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"Jalyukta Shivar" - A Combat to Water Stresses In Maharashtra

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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. Maharashtra government has launched a new program named 'Jalyukta Shivar Abhiyan (Campaign)' in a bid to make Maharashtra a drought-free state by 2019. The JYS proposes a framework for village level water balance calculation which includes estimation of crop-water requirements, drinking water stress etc. 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. This transformation has been possible with concentrated efforts towards developing water sheds, improving ground water levels, de-silting and decentralizing water sources and increasing the area under irrigation. The project involves deepening and widening of streams, construction of cement and earthen stop dams, work on lakes and digging of farm ponds .After completion of irrigation projects in next two years, 50% area will be under irrigation. For the rest 50%, rainwater harvesting and decentralizing water sources are the only options to solve the issue of water scarcity. The JYS is a successor of many earlier watershed programs which have already been implemented, and some of which are ongoing, such as the IWMP. With unique initiative like Jalyukta Shivar, water scarcity will surely be a thing of the past!

Keywords— Jalyukta Shivar, water stress, Water Scarcity, rainwater harvesting.

I. INTRODUCTION

One of the most important natural resources which are extremely crucial for our daily life is water. There are the two types of sources of this essential resource viz. surface water and ground water. Maharashtra, the second largest state in India, both in area as well as in population, has very limited assured irrigation. Considering drought-like situation occurring frequently in the state, Jalyukta Shivar Campaign is being taken up under 'water for all - drought-free Maharashtra 2019'.Capacity and around 84% of its agricultural land is rain fed. Around 159 lakhs hectares of area is drought-prone 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. 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. This 'Jalyukta 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, 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/Non-governmental 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.

II. AIMS AND OBJECTIVES OF JYS CAMPAIGN

The various objectives of this campaign are:
Harvesting maximum rainwater in the surrounding of village itself.
Increasing level of groundwater.
Increasing area under irrigation in the state - Increasing assured water for farming and efficiency of water usage.

Guaranteeing availability of sufficient water for all in the state - Increasing water supply by resurrecting dead water supply schemes in the rural area.
Implementing groundwater act.
Creating decentralized water storages.
Initiating new projects to create water storage capacity.
Reinstating / increasing water storage capacity of existing and dysfunctional water sources (small dams / village tanks / percolation tanks / cement dams).
Extracting sludge from existing water sources through public participation and increasing water storage of water sources.
Encouraging tree plantation and planting trees.
Creating public concern / awareness about balanced use of water.
Encouraging / creating awareness about efficient utilization of water for farming.
Sensitizing people about water harvesting / increasing public participation

III. BACKGROUND

A. State Profile

Maharashtra's total geographical area is 307.70 lakh hectares of which 225.4 lakh hectares area is “cultivable land”. Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 kilometres along the Arabian Sea. The Sahyadri mountain ranges provide a physical backbone to the State on the west, while the Satpuda hills along the north and Bhamragad-Chiroli-Gaikhuri ranges on the east serve as its natural borders. The State is surrounded by Gujarat to the north west, Madhya Pradesh to the north, Chhattisgarh to the east, Andhra Pradesh to the south east, Karnataka to the south and Goa to the south west. The state has a geographical area of 3, 07,713 sq. km and is bounded by North latitude 15°40’ and 22°00’ and East Longitudes 72°30’ and 80°30’. About 75% area of Maharashtra is drained by eastward flowing rivers; viz. the Godavari and Krishna, to the Bay of Bengal and the remaining 25% area is drained by westward flowing rivers like the Narmada, Tapi and Konkan coastal rivers to the Arabian Sea. Maharashtra is prone to various disasters such as drought, floods, cyclones, earthquake and accidents. While low rainfall areas of the state are under the constant risk of droughts, high rainfall zones of eastern and western Maharashtra are prone to flash floods and landslides. The Koyna reservoir and surroundings fall under the high risk of earthquake hazards. The Government of Maharashtra has established a mechanism for disaster preparedness and mitigation by integrating science and technology with communication network facilitates. The Deccan plateau constitutes 50 per cent of the drought-prone areas of the state. 12 per cent of the population lives in drought-prone areas. Once in 5 years, deficient rainfall is reported. Severe drought conditions occur once every 8-9 years. The 1996 drought affected 7 districts and 266.75 lakh people. The 1997 drought affected 17 districts. About 50 per cent of the drought prone areas of Maharashtra are in the Deccan Plateau. About 90 per cent of the land in the state has basaltic rock, which is non- porous and prevents rainwater percolation into the ground and thus makes the area drought prone.

