

Impact Assessment of Jalyukt Shivar Abhiyan for Padali Helgaon Village Tal-Karad, Dist-Satara



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Abstract: 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. Maharashtra government has propelled another program named Jalyukt Shivar Abhiyan (JSA) to make Maharashtra a dry season free state by 2019. The JSA proposes a structure for village level water balance computation which incorporates estimation of yield water necessities, drinking water pressure and so forth. JSA advances a mix and coordination between different government organizations and programs during arranging and usage levels and weights on individuals' cooperation as one of the key goals. The program means to make 5000 villages free of shortage of water consistently. This change has been possible with concentrated efforts towards creating watersheds, improving groundwater levels, de-silting and decentralizing water sources and expanding the region underwater system. 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 village name of 'Helgaon Padali' selected which is situated in the Karad Tehsil, Satara 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 village regarding water level increment, crop production increment had studied.

Index Terms: Keywords: Impact Assessment, Jalyukt Shivar Abhiyan (JSA), JSA Structures, JSA beneficiary.

I. INTRODUCTION

A. State profile

Out of 307.70 lakh hectares of the geographical area, 225.4 lakh hectares area is "cultivable land." The state has about 75% area which is drained by eastward flowing rivers; viz. the Godavari and Krishna, to the Bay of Bengal and the staying

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25% territory is depleted by westbound streaming waterways like the Narmada, Tapi and Konkan seaside waterways to the Arabian Sea. Maharashtra is inclined to different debacles, for example, dry season, floods, violent winds, seismic tremor and mishaps. To overcome the drought situation in the state, government of Maharashtra has taken a step called 'Jalyukt Shivar Abhiyan' (JSA) with the aim to make 'Drought Free Maharashtra' by 2019.

B. Jalyukt Shivar Abhiyan

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 (2234 villages) 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, 15747 water scarcity Villages in 2015-16 and 6883 water scarcity Villages in 2016-17. This 'Jalyukt Shivar' campaign needs to be implemented in these locations on priority. Also, provisions should be made to ensure water scarcity situation is not created in future in the remaining part of the state. Therefore, government is authorizing implementation of 'Jalyukta Shivar' campaign in all districts of the state.

C. Criteria - Selection of Villages (Priority)

1. IWMP Phase 1,2 &3/VIIDP/Gatiman Dry land agribusiness cultivating mission/villages canvassed in half or progressively finished watersheds/+ Current Year Scarcity proclaimed village + Tanker Feed village+ over misused village in the watershed.
2. IWMP Phase 1,2 &3VIIDP/Gatiman Dryland agribusiness cultivating mission/villages shrouded in half or progressively finished watersheds/+ Current Year Scarcity Declared Village + Tanker Feed village.

3. IWMP Phase 1,2 &3/VIIDP/Gatiman Dryland agribusiness cultivating mission/villages shrouded in half or progressively finished watersheds/+ Current Year Scarcity announced village.
4. IWMP Phase 1,2 &3VIIDP/Gatiman Dryland agribusiness cultivating mission/Villages shrouded in half or progressively finished watersheds/+ Scarcity announced village for most recent five years + Tanker Feed village+ over abused village in a watershed.
5. IWMP Phase 1,2 &3/VIIDP/Gatiman Dryland agribusiness cultivating mission/Villages shrouded in half or progressively finished watersheds/+ Minimum one-year tanker fed village in most recent multi-year.
6. Watershed Declared Village and a village were Scarcity was announced at any rate once in most recent multi-year.
7. Selection of village is exceptionally straightforward. Authority's board to choose villages.

D. Works To Be Done Under JSA

1. Broadening and deepening of the Nalla,
2. Removing silt from lakes, ponds, farm ponds, and canals which prevents water percolation.
3. Building check dams, canals, small ponds, and wells (individual and community).
4. Tree plantation.
5. Construction of Cement Concrete nalla bhandh (CNB),
6. Earthen nalla bhandh (ENB).
7. Compartment Bunding.
8. Construction of continuous contour trenches (CCT).

