



IMPACT ASSESSMENT OF SOIL AND WATER CONSERVATION WORK CARRIED OUT UNDER JALYUKT SHIVAR YOJANA IN WARDHA TALUKA

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ABSTRACT

Maharashtra is the third largest state in India and nearly 55 % of population lives in the rural area which largely depends on agriculture for their livelihood. Maharashtra has constantly confronted dry seasons. The dry spell has endured for four back-to-back years and has influenced drinking water security and harvest creation and profitability seriously everywhere throughout the Maharashtra state. The JSA proposes a structure for village level water balance computation which incorporates estimation of yield water necessities, drinking water pressure and so forth. This Campaign is organized action plan where in many departments are collectively & collaboratively working towards a common goal i.e., 'Water for All'. The program means to make 5000 villages free of shortage of water consistently. This impact assessment presents how the excess runoff stored in the catchment area is beneficial to the farmers and village people for irrigation and drinking water purpose. In this investigation, the 5 villages name of 'Ashta, Pujai, Dattapur, Pulai, Mandwa' selected which is situated in the Wardha Taluka, Wardhs District (M.S.) India. The fundamental point of the investigation is to compute complete water request of the village, water balance sheet and remaining runoff calculation. Visit to JSA work, for example, stream developing and broadening, Concrete Nala bund, Farm pond, well, compartment bunding and so forth and gather the information according to evaluation technique given in GR(Government Resolution) - 2014 water protection office (MS). Impact assessment of villages under study regarding water level increment indicated 21.69 per cent increase in ground water level and crop productivity of different crops increased by 12 to 20 per cent.

KEYWORDS: Impact assessment, dry spell, water balance, livelihood, runoff

INTRODUCTION

Maharashtra is the third largest state in area and second largest state in population of India. It has an area of 3,07,713 sq. km. with 35 districts, 358 blocks and 43,711 villages and a population of 11,23,72,972. . The western ghats form one of the three watersheds of India, from which many south Indian rivers originate, notable among them being Godavari River, and Krishna, which flow eastward into the Bay of Bengal, forming one of the greatest river basins in India. The west-flowing rivers flow in to the Arabian

sea. The major rivers of the plateau are Tapi, Godavari, Bhima, Krishna, Koyna and Wainganga. The Godavari is the principal river of Maharashtra.

Considering drought like situation occurring frequently in the state, Jalyukt Shivar Campaign is being taken up under 'Water for All -Drought-Free Maharashtra 2019'. Capacity and around 84% of its agricultural land is depends upon rainfall. Around 159 lakhs hectares of area is drought-prone. Water conservation program is one of the very important programs, the Government of Maharashtra has decided to implement with a view to improve the lifestyle of the people and economic situation, agriculture development in rural areas and thereby achieve the rural development. In the state, 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. There are 188 Talukas (2,234villages) where groundwater level dropped for more than 2 meter and drought situation were declared in 19059 villages from 22 districts in the year 2014-15.This 'Jalyukt Shivar' campaign needs to be implemented in these locations on priority.

Work Done under Jalyukt Shivar YOJANA

- Broadening and deepening of nalla.
- Removing silt from lakes, ponds, farm ponds, and canals which prevents water percolation.
- Building check dams, canals, small ponds, and wells (individual and community).
- Construction of cement nalla bhandhara (CNB)
- Earthen nalla bandhara (ENB).
- Recharge bandhara.
- Compartment bunding
- Construction of continuous contour trenches(CCT)
- Tree plantation

MATERIAL AND METHODS

Wardha district is located in the Vidarbha region of Maharashtra state and is named after its most important river, the Wardha. The district is bounded on the west and north by Amravati district, on the south by Yavatmal district, on the southeast by Chandrapur district and on the east by Nagpur district. The boundaries with Amravati and Yavatmal districts are identified by the river Wardha. The Wardha district covers 6,310 km². It is Located 738 km west towards state capital Mumbai. Wardha district population is 1296157. It is 29th largest district in the state by population.

