

PARTICIPATORY IRRIGATION MANAGEMENT IN INDIA: IMPLEMENTATION AND GAPS

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Abstract

During the last decade most of the major states of India like Andhra Pradesh, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Bihar, West Bengal and Orissa have undertaken profound reform measures in irrigation sector to facilitate farmers' participation in irrigation management either under externally aided irrigation development and agricultural intensification programs or through state government initiative. These states are putting emphasis on decentralization of water management and empowerment of water users by encouraging the farmers to form Water Users' Associations (WUAs) to take over the responsibility of operation and maintenance of downstream part of irrigation system, distribution of water among water users and collection of water rates. Though thousands of WUAs have been formed all over India, and management functions of irrigation systems have been turned over to them, the functional efficiency of WUAs in ensuring efficient water use and equitable water allocation is far from satisfactory.

A careful examination of the implementation of PIM in India unveils that the process is fraught with many difficulties due to heterogeneity of farmers, caste-class cleavages, physical system

inefficiency, half-hearted support from the irrigation bureaucracy, lack of committed local leadership, inadequate capacity building and lack of proper incentives. The ultimate success and sustainability of the PIM movement depend on some fundamental factors like cohesiveness, common interest and collective efforts of water users, effective leadership of the office bearers of WUAs, political will of the party in power, bureaucratic commitment of irrigation executives, governmental patronage, legal support, financial viability of WUAs and catalyzing role of the change agents. To achieve the intended benefits of PIM, an integrated and comprehensive reform is necessary

Keywords: India, Participatory Irrigation Management, Water Users' Association, Efficiency, Equity, Sustainability.

Introduction

In India starting from the very inception of planning and in subsequent five-year plans a major chunk of plan outlay has been meant for irrigation development for increasing agricultural productivity and eradication of rural poverty. As irrigation projects are capital intensive in nature with long pay back period and manifold positive externality effects on the society, irrigation development has been the sole responsibility of the state. The major and medium irrigation projects in India are mostly state owned, state funded and are departmentally managed by a hierarchical bureaucracy in a centralized and top down approach.

It is no denying the fact that during 1960s irrigation coupled with application of fertilizer and high yielding varieties of seeds has played the key role in ushering in green revolution and

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made India self-sufficient in food grain production (Dhawan, 1988; Bharadwaj, 1990). Nevertheless, a scrutiny of the performance of irrigation sector in India reveals that the overall performance of irrigation systems is sub-optimal, inefficient and inequitable falling far short of expectations. Irrigation sector suffers from many problems like deteriorating physical structures, poor maintenance, low cost recovery, under-utilization of created potential, tail-end water deprivation, uncontrolled water delivery, siltation, water logging, soil salinity, disintegration of indigenous irrigation institutions and above all poor quality of irrigation service. In spite of massive investments made in irrigation projects, the physical as well as the financial performance of irrigation sector are observed to be quite dismal. The yield increasing potential of irrigation is rarely achieved. As regards the financial performance, leave aside the capital costs of irrigation projects, even revenue receipts from the sale of water hardly cover the recurrent operation and maintenance (O&M) expenses due to high subsidy in water rates and low collection (Svendsen and Gulati, 1995; Swain, 1998) Irrigation sector is not able to generate resources internally for carrying out the operation and maintenance of the irrigation structures.

On the other hand, since 1990s under the new economic policy and structural adjustment program there has been general resource crunch and fiscal compression. The state budgetary allocation for irrigation sector has been squeezed. Moreover, nearly 70 per cent of O&M budget is spent on salary bills of the employees and establishment expenditure. Therefore, an insignificant amount is left for works component and actual repair and maintenance of the physical structures. Thus, due to inadequate preventive as well as regular maintenance, the conditions of irrigation structures have deteriorated significantly causing system inefficiency and poor quality irrigation service, which poses a threat to the sustainability of the created irrigation structures.

To improve the irrigation system performance the government has to secure funds by increasing water rate and reducing irrigation subsidy, whereas the farmers insist that they would pay the increased water rate, only if there is improvement in the quality of irrigation service.

Thus, irrigation sector is confronted with a vicious circle and a deadlock situation. As an escape from this impasse and to make the vicious circle a virtuous one, during the last one decade most of the state governments in India have undertaken profound institutional and financial reform measures in irrigation sector (Vaidyanathan, 1994; Svendsen and Gulati, 1995; Mitra, 1996; Kar and Swain, 2000).

Prior to 1980s irrigation has been mainly considered as a technical enterprise aiming at construction of hardware like dams, reservoirs, weirs, barrages and canals. The software component or the management part of the system has been grossly neglected. It is now increasingly recognized that mere provision of irrigation facility to land does not ensure enhanced agricultural production. The productivity impact of irrigation is critically dependent on the way water is applied and utilized. The quality of irrigation service in terms of adequacy, timeliness, equity, dependability and convenience in its supply affects the yield from irrigation commands to a great extent. In the new agricultural technology, proper water management holds the key to increase agricultural productivity.

