



Original Article

Assessment of “JalyuktShivar - A Study of Mangalwedha Tahsil in Solapur District Using Geospatial Technology”

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Abstract

The "JalyuktShivar Abhiyan" is a flagship water conservation initiative launched by the Government of Maharashtra to make villages drought-free by enhancing groundwater recharge and ensuring water availability through decentralized water harvesting structures. This study assesses the impact of the JalyuktShivar initiative in Mangalwedha Tahsil of Solapur district using geospatial technology. Remote sensing (RS) and Geographic Information System (GIS) tools were employed to analyze land use/land cover changes, water body expansion, and vegetation health before and after the implementation of the program. Satellite imagery from pre- and post-intervention periods was processed and interpreted to evaluate the effectiveness of the watershed management activities. The results indicate a significant improvement in water storage capacity, agricultural productivity, and vegetation index in targeted areas. This case study highlights the role of geospatial technology as a vital tool for monitoring and evaluating water conservation initiatives, providing critical insights for sustainable water resource management in drought-prone regions.

Keywords: Jalyukt Shivar Abhiyan, Geospatial Technology, Remote Sensing, GIS, Mangalwedha, Solapur.

Introduction

Water scarcity has emerged as a critical challenge in the drought-prone regions of Maharashtra, particularly in districts like Solapur, where erratic rainfall and over-exploitation of groundwater have intensified agricultural and socio-economic distress. In response, the Government of Maharashtra launched the JalyuktShivar Abhiyan (JSA) in 2015 with the vision of making villages drought-free by adopting decentralized, community-driven water conservation techniques. The program emphasizes the creation of water harvesting structures such as farm ponds, percolation tanks, and continuous contour trenches to increase groundwater recharge and ensure sustainable water availability.

Mangalwedha Tahsil, located in the Solapur district, was one of the targeted areas under this initiative due to its recurrent drought conditions and agricultural dependency. This case study aims to evaluate the impact of JalyuktShivar activities in Mangalwedha using geospatial technology, which provides powerful tools for mapping, monitoring, and analyzing landscape changes over time. By utilizing Remote sensing (RS) and Geographic Information System (GIS) techniques, the study attempts to assess changes in water bodies and vegetation cover to measure the effectiveness of the implemented interventions. This assessment not only helps validate the outcomes of the initiative but also underlines the role of geospatial tools in planning and managing water resources in vulnerable regions.

Study Area:

The present study is focused on Mangalwedha Tahsil, located in the Solapur district of Maharashtra, India. This region lies in the semi-arid zone of western Maharashtra and is frequently affected by droughts due to scanty and irregular rainfall. The geographical coordinates of Mangalwedha Tahsil approximately range between 17°15' N to 17°45' N latitude and 75°15' E to 75°45' E longitude. The total area of the tahsil is around 1,294 sqkm, comprising about 82 villages.

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Mangalwedha is primarily an agrarian region, with agriculture being the main livelihood source. However, the dependency on erratic monsoon rains makes the area vulnerable to water scarcity and crop failures. In response to these challenges, the JalyuktShivarAbhiyan (JSA) was implemented here with the goal of making villages drought-free by enhancing water conservation and groundwater recharge through the construction of various water harvesting structures such as farm ponds, check dams, and cement bunds.

The Implementation of geospatial technologies such as remote sensing (RS) and Geographic Information

System (GIS) plays a vital role in assessing the effectiveness of the JSA. These tools facilitate mapping, monitoring, and analyzing changes in land use, surface water availability, and vegetation cover pre- and post-implementation of water conservation measures. This study utilizes satellite imagery, topographic maps, and field data to assess the impact of JSA interventions in Mangalwedha Tahsil, providing an evidence-based understanding of how geospatial technology can support sustainable watershed management and drought mitigation strategies.

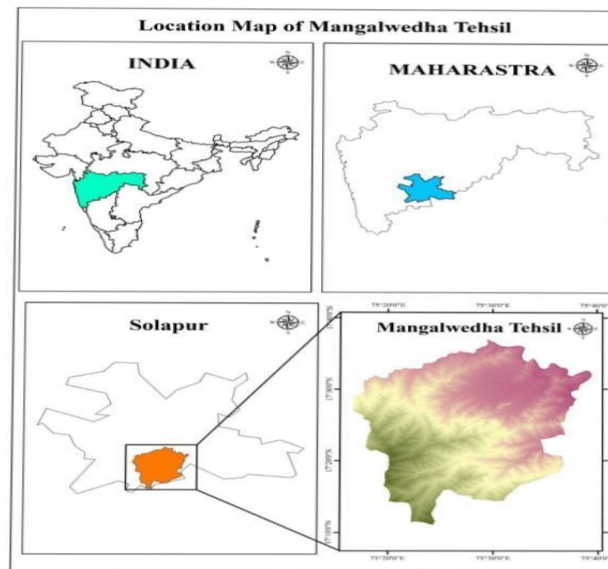


Fig.3.1 Location map of Mangalwedha Tehsil.