II. LITERATURE REVIEW

In the study of Jalyukt Shivar Abhiyan different case studies of different areas in Maharashtra had considered. Authors had studied Jalyukt Shivar Abhiyan and gave their conclusions regarding Assessment, Watershed management and Impact analysis. In 2017, R. T. Pachkor, et.al, [1] studied a case study of Pusad region in Maharashtra which is on assessment of works under Jalyukt Shivar Campaign. In 2017, Potekar U. P. et.al, [2] had studied Jalyukt Shivar Abhiyan and Micro irrigation in Maharashtra. This study concludes that due to Jalyukt Shivar Abhiyan precipitation run-off, soil disintegration declined undercharge of ground water level and water stockpiling limit likewise expanded under water system region. Improving efficiency and financial state of farmers. In year 2017 Mr. Khillare N. J.[3] studied analysis of delays in work under Jalyukt Shivar campaign. Author concludes that significant segment of venture process duration is being consumed by undertaking inception, detailing, and endorsement stages than real development stage. In 2015 Zeeshan and R.T. Pachkor [4] studied Jalyukt Shivar – A combat to water stresses in Maharashtra. The JSA is a successor of numerous prior watershed programs which have just been executed, and some of which are continuous, for example, the IWMP. With extraordinary activity like Jalyukta Shivar, water shortage will doubtlessly be a relic of times gone by. Manchand Singh, Prof.Deepali Kulkarni, Prof S. D. Talegoankar [5] were studied Assessment of Effectiveness,

Plan and Design of Watershed Management: A Case Study of Khor Village, Daund Tehsil, Pune District, Maharashtra. Author concluded, to defeat the issue of water shortage in Khor village water monitoring structures and methods for watershed the board will be proposed. Another part of ground water revives additionally enhanced with the equivalent for this specific village which straightforwardly benefits the residents and farmers. Suhas P. Wani and Y.S. Ramakrishna [6] were studied Sustainable Management of Rainwater through Integrated Watershed Approach for Improved Rural Livelihoods. This coordinated watershed approach empowers to have 'winwin' circumstances for continuing profitability and improving vocations as it incorporates intermingling of exercises at different dimensions subsequently upgrading network investment and making salary creating alternatives.

III. STUDY AREA AND DATA COLLECTION

A. Introduction of Village

From previous studies and reviews, Padali Helgaon village is selected. It belongs to Western maharashtra region, according to Census 2011 information the census code of Padali Helgaon village is 564490. Padali Helgaon village is located in Karad Tehsil in Satara district in Maharashtra, India. It is situated 27 km away from sub-district headquarter Karad and 40 km away from district headquarter Satara. Padali Helgaon village is a Gram panchayat. The total geographical area of the village is 1000.36 hectares. Padali Helgaon has a total population of 2890 people. There are about 412 houses in Padali Helgaon village. Latitude: 17.4801163N, Longitude: 74.1856956E and Elevation: 576 m.

B. General Data

General data (As per National Rural Drinking Water Programme Habitation Profile)

No. of Houses holds (As on 01/04/2019)	412
No. of Cattles (As on 01/04/2017)	850
Total Population (As on 01/04/2017)	2890

C. Some Basic Details of Padali Helgaon

As per the JSA Plan	
a. Total Geographic Area	1000.36 Hectare
b. Cultivable	740.85 Hectare
c. Total Population	2890
d. No. of cattle	850
e. Annual Rainfall	615 mm

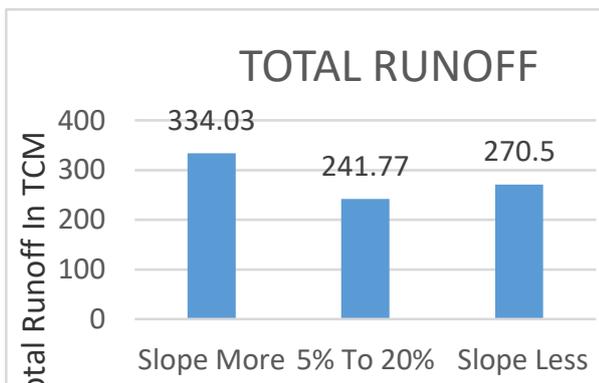


f. Water budget 1) Demand	846.30 TCM (Agri.-556.45, Drinking-165.85 TCM)
2) Deficit	0.0 TCM
g. JSA Plan	
1) impounded water	776.92 TCM
2) Planned Budget	1.97 Corers

D. Runoff Data

Table No. 1 –Runoff data.