To establish such an improved water delivery system and for optimal utilization of scarce water, new trends advocate much more active participation of the water users in all aspects of water resources development and management, which include planning, design, construction, operation, maintenance, on-farm development, rehabilitation, modernization, water distribution, financing, resource mobilization, collection of water rates, monitoring and evaluation (Wade, 1987; Chambers, 1988; Balland and Platteau, 1996; Meinzen-Dick et al., 1997; Vaidyanathan, 1999; and others).

As a matter of fact, in India during early 1990s Participatory Irrigation Management (PIM) through Irrigation Management Transfer (IMT) to farmers has been officially recognized as the most appropriate mechanism to bring about efficient utilization of irrigation water, its equitable distribution and sustainable irrigation service. No doubt the concept of PIM is based on laudable ideologies like democratization, decentralization, debureaucratization and above all the empowerment of water users, who are the ultimate benefi-

ciaries of irrigation system. During the last decade most of the major states of India like Andhra Pradesh, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Bihar, West Bengal and Orissa have undertaken systematic institutional and organizational changes to increase farmers' participation in irrigation management either under externally assisted economic restructuring programs like Water Resources Consolidation Project funded by World Bank, European Commission aided minor irrigation project, agricultural intensification program assisted by Japan Bank for International Cooperation, PIM in lift irrigation projects aided by Department for International Development, UK or through state government initiative. These states are putting emphasis on decentralization of water management by encouraging the farmers to form Water Users Associations (WUAs) to take over the responsibility of operation and maintenance of downstream part of irrigation system, distribution of water among water users and collection of water rates.

In the era of liberalization, delicensing and decontrol, which has started in India since 1991, its impact on irrigation sector is obvious. There is a growing realization that the unnecessary bureaucratic control in management of irrigation system at tertiary levels should be reduced to improve irrigation efficiency and to check corruption and rent seeking behaviour. As the farmers have better knowledge of their eco-environment and field conditions, they can manage the irrigation system more efficiently and effectively which is truly a common pool resource. Usually the farmers believe that the canals belong to the government and they are the beneficiaries of the system. They do not have any role and responsibility in upkeep of the physical structures. In the changed institutional context irrigation will be considered as a common pool resource and will be managed by the farmer community (Sengupta, 1991; Singh, 1994) and its maintenance and sustainability will be the responsibility of the Water Users' Associations.

Evolution of PIM in India

In India the concept of PIM has evolved gradually through three distinct phases (Maloney and Raju; 1994). In early 1980s the concept was

in its nascent stage limiting to farmers' participation through their representatives. It was felt then that in the decision making process of irrigation sector, the views of farmers should be taken into account and they should be consulted in planning, development and management of the system. However, mere farmers' representation in scheme level committees could not yield much result. In the latter part of 1980s, it was realized that farmers couldn't have considerable stakes in irrigation management without a formal structure/forum to express their views. Therefore, the catchword became farmers' organization.

In various states like Andhra Pradesh, Tamil Nadu and Maharashtra thousands of outlet associations/chak committees had been formed only in pen and paper but actually most of them became dysfunctional after a short period. By this time the concept of PIM had received due importance through the implementation of the Water Resources Management and Training (WRM&T) project of Government of India supported by United States Agency for International Development (USAID). Motivating farmers to foster Water Users' Associations was an essential feature of action research program taken up by Water and Land Management Institutes (WALMIs) in eleven states of India. By early part of 1990s it became apparent that the concept of farmers' participation in few activities is not sufficient. As irrigation is for the farmers, it should be owned and managed by them. Therefore, a radical concept of farmers' organization and system turnover (FOT) was adopted under World Bank aided Water Resources Consolidation Project (WRCP) in which thousands of WUAs were formed and the functions of operation and maintenance of minor/distributary, allocation of water among farmers and collection of water charges from water users were handed over to them. During late 1990s most of the state governments in India (Andhra Pradesh, Gujarat, Maharashtra, Madhya Pradesh, Orissa and others) have taken policy decision and enacted exclusive legislation to implement Participatory Irrigation Management in a mission mode (Maloney and Raju, 1994; Jairath, 2001; Hooja et al.2002; Brewer et al., 1999).

Water Policy and Legal Environment

Water is a prime natural resource, a basic human need and a precious national asset. Therefore, it is stressed that planning, development and management of water resources need to be governed by national perspectives. In India the first National Water Policy was adopted in 1987. As regards PIM, this policy envisages that

‘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.’

