Irrigation Management Transfer In India: The Processes and Constraints

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Over the last decade, various policy reforms have been carried out in India's water sector in recognition of the fact that water is becoming increasingly scarce in many regions, and require judicious management. Irrigation sector being major consumer of all water use got maximum attention throughout these reforms. It was considered that to improve the overall situation in irrigation water management, important is to involve end users/farmers in the operation and maintenance of the irrigation conveyance systems. The basic idea behind Farmers Managed Irrigation Systems (FAMIS) was to improve the overall efficiency of irrigation system, generate sense of ownership among farmers and to improve the irrigation revenue recovery rate. This laid the seeds for Participatory Irrigation Management (PIM) in India. This particular paper discusses about the PIM in three states of India i.e. Gujarat, Madhya Pradesh (MP) and Maharashtra. The selection of these 3 states presents a unique combination of PIM process undertaken in the country. In Gujarat the process is mainly facilitated through the efforts of civil society organization, in MP it is through water resources department (WRD) and in Maharashtra both civil society network and state irrigation department were involved. The main focus of this paper is on the policy process undertaken in each of these states for PIM and the factors which leads to the success and failure of such participatory attempts. Assessment of implementation of irrigation management transfer (IMT) in these states suggests that the success of such programs is highly dependent on effectiveness of the execution and the financial resources available with the government which are often limited. Many a times, government is dependent on external donors for the full scale implementation of PIM in the respective states. Also such programs will reap desired benefits, if the end users are involved in more effective manner with greater autonomy and delegation of authority.

Key Words: India, Irrigation Management Transfer, Participatory Irrigation Management, Farmers Managed Irrigation Systems, Policy Process.

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Prepared for Council for Social Development (CSD) Conference on Participatory Approaches towards Water Resources Management

1. Introduction

Agriculture and irrigation sectors have always been a prime focus world over for reforms because of their importance in world economy and farmers' livelihoods (also employs 41% of world total labor). The World Bank has also lent some 35 billion dollars for irrigation development or an equivalent seven percent of all its lending since 1950's (Plusquellec, 1999). In spite of such huge investments, irrigation sector continued to be trapped in a vicious circle. It has been observed worldwide that lack of basic infrastructure for irrigation, poor maintenance of existing systems, and reducing government investments on repair and rehabilitation (R&R) of systems have been the major precursors for the irrigation reforms (Gulati et al., 2005; Madhav, 2007; Vermillion, 2001). Irrigation reforms stated as early as 60s in Bangladesh and USA, 70s in Mali, New Zealand and Colombia and to 80s in the Philippines, Tunisia and Dominican Republic. The new century interventions have taken place in Sudan and Pakistan (2000), India (1990's), China (2002) and more recently in some of the Central Asian countries. Presently more than 60 countries in the world have undergone some type of irrigation sector reforms (Munoz et al., 2007). These countries constitute around 75% of the world population and represent some 80% of the irrigated area of the world (FAOSTAT, 2003).

In India, various policy reforms have been carried out over the past decade in water sector including irrigation. This is primarily because: a) water which is becoming increasingly scarce in many regions requires judicious management, and b) country's surface irrigation systems are deteriorating. As per estimates, of all the uses of water in India, irrigation is a major consumer. Figures indicate (Source: Indiastat) that annual requirement of water for irrigation in India will go up from 541 Billion Cubic Meter (85% of the total annual water requirement) from the 2000 levels to 910 Billion Cubic Meter by 2025 at the current levels of efficiency (20-50%). Major problems facing Indian irrigation sector include: a) declining investment on maintenance; b) low levels of system efficiency; c) poor financial working; and, d) low quality, reliability, and system-wide equity. Further, there is a competing demand for water from other sectors.

It was considered that to improve the overall situation in irrigation water management, important is to involve end users/farmers in the operation and maintenance of the irrigation conveyance systems. The basic idea behind Farmers Managed Irrigation Systems (FAMIS) was to improve the overall efficiency of irrigation system, generate sense of ownership among farmers and to improve the irrigation revenue recovery rate. This laid the seeds for Participatory Irrigation Management (PIM)[2] in India. Pant (2007) described the process of Indian PIM having passed through four distinct phases during the last three decades: i) first from 1975-85 where emphasis was on creating outlet based water user organization, ii) second phase from 1985-90 where focus shifted to experimentation and establishments of pilot PIM projects with help of government,

[2] Participatory Irrigation Management (PIM) refers to the involvement of irrigation users in all aspects and all levels of irrigation management. "All aspects" includes the initial planning and design of new irrigation projects or improvements, as well as the construction, supervision, and financing, decision rules, operation, maintenance, monitoring, and evaluation of the system (Source: World Bank).

international donors and non-governmental organizations (NGO's), iii) third phase from early 1990's where few of the progressive states such as Maharashtra propagated the idea of turn over of management of irrigation systems to the farmers. During this phase came the India first farmers Management of Irrigation System Act by Andhra Pradesh in 1997. Subsequently many other states i.e. Chattishgarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, and Tamil Nadu came up with act or legislation governing farmers involvement in irrigation management and, iv) The fourth phase starting 1997 marks the emergence of donor funding for restructuring India's irrigation sector with PIM as a core project activity.

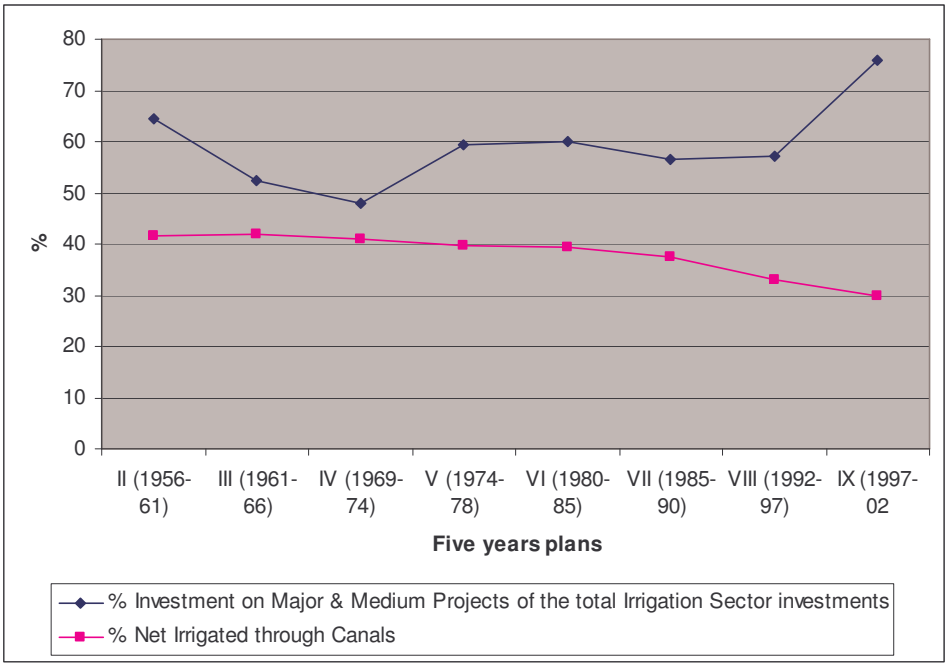

Figure 1 Investments on Surface sources (only canals) and Net Irrigated Area, India (Source: Indiastat)