Table 1 Source of irrigation

Source of irrigation	Area in ('000ha)	% of total irrigated area
Canal	3.52	7.57
Open wells / Bore wells	28.665	61.67
Tanks	0.2	0.43
Lift irrigation systems	1.00	2.15
Other sources	13.1	28.18
Total	46.485	100 per cent

Hydrological Data: Rainfall data recorded is tabulated below

Table 2 Annual Rainfall Data(2010-19)(mm)

Taluka	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
Wardha	864.6	951.1	885.4	1121	940.3	1152.9	892.7	617.3	1393.4	974.7
Seloo	1279	968	1105	1395	1084	1643.1	986.1	758.3	1329.5	1152.2
Deoli	941.7	967	739.6	1165	-	-	682.3	581	1242.6	916.6
Hinganghat	988.2	1048	956.9	1246	-	-	1011	769.3	1513.6	1059.4
Samudrapur	1074	1112	882.8	1281	-	-	733.9	772.9	1440.6	1050.7
Arvi	793.9	863.7	789.5	1216	1146	1132.0	977.6	605	1174.1	978.1
Ashti	760.6	706	699	1020	843.7	1203.3	578.8	569.4	873.6	807.6
Karanja	876	910.8	879.5	1051	958.7	1061.6	705.2	702.3	1253	932.2
Average	947.3	940.9	867.2	1187	994.6	1238.6	821.0	671.9	1247.1	

Agricultural Data: The agricultural water balance is calculated with the assumption that the existing cropping pattern is the cropping pattern which will remain constant for all years. But crop patterns change due to many reasons like increase in water availability, low rainfall, farmer's affordability etc.

Table 3 Agricultural data

Cropping pattern	Crops
<i>Kharif</i> (1/04 to 30/09)	Cotton, Soyabean, Pigeon Pea, Chickpea, Sorghum, Green gram, Black gram
<i>Rabi</i> (1/10 to 31/03)	Wheat, Turmeric, Groundnut, Sunflowers
Seasonal	Vegetables
Yearly	Sugarcane, Horticultural crops

The change in cropping pattern due to increased availability of water is not incorporated in the current jalyukt shivar yojana frame work. Jalyukt shivar yojana GR mentions about crop plans and regulations in water use. But there is no provision for agreements or regulations to be done at the village level to bring these things into the plan. For the survey of Jalyukt Shivar Yojana, 5 villages were selected listed as Ashta, Pujai, Dattapur, Pulai, Mandwa from the taluka of Wardha of Wardha district. In these area between 2014-19 under Jalyukt Shivar YOJANA total 106 different projects completed, such as cement nalla bunds, farm pond, water well, regulation of river, gabion bunds, graded bunding, forest pond, etc.

Table 4 Horticultural Crops

Horticulture Crops(Fruits)	Area in ('000ha)
Orange	3.10
Mango	0.2
K. Lime	0.70
Aonla	0.40
Custard Apple	0.10
Ber	0.40
Banana	0.1
Tomato	1.1
Brinjal	1.3
Onion	0.40

Assessment of Jalyukt Shivar Yojana

- 1) To study JSA DPR and understand whole JSA process.
- 2) Analysis of case study with respect to the data provided during interview and site visit to verify actual physical condition of works.
- 3) To assess the location and quality of works done under JSA. The on-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, location 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
- 4) 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 interns 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.
- 5) To record suggestions from the stakeholders and recommend suitable alterations in existing processes, if any.
- 6) Study historical data from literature survey.
- 7) To recommend suitable alterations in existing processes and solutions to increase the effectiveness of the structures.

RESULTS AND DISCUSSION

Analysis is done on the basis of response recorded form the peoples who are the beneficiaries of the structures develop under JSY of particular village.

Area Under Irrigation: In Ashta village 713.29 ha out of 623 ha of land use for cultivation and agricultural related work. In which 447 ha is unirrigated land 176 ha is irrigated and 83 ha is barren land. Total 33 projects are completed in Ashta village under JSA between year 2017 to 2019.

