

Waghad model of community participation in irrigation water management and sustainable returns, India

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Abstract

Introduction: The Government of India has been promoting, Participatory Irrigation Management (PIM) by way of formation of Water Users' Associations (WUAs) in many irrigation schemes, with the objectives of achieving improved operation and maintenance of irrigation schemes, improved water use efficiency, improved crop productivity, reduced water conflicts thereby ensuring sustainability in irrigation development and management. For smooth transfer of management to WUAs, various states have made their own legal provisions and Acts in India. Maharashtra State has long experience of community participation in irrigation management. Phad (Block) System and Malgujari Tank System are the best historical examples of the participatory & sustainable irrigation management systems. After 1985, Government of Maharashtra deliberately took keen interest in the formation of water users' co-operative societies / associations. Operation and maintenance of the distribution system is done by those associations themselves. After 2005, Maharashtra Government passed a special Act viz. Maharashtra Management of Irrigation System by the Farmers Act, 2005 for promotion and formation of WUAs.

Materials and Methods: The main objective of this research work is to study

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community participation in irrigation water management for sustainability of the farming business in the state of Maharashtra, India. A case study of Waghad irrigation project has been selected for detailed investigation. Waghad irrigation project is located in the tribal area of Nashik district of Maharashtra, India. Waghad irrigation project is a unique case in which complete control of management, operation and maintenance has been transferred to the federation formed by 24 WUAs existing in this project. This federation is the apex organization called Waghad Project Level Water Users' Association (WPLWUA).

Results: The study reveals that the cluster of WUAs of Waghad project is supplying equitable, judicious, timely and assured water to farming community, which is the result of an innovative and sustainable irrigation management transfer. It builds up a sense of responsibility amongst the farming community. Beneficiary farmers are taking multiple and varied crops according to their own preferences. Water is distributed on volumetric basis rather than on area basis from tail to head. The construction of water conservation structures in command area has resulted in recharging wells which led to conjunctive use of water. The assured water supply has an in built incentive to promote micro irrigation techniques, which has led to improvement in water use efficiency as well as crop productivity in the command area of the project. Apart from the equitable distribution of water WPLWUA has been entered in diverse agri-business activities which lead to employment generation, value addition in agri-business and raising farm return and bringing sustainability in agriculture. This community managed project brought sustainability in farming business. Waghad model of community participation in irrigation water management is very successful and have got several state and national level awards for participatory irrigation management, operation and maintenance of irrigation system in India.

Conclusions: The Cluster of Water Users Associations of Waghad project are supplying equitable, judicious, timely and assured water to farming community that results into innovative and sustainable irrigation management transfer. The project level associations of Waghad saved about one-third water supplied for irrigation apart from increasing productivity. This water has been used for additional area under irrigation. Waghad project has developed good rapport and coordination between various institutions involving in irrigation management. This innovative participatory water management model of Waghad project can be replicated in different part of the country and also in the world.

Keywords: Community Participation, Water Users' Association, Waghad Irrigation Project, Irrigation water management, Sustainable Returns.



1. Introduction

The Government of India has been promoting, Participatory Irrigation Management (PIM) by way of formation of Water Users' Associations (WUAs) in many irrigation schemes, with the objectives of achieving improved operation and maintenance of irrigation schemes, improved water use efficiency, improved crop productivity, reduced water conflicts thereby ensuring sustainability in irrigation development and management. Maharashtra State has long experience of community participation in irrigation management. Phad (Block) System and Malgajari Tank System are the best historical examples of the participatory & sustainable irrigation management systems. Since 1985 Ministry of Water Resources has been inspiring farmers to participate in water distribution and management of tertiary system in the projects covered under the centrally sponsored command area development programme. The concept of involvement of farmers in management of the irrigation system has been accepted as a policy of the Government of India and it has been included in the national water policy - 1987. Provisions made in the national water policy of 1987 were as under:

“Efforts should be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Assistance of voluntary agencies should be enlisted in educating the farmers in efficient water-use and water management” (GOI, 1987).