However, mere enactment of legislation does not assure solutions to the problems circumscribing the country's irrigation sector. Even after the completion of the eighth and ninth five year plans, there was no pronounced effect in the net irrigated area through canals (figure 1). Similar trends were noticeable for quality of maintenance of conveyance systems, timeliness and equity of water delivery (DSC, 2003), and efficiency of water fee collection. This was the situation despite emphasis for both government investments in irrigation and involvement of end users in irrigation management. Research studies have also shown that even after the enactment of IMT/PIM act in various states, performance of transferred systems has improved only marginally (Parthasarathy, 2000; van Koppen et al., 2002;). Some of the reasons for this are: a) haste in creating WUAs without any capacity building of farmers as in Andhra Pradesh, b) transfer of systems without complete repair & rehabilitation (R&R) work as in Gujarat, or c) lack of appropriate legal back up for end user organizations as in Punjab and West Bengal. In order to understand the success or failure of PIM, important is to look at formulation and implementation of PIM acts or legislations. Thus, this particular paper

will look into the PIM process being followed in the state of Gujarat, Madhya Pradesh and Maharashtra, and the success they are able to achieve.

2. Methodology

Three states i.e. Gujarat, Madhya Pradesh (MP) and Maharashtra were selected to understand the PIM process being followed in these states. For understanding the policy process purposive sampling was followed for the selection of respondents, which included government officials, academicians, NGO's personnel and farmer's representatives from the WUAs. Informal interviews and group discussions were carried out with various respondents to have their views on the PIM act formulation and implementation in the respective states. Three WUA's were selected (two from Maharashtra and one from MP) to understand the success of PIM when done with proper support and guidance. The WUAs were chosen based on the recommendation by various experts and people associated with PIM process in the respective states. Government records, research papers and other working papers and articles were also used for reference and secondary data.

3. Process of PIM in selected states

The selection of these 3 states presents a unique combination of PIM process undertaken in the country. In Gujarat the process is mainly facilitated through the efforts of civil society organizations, in Madhya Pradesh it is through water resources department and in Maharashtra both civil society network and state government were involved. It will be interesting to take up the process followed in these states individually.

3.1. Gujarat

In Gujarat, Water Resources Department (WRD) invited leading NGOs to work closely with them for improving canal irrigation management. In 1992 a workshop was jointly organized by Water and Land Management Institute (WALMI), Gujarat and AKRSP, India (a prominent NGO in Gujarat) to discuss appropriate measures that can be initiated to promote PIM. By 1994, 13 pilot projects on PIM were launched across the state with the involvement of NGOs. Taking from the results of these pilot projects and strong NGO support for the PIM (especially from AKRSP and DSC), Government of Gujarat launched policy resolution (1st June 1995) to invite participation of farmers and NGOs in management of state owned irrigation systems. Between 1995 and 2000, some 37 orders were issued from the WRD to facilitate PIM process in the state. Some of the important orders include the following:

i) Canals have to be rehabilitated prior to transfer, the WUAs will contribute 10 percent of the costs.
ii) General orders for canal rehabilitation work has to be first offered to the WUAs, then to the NGOs and if both decline, it will be done by government.
iii) The WUAs willing to execute the work are given 1/3rd of the estimated costs in advance.

iv) Transfer of canal before rehabilitation to the willing WUAs after signing an MOU, which shall include jointly agreed estimates for rehabilitation work to be done by the government and the physical and financial target of its completion.
v) The WUAs will collect water fees and retain 50 percent. The WUAs are also free to decide water rates, over government rate but not exceeding 10% in any case. The additional amount can be retained by the WUAs (ADB, 2008; DSC, 2006).

By the end of 2005, total of 377 Irrigation Cooperatives (nomenclature for WUAs in Gujarat) were formed covering an area of 1.02 lakh hectares under farmers management.

3.2. Madhya Pradesh

Madhya Pradesh has a total irrigation potential of 6.72 million hectares. Of this, a potential of 2.15 million hectare has already been created. However, the potential utilized is only 46%, i.e., 1 million hectare (as per 2003-04 figures). The main reasons for such heavy underutilization were system deficiencies, deferred maintenance of the system, insufficient revenue to meet O&M cost and non-involvement of farmers in irrigation management (Agrawal 2005; Pandey 2006). Hence, to improve the overall situation, policy reforms were conceived and PIM act was enacted in 1999. The dual purpose was to improve system condition and involve end users in irrigation management.

Before formulation of PIM act, MP government took several other initiatives to have farmers' involvement in irrigation management. They established the Irrigation *Panchayats* (IPs) in early 1984-85 under MP Irrigation Act, 1931. The functions of these IPs, their rights and duties were not clearly defined under the then existing MP Irrigation Rules, 1974. Consequently these IP's became defunct. In 1994-95, Farmers Management Committees (FMCs) were formed on pilot basis. Their design principles were very much similar to the farmers' cooperatives in the state of Gujarat and Maharashtra. These FMCs were registered under the Cooperative Society Act of the MP state. But these FMCs were not able to deliver goods as desired of them and did little to involve farmers in irrigation management.

Drawing on the experiences from two earlier attempts of involving farmers in irrigation management in MP, it was thought important is to create an enabling legal framework before going ahead with PIM. PIM legislation received major thrust because of the then Chief Minster inclination towards participatory approach for natural resource management. For accomplishing the formulation of the irrigation management act, necessary environment was created in the state by discussions and interactions between beneficiaries' farmers and public representatives. This formed the foundation for PIM act formulation. There was no involvement of civil society organizations in these initial stages of policy formulation. The irrigation department (now Water Resources Department) was given complete responsibility to provide suggestions for the formulation of PIM act by looking at the procedure followed worldwide and within the country. Examples of implementation of farmers managed irrigation systems in Mexico,

Philippines, and India (Andhra Pradesh, Gujarat and Maharashtra) were examined. Finally, the government decided to formulate an act similar to Andhra Pradesh PIM act with modifications as per the regional settings of MP (Source: As told in various meetings with WRD and PIM Directorate Officials, MP).

Finally in 1999 MP PIM act called as "Madhya Pradesh *Sinchai Prabandhan Mein Krishkonka Bhagidhari Adhiniyam* 1999" was brought into force for the entire state. The rules for act implementation were passed in the same year (Madhya Pradesh Farmers Organization Rules, 1999) by the state government. The Act provides for a three-tier farmer's organizations (FO's) for irrigation management. The lowest tier in the institutional hierarchy is Water Users' Association (WUA) at minor canal level of the irrigation system, secondary unit is Distributory Committee (DC) at distributory canal of the irrigation system and tertiary unit is Project Committee (PC) at the whole irrigation project level.