Fig.1: Map of India showing location of Maharashtra.

B. Local Government Structure

The State has 35 districts which are divided into six revenue divisions viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur for administrative purposes. The State has a long tradition of having statutory bodies for planning at the district level. For local self-governance in rural areas, there are 33 ZillaParishads (District Councils), 351 Panchayat Samitis (Block Councils) and 27,906 Gram Panchayats (Village Council). The urban areas are governed through 26 Municipal Corporations, 222 Municipal

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Councils, 7 Nagar Panchayats (Notified Area Council) and 7 Cantonment Boards.

TABLE I
REGION WISE WATER AVAILABILITY OF MAHARASHTRA STATE (PER CAPITA, PER HA.)

Region	CCA in Lakh Ha.	Population	Water Availability as per Tribunal in Mcum.	Water Availability in Mcum. Per capita (Col.4/3)	Per ha. of CCA (Col.4/2)
1	2	3	4	5	6
Konkan with (Mumbai)	17.9	28629512	65357	2283	36451
Konkan Excluding(Mumbai)	17.6	16151066	64289	3980	36507
Nashik	40.2	18571535	13635	734	3395
Pune	45.6	23440998	16087	686	3531
Rest of Maharashtra	**103.7**	**70642045**	**95079**	**1346**	**9173**
Aurangabad	59.3	18727748	8202	438	1383
Marathwada	**59.3**	**18727748**	**8202**	**438**	**1383**
Amravati	35.6	11266653	7033	624	1974
Nagpur	26.9	11736526	15622	1331	5818
Vidarbha	**62.5**	**23003179**	**22655**	**985**	**3627**
Maharashtra	**225.4**	**112372972**	**125936**	**1121**	**5587**

Table 1 clearly shows that except the Konkan and Nagpur division, the natural availability of water in Maharashtra is not very good. Use of Water resources for economic development should, therefore, be planned with extreme care, efficiency and caution.

C. The Need To Conserve Water

Factually, Maharashtra has been bestowed with adequate rainfall, perennial rivers, lakes and large streams. However, due to concretization in last few decades, natural resources in the State have endured huge losses, driving it to situations like drought. Any type of natural activity is in essence completely balanced. Natural streams are created as a cumulative result of various land strata such as hills and hillocks, slightly deeper stretches, plateaus and grounds as well as green cover and rainfall in the area. The water bodies, in the form of rivers, streams, nallas and smaller streams, decide the sustainability and future of the region. Urbanization in any part of the land requires changes in the natural landscape of the region. The speed of urbanization in the State too adversely affected the water bodies it had. Today, one cannot find a city, town or a village in Maharashtra where natural streams have not been encroached. One of the major responsibilities undertaken through Jalyukta Shivar Abhiyan is to rejuvenate these natural water sources.