The National Water Policy, 2002, however, is more explicit in emphasizing the need for farmers’ participation in irrigation management and broadly outlines a Participatory Approach to Water Resources Management as follows:

‘Management of the water resources for diverse uses should incorporate a participatory approach: by involving not only the various government agencies but also the users and other stakeholders, in an effective and decisive manner, in various aspects of planning, design, development and management of the water resources schemes. Necessary legal and institutional changes should be made at various levels for the purpose, duly ensuring appropriate role for women. Water Users’ Associations and the local bodies such as municipalities and gram panchayats should particularly be involved in the operation, maintenance and management of water

infrastructures/facilities at appropriate levels progressively, with a view to eventually transfer the management of such facilities to the user groups/local bodies.’

As irrigation is included in the state list of Indian constitution, irrigation policy, acts, rules and regulations differ from state to state. In this paper we are depicting the Indian scenario with special reference to Orissa, which is a pioneering state in implementing Participatory Irrigation Management in a mission mode.

Recognizing the need for sound legal framework for PIM in the country, the Ministry of Water Resources brought out a model act to be adopted by the state legislatures for enacting new irrigation acts/amending the existing irrigation acts for facilitating PIM. In accordance with the model act ten State Governments, namely, Andhra Pradesh, Goa, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Kerala, Bihar and Maharashtra have legislated new acts or amended the existing acts. Details of the acts/rules enacted by different states are given in Table 1.

Andhra Pradesh is the first state to enact exclusive law on PIM: the Farmers’ Management of Irrigation Systems Act, 1997. Madhya Pradesh and Rajasthan have promulgated laws based on Andhra Pradesh model. Government of Orissa has enacted the Orissa Pani Panchayat Act in 2002. In Uttar Pradesh, Maharashtra and Orissa membership of WUA is mandatory for water users. In Andhra Pradesh and Orissa more than ten thousand WUAs have been formed due to the political will of the party in power. The target is

Table 1. State-wise Position of Enactment of New Act/Amendment of existing Irrigation Act

Sl. No.	Name of State	Position of new Act/Amendment of Irrigation Act
1.	Andhra Pradesh	Andhra Pradesh Farmers' Management of Irrigation Systems Act, March, 1997
2.	Goa	Goa Command Area Development Act 1997 (Goa Act 27 of 1997)
3.	Karnataka	Ordinance on 7 June 2000 for amendment of the existing Karnataka irrigation Act 1957
4.	Madhya Pradesh	Madhya Pradesh Sinchai Prabandhan Me Krishkon Ki Bhagidari Adhinyam, September 1999.
5.	Orissa	The Orissa Pani Panchayat Act, 2002
6.	Rajasthan	Rajasthan Sinchai Pranali Ke Prabandh Me Krishkon Ki Sahabhagita Adhinyam, 2000
7.	Tamil Nadu	Tamil Nadu Farmers' Management of Irrigation Systems Act, 2000
8.	Kerala	The Kerala Irrigation and Water Conservation Act 2003
9.	Bihar	The Bihar Irrigation, Flood Management and Drainage Rules, 2003 under the Bihar irrigation Act, 1997
10.	Maharashtra	The Maharashtra Management of Irrigation Systems by Farmers Act, 2005

Source: Ministry of Water Resources, Government of India, 2006.

to cover the entire irrigated command area under PIM within a couple of years. Some States like Gujarat had experimented with the idea of farmers' co-operative movement in irrigation manage-

ment. Subsequent to the enactment of laws on PIM, various states of India have taken steps to form WUAs. The state-wise details of WUAs formed are given in the Table 2.

Table 2. State-wise Number of WUAs Formed and Area covered by them

SI. No.	Name of State	Number of WUAs	Area covered ('000 ha)
1	Andhra Pradesh 10790	10790	4800.00
2	Arunachal Pradesh 2	2	1.47
3	Assam 37	37	24.09
4	Bihar 37	37	105.80
5	Chhatisgarh 945	945	N.A.
6	Goa 42	42	5.00
7	Gujarat 576	576	96.68
8	Haryana 2800	2800	200.00
9	Himachal Pradesh 875	875	35.00
10	J&K 1	1	1.00
11	Karnataka 2284	2284	1062.10
12	Kerala 3930	3930	148.48
13	Madhya Pradesh 1470	1470	1501.45
14	Maharashtra 1299	1299	444.00
15	Manipur 62	62	49.27
16	Meghalaya 99	99	N.A.
17	Nagaland 25	25	N.A.
18	Orissa 12688	12688	995.00
19	Punjab 957	957	116.95
20	Rajasthan 506	506	219.65
21	Tamil Nadu 7725	7725	474.28
22	Uttar Pradesh 24	24	10.55
23	West Bengal 10000	10000	37.00
Total		57174	10,327.77

Source: Ministry of Water Resources, Government of India, 2006.

Table 2 indicates that Andhra Pradesh has covered highest area under PIM programme followed by Madhya Pradesh, Karnataka and Orissa.

