

Participatory Approach of Water Resource Management: A Case Study of Marathwada

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Abstract: *The water problem varies significantly from one region to another and also from one year to another. Providing water was considered solely the job of the government. Solution to water problems depends not only on water availability but also on many other factors, among which are the processes through which water is managed, competence and capacities of the institutions that manage them. A campaign 'JalJagratiAbhiyan', representatives took an initiative to create awareness with the help of around 2,500 participants including Sarpanch, Gramsevak and members of Grampanchayat of Marathwada, started a project for fulfilling the gap between water demand and supply and given permanent solution for water shortage in drought areas, creating tanker-free villages, and ample water for irrigation, drinking and animals, improving agriculture, through usage of de-silted soil, which is very fertile, as top soil in the agriculture fields. Methodology adopted for this study is social motivation and focus group discussion. There are many economic phenomena that be explained with an understanding of social norms and economic perspective can be taken as complete explanation and understanding the phenomenon. Some of the sociological phenomena are explained by different models, such as peer effect models, identity models, and motivated belief models. Community-based natural resource management (CBNRM) approach has been consistently credited to be the dominant global theory of neoclassical economics and liberal democratic theory.*

I. Introduction

Nature's water cycle, involving the processes of evaporation, condensation, precipitation, infiltration, run-off and subsurface flow. Regional climatic variables affect and get affected by the water cycle. In agriculture-dependent nations like India, the discussion of water is inextricably linked with the Monsoons. Agriculture and allied sectors like forestry and fisheries accounted for 13.7% of the GDP (Gross Domestic Product) in 2013, but employed as much as 50% of the total workforce (CIA Factbook).

Importantly, the crop irrigation scenario in India is still largely Monsoon-dependent. In fact, as per a 2013 World Bank report, only 35% of cultivated land in India was covered under reliable irrigation (World Bank Report, 2013). The unreliability of monsoons is particularly painful in central India where rainfall is normally less, rivers are seasonally fed and groundwater levels are low (Phadke 2002). Especially, the state of Maharashtra is drought- and farmer suicide-prone. Major portion of the state is semi-arid and though the Western Ghat and coastal districts receive an annual rainfall of 2000 mm, most part of the state lies in the rain shadow belt of the ghat with an average rainfall of 600 to 700 mm. The rainfall variations from 500 to 5000 mm have been recorded with an average of 1000 mm distributed over 60-70 days.

The state has been divided into 9 agro-climatic zones based on rainfall, soil type and vegetation. These are: South Kokan Coastal Zone, North Kokan Coastal Zone, Western Ghat Zone, Transition Zones 1 & 2, Scarcity Zone, Assured Rainfall Zone, Moderate Rainfall Zone and Eastern Vidarbha Zone.

Marathwada is predominantly an agrarian region. The term Marathwada means "the house of Maratha people". It includes the following districts: Aurangabad, Jalna, Beed, Osmanabad, Nanded, Latur, Parbhani, and Hingoli. The total area of Marathwada is 64590 km². Many villages in Maharashtra are reeling under water negativity – the districts of Sangli, Jalgaon, Osmanabad and Latur districts have a high dependence on crops such as sugarcane, and a weak Monsoon or drought-like situation can wreak havoc on their livelihood, and even existence. High suicide rates among farmers and incessant migration of the rural youth towards cities bear testimony to the fact that our villages have failed to become the self-sustained units of Mahatma Gandhi's vision. Since 1995, more than three lakh farmers have taken their lives in India. According to the 2011 census, the suicide rate for farmers was 47% higher than the national average. 33,752 have occurred in Maharashtra alone from 2003 to 2012, at an annual average of 3,750. The major reasons for these suicide are severe climatic changes resulting in bouts of droughts and floods coupled with hailstorms, and market recessions, have spurred the suicide rates in the state.