No.	Catchment Type	Range Chart per (Ha) Runoff	Area (Ha)	Total Runoff TCM
1	20.00 % More Than Slope	1.169	285.50	334.03
2	5% To 20% Slope	0.875	276.00	241.77
3	5% Less Than Slope	0.616	438.86	270.50
	Total		1000.36	846.30



Graph no. 1 - Slope wise runoff data of Padali Helgaon village

E. Total Water Demand - Drinking Water

Following table, the total need of water for drinking purpose of population, animals and poultry.

Activity	No.	Per Day Liter	Total Need Water (TCM)
Population	2890	128	135.02
Animal /Goat –Ship	720	110	29.17
Poultry	650	07	1.66
Total	4260		165.85

F. Crop Water Requirement

Below table shows the crop water requirement for all season wise crops.

Table No.2 – Crop water requirement.

Seasons	Crop Name	Area (Ha)	Needed Water Per Ha. TCM	Total Need Water TCM
Kharif	Kh. Jowar	250	0.6	150
	Soybean	290	0.6	174
	Groundnut	5	0.65	3.25
	Pulses	25	0.50	12.50
Rabi	Maize	11.46	0.60	6.87
	Rabi Jowar	3.98	0.50	2.00
	Wheat	10	0.65	6.50
	Bengal Gram	30	0.55	16.50
Summer	Groundnut	5	0.65	3.25
Cash crops	Sugarcane	105	1.5	157.50
	Turmeric	3.95	0.60	2.37
	Ginger	5.18	0.60	3.11
Vegetables	Tomato	2	0.70	1.4
	Brinjal	1	0.60	0.6
Fruits	Mango	2	7.00	14.00
	Pomegranate	2	1.3	2.6
	Total	751.57		556.45

IV. METHODOLOGY

A. Methodology of JSA Assessment: -

According to the JSA GR dated-5/12/2014 of Water Conservation Department of Maharashtra and this study adopted following methodology.

- 1.Pre visit to Padali Helgaon village for approval from Gram panchayat.
2. Location- (Whether the Location of mediation is suitable? And so forth.)
- 3.Structural Soundness- (Whether the mediations are fundamentally solid and according to applicable rules? And so forth.)
4. Utility- (Whether the proposed advantages have been satisfied? And so forth.)
5. Important Government Officials (Agri Assistant, Gram sevak) to be contacted and JSA plan will be obtained.
6. An arrangement of essential visits to the village and three of them have been executed.

7. Visit to genuine JSA work of structure, widening and extending of Nallah; observe the structure gather the information from real structure developed according to the JSA plot.

B. Assessment of JSA Structure

In the study of assessment of different JSA structure had visited. Following table shows the JSA structures and its locations.

Table No.3 – Beneficiary farmers name and JSA structure.

Serial No.	Farmer Name	JSA Structure	Distance from CNB	Gat No.
1	Popat Balku Kamble	CNB	15 m	256
2	Bhagwan Patil	CNB	10m	283
3	Balu mura Jadhav	CNB	10m	284
4	Vitthal Daji Gaikwad	CNB	10m	769
5	Pandurang Thaware	CNB	15m	684
6	Gorkhnath Raghunath Jadhav	CNB	20m	677
7	Shankar Babu Jadhav	CNB	15m	573
8	Dildar Laxman Waghmare	CNB	5m	593
9	Prakash Dnyanu Waghmare	Deep CCT	-	644
10	Satyanarayan Waghmare	Deep CCT	-	659
11	Samadhan Waghmare	Deep CCT	-	660
12	Manik Ramchandra Patil	Unlined Form Pond	-	851
13	Balu Mahadev Jadhav	Drip Irrigation	-	843
14	Yashodabai baban Kharade	Drip Irrigation	-	861
15	Sambhaji Shankar Jadhav	Drip Irrigation	-	636
16	Ramchandra Ganpati Jadhav	Drip Irrigation	-	474

V. RESULT AND DISCUSSION

JSA assessment village data is collected as per Village data sheet, number of works done by different government agencies. Storage capacity of those structures observed in the assessment of JSA. The structures under JSA help to impound 463.51 TCM. This stored water used for farm irrigation purpose, as well as increase in ground water level.