However, following modifications were made in the national water policy 2002 regarding the participatory approach to water resources management:

“Management of the water resources for diverse uses should incorporate participatory approach, by involving not only the various Governmental agencies but also the users’ and others stakeholders, in an effective and decisive manner, in various aspects of planning, design, development and management of the waterresources schemes. Necessary legal and institutional changes should be made at various levels for the purpose, duly ensuring appropriate role for women. Water Users’ Association (WUA) and local bodies e.g., Municipalities and Gram- Panchayats should particularly be involved in the operation, maintenance and management of water infrastructure at appropriate levels progressively, with a view to eventually transfer the management of such facilities to the user groups/local bodies” (GOI, 2002).

The Government of India has been promoting the Participatory Irrigation

Management (PIM) in many irrigation schemes, especially in major and medium projects, with the objectives of improving the operation and maintenance of irrigation schemes, reducing fiscal burden on the States, increased cost recovery, and higher crop production through better water management. As a result more than fifty thousand Water User Associations were formed all over the country (Belsare, 2014). Further, agriculture and irrigation is state subject, there for smooth transfer of management to WUAs, various states have made their own legal provisions and Acts in India as given in the Table 1.

Table 1. State-wise Participatory Irrigation Management Acts in India

Sr. No.	State	Name of the PIM Act
1	Andhra Pradesh	Andhra Pradesh Farmers Irrigation Management Act 1997.
2	Madhya Pradesh	Madhya Pradesh Farmers Participation Irrigation Management Act 1999.
3	Rajasthan	Rajasthan Farmers' Participation Irrigation Management System Act, 2000.
4	Tamil Nadu	Tamil Nadu Farmers' Management of Irrigation System Act, 2000.
5	Karnataka	Karnataka Irrigation and certain other law (amendment) Act, 2000.
6	Orissa	Odisha Pani Panchayat Act, 2000.
7	Bihar	Bihar Irrigation, Flood Management and Drainage Rules 2003.
8	Maharashtra	Maharashtra Management of Irrigation Systems by the Farmers Act, 2005
9	Gujarat	Gujarat Water Users PIM Act, 2007
10	Uttar Pradesh	Uttar Pradesh PIM Act, 2009

2. Water users association (WUA) in Maharashtra, India

The Maharashtra state has a long experience of Participatory Irrigation Management (PIM). Phad System, Malgujari Tank System, Khajana well, etc. are the best historical examples of the PIM in the Maharashtra. These community managed irrigation system are functioning since last 300 to 400 years ago (Agarwal & Narain, 1997). After 1985, Government of Maharashtra has taken keen interest in the formation of water users co-operative societies. Water is supplied to these beneficiaries' societies on volumetric basis by the Irrigation Department and Management, operation and maintenances of the distribution system is done by the water user's co-operative societies themselves (Lele & Patil, 1994). WUAs were registered by the groups of farmers under existing Maharashtra Co-operative Societies Act, 1960 till 2005. After 2005, Maharashtra Government has passed special Act for formation of WUA viz. Maharashtra Management of Irrigation Systems by the Farmers Act, 2005. Present status of formation of WUA under

Maharashtra Management of Irrigation Systems by Farmer (MMISF) Act, 2005 and the Maharashtra Cooperative societies Act, 1960 in the Maharashtra State is given in Table 2.

Table 2. Present status of formation of WUA in Maharashtra State, India

Act.	Functioning		Agreement done yet to functioning		Registered Agreement yet to be done		Total number of WUA	
	No.	CCA (ha.)	No.	CCA (ha.)	No.	CCA (ha.)	No.	CCA (ha.)
Under MMISF Act, 2005 (new act) (A)	1656	707975	-	-	685	280437	2341	988412
Under Co- operative Act, 1960 (B)	1395	512918	260	99474	1108	428282	2763	1040674
Total (A+B)	3051	1220893	260	99474	1793	708719	5104	2029086

Source: Data compiled on the basis of information received in the Directorate of Irrigation and Research Development, Pune, 2016

It is observed from the Table 2 that in Maharashtra state 1656 WUAs are formed under MMISF Act, 2005 and 1395 under co-operative Act, 1960 with CCA 707975 ha and 512918 ha respectively. If we consider agreement and registration done by WUAs in Maharashtra state, very soon it is possible to form 5104 WUAs which will cover 2029086 ha CCA under both Acts.