Approaches to PIM

International experiences in PIM implementation unfold that basically there are two types of approaches to program execution: gradualism and big bang. In countries like Philippines, Indonesia the program has been executed in a gradual and incremental way. By contrast in Mexico, Turkey the PIM was implemented rapidly for several thousands or even millions of hectares. The latter is referred to as the 'big bang' approach. In some cases government mandates transfer of all targeted systems (as in Turkey or Indonesia). In other cases, the government negotiates on a case-by-case basis and systems are only transferred if water users agree (such as in the Philippines). Many advocate the 'big bang' route as the impact

is rapid, deep, and sustainable (Groenfeldt, 2000; Society for Promoting Participative Ecosystem Management, India).

In India implementation of PIM seems to have two approaches-target oriented and the motivational. Andhra Pradesh and Madhya Pradesh first enacted legislation and went in for fast and extensive introduction of PIM i.e. going in for a top down approach. As against this, Maharashtra and Gujarat adopted the motivational strategy i.e. a bottom-up approach. In Andhra Pradesh, where a big-bang approach was followed by forming nearly ten thousand WUAs within a year of implementation of the program by legislating Farmers Management of Irrigation System Act in 1997, the performance of the WUAs has been poor with a lot of problems like capture of power by rural elite and political interference (Jairath, 2001). The motivational approach, on the contrary, so far adopted in Maharashtra and Gujarat

may not have achieved quick spread all over the state but the motivated water users groups showed spectacular success in few of the irrigation projects of Maharashtra and Gujarat.

On the other hand Orissa has adopted a sequential approach. To start with, in the implementation of PIM, for a certain period a bottom up approach with motivational strategy was adopted. Later on when the movement attained a certain level of momentum, the state adopted somewhat a top down strategy legislating the Orissa Pani Panchayat Act, 2002. The strategy adopted by the state of Orissa is proving to be more effective. There is a steady progress in achieving the goals of PIM.

Structure and Functions of WUA

In this section we briefly discuss the organizational structure and functions of Water Users' Associations taking the state of Orissa as a case study. As envisaged in the Orissa Pani Panchayat Act, 2002 the principal objectives of Pani Panchayat (PP) or farmers' organization shall be 'to promote and secure distribution of water among its users, adequate maintenance of the irrigation system, efficient and economical utilisation of water to optimise agricultural production, to protect the environment, and to ensure ecological balance by involving the farmers, inculcating the sense of ownership of the irrigation system in accordance with the water budget and the operational plan.'

A Pani Panchayat/Water Users' Association is an association of all persons owning land within a hydrologically delineated portion of the command area ranging in size approximately from 300-600 ha in case of major/medium / minor irrigation project. It may be in respect of minor or sub-minor or direct outlets from the main or branch distributary of the project. In case of minor flow or lift irrigation the area is limited to project command area when the project command area is less than 300 ha. At the lowest level, outlet (chak) committee is formed electing three farmers, one from head reach, one from middle reach and one from tail reach of the command of an outlet. An elected representative from among the outlet committee members (called chak leader) of each chak committee is a member of executive committee of Pani Panchayat. The

president, secretary and treasurer of the Pani Panchayat are elected out of the executive body of concerned Pani Panchayat. It may be mentioned that all the water users are members of general body of the Pani Panchayat. The details of organizational structure of farmers' organization is given in the following figure.

In Orissa the Pani Panchayat is a three tier organization for medium irrigation project and four tiers for major irrigation projects as indicated below:

- (i) Pani Panchayat at primary level consisting of several chak or outlet committees
- (ii) Distributary committee at secondary level (major projects) is a federation of all the Pani Panchayats under the distributary
- (iii) A project committee at project level is a federation of all distributary committees for major projects. Similarly for medium irrigation projects, a project committee at project level is a federation all the Pani Panchayats.
- (iv) A state level committee is constituted by the Government with presidents of the project committees not exceeding ten.

As laid down in the Act, the major functions of Pani Panchayats shall be as follows:

- To prepare a cropping programme suitable for the soil and agro-climatic condition with due regard to diversification;
- To prepare a plan for the maintenance of irrigation system in the area of its operation at the end of each crop season and carry out the maintenance works with the funds of the PP;
- To regulate the use of water among the various pipe outlets under its area of operation according to the warabandi schedule;
- To promote economy in the use of water allocated;
- To assist the revenue department in the preparation of demand and collection of water rates;
- To resolve disputes between the water users;
- To raise resources;
- To conduct regular water budgeting;
- To conduct annual audit of its accounts and periodical social audit, as may be prescribed.