A. Runoff Stopped Due To Watershed in the Village (Rain Water)-

In the following table details of comparison of old JSA and new JSA structures. Table gives details of number of structures and water quantity before JSA and after JSA implementation respectively.

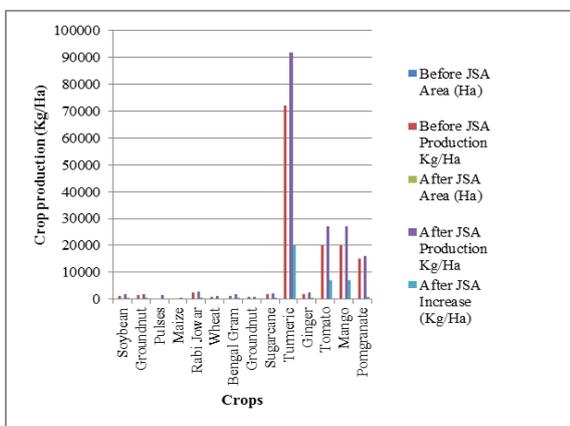
Table No.4 – Comparison of Old and New JSA works by Different departments.

Type of Work	Old JSA Work		New JSA Work		Total	
	NO.	TCM	NO.	TCM	NO.	TCM
Agricultural Dept.						
Deep CCT	25	12.75	3	28	28	40.75
Compartment Bunding	0	0.00	9	227.47	9	227.47
Farm Pond	0	0.00	1	7.45	1	7.45
Earthen Nallah Bund	6	6.00	9	23.38	15	29.38
Cement Nallah Bund	11	132	9	125.45	20	257.45
Earthen Bund	75	0.56	0	0	0	0.56
Loose boulder	65	0	0	0	65	0
CNB Repair	0	0	1	5.51	1	5.51
CNB Deepening	0	0	8	18.13	8	18.13
Drip Irrigation	0	0	6	0	6	0
Forest Dept.						
Forestation and Tree plantation	186	41.56	0	0	186	41.56
Deep CCT	0	0	3	0.72	3	0.72
Earthen Nallah Bund	0	0	2	11.80	2	11.80
Small scale (W.R.) Z.P						
K.T. Weir	2	50	0	0	2	50
K.T. Weir repair	0	0	3	9.60	3	9.60
Percolation tank	4	56.40	0	0	4	56.40
Local sector (W.R)	2	20	20	0	20	0
W.C. Dept.						
CNB	0	0	1	6.00	1	6.00
Gram Panchayat						
Well recharge	0	0	8	0	8	0
Irrigation well	0	0	2	0	2	0
Total		319.27		463.51		782.78

B. Comparison of crop production before JSA and after JSA

Table No.5 – Comparison of crop productivity in before and after JSA works.

Crop Name	Before JSA		After JSA		Increase (Kg/Ha)
	Area (Ha)	Production Kg/Ha	Area (Ha)	Production Kg/Ha	
Kh. Jowar	250	1350	300	1750	400
Soybean	290	1520	320	1940	420
Groundnut	5	62	62	1520	200
Pulses	25	335	45	515	180
Maize	11.46	2400	13.8	2900	500
Rabi Jowar	3.98	995	5	1250	255
Wheat	10	1280	70	1850	570
Bengal Gram	30	725	50	950	225
Groundnut	5	1800	15	2300	500
Sugarcane	105	72000	130	92000	20000
Turmeric	3.95	1900	5	2400	500
Ginger	5.18	20000	7	27000	7000
Tomato	2	20000	15	27000	7000
Mango	2	15000	3.50	16000	1000
Pomegranate	2	7000	7	8000	1000