3. PIM in waghad irrigation project, India

Waghad Irrigation project is located in tribal area of Nashik district of Maharashtra, India. The Index map of Waghad irrigation project is shown in Figure 1.

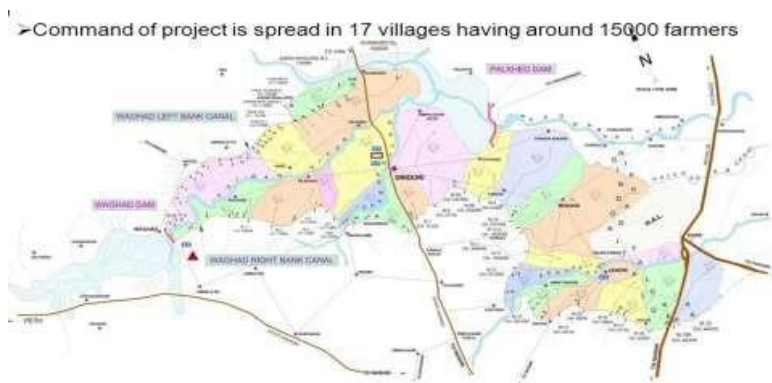


Figure 1. Index Map of Waghad Irrigation Project

The Project was completed in 1981. The Waghad Dam is under Upper Godavari Project in Dindori tehsil across the river Kolwan, which is a tributary of river Kadwa. Tail ender farmers are not getting water so to overcome this problem, three WUAs were formed at the tail end in 1990 in response to the wishes of a local civil society called *Samaj Parivartan Kendra* (Center for social transformation) in collaboration with the State Irrigation Department. Irrigation management was transferred to these WUAs. They were receiving their quota of water, discipline was established among the beneficiaries, and water use efficiency was improved and thus started to irrigate more and more area. The active participation of WUAs in irrigation management resulted in assured irrigation in tail reach and irrigated area rose to five times in a span of 3-5 years. Enthused with the success of these 3 WUAs, farmers from the entire command gradually formed 24 WUAs. As a step forward, in the year 2003, all the WUAs joined their forces to take over the operation and management of the entire irrigation scheme by forming an apex organization called Waghad Project Level Water Users Association (PLWUA). This is unique case in which complete control of the project has been handed over to the federation formed by the 24 WUAs in 2005 and set up a mile stone. The mean annual rainfall in the project area is 750 mm and live storage of the Waghad Dam is 72.20 Mm³. The cultivable command area is 9642 ha, but only one-third of it (3212 ha) could be irrigated before formation of WUAs. The tail-end farmers were deprived of the irrigation water. Out of the 1150 ha command at the tail reach of the canal, hardly 100 ha was getting irrigation benefits.

4. Functioning of WPLWUA

Water management at project level is successfully done by the WPLWUA, under the technical guidance and support from Water Resources Department. The department releases water at the canal head as per the mutually agreed schedule and approved allocation, on volumetric basis. The WPLWUA distributes the water among 24 WUAs as per their demand and entitlements. WUAs further distribute water among their members. Operation and maintenance of the main canal and field channels are done by project level WUA and concerned WUA respectively. View of Waghad Irrigation project is shown in the Figure 2.