During the early stages of PIM implementation, all the financial support was provided by the MP government. After the first FO's election in 2000, an operation and maintenance grant (O&M) @ Rs. 40/ha was provided to each WUA to make them functional. From 2004-05 this grant was doubled. At present Rs. 90/ha O&M grant is given to the WUAs at major and medium irrigation projects and Rs. 80/ha is given to the WUAs at minor irrigation project. In addition to this, a sum of Rs. 5000/annum is being provided to the WUAs for their administrative expenses. A daily wage staff @ 1 person per 200 hectares is also provided to WUAs to assist them in repair and maintenance of minor canal.

In 2002, MP government received financial support from the Indo-Canada Environment Facility (ICEF) to speed up the process of implementation of PIM in the state. This support was for the duration of four and half years to assist in the physical work on the transferred irrigation systems and capacity building of both WRD officials and farmers. Under the project, 1 major (*Samrat Ashok Sagar*), 3 medium (*Koncha, Chappi & Satak*) and 3 minor irrigation schemes (*Gora, Birsagar & Segwal*) were selected. Noticeable clause in the project was related to the total expenditure on the execution. Under the clause, 50% of the total expenditure was contributed by ICEF, 20% by state government and 30% by the farmers. However, because of farmers' inability to contribute the 30%, the proportion was later changed to the ratio of 50:30:20 and again to 60:30:10. In total of about Rs. 111.3 million was spent over four and half year of ICEF project execution.

After the completion of ICEF project, state government has now received a World Bank support under the MP Water Sector Restructuring Project. This project has a financial support of Rs. 19.19 billion and will cover the five river basins in the northern part of the state. This project is for period of seven years (2005-2011) and has a major focus on modernization of irrigation system and effective implementation of PIM act in the state.

By the year 2000-01, management committees of 1470 WUAs, 90 DCs and 57 PCs were formed in the state through the election process. Elections for the second term of WUA management committee were held in 2006 (table 1). However, election for the second tenure for the management committees of DCs and PCs were still to be held.

Table 1Constituted Farmers Organization in Madhya Pradesh

	In 2000-01 Total number of Farmers' Organization (FOs')	**Total elected Person**	**Area under FO's (million Ha.)**	**Total Members (in Lakhs)**	**In 2006* Total number of Farmers' Organization (FOs')**	**Total elected Person**	**Area under FO's (million Ha.)**	**Total Members (in Lakhs)**
WUAs								
Minor	850				936			
Medium	153				209			
Major	467				542			
Sub-Total	1470	11752			1687	12877		
Distributory Committees (for major Projects only)	90	300	1.5	11.75	90	300	1.69	Not Available (NA)
Project Committees								
Medium	57	398			57	398		
Major	19	151			19	151		
Sub-Total	76	549			76	549		
Total	**1636**	**12601**	**1.5**	**11.75**	**1853**	**13726**	**1.69**	**NA**

* Only elections for WUAs are held, figures for DCs and PCs are of 2000-01 elections only

3.3 Maharashtra

Maharashtra has a rich history of farmer's involvement in the management of irrigation system. Be it *phad*[3] system or *shejpali*[4], farmers in state have been instrumental in using their collective action, a social asset for getting water for irrigation purpose. The first intent by government of Maharashtra in moving towards participatory irrigation

[3] Phad is the community-managed irrigation system, prevalent in northwestern Maharashtra, probably came into existence some 300-400 years ago. The system starts with a *bandhara* (check dam or diversion-weir) built across a rivers. From the *bandharas* branch out *kalvas* (canals) to carry water into the fields. The length of these canals varies from 2-12 km. *Charis* (distributaries) are built for feeding water from the kalva to different areas of the *phad*. *Sarangs* (field channels) carry water to individual fields. *Sandams* (escapes), along with *kalvas* and *charis*, drain away excess water. In this way water reaches the *kayam baghayat* (agricultural command area), usually divided into four *phads* or blocks (CSE Website).

[4] The main feature of *shejpali* system is that the government enters into some sort of agreement with the farmers for supplying water to them. Under the *shejpali* system, water is distributed according to predetermined date in each rotation. Farmers at the tail-end of the command are served first and those at the head are served last (Plusquellec, 2002).

management came in the form of Cooperative Water User's Association (WUA) Guidelines (1994) where irrigation department adopted a policy to: a) create water user's association at minor canal level, b) transfer O & M responsibility for the minor and smaller channels to WUA's, c) allocate water to WUAs through year agreements and d) charge WUAs for irrigation water supplied on volumetric basis (Naik and Kalro, 1998). Since then, there were continuous reforms and changes in guidelines for involving farmers in the management of irrigation system. All these reforms ended with the state government coming out with Maharashtra Management of Irrigation System by Farmers Act (MMISF), 2005.

Under the MMISF act, WUA were entrusted with following rights after taking over of the water management from the irrigation department;

a) After receiving the water on volumetric basis at the head of the minor, right of internal distribution of water amongst the farmers rests with the association.
b) WUA can levy different water charges for the members and the non- members. The only restriction is that the rates levied on the non-members should not be more than 130 % of those charges to the members.
c) If the association saves water from the quota for *rabi* (winter) season, the saved quantity of water can be used by the association in summer season.
d) The profit accrued to the association through water distribution, can be retained by the association and can be used for under taking other schemes, beneficial to the members.
e) The association has to keep the distribution system always in good shape by taking the responsibility of maintenance & repair work upon itself and consequently it can give satisfaction of better service to the beneficiaries.

The act also provided with the management subsidy and maintenance & repair (M & R) grant to the WUAs. Before the MMISF act, the WUAs were supposed to get management subsidy at the rate of Rs.100 per hectare for the first two years and Rs.75 per hectare for the third year. However if the association encounters some difficulty in availing the subsidy as mentioned above, they may opt from the first year itself or after the third year for the subsidy from the Irrigation Dept., equal to 20 % of the water charges that would be charged by the Government. These rates were revised and in the decision taken by the Government on 23rd July 2001 an amount of Rs.225 per hectare from central government & Rs.225 per hectare from state government were to be given to the associations, which have formed under Command area Development (CAD) projects. For the WUA formed under non-CAD projects, an amount of Rs.450 per hectare will be given, provided the associations should agree the condition of Rs.50 per hectare made available for management expenditure from their side. For annual maintenance grant, Rs.20 per hectare of CCA was allowed to the association before MMISF Act. Revised rates of maintenance and repair under MMISF Act are given in table 2.

Table 2 Revised rates of M & R grants are as under

Years	M & R Grant (Rs./hectare)
For first 5 years of functioning of WUAs	60
Sixth year	50
Seventh year	40
Eight year	30
Ninth year	20
From Tenth year	It will be stopped

In addition to the grants provided one of the important aspect covered under the act is the capacity building of the newly formed WUAs. In this regard, Water and Land Management Institute (WALMI), Aurangabad, was entrusted with the responsibility of imparting training to the office bearers of WUAs, canal operator (*patkaries*), beneficiaries of the WUA and officers from Irrigation, Agriculture and Co-operative department.

In 2006, state has 1127 functional WUAs covering a cultivable command area (CCA) of 371785 hectares and around 2000 WUAs in various stages of formation (table 3).