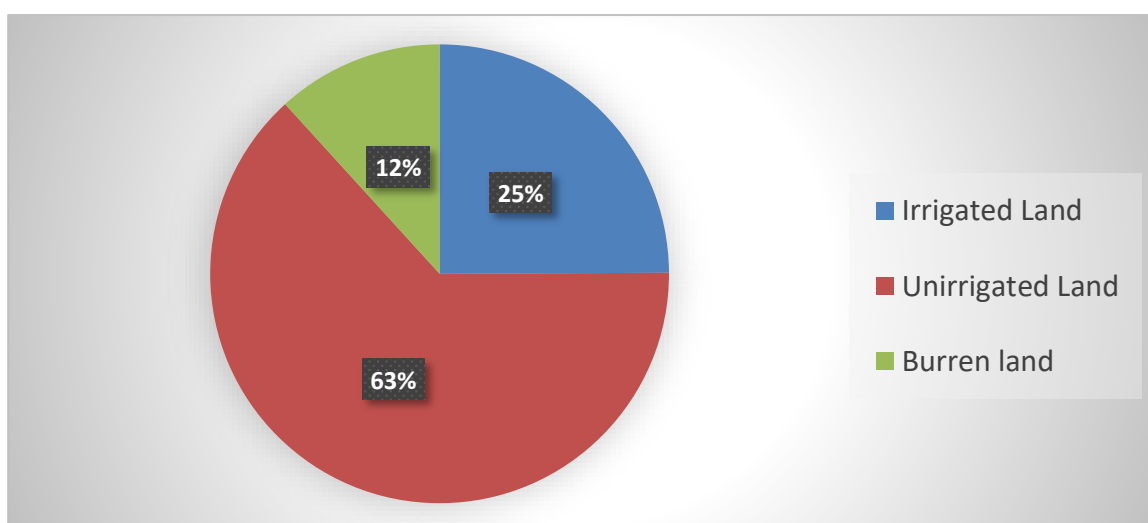


Chart 1 Area under irrigation of Ashta village

Impact on groundwater level: After the completion of JSA, slightly increase in ground water level in Ashta village had observed. It is shown in following data

Table 5 List of farmers from Ashta village (Source: personal survey)

Sr. No	Name of Farmer	Land Acquired	Increase in Well Water Level	Benefits from JSY	Suggestion
1.	Valmik Devidas Thakre	2.5 acres	1-2 Meter	Increase in Irrigated land	At least one farm pond required in area
2.	Prabhakar D. Thakre	4.5 acres	-	Increase in yield	More projects should run in area
3.	Subhash V. Shelke	6 acres	1-1.5 meter	Cultivated area increases	Farmer must be aware of this type of schemes
4.	Shalik C. Shelke	5 acres	1-2 meter	Help in Irrigation	-
5.	Shashikala A. Raut	9 acres	-	Reduce in soil erosion	No of Nalla bund and farm pond should increases
6.	Suresh S. Raut	15 acres	1-2 meter	Increase in ground and well water level	Awareness about such schemes should be spread among the farmers
7.	Sandesh B. Raut	2 acres	-	Reduce in soil erosion	There is huge requirement of wells in farm
8.	Anil N. Khairkar	3 acres	1-1.5 meter	Increase in ground water level	-
9.	Baba D. Thakre	26 acres	1-2 meter	Increase in irrigated area	In some areas there are requirement of canals
10.	Vithoba T. Raut	3.5 acres	-	Increase in net yield	More wells are required

Table 6 Groundwater analysis in Ashta village

Source	Total Available	Before Project		After Project		Overall Impact
		Before Monsoon Average Water level(m)	After Monsoon Average Water level(m)	Before Monsoon Average Water level(m)	After Monsoon Average Water level(m)	
Well	67	3.2	4.7	5.1	7	After project about 2.0 m increase in water level
Bore well	6	3.5	4.7	5.2	7.1	

(Source: Yearly report of JSY publish by Agricultural Department of Maharashtra)



Fig 1 Nalla deepening in Ashta village before & after

Table No 7 Benefits of Jalyukt Shivar YOJANA Ashta village

Sr No	Benefits	Before Monsoon		After Monsoon	
		Before Project	After Project	Before Project	After Project
1)	Water Replenishment	-	-	1996 TCM	2436 TCM
2)	Reduce soil erosion	-	-	12%	47%
3)	Increase in Ground water level	3.2 m	4.7 m	5.1 m	7 m
4)	Increase area under irrigation	-	-	176 ha	193 ha
5)	Increase in Cattles & Domestic Animals			5200	5350

Due to JSA crop productivity increased up to 12-20 % in Ashta, Pujai, Dattapur, Pulai and Mandwa villages. Some farmers reported cropping pattern change due to CNB's and due to desilting of farm pond. 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.

CONCLUSION

The water harvesting structures play a key role by storing water and allow sufficient time for water to percolate into ground. Therefore, increases in ground water table 1-2 m in drought prone area is success of JSA and percentage increase in ground water level is 21.69% after JSA.

REFERENCES

- Khillare N.J.(2017). Analysis of Delays in Works under Jal yukt Shivar Campaign. Vol. 5, issue 04.
- Pachkor, R. T. and Parbat D. K. (2017). Assessment of works under Jal yukta Shivar Campaign – A case study of Pusad region,” Volume 5 Issue IV, April 2017.
- Vinchurkar S. S. and Ingole N. W. (2016). “Study and Evaluation of Impact of Soil and Water Conservation Treatments on Selected Watershed Area,” International conference on Science and Technology for Sustainable Development (ICSTSD).
- Zeeshan Adib Ahmed and Pachkor,R.T. (2015).“Jal yukta Shivar - A Combat to Water Stresses in Maharashtra,” Volume 3 Issue X.