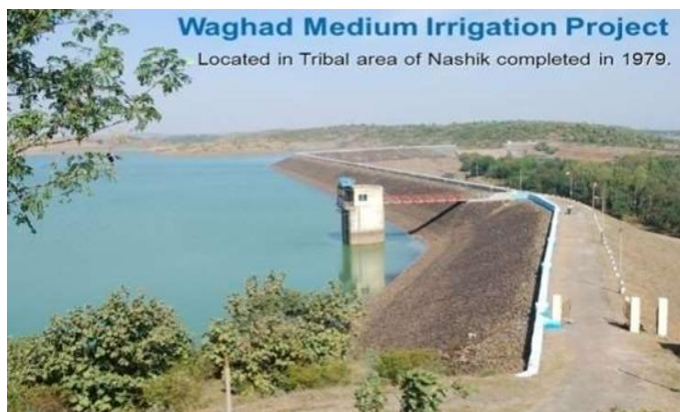


Figure 2. View of Waghad Irrigation project

4-1. Expenditure on Operation and Maintenance of WPLWUA

Expenditure on the operation and maintenance of WPLWUA is given in the Table 3.

Table 3. Expenditure on Operation and Maintenance of WPLWUA

Sr. No	Year	Canal Maintenance Cost (Rs)	Operation Cost (Supervisory) (Rs)	Total O & M Cost (Rs)
1	2011-12	117925	80500	198425
2	2012-13	128240	147690	275930
3	2013-14	556620	150900	707520
4	2014-15	230530	142170	372700
5	2016-17	36490	113770	150260
6	2017-18	38790	160220	199010
7	2018-19	77000	207400	284400
8	2019-20	119935	154050	273985
9	2020-21	156352	293900	450252

Source: Data compiled from various annual report of the WPLWAU

It is revealed from Table 3 that the expenditure has been increasing over the years. Major work of maintenance of main Canal was done during the years 2013-14 and 2014-15.

4-2. Volumetric Water Supply and Equitable Water Distribution

WUAs are getting water on volumetric basis. Each WUA is then distributing the water among their members. The water use rights and cropping freedom to WUAs have resulted into transforming Waghad irrigation scheme from eight-



monthly to Perennial scheme and traditional cropping pattern to high value and productive cropping pattern. The extensive use of drip irrigation and conjunctive use of water has made it possible to use water quota efficiently and productively. The water quantum and canal rotations are planned in such way that water is made available for irrigation use round the year. As average land holding of farmers is very small (0.5-1.0 ha), volumetric supply to each farm holding is difficult, so farmers have devised an innovative way to share water on time basis. For example, if the discharge of an outlet is 30 lps then entire water is released to a farmer at the rate of 4 hours per ha at the time of irrigation. Those outlets drawing lesser discharge, time share for the farms under the command of such outlets is increased proportionally. Thus equity is maintained in distribution of water.

4-3. Assessment and Recovery of Water Charges

Minor level WUAs collect the water charges from farmers in the command. The WPLWUA collects the water charges from WUAs at Minor levels and pay to the government. It is found that the recovery is 100% (Belsare, 2014). The status of area irrigated, recovery of water charges - before and after is shown in the Table 4. Table 4 reveals that management transfer to WPLWUA has resulted in 100 % utilization of irrigation potential, saving in water, crop diversification, and 100 % collection of water charges.

4-4. Audit and Annual Report

The WPLWUA is also responsible for holding general body and regular management committee meetings from time to time for planning of rotation and its implementation, encouraging active participation of women in management committee, annual auditing of expenditure, and publication of annual report.

Table 4. Status of area irrigated, recovery of water charges - before and after management transfer

Sr. No.	Description	Before formation of PLWUA (1980-90)	After formation of PLWUA (2013-14)
1	Average Area Irrigated	3,212 ha	10,750 ha
2	Mode of Water Supply	Area basis	Volumetric basis
3	Average Water Charges Recovery	Rs. 0.3 million	Rs. 2.5 million
4	Recovery of Water Charges	60 %	100 %
5	Crop pattern	Restricted	Cropping freedom
6	Water Entitlement	No entitlement	Transparent and enforceable