Table 3 Status of formation of Co-operative Water Users' Association in the State (August – 2006)
(Source: Website of Directorate, Irrigation Research and Development, Pune)

	Number	CCA (in hectares)
WUA which have Started Functioning	1127	371785
WUA whose Agreement is done	487	165361
Registered WUA, Agreement is yet to be done	1337	487753
WUA under Proposal	3902	1644998

4. Successful case studies from different States

4.1. Satak Irrigation Project

Satak Irrigation Project is a medium tank project constructed during 1955-1966 on *Satak* River in Narmada basin. The tank is located in *Bamandi* village of Kasrawad *tehsil*, in Khargone district of MP. The project has 2706 hectares of culturable command area, out of which 1800 hectares is irrigable command area. The tank has a total distribution network of 53 km and covers 17 villages comprising 1750 water user families. The canal system of Satak tank project consists of 1 main canal, 1 main distributory and 13 minor canals. Crops in the command area include soyabean, chilies, cotton in *Kharif* (monsoon season) and wheat, gram in *Rabi* (winter season). There is large-scale use of groundwater in the command area.

Only one WUA was formed in the entire command area of *Satak* project in the year 2000. The canal distribution network was transferred to WUA without the necessary

repair and rehabilitation (R&R) works. Until the early part of year 2003, the major role of WUA was restricted to only annual maintenance of the canal structure. In the later half of 2003, Satak project was included in the ICEF project for the renovation of whole canal network and Rs. 128.05 lakh was assigned for the purpose. Under this project 30% of the cost (i.e. Rs. 38.41 lakh) was to be borne by the farmers of the command area, which was later reduced to 20% and finally 10%. A NGO named ASA was involved as a facilitating agency to mainly: a) promote local institution building at grassroots level, b) motivate farmers to pay their contribution and c) to provide guidance to the farmers for the execution of the physical works. WRD was also equally involved in conducting meetings with farmers and providing guidance for the canal renovation. After a number of meetings and three years of dedicated work by ASA, both quantitative and qualitative change was visible in the community participation for both cost sharing and management of canal system. It was one of the few projects where community made full contribution from their side as a requirement under the ICEF project. However, as a rule under the MP PIM act, all the money was deposited in the joint bank account of the executive engineer and divisional accountant, WRD, Kasrawat. Release of fund from this account is subjected to technical clearance of physical works from the WRD. Before finalizing on the repair work on the canal, a participatory walk through (PWT) on canal was carried out jointly by WRD, farmers and NGO members with the aim of deciding priority work to be undertaken first. After the participatory walk through, WUA undertook the canal restoration work under the guidance of WRD and NGO.

As per the PIM directorate record (June 2007), physical work on the *Satak* project has been executed as per the cost estimates (128.05 lac rupees). Our visit to the *Satak* project area (23-27 Sep, 2007) presented the different story. The physical works were still in progress and only initial part of the main canal was renovated.

Satak tank is considered one of the best schemes under the ICEF project and it is being promoted as a successful PIM model across the state. As per the MP PIM Act, role and responsibility of WUAs is only restricted to maintenance of canal system and motivating farmers to pay their water charges on time. However, collection of water charges is still under the WRD representative (called as *Amin*). Also, WUAs as per the act are not totally independent. An officer of the rank of sub-engineer is the secretary of WUA (does not have any voting right) and the competent authority to oversee the implementation and execution of the decisions taken by WUAs.

Considering the limited role offered to WUAs', what was looked in the performance of *Satak* WUA was the improvement in the irrigation in the command area and water charges recovery from the farmers. It was found that there was a strong correlation between the gross irrigated area and the water charges recovered after the formation of WUA (i.e. 2000) and more especially after *Satak* tank was made part of ICEF project i.e. 2003-04 (figure 2). It can be inferred that the work carried out by WRD and NGO with the farmers under the ICEF project is paying rich dividend at least in terms of water charges recovery. One significant feature to note is very less gross irrigated area in the year 2000-01 and 2005-06. It has to do with poor rainfall during these years leading to less storage of water in reservoir and hence less irrigation.

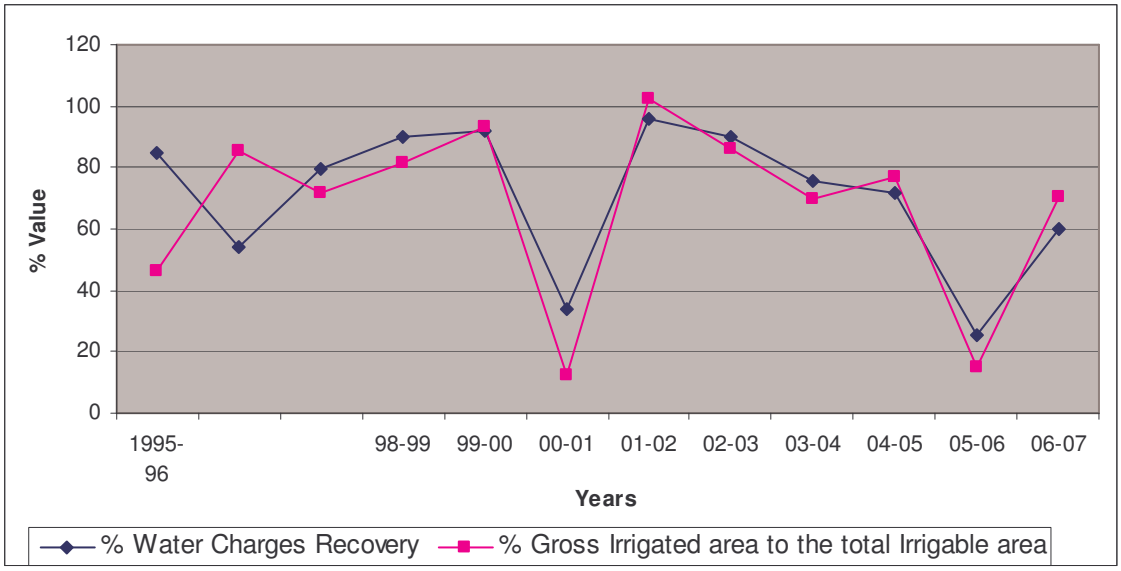

Figure 2 Water Charges recovery and Gross Irrigated Area over the years, Satak Project

Once the ICEF project was completed, the NGO has withdrawn support from the command area. It is quite prominent from the information that WUA was able to work when some kind of financial and organizational support was provided to them. But how this WUA will perform in future is not clear. However, one thing was quite evident, WUA office bearers feel that the limited role they have been offered under the PIM act should be expanded. They should be given right to collect their water charges, to have their operator looking after the canal system and greater freedom in their administrative working. It seems that competent authorities of WRD officials still have a bigger say in the day to day management of canal water and also in sanctioning funds to WUA for the maintenance activities. Because of the limited role of WUAs, they are not able to achieve what they actually desire i.e. equitable and timely supply of irrigation water across the command. There was one more source of concern for the WUA. After the second term of WUA elections in the state, earlier office bearers have changed. The new office bearers also need to be trained as was done for the earlier office bearers. But, who will do that? Who will provide financial support for that? The newly formed management committee of WUA at *Satak* project looks confused about there future course of action. Discussions with farmers revealed that they are not very comfortable with the limited role offered to them under the PIM act and also with the larger involvement of WRD officials in their working.