In this context, a question arises – is the provision of much-necessary water the responsibility of the government alone? Or, in the absence of concrete administrative steps, despite the expenditure of crores, must not the local population actually bearing the brunt of the problems be motivated to take the situation in hand?

Indeed, ensuring the sustainability of water provision is too fundamental, urgent and indispensable a requirement that entails all working hands on board.

II. Literature Review

Community-based natural resource management (CBNRM) approach has been consistently credited to be the dominant global theory of neoclassical economics and liberal democratic theory (Virtanen, 2003). Community based conservation has been identified as an important role player to conservation, collective behavior for sustainable development in a globalized world. The many international organizations have widely adopted the CBNRM principles (Berkes, 2007). CBNRM has been a critical principle to guide World Bank's projects in West Africa, South America, and Asian countries (Mansuri and Rao, 2004; World Bank, 2005). The United Nations Development Program (UNDP) has also applied the community-based conservation approach to a number of international programs to make project successful.

CBNRM originated from Jeffersonian ideals of civil society to encourage citizens' voluntarily participation in democratic processes to advance the public good (Lurie and Hibbard, 2008). The major motivation for a bottom-up CBNRM approach is local sustainable development.

CBNRM advocates the participation of Local Communities. Local communities are closer to the local environmental problems and they can find connections to the solutions. Thus, it is appropriate for residents to play important roles in local environmental conservation. Community residents and key stakeholders can be more responsive to local environmental preferences and have more motivation to ensure local environmental quality. Local communities could have strong commitment to their own places. CBNRM provides bottom-up motivation and necessary local knowledge to effectively manage the environment. Recent research has highlighted the importance of linkage between environmental planning and sustainable development in the local context (Berke and Conroy, 2000; Conroy and Berke, 2004).

Many local governments in different parts of the world have started to strategically incorporate critical environmental elements as a part of local sustainable initiatives into their local long-term comprehensive land use plans (Tang, 2009). The motivation and movement towards achieving sustainability in local level provides a great opportunity to integrate environmental conservation as a part of local jurisdictions' sustainable development campaigns. Action towards environmental conservation at the local jurisdictional level can result in a holistic sustainable development outcome, where all the society members work in integration of their thoughts and action.

Hence, it is amply clear that community participation is the key to the journey from water negativity to water positivity. The National Water Policy adopted by the Govt. of India in the year 1987 was revised in the year 2002 wherein it underscored Water Use Efficiency, Community Participation and Participatory Irrigation Management. In accordance to these recommendations, the Maharashtra State Water Policy was framed in the year 2003 in order to ensure a sustainable development and optimal use and management of water resources in the State for maximizing the social and economic benefits for the State. Subsequently the enactment of the "Maharashtra Management Irrigation Systems by Farmers" Act in the year 2005 gave statutory recognition to the constitution and operation of Water User Associations for enabling the farmers to act collectively to improve the productivity of irrigated agriculture.

III. Background of the Problem

The study has been carried out in the affected villages (Latur Districts) to check their motivation level, binding forces and their commitment to take lead to transform the village from water scarcity to a place where water is now actually generating revenue. The work was initiated in April 2013 and is still underway with several other water bodies. Methodology adopted for this study is social motivation. There are many economic phenomena that be explained with an understanding of social norms: what they are, how they form, and how they change, economic perspective can be taken as complete explanation and understanding the phenomenon. Some of the sociological phenomena are explained by different models, such as peer effect models, identity models, and motivated belief models.

Sociological phenomena theory predicts that social interaction of a group or community works for common welfare. The JalJagrati Abhiyan (JJA) worked on the philosophy of social motivation, as this abhiyan (campaign) primarily focused on explaining sociological phenomena, with the hope that the structure of work will be useful in clarifying economic phenomena by making the area water positive. It is observed that social motivation facilitates cooperation and creates self-satisfaction, economic cooperation, reducing unemployment.