Aim:

To assess of the JalyuktShivar Abhiyan in Mangalwedha Tahsil of Solapur District through geospatial techniques, with a focus on water conservation and groundwater management.

Database and Methodology

The current study analyzes the water conservation strategy in the studied area using secondary data. Google Earth was the source of these data. As an example, Jalyukt Shivar Yojana After the digitization process is complete; we convert these digitized data files from kml to.shp format. We determine the volume of each square of the study area using all the rectangular shapes.

Arc GIS 10.1 software is used to combine village-by-village data from several water conservation techniques into a shape file. This article attempts to investigate how JSA has affected drought conditions, local residents' attitudes toward the campaign, and their life expectancy. A study of Mangalwedha Taluka has been conducted for this purpose.

Research Variables The causal relationship between an independent variable and a dependent variable forms the basis of this investigation. In this case, JSA is seen as an independent variable, while the factors that depend are rural water management, agricultural productivity, the intensity of the drought, water supply costs, and rural social change.

Name of Villages	No. of Jalyuktshivar	Name of Villages	No. of Jalyuktshivar	Name of Villages	No. of Jalyuktshivar
Hivargaon	15	Pout	28	Gharniki	7
Hajapur	36	Bavachi	50	Tandor	13
Lamantanda	56	Bhose	157	Degaon	11
Lendavechichale	12	Chikhalgi	125	Marapur	9
Bhalwani	41	Shivangi	19	Gunjegaon	35
Metkarwadi	11	Shirnadgi	83	Rahatewadi	2
Junoni	16	Salagarbk	276	Mahamadabad (shetfal)	16
Diskal	39	Asabewadi	31	Mundhewadi	33
Jalihah	58	Hunnar	53	Fatewadi	17



Gonewadi	48	Maroli	121	Akole	27
Kagasht	14	Manewadi	7	Borale	23
Khadaki	10	Lavangi	250	Shelewadi	19
Jitti	47	Revwadi	18	Laxamidahiwadi	148
Yelagi	15	Lonar	26	Ganeshwadi	41
Salagarkh	73	Padolkarwadi	26	Andhalgaon	141
Yedrav	32	Khupsangi	49	Arali	19
Katral	28	Huljanti	7	Donaj	24
Khawe	22	Uchethan	10	Bhalewadi	2
Karjal	21	Kacharewadi	33	Khomnal	29
Soddi	8	Bathan	3	Dongargaon	53
Jangalgi	40	Dharamgaon		Pathkal	37
Nimboni	53	Bramhapuri	19	Talsangi	51
Nandeshwar	106	Dhavalas	3	Maravade	69
Radde	99	Machanur	18	Nandur	1
Malewadi	13	Mangalvedha	134	Shirashi	32
Siddhankire	14	Mallewadi	4	Siddapur	27
Mangalvedhe(M CI)	19	Tamdardi	23	Mahamadabad (hunnar)	69
Mudhavi	2				

Result:

This study lists the organizations who contribute funds to the JSA's implementation. According to the replies, funding for the program has come through the state government. Funding supporting this work has come from the Pani Foundation. This strategy has received support from non-governmental organizations (NGOs). One important water-saving technique that encourages raising groundwater level. Long-term agricultural usage of the stored water followed. This technique is employed during the monsoon or rainy season to collect and store excess runoff. When there is a drought or crop water shortage, the saved water can be utilized. 82 villages are part of the study area under the JYS initiative. There are the most farm ponds in the village. A farm pond water collecting structure occupies the southern portion of Mangalwedha tehsil.

Conclusion:

The geospatial analysis of the JalyuktShivarAbhiyan in Mangalwedha Tahsil reveals a significant positive impact on the region's water conservation and agricultural sustainability. Remote sensing and GIS tools effectively mapped the spread and impact of water conservation structures like check dams, farm ponds, and percolation tanks.

Jalyukt Shivar Abhiyan has unified many water conservation initiatives under a single umbrella, encouraging rainwater collection, decentralizing water storage facilities, and raising groundwater levels for agricultural usage. The many financial organizations assist in carrying out the Jalyukt Shivar Abhiyan. Under the Jalyukt Shivar Abhiyan, the research region developed its own water potential, which is highly advantageous for farmers. The research area is now classified as a drought-prone area. The groundwater level has gone up since the JSA work. Mangalwedha tehsil has excellent potential for crop diversification. Farmers are expected to switch to dynamic farming following this campaign. This plan is

useful for overcoming drought and water scarcity permanently.

Key conclusions include:

Better Water Availability:

Data collected after implementation indicates a discernible rise in surface water present and groundwater levels, particularly in post-monsoon seasons.

Enhanced Land Use and Vegetation:

LULC and NDVI analyses show increased vegetation cover and the transformation of fallow or barren land into arable land, which reflects enhanced access to irrigation and soil moisture.

Technology Effectiveness:

The scheme was successfully planned, monitored, and evaluated with the help of geospatial technologies, which also allowed for data-driven decision-making and the depiction of changes over time.

Sustainable Impact:

Integration with other watershed development initiatives, community involvement, and routine structure maintenance are necessary for the improvements to be sustained over the long run.

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Nil.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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