4.2. Jai Yogeshwar Water User Association

Jai Yogeshwar WUA, village *Ozar* (around 25 km from district Nashik) is located at the tail end of the Waghad irrigation project. Waghad dam is a major dam (under upper Godavari project) constructed in 1978 on river *kolwan* which is a tributory of *kadwa* river. Dam is situated in Dindori *taluka*, District Nashik, Maharashtra and is about 35km from Nashik. It has got two canals a) Waghad Right Bank Canal (RBC) to irrigate 5100

hectare of land from Dindori & Niphad *taluka* and b) Waghad Left Bank Canal (LBC) to irrigate 1650 hectare of land from Dindori *taluka* (figure 3). Both the canals are eight monthly, with no assured provision for summer watering.

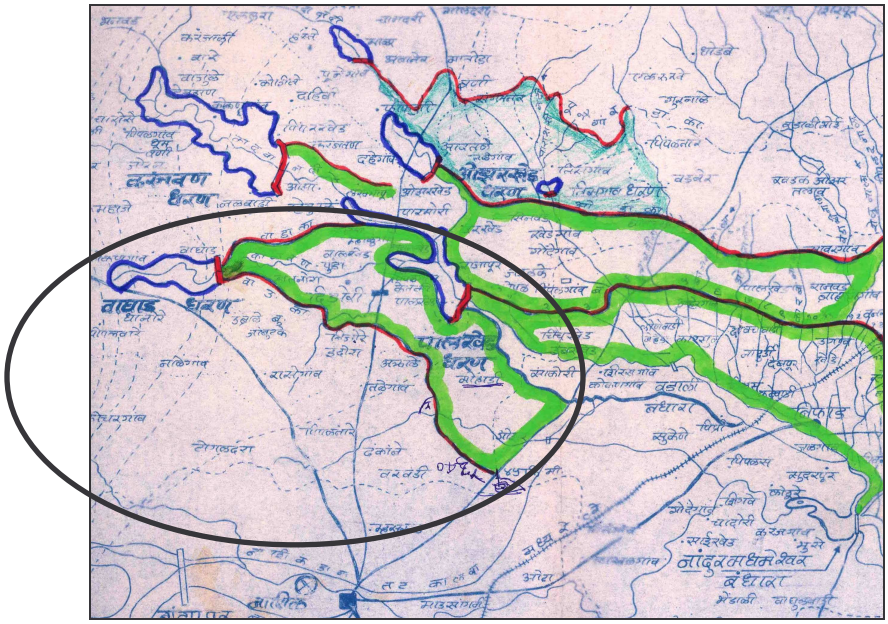

Figure 3 Encircled portion showing command area of Waghad Irrigation Project

Jai Yogeshwar WUA (table 4) was formed with the tireless and unending efforts of Samaj Parivatan Kendra (SPK), a social organization led by late Bapu Upadhye. For organizing and making farmers understand about the importance of participatory irrigation management, SPK organized number of meetings. There efforts finely paid back when the association got finally registered in 1991 under cooperative society act[5] and started its operation on the handed over irrigation system in the same year as well. Initially technical support to SPK was provided by SOPPECOM, a Pune based NGO working in the field of natural resources. During the handing over of the irrigation system to the WUA only selective repairing of the minors (18A and 19) was done because of paucity of funds with the irrigation department.

With the formation of *Ozar* WUA, net irrigated area over the years (pre[6] and post WUA) through canal water has increased as a result of better management and optimum utilization of water by the WUA (figure 4). Figures available from dam storage also support the point (table 5). Although the gross dam storage is constant from 2002-03 onwards but the WUA was able to irrigate more land with the same amount of water. Overall there was an increase in net irrigated area, 116 times in *summer* and 128% in *Rabi* season in post WUA scenario. One of the reasons for such a drastic increase in summer was, members of WUA using less number of sanctioned water quota in *rabi* and

[5] Under the Maharashtra PIM act, 2005 all the WUAs have to get registered with irrigation department.
[6] Figures for 89-90 and 90-91 are for the whole command area which is now under three WUA's at OZAR. Separate figures for the pre WUA formation stage were not available for individual societies. Pre stage is a year before the formation of WUA i.e. 1990-91) and post is 2005-06 season.

using the saved water in *summer* season. Most of the farmers use the water received in summer season primarily for grapes, which is the major cash crop in the command area. In fact this has provided incentive to farmers to go for grapes intensive cropping as they were assured of irrigation in *summer* season.

Table 4 Salient Features of Jai Yogeshwar WUA

Name	*Jai Yogeshwar* WUA, village *Ozar*, Tal. Niphad, Nashik
Location of WUA	Tail end of the system
Minor No.	18A and 19
Length of both Minors	9 km
GCA	615 hectare
CCA	595 hectare
ICA	390 hectare
Water Allotment- Kharif	273 thousand cubic Meter (TCM)
Water Allotment- Rabi	587 TCM
Total Beneficiary (including non-members)	339
Total Members[7]	292
No. of Years of watering	15. Started from 1991-92.
Caste Composition	87% general

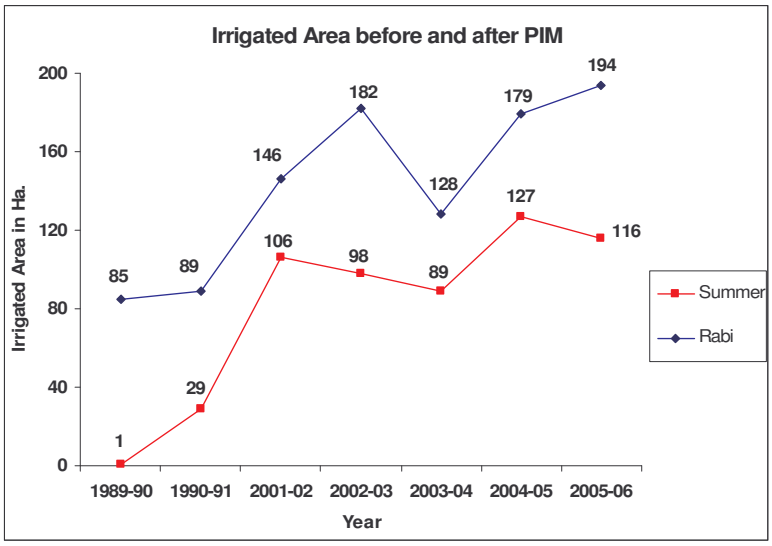

Figure 4 Net Irrigated area before (prior to 91-92) and after formation of Jai Yogeshwar WUA

[7] As per the Maharashtra PIM act, 2005 all the farmers in the command area by default are members of WUAs.