A non-governmental organization, The Art of Living (AOL) is involved in humanitarian projects, operates globally in 152 countries and has touched the lives of over 370 million people. AOL areas of work covers conflict resolution, disaster and trauma relief, poverty alleviation, empowerment of women, prisoner rehabilitation, education for all, campaigns against female feticide and child labor and environment sustainability.

IV. Objective of the Study

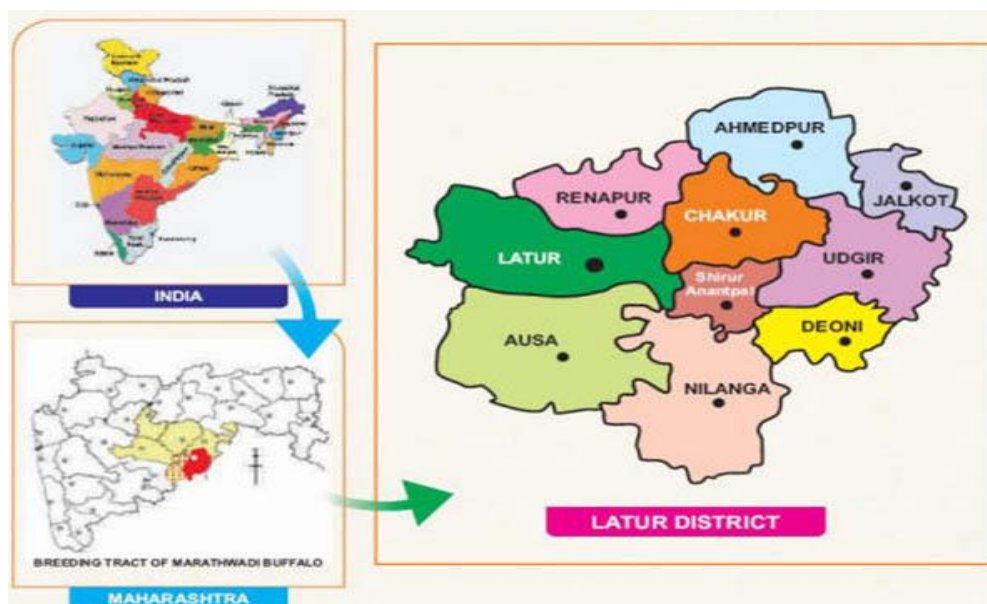
The main objective of the study is to explore how local people were involved in resolving water problem, rejuvenating rivers, nallas (water streams), and construction of various types of dams, re-charge shafts, tree plantation, etc. The study is carried out in the affected villages to check their motivation level, binding forces and their commitment to take lead to transform the village from water scarcity to a place where water is now actually generating revenue. Study has also explored about how de-siltation of the tanks and rivers was carried out– thereby increasing their water carrying capacity and ensuring that they remain with water for a larger portion of the year. The silt which was coming out through de-siltation process, we also tried to find out how this silt, can be use an efficient soil conditioner, as a fertilizer for their agricultural fields.

Study Area Details

The study was conducted in Latur city, located in the Maratwada region of Maharashtra and is the district headquarters. The city has an area of 32.56 sqkms and a population of approximately 3.5 lakhs, as per the 2001 census and is expected to have a growth rate of 52% every 10 years due to increase in trade and commerce. In Table 1, the demographic details of the studied districts have been enlisted.

	Sangali	Jalgaon	Osmanabad	Latur
Population (census 2011)	2,822,143	4,229,917	1,486,586	3,82,754
Gender- Male	1,435,728	2,197,365	769,368	1,075,257
Female	1,386,415	2,032,552	717,218	1,005,028
Sex ratio (per 1000)	996	925	932	935
Population growth	9.24%	14.86%	11.50%	18.04%
Area sq km	8,572	11,765	7,569	7,157
Density/km ²	329	360	196	291
Literacy rate	81.48%	78.20%	69.02%	71.54%