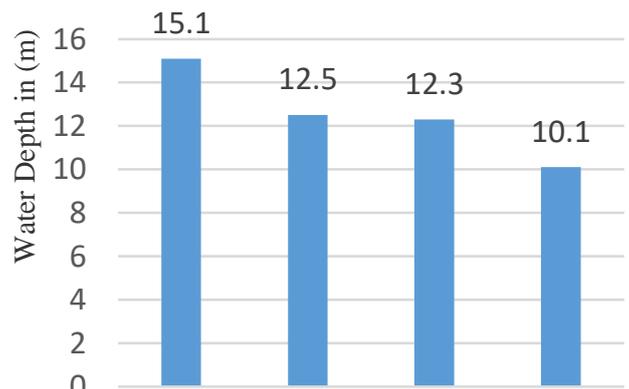


Graph no. 2 - Comparison of crop production before JSA and after JSA

C. Comparison of water levels before JSA and after JSA-

Following table shows details of water level in the well before rain and JSA works as well as water level after rain and JSA works in the village to understand the water level increment

Open well



Graph no. 3 – Comparison of water levels before and after JSA.

VI. CONCLUSION

Following are the conclusions based on the impact assessment of Jalyukt Shivar Abhiyan which was held in year 2016-17 by the different departments of government of Maharashtra

1) Increase in Ground Water level -

The water harvesting structures play a key role by storing water and allow sufficient time for water to percolate into ground. Therefore, Increase in ground water table in drought prone area in measurable indicator of Success of JSA. Percentage increase in water level is 11.69% after JSA from

2) Run Off Reduction -

With regards to run-off reduction it was observed that the programme is successful in achieving this goal. According to the JSA beneficiaries, this has been possible because of the contour bunding or field bunding. The reduction in runoff resulted in soil moisture retention. Utilization of soil Moisture retention is 92%.

3) Cropping Pattern and Agriculture Productivity -

Since water is essential for agricultural production, with available water harvesting Structure Farmers are inclined to new cropping Pattern. From table number 5, average increase in kharif crop production is 340 kg per hectare. Average increase in Rabi crop production is 387.5 kg per hectare. Average increase in Cash crop production is 6083.33 kg per hectare.

4) Cropping Intensity –

The change in cropping intensity is one of the major indicators to assess impact of the Jalyukt Shivar Abhiyan. Increase in residual moisture content due to contour bunding help in crop growth and yield. Decrease in Soil Erosion and hence Protection of Fertile top Soil due to contour bunding.

5) Increase in Milk Productivity -

Agricultural productivity increases due to JSA and also the fodder production increased. Ultimately it resulted in increase of milk production. Overall, the result of JSA increased productivity

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6) Percentage (%) Increment in all aspect after JSA –

According to data provided by krishi assistant, in the format of Jal Paripurnta Ahwal, Percentage increments in all aspect are as follows;

- Percentage Increment in irrigated land - 3.37%
- Percentage Increment in open wells - 2.78%
- Percentage Increment in bore wells – 50%
- Percentage Increment in Animals (Cattles, Goats and Ships) - 18.05%
- Percentage Increment in Poultry - 53.85%
- Percentage crop production increase – 28%

7) Employment Generation -

According to the Watershed Guidelines, the under the study, additional employment is generated due to JSA. It was reported that during the implementation of JSA's Earthen Nallah, Bunding, Cement Nallah bund, K.T. Weirs Employment have been generated for local peoples.

8) Overall status of social life –

Due to implementation of Jalyukt shivar abhiyan, the life of village peoples had changed. Overall increase in water levels, crop production, animals, employment generation, irrigation land, therefore the economic condition is improved. Overall status of social life has changed.

A. Abbreviations and Acronyms

WRD - Water Resource Department.
JSA – Jalyukt Shivar Abhiyan.
JYS - Jalyukt Shivar Structure.
CSR - Corporate Social Responsible.
CNB - Cement Nallah Bund.
ENB - Earthen Nallah Bund.
CCT - Continuous Contour Trenches
IWMP - Integrated Water Management Programme.
GSDA- Groundwater Survey and Development Agency
TCM - Thousand Cubic Meter
NRDWP - National Rural Drinking Water Programme
ICAR - Indian Council of Agricultural Research's

B. Other Recommendations

- Proper widening and deepening of nallah on upstream side of CNB should be done to increase capacity of CNB.
- Deeper CCT should be provided near to the top of hill.
- Use of more drip irrigation will increase production of crop in less use of water.
- Less number of bore wells should be taken to maintain a ground water level.
- Different Cropping pattern should be adopted which required less water.

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