Table 5 Storage level of reservoir

Year	Gross Storage (in million cubic feet)
2000-01	2071
2001-02	2350
2002-03	2700
2003-04	2700
2004-05	2700
2005-06	2700

Jai yogeshwar WUA was also found to be financially sound except for the 2004-05 and 05-06 seasons (figure 5). On scrutinizing their records it was found that the cost on the maintenance of minor is increasing continuously from last 2 years i.e. from Rs. 23,520 in 2003 to Rs. 42,057 in 2005. Also total water charge paid to the irrigation department was increasing i.e. 62,081 in 2003 to 1,55,162 in 2005. Whereas water charges[8] kept by WUA for members was found to be same from last 2 years i.e. in rabi Rs. 50/hr. & summer Rs. 125/hr. in 2003 and same for Rabi & summer Rs. 130/hr for 2005. Therefore, increasing expenditure on maintenance without any increase in irrigation charges might be causing WUA to be running in debt. Importantly irrigation charges recovery rate for the last 6 years was found to be more or less constant and above 90% (figure 6). This conveys that whenever there is reliable and assured supply of irrigation water, farmers do not hesitate to pay water charges on time.

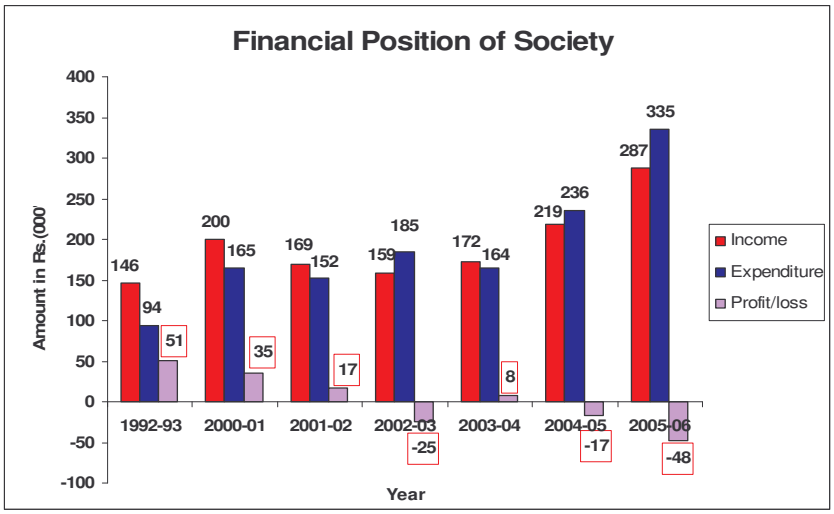

Figure 5 Financial position of WUA

[8] Irrigation department charges WUA on volumetric basis i.e. charges according to the volume of water used whereas *Jai yogeshwar* WUA charges on hourly basis i.e. time taken to irrigate the desired field.

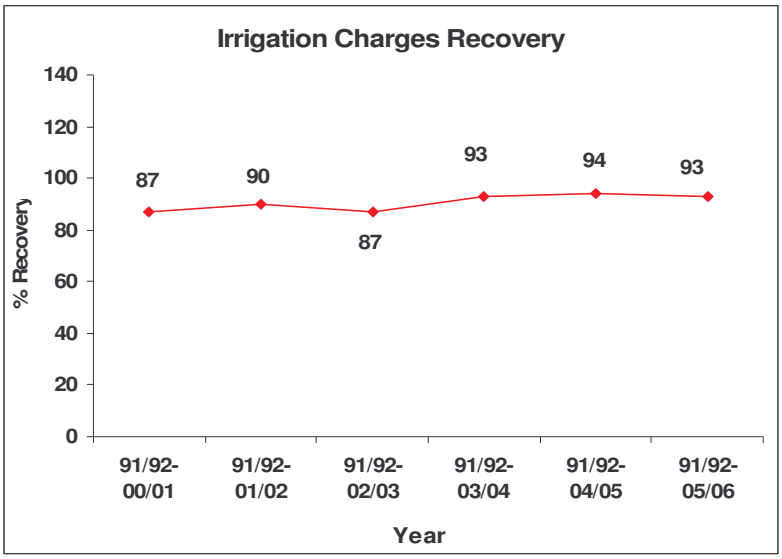

Figure 6 Irrigation charge recovery rate for WUA over the years

On the aspect of participation of village community in the WUA working, the *Ozar* experience seems to be working fine. Under the bylaws, WUA must have one general body meeting per year and one executive body meeting per month. *Jai yogeshwar* WUA was found to be regular in organizing meetings as per their bylaws. It should be noted that executive body meeting was to be attended by executive committee (EC) or working committee (WC) members only and general body meeting (GBM) was to be attended by all the members in the command area. It was found that attendance in GBM was less as compared to executive meetings. Discussions with farmers revealed that members are more interested in getting assured and regular supply of water rather than attending general body meetings. On the other hand, executive committee members were serious towards their roles & responsibilities and hence better performance of WUA.

Ozar WUA is performing well and looks to be very stable. However minor canal under their operation requires R&R at various places. Also in view of Maharashtra government decision that WUAs shall be provided water based on the volumetric basis, this R&R work should be given urgent priority. It is more so important because the volumetric supply will only reap the desired benefit of judicious use of irrigation water if the conveyance system is in better condition. The only constrain for carrying out such mass repair and rehabilitation of minors is the lack of funds with the state government.

4.3. Krishna Kalva Water Users Association

Krishna kalva WUA, village Malegaon (around 15 km from district Nanded) is situated at the tail end of purna irrigation project. The project consists of two dams namely *Yeldari* and *Sidheshwar* constructed on the river purna. Purpose of *yeldari* dam is for hydro-power generation and storage of water whereas *sidheshwar* dam was primarily constructed for irrigation. The irrigable command area (ICA) under the project is 57,988 hectares (figure 7).

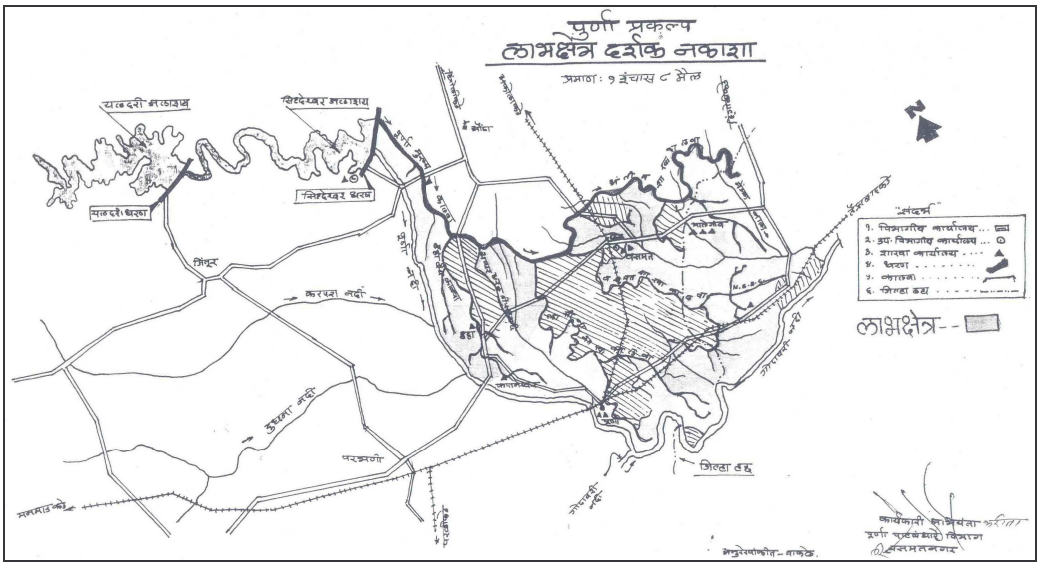

Figure 7 Command area map of Purna Irrigation Project

Krishna kalva WUA was started as a pilot project of irrigation department. The WUA was registered in 1989 and started its first operation in 1991-92 (table 6). The system was handed over to the WUA with selective repairing of minors.