For successful implementation of Pani Panchayat Program, the implementation process is divided into several phases viz. (i) Preparation, (ii) Assessment, (iii) Organizing, (iv) Joint management and (v) Turnover. Following the above

Organisational Setup of Pani Panchayat

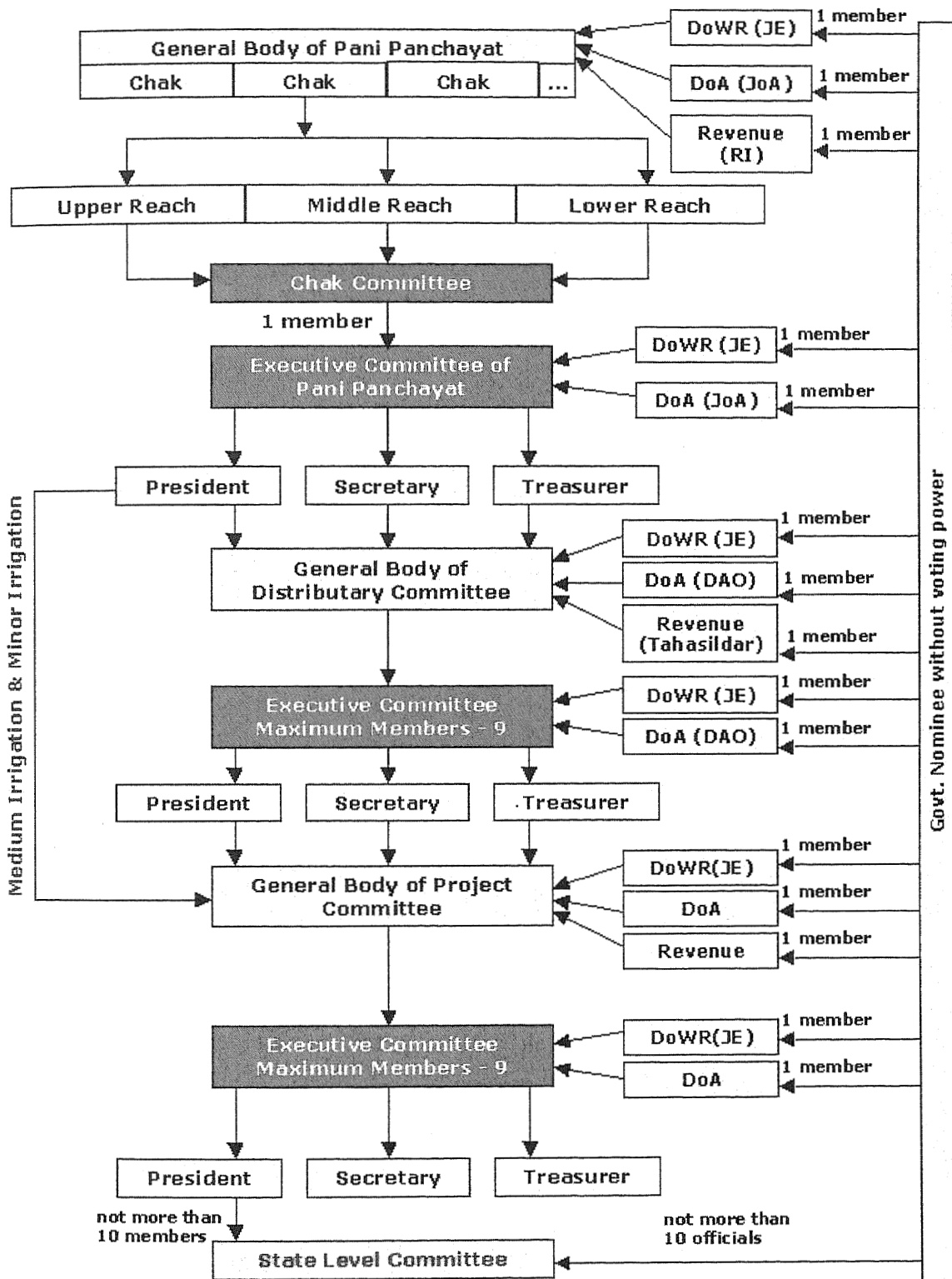


Fig 1 near here

procedure until 2006 irrigation management functions have been transferred to as many as 57174 numbers of WUAs covering about 10.32 million hectare command area of surface and lift irrigation projects in India (Table 2). The results from decentralized irrigation management are mixed and context specific. The benefits that have accrued in most of the cases are increase in irrigated area, improved maintenance, less water conflicts, crop diversification, better interaction with irrigation department, increased lobbying activity for common benefit, improved water rate collection etc. (Singh, 1991; Maloney and Raju, 1994; Svendsen et al., 1997; Pant, 1999; Meinzen-Dick et al., 2000; Parthasarathy, 2000; Marothia, 2005).