IV. DATA AND METHODS

Since last two years, chain cement concrete canal construction program, and various other water and land conservation campaign have been implemented in the state. Similarly, water harvesting activities like sludge extraction in Latur district and well refilling in Nanded district have been successfully conducted. To permanently overcome drought situation, Jalyukta Gaav (water full village) campaign was implemented in 5 districts from Pune division in the year 2012-13. Under this, action plan was prepared for water harvesting and increasing groundwater level by implementing various schemes collectively through coordination of all departments. Activities taken up under this campaign were - watershed projects in the division through water conservation, cement chain canal constructions, repair and renovation of old existing cement canal dams / K.T. Weir, sludge extraction from water source, water source empowerment, well refilling, efficient utilization of available water and canal joining works. Through all these projects, decentralized water storage of 8.40 TMC capacity has been created. Because of this, groundwater level is increased by 1 to 3 Meter and provision for drinking water and protected irrigation for farming is made. This has helped to permanently overcome drought

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situation. Considering results of all these projects, the government was thinking of preparing organized action plan to make 'water for all - drought-free Maharashtra and to permanently overcome drought situation and implementing 'Jalyukta Shivar' (water full surrounding) campaign to increase water availability.

Fig.2: Dongarwadi, a village in Miraj taluka of Sangli district, has been selected under Jal yukta Shivar Abhiyan. The work done here with public participation has led to a rise in the groundwater level

Fig.3: Jalyukta brings drought freedom to Kita village

Fig.4: Rivers deepened, water level in the wells enhanced

After witnessing the tremendous works planned and carried out in drought-affected villages, people were encouraged to participate, and within seven months, a total of 99,154 works were completed in 6,202 villages. The scheme helped villagers realize what they had lost over the years. To create further awareness among people, water processions were organized in various villages. In the backdrop of a celebratory mood set by these processions, the villages keenly looked at the subject, and awareness was created. Small groups took the lead and achieved participation of other villagers.

A. Impetus to Jalyukta Shivar Campaign

Under Jalyukta Shivar Abhiyan works of compartment bunding, de-siltation, mud nulla (lake) bunding, cement check dams, repairs

of bunding, KT weirs, farm ponds and village talao, refilling of wells, recharge shaft, drip irrigation and sprinkle irrigation have been brought together.

B. What Lies Ahead?

After completion of irrigation projects in next two years, 50% area will be under irrigation. For the rest 50%, rainwater harvesting and decentralizing water sources are the only options to solve the issue of water scarcity. The Chief Minister has made a suggestion to carry out a structural mapping of the work done so far. He has set a target of 13,000 villages in two years and 20,000 villages in five years to be draught-free. He believes that to achieve this, rainwater harvesting is the only way forward. As the first phase of the scheme is successfully near completion at most places, the CM now wants to emphasize on correct crop patterns, group farming and forming farmers' cooperatives in the next phase. From next year, 25% funds will be allocated for maintenance and repair work of these projects and all water sources will be brought under the scheme, including rivers.

V. BENEFITS DUE TO JYS CAMPAIGN ON PRACTICAL IMPLEMENTATION

A. Rivers Deepened, Water Level In The Wells Enhanced

The results of bending nature according to our whims are best explained by the villagers of Telhara, a small hamlet in the foothills of Satpuda range. With good precipitation, agriculture has been flourishing here. However, every year during the rains, the villagers used to be on their toes. River Gautama flows near the village and there was a huge encroachment on the banks. Trees were proliferating in the river bed and the river had become shallow. Every rainy season, Telhara used to get waterlogged and the farmers suffered huge losses. During the floods in 2014-15, an area of 383 ha around the village was affected. To overcome the problem, there was a need to deepen the river bed. People joined hands and a stretch of 10 km was deepened and widened. Sediment to the extent of 5.4 lakh cu.m was removed. The farmers made use of the sediment to make their soils fertile.

B. Water-Filled Dams, Healthy Crops

In Karveer taluka of Kolhapur, the construction of a cement nalla bunding began in January this year. By July, the construction was done and the water stored in the dam was helping in the irrigation of the region's sugarcane crop. Karveer today presents an opportunity to witness the huge change water can bring about in the life of people, especially farmers. Even after the absence of rain in June and before it started intensely, the benefits of Jalyukta Shivar Abhiyan to the villages were very much visible.