Table 1: Demographic Details of Sangli, Jalgaon, Osmanabad and Latur Districts



The water bodies taken up for study were

River Gharni: Gharni is a river near Shirur and Latur districts in the state of Maharashtra. It is a tributary of the River Manjara, the main river in Lature district. River Gharni has its origin near Wadval and flows through Chakurtaluka. An 'earthfill' dam has been constructed on the course of the river, called as the Gharni dam. The height of the dam above lowest foundation is 15.24 m (50.0 ft) while the length is 956 m (3,136 ft). The gross storage capacity is 25,080.00 km³ (6,017.01 cu mi). Unfortunately, this river had been looking more like a *nala* (drain) because of the accumulated silt and the growth of shrubs in the river basin.
RiverTerna: River Terna is a tributary of the River Manjara near village Makani of Latur district of Maharashtra. Like River Gharni, River Terna is also one of the main tributaries of Manjara which flows on the southern boundary of the Ausataluka. Both these rivers are of immense local importance.

Required Remedial actions

Rejuvenating various water resource structures rivers, nallahs, small streams, etc.
Establishing a healthy partnership with the villagers to work in coordination

Action taken

There are three major components of CBNRM are identified through literature areStakeholder involvement, Public participation, and Inter-organizational collaboration. These principles motivated and helped local communities to overcome the inherent biases and limitations in the traditional environmental planning model through incorporating the ideas, knowledge, energy, and assistance of local people.

V. Cooperative Action Taken

Considering the difficulty of drought-hit Marathwada, anexercise of ensuring 'swavalamban' or self-help and environmental sustainability through enhanced rainwater harvesting capacity of the region was initiated.The project taken by AOL was conceived with the name of JalJagratiAbhiyan (JJA)" AOL volunteers motivated around 2,500 participants including the Sarpanch, Gramsevak and members of Grampanchayat of Marathwada. A participatory Approach for water conservation was undertaken by the volunteers. Participatory situation analysis includes the active involvement of villagers (men and women of all ages and social classes) in assessing their resources with regard to their availability utilization as well as problems and opportunities for development. The JJA , a multi-pronged initiative, addressed water issues in a concerted and effective manner in Sangli,Latur, Osmanabad and Jalgaon.

The first of all situation analysis was done about water problem in the village in Maharashtra. Situation analysis is used to generate consciousness for development amongst the participating villagers. The process of social motivation took 10-30 days, with more than 50 volunteers of AOL involved in the exercise. About 50-100 villagers from each village were involved in the exercise. The innovative approach of creating awareness and making the villagers active for collective action, following step were followed during this process:

In order to achieve the aim, facilitators took charge of the following:

Elaborated the objective of the project with the villagers;
Introduced the contents of every session:
Use of Audio -visual aids to motivate the participants;
Provided equal opportunity to each participant to share their views;
Water awareness program.
Proper guidance to the participants with relevant questions and answers sessions in order to understand the problem thoroughly;
Ensured the participation of all groups (men and women) in the process;
Created awareness on the importance of local natural resource conservation
Promoted self-help spirit as a means to development;
Empower the villagers to address their problems and to find their own solutions;
Involve the majority of villagers in decision making process;
Generate information to be used for decision making and preparation of action plans.

Outcome

Recharge ground water reserves.
Meet irrigation needs.

Help check soil Erosion by planting trees.
Rejuvenating rivers
Organic farming

VI. Outcome

The river banks were strengthened to increase slope stability through plantations – this helps to check erosion and reduce the rate of sediment disposal in the rivers and tanks, thereby maintaining their increased carrying capacity for a longer time. In addition, with more of the local water bodies remaining with water for a larger part of the year, the ground water table get augmented and likely to rise in the coming years. The rivers Terna and Gharni, bandharas at Takli and Jewali, as well as the Esai Devi and Babhalgaon tanks are among the water bodies that have been cleaned up, benefitting several villages in Sangli, Jalgaon, Osmanabad and Latur districts. In Jalgaon alone, canals in 6 villages in 6 talukas have been recharged. More than 200 water bodies on the course of River Arkavathi have been rejuvenated, in the first-ever project undertaken by the State to revive a river.



