencies and program during planning and implementation levels and stresses on people's participation as one of the key objectives. The program aims to make 5000 villages free of water scarcity every year. The scheme aimed at solving water woes of draught-prone regions is already a hit with farmers as many villages are inching towards becoming water-sufficient. With unique initiative like Jalyukta Shivar, water scarcity will surely be a thing of the past!

**Key Words:** jalyukta shivar, water scarcity, assessment, water budget, watershed

## 1. INTRODUCTION

Water Conservation Program is one of the very important programs, the Govt. of Maharashtra has decided to implement with a view to improve the lifestyle of the people in rural areas and thereby achieve the rural development. In the state of Maharashtra, inconsistency of rains in the very times of crop growth and discontinuity of rains create drought-like situation and agriculture field is heavily impacted. Almost 82% area in the state is dry land while 52% area is drought-prone. Government is authorizing implementation of 'Jalyukta Shivar' campaign in all districts of the state, in order to permanently overcome drought situation by convergence of funds approved for schemes under various departments and through MREGS/MLA/MP Fund/District-level Fund/Nongovernmental Organizations/CSR and public participation. The scheme aimed at solving water woes of draught-prone regions is already a hit with farmers as many villages are inching towards becoming water-sufficient.

### 1.1 METHODOLOGY

- 1) To study JSA DPR and understand whole JSA process.
- 2) To assess the location and quality of works done under JSA. The on-field assessment is intervention-centered. All

the soil and water conservation work need to be visited in the village and need to be geo-tagged. The quality of works needs to be assessed (dimensions, construction quality, engineering appropriateness, locational suitability, adherence to watershed principles etc.). The assessment of works on above criteria needs to be done through simple measurements, primary investigation, visual inspection and farmer/resident interviews

- 3) To understand the impact of works. Along with the quality check, it is important to assess the utility of the work done and benefits accrued. The benefits can be in terms of increased groundwater availability or reduction in soil erosion or increase in farm incomes or increase in drinking water availability. This needs to be assessed through visual inspection and farmer/resident interviews.
- 4) To pay special attention to areas which were not addressed and solution for the same.
- 5) To record suggestions from the stakeholders and recommend suitable alterations in existing processes, if any.

### 1.2 AIMS AND OBJECTIVES

1. Harvesting maximum rainwater in the surrounding of village itself.
2. Increasing level of groundwater.
3. Increasing area under irrigation in the village - Increasing assured water for farming and efficiency of water usage.
4. Guaranteeing availability of sufficient water for all in the village - Increasing water supply by resurrecting dead water supply schemes in the rural area.
5. Implementing groundwater act.
6. Creating decentralized water storages.
7. Sensitizing people about water harvesting / increasing public participation.

## 2. LITERATURE REVIEW

1. **Assessment of Works under Jalyukta Shivar Campaign - A Case Study of Pusad Region** was published by Prof. R. T. Pachkor, Dr. D. K. Parbat

Department of Civil Engineering, Babasaheb Naik College of Engineering, Pusad, Maharashtra, India  
Department of Civil Engineering, Government Polytechnic, Nagpur, Maharashtra, India Volume 5 Issue IV, April 2017 IC Value: 45.98 Pachkora and Parbat 2017 studied that JYS is the government of Maharashtra program to provide water for all and make villages scarcity free. Maharashtra has been witnessing increasing agriculture and drinking water stress in recent years. Maharashtra government has launched a new program named "Jalyukt Shivar Abhiyan" in bid to make Maharashtra a drought free state by 2019.

2. **Analysis of Delays in Works under Jalyukt Shivar Campaign** published Niranjan J. Khillare Department of Civil Engineering NDMVPS's KBT COE, Nashik, India. He studied that JSA campaign is flagship program of government of Maharashtra aims to dream water empowerment to the drought affected villages to make Maharashtra drought free by 2019. Also, the government is only monitoring construction phase of project cycle whereas delays in preconstruction activities are not being considered.
3. **Mr. Potekaret U.P and Pawar 2017** concluded that water is important because it is essential to life on earth. In Maharashtra state nearly 82% area of state fall in rainfed sector and 50% area is drought prone, uncertain, insufficient and irregular rainfall pattern adversely affect agriculture. Drought occurs frequently resulting shortage of water for drinking and irrigation.
4. **Zeesham and Pachkore R.T** conclude that JYS is the government of Maharashtra programme to provide water for all and make villages scarcity free. The JSA proposes framework for village level water balance calculation which includes estimation of crop water requirement, drinking water stress etc. After completion of irrigation projects in next two years 50% area will be under irrigation. With unique initiative like Jalyukt Shivar water scarcity will surely be a thing of the past.