The Ozar WUAs have gone even beyond the conventional functions of WUAs. For example they have constructed small check dams on the *nallas* (Rivulets) in the command area. These check dams help to harvest local rain water and also store part of the water they get from Waghad dam. This has made the local water system more stable and assured and the farmers can by and large give irrigation as per the requirement of different crops. They have also gone for conjunctive use of surface and groundwater. The WAUs charge the farmers on an hourly basis and this has checked wastage of water and brought in more efficiency. In land under the WUAs, the members also pay a water charge to the Association for using water from their own wells because they know that the well water is basically recharged water. Thus they have been able to bring the wells in the command area under the jurisdiction of the WUA. They have formed WUAs to cover the entire command area of the Waghad project and the management of the entire project has been handed over to the federation of the WUAs. This is the first and only case of project transfer in Maharashtra, and probably in India too.

5. Crop productivity

Area under selected crops and crop production and productivity along with ha income in Waghad irrigation project is given in Table 5.

Table 5. Productivity of Selected Crops in Waghad Irrigation Project (2020-21)

Sr. No.	Crop	Area (ha)	Productivity (Quintals Per ha)	Income (Rs. Per ha)
1	Wheat	1001	22	44,000
2	Groundnut	170	13	18,850
3	Gram	335	11	31,350
4	Onion	170	160	1,92,000
5	Grapes	3143	270	4,72,500
6	Sugarcane	295	1200	2,52,000
7	Flowers	132	54,000	4,86,000
8	Vegetables	1144	410	2,56,250
9	Fodder	105	150	33,000

Source: Data compiled from Annual Report of Waghad project Level WUA, 2020-21

6. Achievements

A) Increase in Farm Income

Predetermined and assured water supply enhances crop diversification and



enables them to grow high value crops like grapes, vegetables and flowers. Thus the farmer's income has been substantially increased.

B) Employment Generation

Previously job in agricultural field for Local labours was available for average 2 months in a year, the irrigation facility and crop diversification is providing jobs to the local agricultural workers for round the year.

C) Water Conservation and Conjunctive Use

Construction of water conservation structures such as weirs, ponds, etc in the command area has been recharging of about 2523 wells. This led to increased availability of water to farmers even in hot weather season.

D) Use of Drip and Sprinkler Irrigation

The assured and timely availability of water has worked as an incentive to enhance use of water saving techniques like drip and sprinkler. Nearly 4100 ha (50% of the planed command) is brought under drip irrigation system. Farmers have invested in drip irrigation systems for grapes, vegetables etc.

E) Innovative ideas

Farmers have become confident and have started new initiatives and ideas, materials and crops. PLWUA has registered Waghad Agricultural Producer Company (WAPCO) in September 2009 to market and process agricultural produce of farmers.

7. Awards

Waghad irrigation project level Water Users Association and its member got various National, State and Regional level awards and prizes. Following are the selected awards received by the PLWUA:

- 1) National Productivity, Second Prize, New Delhi, 2007-2008.
- 2) State Level First Prize, Nanded (M.S.), 2009-10.
- 3) ICID Water Annual Award, Delhi, 2009.
- 4) CII National Award for Excellence in Water Management, Hyderabad, India 2009.
- 5) Excellence Water Planning Award, Agricultural Department, Nashik, India 2010.
- 6) Excellence Work, *Samaj Parivartan Kendra* (Centre for Social Transformation, Nashik, India 2010.)
- 7) Second National Award, 2019, Ministry of Jal Shakti, Government of India, New Delhi.

8. Conclusions

The Cluster of Water Users Associations of Waghad project are supplying equitable, judicious, timely and assured water to farming community that results into innovative and sustainable irrigation management transfer. The project level associations of Waghad saved about one-third water supplied for irrigation apart from increasing productivity. This water has been used for additional area under irrigation. Waghad project has developed good rapport and coordination between various institutions involving in irrigation management. This innovative participatory water management model of Waghad project can be replicated in different part of the country and also in the world.

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