Table 6 Salient Features of Krishna kalva WUA

Name	*Krishna Kalva* WUA, village *Malegaon*, Tal. Ardhapur, Ditrict Nanded
Location of WUA	Tail end of the system
Minor No.	*Malegaon* minor no. 2, *Dor* minor, *Camp* minor, *Saralchari* colony direct outlets no. 5-9.
Total length of Minors	4.9 km
CCA	1036.1 hectare
ICA	658.32 hectare
Water Allotment- Kharif	999 thousand cubic Meter (TCM)
Water Allotment- Rabi	3426 TCM
Water Allotment- Summer	1526 TCM
Total Beneficiary (including non-members)	581
Total Members	295
No. of Years of watering	14. Started from 1991-92.
Caste Composition	91% general

As was the case with *Ozar* WUA, there was increase in irrigated area after the transfer of minor canal under *krishna kalva* WUA[9] (figure 8). This is primarily attributed to the better management of canal water by the WUA. Sharp decline in the irrigated area for 2004-05 season was because of less availability of irrigation water (figure 9) from the dam site (on account of low rainfall). Interesting to note that water availability was less in 03-04 and 05-06 *rabi* season as compared to 02-03 season but the irrigation achieved is

[9] Secondary data for irrigated area before the formation of WUA (1990-91) was not available.

higher. This proves the point that there was efficient and better management of irrigation water by WUA which ultimately resulted in increase in irrigated area.

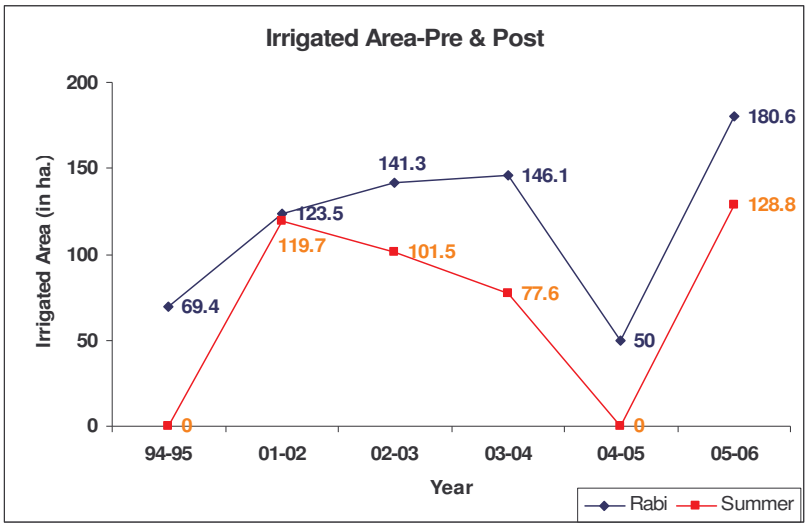

Figure 8 Irrigated area for Krishna Kalva WUA

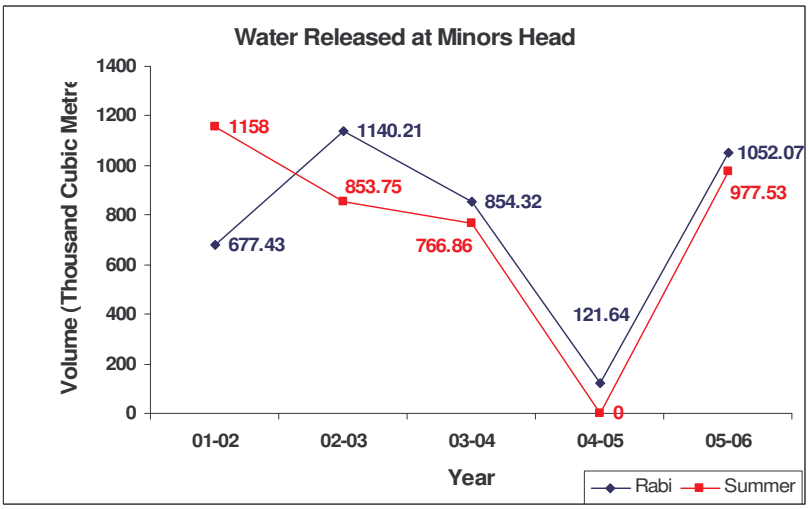

Figure 9 Total volume of water released at minors head

Accounts kept by WUA highlights that financially the WUA is performing well apart from suffering losses in 2005-06 season (figure 10). No specific reason emerged for this loss.

Water charges recovery rate were also found to be very consistence over the years (figure 11). As per the WUA records, less percentage of members were attending general body meeting as they were more satisfied with getting assured and reliable supply of irrigation water than attending the meetings.