### 3. ON FIELD ASSESSMENT

#### 3.1 ASSESSMENT VISIT SCHEDULE

The team visited Sonavade on the days of 15th, 16th and 17th July 2018. The team consisted of Prof. Vishal Sanade, Mr. Sandesh Dongare, Mr. Sainath Patil, Mr. Siddheshwar Davan from T.K.I.E.T Warananagar and Mr. Kshirsagar TAO Panhala. The arrangements for lunch were made at hotel in Bambawade.

##### DAY 1 -

1. Meeting was held at TAO office to brief the concerned government officials (Agriculture, water resource, Minor Irrigation (ZP), Minor irrigation (WC), GSDA etc.) about the agenda and methodology for assessment. All the data regarding estimates, beneficiary farmers list,

revenue-map etc. were collected and a detailed visit-plan was decided.

2. Meeting was held in GP office with Sarpanch, few GP members, Gram Sevak, few residents and concerned officials. The objectives and procedure of the assessment, viz., ascertaining the conduct of the JSA works, its utility and quality, the drinking water situation and a special reference to NW&D was explained during the meeting.
3. Visits to intervention sites -i) Cement Concrete Nala Bund ii) Desiltation of village lake.

##### DAY 2 -

On day-2, we began with the village meeting at the Gram Panchayat Office. This was attended by about 10 people, along with other officers. The team explained the purpose of the assessment and the process which was being followed. Many farmers expressed their demand for more works, esp. removing the silt deposited. Some strong opinions were expressed. On the whole though, the village seemed satisfied with the conduct of the JSA. Continued with assessment of works -i) Cement Concrete Nala Bund ii) interviews with various farmers and iii) Desiltation of village lake.

##### Day 3 -

Continued with assessment of works- i) Cement Concrete Nala Bund ii) Desiltation of village lake, Assessment of drinking water situation - i) Meeting with Gram Sevak and data collection, ii) Visits to all the wards (vastis) and interviews with women, iii) general interviews with farmers.

### 3.2 STRUCTURAL SOUNDNESS

All the works were found to be of good quality and matching estimates. In some cases, berms were not in place and have collapsed into the stream. Excavation was not found to be more than 3m in any work. There was heavy Silting in all the structures. CNBs were also structurally sound. All the CNBs passed the hammer test. Dimensions were as per estimates. Due to heavy silting no upstream slope was present. Silting was due to the deposition of silt from the wells dug on U/S side. The waste remains of the rice after cultivation were deposited in the stream.

#### Utility

The farmers on either side reported about the positive impact of deepening on the well levels.

But the positive impact was in the first year only. Later due to siltation the storage capacity was reduced and no proper arrangements were made for desilting.

### 3.3 IMPACT ASSESSMENT

Sonavade is a typical village in the Western Maharashtra region with flat terrain, good clayey soils and assured kharif crop due to assured rainfall. But in the last few years there

has been uncertainty in the rainfall. Also, during good rainfall years, there are frequent and long dry spells which affect productivity of kharif crops.

As per the land use and soil maps of MRSAC, the vulnerable zone of the village lies in the southern, western and northern ridge area of the village where the soils are gravelly and thin and farmers can only take kharif crops.

Thus, the main problems faced by the village are - i) protection of kharif crops, and ii) drinking water security, especially in the low rainfall years.

Through JSA the problems regarding the scarcity of water in dry period is resolved but the problem of drinking water is not completely resolved by JSA.

The CNB works in the area were effective in retaining soil moisture and increased percolation till first and second year. Many farmers reported increased soil moisture retention due to CNB structure for first year. Due to heavy siltation the structures were found to be not useful in last year.

The siltation was due to deposition of silt from the adjoining dug wells. The waste remains from the fields were deposited in stream.

Farmers reported increase in yields due to JSA activities. Some farmers reported cropping pattern change due to CNB's and due to desilting of Village Lake.

The desilting activities would be effective in a drought year when there are few rainfall events and also in the dry spells. The runoff generated is arrested in the deepened streams and recharges nearby wells till for next 4-5 months. Thus, farmers are able to provide protective irrigation to kharif crops. But in the case the chained CNBs activities runoff due to silting should not reach the downstream areas during low rainfall years. This needs to be studied further. Also, the active participation of the villagers was not observed. On many CNB's it was observed that the neighboring farmers had installed pumps to drive water. Heavy silting was observed in all the CNB's. In some cases, the location of structures was not suitable. The U/S and D/S slopes were not provided properly.

The structures were sound and safe but desiltation is to be done immediately. The Officials and the village people asked about the place to deposit the desilted material. So proper place is to be provided for deposition.

**4. DESIGN OF WATER SUFFICIENT VILLAGE- SAVE**

**4.1 RAINFALL**

Annual average rainfall at save is 1500mm. Which is taken from www.maharain.com.