Constraints in Implementing PIM

Crafting a new institution in the management of irrigation infrastructure by social engineering approach is obviously a difficult task. Changing the mindset and ingrained attitude of farmers and officials of water agency is not so easy. Therefore, while motivating the farmers to form WUAs and taking up the management of irrigation system many problems are encountered in the field, which act as impediments to the formation of WUAs and their sustainability in the long-run. Some major constraints in organizing farmers and operationalizing PIM as revealed by many research studies (Bardhan, 2000; Jairath, 2001; Reddy and Reddy, 2005) and also experienced by the authors in implementing PIM program in Baghua and Hiradharabati medium irrigation projects in Orissa during 2002-2004 are discussed in the following sections.

(i) Physical System Inefficiency

Due to resource constraint, most of the old irrigation projects suffer from several physical system inefficiencies. Many irrigation structures like head regulators, outlets, cross drainage works, village road bridges, falls are in deteriorated and derelict conditions. Most of the projects face reservoir and canal siltation and are in need of repair. Unless the faulty structures and canal networks are renovated, rehabilitated and become fully operational, there is little hope that farmers will come forward to take up the responsibility of

operation and maintenance of an ailing system. Hence it is imperative that irrigation structures be kept fully operational so as to facilitate smooth implementation of turn over of irrigation system to farmers. In the modernization and rehabilitation of irrigation infrastructure, WUAs should be involved and views of the farmers should be taken into consideration.

Before turning over the minor/subminors to WUA for operation and maintenance, the project authority should conduct a proper hydraulic testing of the irrigation system in the presence of WUA executives and farmers. The water users of the concerned WUA should be satisfied that the canal is discharging the designed volume of water and water is proportionately distributed in different reaches of the canal without any tail-end deprivation.

(ii) Socio-economic Heterogeneity

Peasant agriculture is most often confronted with the problems of a heterogeneous and stratified society having several caste and class cleavages. There are political differences too. The farmers having different political affiliations naturally have differences of opinion. In a socially and economically differentiated society it is very difficult to inculcate community feeling and facilitate farmers' participation in irrigation management. The unequal production relations, community segregation, caste antipathy, class differential and political differences observed among water users in a village or within a WUA have significant implications for the formation of WUA and its sustainability. If the inter-village and intra-village socio-economic and cultural conflicts are severe, it is very difficult to organize WUA. The implementing personnel must use their ingenuity to overcome location specific problems. Learning by doing approach should be followed to determine the model and modalities of organizing WUAs depending on the socio-economic conditions, psychology and cultural heritage of the farmers in the locality (Ananda and Crase, 2006).

As the boundaries of WUAs are determined on hydraulic basis i.e. minor/sub-minor, most of the WUAs cover more than one village. If historically the villages coming within the hydraulic boundary of a single WUA have hostile relationship for some reasons or other, this may pose as a

serious setback in forming WUAs.

(iii) Capture of Power

It is observed that many problems crop up in election of committee members and office bearers of WUA. Most of the office bearers are elected uncontested on consensus. Though it seems to be fair, in reality there is a lot of manipulation by the rural elites. Potential candidates are dissuaded in various contrived ways not to contest. It is surprising to find that contractors, businessmen having charismatic leadership quality and political influence are elected as farmers' leaders. Many consider holding a position in WUA as a starting point of their political career. Though the election procedure as laid down in the Act has no provision for any role of political party, the unwanted political interference in the election process creates a lot of problems. The political interference creates separation walls among the water users.

The election of office bearers of WUAs should be fair and no money and muscle power should be used to persuade/pressurize the farmers to cast vote against their conscience. Success of any democratic institution depends on an enlightened and informed electorate. Therefore, the water users should be made aware of the details of the PIM program like the objectives and benefits of forming WUA, its structure, the organizing procedure, functions, rights, duties and responsibilities of different stakeholders as enshrined in the PIM Act. Utmost care should be taken that the rural elites do not capture power (Bardhan, 2002).

One of the important constraints that affect the efficiency and sustainability of WUA is lack of confidence of water users in the credibility of office bearers or leaders. Unless the leaders are honest, dynamic, and farmer friendly, the very purposes of the program may not be successful. The role of the office bearers of WUAs like president, secretary and treasurer is very much crucial for obtaining the intended benefits of PIM program.

The general body and executive committee should meet regularly to take decision on water management issues. The general body meeting should be convened and all decisions and actions taken need to be informed to the water users. No room should be left for arousing suspicion in the minds of water users regarding misuse of admin-

istrative and financial powers by the executives. Therefore, local accountability mechanism should be strengthened. In the Pani Panchayat Act of Orissa, 2002 there is a provision to recall the president of a Pani Panchayat if he is not responsive to farmers' needs and misuses his power and position.