C. Efficient Management Of Rainwater

The taluka of Khed, Ambegaon and Junnar are hilly and inaccessible. The precipitation here is quite good, but, as there are no ways to store rainwater, the region faces water scarcity. An excellent remedial measure is now set to change the situation. In Khed and Ambegaon, the Jalyukta Shivar Committees of Pune district administration has planned to store every drop of rainwater. One of the works is the cement nalla bunding on a stream at Vafgaon in Khed. Earlier, the height of the dam was 1 m, but with deepening and widening, it has become 3 m deep and around 160 m wide. The work has increased the capacity of the dam to store water tremendously. The water level in the wells nearby has increased and the moisture in the soil has been maintained. The water level in the adjoining agricultural lands has also been enhanced.

Fig.5: Deepening and widening of water bodies- an efficient management of rainwater

D. Use Of Mobile App And Representation On GIS Platform

Proper description of the situation is one of the most important first steps for any program to succeed. This requires representation and proper analysis of all the relevant data. This demands for proper data collection of various parameters like terrain, soil, geology, rainfall, wells, crops, quality and so on, in order to tackle the problem of water security. In order to have proper representation and analysis, this data needs to be transported to GIS platform. JYS GR (dated 5-12-2014) mentions the importance and use of GIS in planning and representation. Currently most of the data like soil, geology, land use etc. is available with Maharashtra Remote Sensing Application Centre (MRSAC) as GIS shape files at village level. The mobile app developed by MRSAC, is being used to these locations. The mapped location can be monitored through web page. These GIS layers can be very useful in understanding the nature and causes of drinking water scarcity, quality problems, impact of conservation structures etc. Use of GIS also makes available different maps like drinking water stress maps, quality affected areas maps, sugarcane belts, poor groundwater belts etc. Such maps would serve two purposes; i) maps convey more information than tables and reports, hence villagers will become more aware and ii) these maps give further direction in understanding the problem better.

VI. BROADER SUGGESTIONS

A. Interaction And Coordination Between Departments

Proper representation of data on GIS platform requires integration of data from different departments. Different datasets like revenue and land use data from Revenue department, crop data from Agriculture department, canal and command area data from Water Resources department, groundwater assessment data from GSDA, conservation structures data from Soil conservation department, watershed data from IWMP (Agriculture department), drinking water data from Water Supply and Sanitation department etc. has to be brought to one place for correct analysis and formulation of the problem. This requires proper integration and communication between all these departments. JYS GR mentions this as a requirement while preparing all the village plans. But there is no clear provision and room to make such interaction and communication in the village planning framework. Village plans talk about financial convergence between various departments and programs, but this need to be extended to convergence of data, capacities and so on.

B. Groundwater Modelling And Simulations

Some complex problems might require more research and analysis and use of tools such as groundwater modeling for greater understanding of the problem. For example, finding suitable areas for interventions like *lake*-deepening would include understanding of the geology, aquifer characteristics and groundwater flows. Similarly, impact of recharge shafts or identification of source of contamination of drinking water in villages etc. can be carried out by using groundwater modeling and simulations. A suite of such simulations will help in designing JYS better.

VII. CONCLUSIONS

Jalyukta Shivar Campaign has become a people's movement in Maharashtra, and it is proving to be useful for irrigation and enhancement of groundwater level.

This program should be strictly implemented as a campaign through government departments, voluntary organizations, public participation and funds available with private businessmen (CSR), to ensure drought does not occur in future in drought prone areas and remaining area.

In order to create public awareness it is important that along with the JYS promotion-vehicle travelling to villages, village maps showing all the proposed and existing interventions should be displayed in the Gram Panchayat (Village Council) office and schools.

Implementing Jalyukta Shivar Campaign in other parts of country will be helpful to overcome permanently drought and water scarcity problems.

With unique initiative like Jalyukta Shivar, water scarcity will surely be a thing of the past!