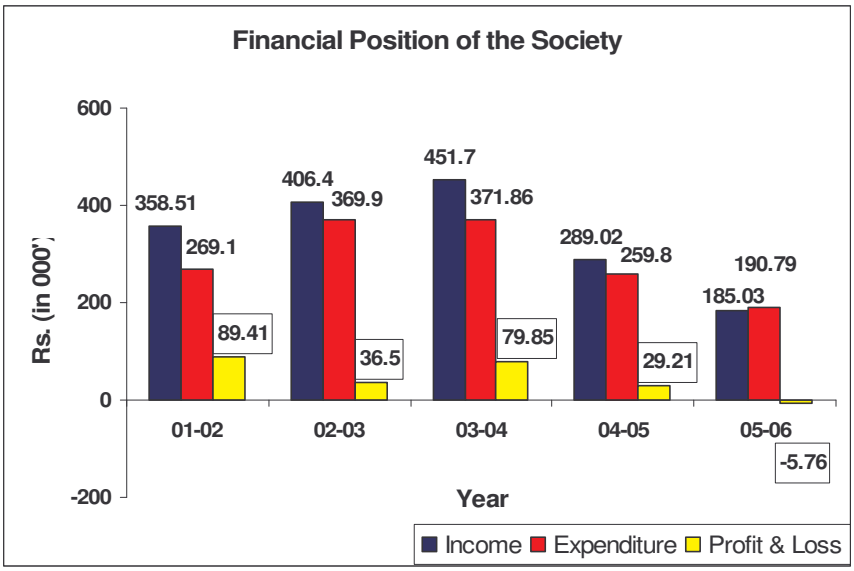

Figure 10 Financial position of WUA

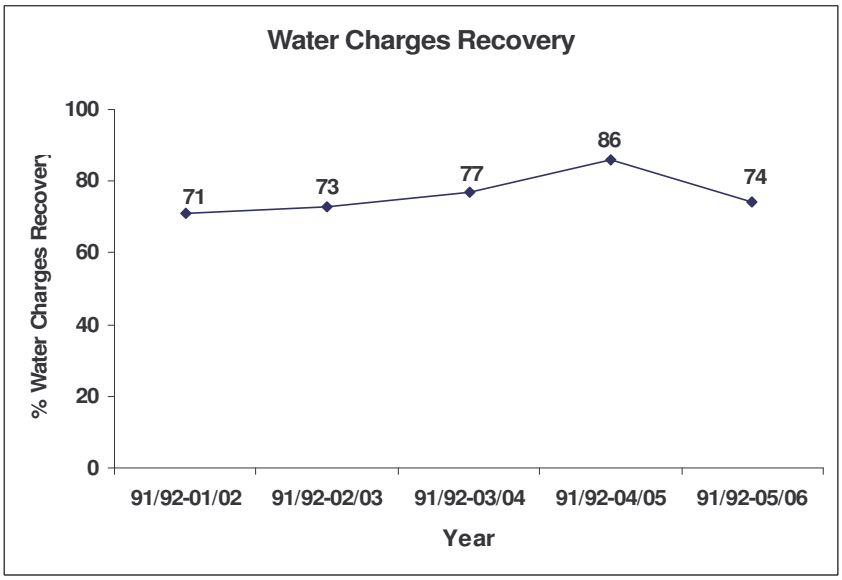

Figure 11: Irrigation charge recovery rate for WUA over the years

Formation of *krishna kalva WUA* has considerably improved availability of irrigation water to the village farmers. Being located at the tail end of the purna irrigation system, command area of *krishna kalva* was deprived of getting equitable and assured water for number of years. With the formation of WUA the farmers in the command were more than happy in getting timely and assured supply of irrigation water. This has resulted in increase crop productivity and profit to the community. Water for irrigation is not a constraint now and there is better relationship amongst WUA members. The main improvement as was required in the case of *Ozar* WUA is the R&R work on the minor under WUA operation.

5. Major Constraints for success of PIM

These successful outcomes from different states present only one side of the story, there were other concerns too which require immediate attention. The major concern is the further improvements require for conveyance distribution system to make it much more efficient. For the interest, as per one of the estimates, cost of automation on a main canal can vary from Rs1 500 to Rs2 000 per ha and that on a secondary canal from Rs3 000 to Rs4 000 per ha. As discussed earlier, the irrigation systems were transferred to the WUAs with only selective repairing (in all three states) and in some case without any rehabilitation (as in Gujarat). WUAs were in charge of O&M but for that to succeed first they got to have fully repaired and rehabilitated minors. It will be interesting to see how state governments handle this issue in the coming years.

It is also considered important that government should provide or generate resources to fund mass scale PIM activities. Recently it has been strongly voiced that over-dependence on donors has lead to not so stable WUAs. It is mainly because at one stage, the aid will stop and the process will get back to zero. At that stage, either community take the responsibility or people look for more funding or rely on government funds or just move as per the original pace of things. These WUAs are left without any clear future strategies. Thus in implementation of community welfare programs, there is need to craft some rules and procedures, which keep established system in working condition even after the aid ends.

Capacity building is also an integral part of PIM process. It is important that all those who are involved with PIM process must undertake proper trainings for the potential leaders/members of WUAs from the village community to build their capacity on day to day management activities. Capacity building is also required for the technical trainings of these WUAs so that they can efficiently manage their irrigation systems. These leaders or the members who get trainings then shall pass the skill/knowledge to the subsequent WUA members. This shall be able to take care of the situation as happened in *Satak* irrigation project where new WUA committee was confused and has no idea of what is expected from them.

Various reforms carried out under the MP PIM Act, suggested significant involvement of WRD officials within the WUA working. As per the World Bank definition, “PIM refers to the involvement of irrigation users in all aspects and all levels of irrigation management. ‘All aspects’ includes the initial planning and design of new irrigation projects or improvements, as well as the construction, supervision, and financing, decision rules, operation, maintenance, monitoring, and evaluation of the system”. But the way MP state has gone about implementing PIM, most of these functions still remain with WRD. WUA role is only restricted to maintaining the irrigation system and motivating farmers to pay irrigation tax.

But, the WUAs’ role in functions such as operation of the existing irrigation systems, making of irrigation schedules for the different crops, and collection of water tax remains open to question. At present, these roles are not given to them. Discussions

with WRD officials suggest that they want to gradually transfer complete irrigation management to the WUAs'. However, now has been good eight years of PIM act existence in the state and the situation remains more or less same. Thus, limited delegation of authority is actually a hindrance for the success of PIM.

6. Implications

Policy formulation and implementation is a continuously changing process requiring consensus building, participation of key stakeholders, contingency planning, resource mobilization and adaptation, which must be managed in a proper way. The PIM models made available from Gujarat, MP and Maharashtra are quite different from each other. In Gujarat PIM is mainly facilitated through the participation of NGOs in the government run irrigation scheme. Right from the formation, WUAs were dependent on NGOs or on water resources department for handling operation and management of minor canal under their jurisdiction. In MP more of top down approach was followed in the PIM act formulation and implementation especially during the initial years (1999-2003). Large numbers of WUAs were established in comparatively shorter time. However, the autonomy and sustainability of WUAs is in question as highlighted through the case study on *Satak*. On the other hand Maharashtra has followed a very gradual process where WUAs were established over 15 years back but the PIM Act was passed only in 2005 after examining the pros and cons of the process. There was huge involvement of civil society organization and NGOs with the water resources department in establishing the WUAs. WUAs in Maharashtra were found to be more stable and able of handling canal system management.

Greater delegation of power with effective capacity building is important factors for the success of PIM process as was evident in Maharashtra. From MP experience it was quite clear that the limited role offered to WUAs and greater involvement of WRD officials in their functioning is not creating much of an impact in the improvement of the irrigation system as a whole. Further, the success of PIM seems to be in the grip of financial aid. In all the three states financial support is very much required to carry out the complete R&R work. Although Gujarat and Maharashtra are providing some incentives to farmers for O&M activities but for R&R greater financial sources are required.

In the view of financial crunch with states government other ways for promoting farmer management can also be considered. At present private sector involvement in irrigation management is being given due consideration in many parts of the world. In India too, corporate involvement in telecommunications, retail segment, electricity, agro-forestry etc. have shown tremendous success. This success is not only in the quantity but also in the quality of services provided by them. May be we can think of having private sector involvement in irrigation, at least at the main system level. But, this will only happen if there are less political bottlenecks and favorable policy environment for the private operators. In these privately managed irrigation systems, may be farmers have to pay more for the offered services. But, these can be made up from the increase in the net

returns to farmers on account of improved delivery of irrigation water. This can be one of the ways of doing PIM differently. Some incremental thoughts can be given to current reforms and policies to make them more effective and acceptable by the beneficiaries.

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