(iv) Information, Education, Training and Incentive Gaps

In most of the turned over irrigation projects it is observed that the awareness level of water users about PIM program and their active participation are very low. The water users should have thorough knowledge of various aspects of PIM program such as the expected benefits, structure and functions of WUA, rights, duties and responsibilities of Water Resources Department and WUA. The water users need to understand and appreciate the goals and objectives of the program. However, in some cases, farmers wrongly infer that it is a process of privatization by which government wants to get rid of the problem of distribution and operation by simply handing over the system to the farmers. In some other cases, farmers feel that the operation and maintenance of irrigation system is the task of irrigation staff and the department is shifting its responsibility and unnecessarily exerting extra pressure on the farmers without any additional benefits. These types of numerous misgivings and misconceptions stand on the way of smooth formation of WUAs. Hence farmers should be made aware of the pros and cons of the PIM program in its right perspective.

Farmers will come forward to form WUAs and will be ready to take up the additional responsibility, if they are convinced that the benefits due to participatory management will exceed their costs of participation. As most of our farmers are not educated and lack vision to comprehend the future benefits due to participation, special care should be taken while motivating the farmers. They need to be convinced that the benefits due to participation will be substantial, tangible, quick yielding and also sustainable. Otherwise the farmers will not evince interest in a program introduced and implemented through a government directive. The Department of Water Resources, Government of Orissa has declared many incen-

tives for forming Pani Panchayat, which include annual maintenance grant and prizes for best performing Pani Panchayats. Also in turned over projects the department is providing grant-in-aid to each Pani Panchayat at the rate of Rs.100 per hectare. Government of Orissa has increased the per hectare water rate for kharif paddy (Class I irrigation) from Rs.39.54 paise to Rs.100 in 1998 and again to Rs.250 in 2002. Farmers are extremely reluctant to pay the increased water rates and have vehemently protested the arbitrary increase. Therefore, Government of Orissa has declared that 40 per cent of the water charges collected from water users will be given to the concerned Pani Panchayat as O&M grant. These incentives have induced the farmers to form PPs to avail of the financial benefits. The PPs should be financially viable by proper resource mobilization measures like collecting membership fees, share capital, water rate and undertaking commercial activities like sale of agricultural inputs and marketing of output. For sustainability of PPs, its activities need to be monitored and improved upon from time to time by applying a learning by doing approach.

The WUAs will be able to operate and maintain the minors/sub-minors provided their personnel have the expertise, technical know-how and do-how to manage the irrigation system. Being aware of the need for capacity building, many state governments in India are providing appropriate managerial, technical and financial training to office bearers of WUAs and farmers through Water and Land Management Institutes.

Irrigation officials as well as field staffs are also imparted training from time to time to imbibe the right mindset, attitudinal change and technical expertise required for participatory irrigation management. Before taking over the O&M of irrigation system, during the joint management phase the office bearers of WUA should take keen interest to strengthen their knowledge and skill in operation and maintenance of canal structures and clarify their doubts if any. There should be good relationship and mutual reciprocity between the departmental irrigation engineers, field staff and office bearers of WUAs with the common objective of improving quality of irrigation service for benefits of the farmers.

Conclusions and Policy Implications

From the foregoing discussion it can be summed up that the ultimate success and sustainability of WUAs depend on some fundamental factors like cohesiveness, common interest and collective efforts of water users, effective leadership of office bearers of WUAs, capacity building of farmers and irrigation officials, political will of the party in power, bureaucratic commitment of irrigation executives, governmental patronage, legal support, financial viability of WUAs, proper monitoring and evaluation and catalyzing role of change agents.

While introducing institutional and organizational change in the management of an infrastructure, which is a crucial and vital input for agricultural production and a common pool resource, a careful and cautious approach should be followed. Few suggestions are made for effective implementation of PIM by not only formation of WUAs but also strengthening them to carry out the devolved irrigation management functions efficiently in a sustainable manner.

- ◆ As far as possible the formation of WUAs should be need based and demand driven. The WUAs should be endogenously created based on felt needs, common interest and collective effort. The existing social capital like social network, kinship ties, and community solidarity should be used to foster WUAs. The approach should be a synthesis of bottom-up and top-down approach having proper synergy. There is no blueprint model to be prescribed for adoption. The model should be location specific and flexible.
- ◆ Successful implementation of PIM program requires involvement and cooperation of multi stakeholders including farmers, state government, Department of Water Resources, Department of Agriculture, Department of Revenue and the implementing NGOs etc. Political will of the party in power and bureaucratic commitment are highly essential for decentralizing irrigation management. The role of change agents both external and internal is important in fastening the process.
- ◆ The dilapidated irrigation system should be improved and a fully operational and fault-free irrigation system should be turned over to WUAs for its operation, maintenance and management.