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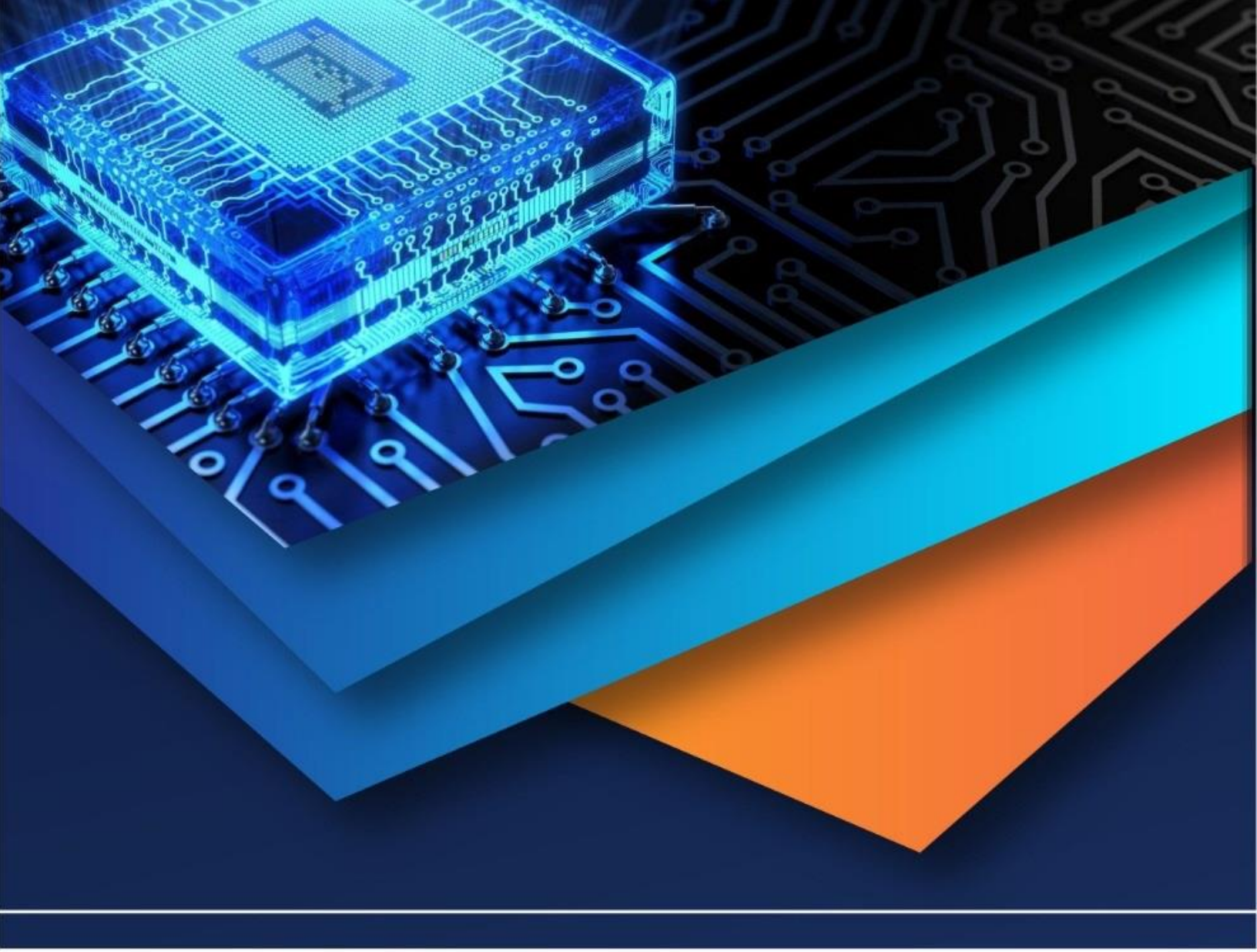

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