**4.2 WATER BUDGET COMPUTATION**

**4.3 Table -1**

Sr. No.	Description	Details
1	Population	2456
2	Geographical area (Ha)	608
3	i) Average Rainfall (mm)	1500
	ii) Total rainfall in TCM	9120 TCM
4	Total water requirement (a+b)	2957.4 TCM
	a) For Drinking	53.4 TCM
	b) For Irrigation	2904.0 TCM
5	Total Runoff as per Inglis formula	1129.056 TCM
6	Total impounded runoff	
	a) Due to lake	301.00 TCM
7	Available runoff (5-6)	828.56 TCM
8	Deficit (6-4)	2656.4 TCM

**4.4 PROPOSED STRUCTURES IN VILLAGE**

- 1) Colsed Contour Trenches
- 2) Earthen Nala Bund
- 3) Cement Nala Bund

**SAMPLE**

**4.4.1 EARTHEN NALA BUND**

A bund constructed out of local soil across the stream to check soil erosion, to store water and to drain out excess water by using spillway is called as Earthen Nala Bund (ENB). Some guidelines are considered while construction of Earthen nala bund. Some of them are as follows:

**4.4.2 NECESSITY OF ENB**

1. To store water.
2. Availability of water for surrounding farms.
3. Availability of water in water scarcity area or drought prone areas.
4. To cut the velocity of flow of water so as to reduce soil erosion.

**4.4.3 POINTS CONSIDER FOR SITE SELECTION**

1. Narrow valley for least amount of earth fills.
2. Minimum catchment area should be 10 ha. & maximum 1000 ha.
3. Slope of water course should not be greater than 3%.
4. The width of nala bed should be at least 5 m & not exceed 15 m.
5. Profitable area on downstream side of nala should be minimum 4 ha.
6. The depth of nala should be minimum 1 m.
7. Sufficient clayey soil for core wall should be available nearby.
8. The structure should not lead to water spreads into the nearby agricultural fields.
9. Foundation strata should be capable of bearing the load of the structure.
10. One of the banks should have suitable strata and area for the spillway
11. Depth of excavation of the hard strata should be kept minimum.

**4.4.4 DETERMINATION OF SLOPES**

**Table -2**

Remark	B.S	I.S	F.S	H.I	R.L	Remark
B.M	2.32 5			102.32 5	100.0 0	B.M
5		2.34 0			99.98 5	
10		2.36 0			99.96 5	
15		2.42 5			99.90 0	
20		2.57 5			99.75 0	
25		2.46 0			99.86 5	
30		2.49 0			99.83 5	
35		2.55 5			99.77 0	
40		2.69 0			99.63 5	
45		2.60 5			99.72 0	
50		2.67 5			99.65 0	
55		2.88			99.44	

		0			5	
60	2.59 0		2.75 5	102.10 0	99.57 0	CP1
65		2.75 0			99.41 0	
70		2.81 0			99.35 0	
75		2.81 0			99.35 0	
80		2.81 0			99.35 0	
85			2.74 5		99.41 5	

$$\text{Slope} = (100.00 - 99.415) / 85$$

$$= 0.68 \text{ i.e. } 6.8\%$$

**5. CONCLUSION**

Farmers reported increase in yields due to JSA activities. Some farmers reported cropping pattern change due to CNB's and due to desilting of Village Lake. The desilting activities would be effective in a drought year when there are few rainfall events and also in the dry spells. The runoff generated is arrested in the deepened streams and recharges nearby wells till for next 4-5 months. Thus, farmers are able to provide protective irrigation to kharif crops. But in the case the chained CNBs activities runoff due to silting should not reach the downstream areas during low rainfall years. This needs to be studied further. Also, the active participation of the villagers was not observed. On many CNB's it was observed that the neighbouring farmers had installed pumps to drive water. Heavy silting was observed in all the CNB's. In some cases, the location of structures was not suitable. The U/S and D/S slopes were not provided properly. The structures were sound and safe but desilting is to be done immediately. The Officials and the village people asked about the place to deposit the desilted material. So proper place is to be provided for deposition. We interviewed around 20 beneficiary farmers to understand the impact were on different accounts like well recharge, increase in productivity, increase in crop land etc. In some cases, the location of the CNB was not selected properly. The upstream slope was not provided properly. Some of the CNB were located on curves. Provisions of funds should be made for the desilting as it is the major problem. Active participation of villagers should be encouraged by the government bodies. Constructed structures were structurally sound and safe. Water level in the well was increased and the water lasted for few more months.

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## BIOGRAPHIES



Vishal Mohan Sanade  
M.E Construction Management  
Professor Dept. of Civil Engg.  
Tatyasaheb Kore Institute of Engg.  
And Technology.



Sandesh Sanjay Dongare  
B.E Civil



Vijay Dattatraya Hande  
B.E Civil



Siddheshwar Dattatraya Dhawan  
B.E Civil



Prajkata Sadashiv Lokhande  
B.E Civil



Sainath Dinkar Patil  
B.E Civil