- ◆ The organizing efforts should be closely integrated with physical improvements to ensure that the farmers are committed to maintaining the improvements.
- ◆ Farmers' representatives should not misuse their power. There should be transparency and accountability to member farmers. Department of Water Resources must support the group decision in their internal affairs and refrain from interfering.
- ◆ WUA should be a socially inclusive institution by reserving seats in executive committee for women, Scheduled Castes, Scheduled Tribes and weaker sections. The specific requirement of women should be addressed to while planning and designing irrigation structures.
- ◆ Not only landowners but also other users of water like fishermen, artisans, livestock rearers, and agro-industries may be allowed to send their representatives to the executive committee to voice their specific problems.
- ◆ Regular monitoring and evaluation of PIM program is necessary for rectification and improvement.
- ◆ Appropriate managerial, financial and technical training should be imparted to office bearers of WUAs to build their capacity to manage the irrigation system efficiently. Irrigation officials as well as field staff should, also, be trained from time to time to imbibe the right mindset, attitudinal change and technical expertise required for PIM.
- ◆ There should be downward accountability of irrigation officials to client farmers.
- ◆ WUA should have proper legal status and clear water right. The water resource department should supply canal water as entered in the agreement between the WUA and the Department.
- ◆ There should be a regulatory body to adjudicate any conflict or breach of contract between WUAs and the Department. It will fix criteria and principles for fixation of water rate and regulate levy of water rate by WUA.
- ◆ Land reform measures should be undertaken to recognize/record tenancy contracts, so that tenants who constitute an important segment of peasantry can become members of WUA.
- ◆ Benchmarking of PIM is necessary to identify shortfalls in achievement and try to catch up

with the best performer. It is a continuous process of measuring one's own performance and practices against the best competitors, and a sequential exercise of learning from other's experiences. Opportunities for improvement are identified by conducting an internal assessment and making comparative measurements with best performing farmers' organizations to determine the performance gaps between current practice and best practice. Selected best practices can then be suitably adopted to fit into WUA's need and implemented to make it effective and sustainable.

- ◆ PIM is a tool to improve irrigation system performance with the ultimate objective of increasing agricultural productivity, providing food security, and sustainable rural livelihoods. Comprehensive micro-planning including crop planning, market mapping and various farm and non-farm livelihood options are considered to be included under functions of WUA. Decentralization of irrigation management should be accompanied with agricultural intensification program to increase agricultural productivity. The WUAs should be multifunctional. Along with the management of water, WUAs need to facilitate timely supply of good quality agricultural inputs like improved seeds, fertilizer, farmyard manure and farm implements at reasonable prices. The WUAs may also take up other allied activities like technology transfer, providing micro-finance through formation of Self-Help Groups, post-harvest management, marketing of agricultural produce and agro-processing for value addition; so that agriculture can be a profitable and paying enterprise.

To conclude, the various factors that impinge on the effectiveness and sustainability of WUAs can be grouped into internal factors (intrinsic to farmer community) like inequality, leadership, education, urban access, scale of farming, land tenure, commercialization of agriculture, occupational diversification; and external factors such as water governance, legal and policy framework; rural institutions, financial and technical assistance, land reforms, agricultural policies, input delivery and markets. Indeed, in India an integrated and comprehensive reform is necessary to make the Water Users' Associations truly effective.

tive and a vibrant and victorious institution in increasing irrigation efficiency, enhancing agricultural productivity and improving rural livelihoods.

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INDIA: DISCUSSION

Question: Regarding the willingness to pay, is there any special method to make the WUA members believe that each member is treated equally in the water allocation?

Answer: The system include small and large scale systems. In small system they know each other and have good relations to discuss the problem. The large- scale system, in which the government is collecting water rate, they have organizations at the village level and can successfully discuss the water rate allocation. They have opportunities to raise their complaints and discuss solutions.

Question: You mentioned 3 irrigation systems/ approaches a) top-down b) bottom -up and 3) synthesis of these two. Which approach is more efficient and effective? And please mention approach-wise and system -wise water loss in percentage and what would be the marginal percentage of water, system loss to make the irrigation sustainable?

Answer: The approach should be a synthesis of bottom-up and top-down approach having proper synergy. There is no blueprint model to be prescribed for adoption. The model should be location specific and flexible.

Question: How was the partnership mechanism between the WUAs and Irrigation Agencies been developed in PIM and IMT in India?

Answer: The case of minor and lift irrigation projects in India the water user associations have been empowered to fix the water charges and collect from water users. They retain and collect water charges for operation and maintenance of irrigation system.

Question: Financial autonomous is the most important factor for long- term sustainability of WUAs. Could you please share some experiences in this aspect? In my country, water fee has been cut down accordingly by government policies, the farmers do not have to pay for irrigation services, WUAs do not have financial source for their operation and maintenance. Do you have any recommendations from your experience?

Answer: In the case of the major and medium canal (surface) irrigation systems, department of

water resources provide operation and maintenance grant to water users association. The ultimate objective of course is to give them the responsibility of water rate collection.

Question: What can be done to ensure broader participation in the user groups in order to pre-

vent the organization from suffering elite capture?

Answer: This is an endemic problem across many organizations across India, not only WUA. The lack of education is a big problem hindering participation. The problem is widely recognized but it will take quite some time to be resolved.