Bandhara Creation

Bandharas are check dams or diversion weirs built across rivers. A traditional system found in Maharashtra, their presence raises the water level of the rivers so that it begins to flow into channels. They are also used to impound water and form a large reservoir.

Where a *bandhara* was built across a small stream, the water supply would usually last for a few months after the rains. They are built either by villagers or by private persons who received rent-free land in return for their public act. A gabion *bandhara* 55m long and 1.5m high was created to hold the water in River Gharni.

Slope Stabilization

Slope stabilization is an extremely significant step necessary for prevention of soil erosion in the slopes of a river/water body. This is, in turn, essential for preventing the fast silting-up of a water body. There are several methods of stabilizing the slope, including rip-rap, jute textile mats, mesh, permeable concrete and geotextile. However, plantation along slopes for slope stabilization continues to be an ecologically and economically superior solution. Local emergent plant species were planted along the slopes to prevent slope erosion and reduce the sedimentation in the newly-deepened water bodies. This is a simple bio-engineering technique that has been used since ages for the purpose of slope stabilization. Emergent species not only prevent the erosion of slope but also serve as feeding and breeding grounds for native fish. Their roots filter the water and naturally purify it. In addition, they undergo rapid biomass increase, thereby acting as carbon sinks.

Soil Conditioning with the Silt

The silt obtained after deepening the water was deemed fit as a soil conditioner by the team of geologists accompanying AOL volunteers. It was, hence, used as such in the agricultural fields of the nearby areas.

VII. Discussion

In Maharashtra for the first time in the last 30 years, the river Gharni flowed with 45 crore liters of water in August 2013. More than 25,000 people benefitted. About 180 crore liters of water will now percolate in the river basin. The Department of Geosciences provided the encouraging news of as much as 30-40% increase in Babhalgaon post the desiltation work. In addition to the above project, more than 200 water bodies on the course of River Arkavathi have also been rejuvenated, in a first-ever project undertaken by the State to revive a river. This noble campaign and initiative for creating awareness for water bodies rejuvenation and awareness creation among many villages in Maharashtra had brought happiness and spring in life again in Sangli, Latur, Osmanabad and Jalgaon.

It is important that the generated information should be documented in a way that it is accessible to the villagers to make sure that they are the owners of the process. In addition, it is also imperative that such case studies are recorded and disseminated in a way that others in a similar predicament are motivated. Experience has shown that villagers face multiple problems that are outside the main issues. Some of these problems are rather serious. The role of AOL is to support villagers in finding appropriate solutions that are within their reach and realistic. In cases where additional help is needed, AOL linked the villagers with the relevant government organizations and NGOs. Since these agencies are few and not well-qualified the project also involved capacity building.

Such case studies come under the banner of 'Irrigation Management Transfer' or IMT. IMT refers to the process that seeks the relocation of responsibility and authority from the controlling government agencies managing irrigation systems (under the public sector) into the hands of non-governmental organizations (NGOs) or other private-sector entities. Usually, these are established as recipients of the transfer or handover of management. IMT emerged as a process for subsector reform. Irrigation agencies established with the purpose of supplying water to irrigation system under a rigid, top-down approach failed in their objectives. Farmers who were meant to pay for these services in order to keep the operation sustainable began to falter in their obligations and to demand better services tailored to their needs. A vicious cycle of non-payment and infrastructure deterioration ensued.

It has several advantages:

Eliminate or reduce recurring government expenditures for operation and management of irrigation systems.

Establish financially self-reliant water service providers to replace the public agency in the management of systems.

Reverse the increasing rate of deterioration of infrastructure.

Provide transparency in management and accountability of the service provider to water users.

As an end-result, the main objective of IMT was to achieve improvements in the performance of the irrigated agriculture sector, including both productivity and financial and physical sustainability.

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