PARTICIPATORY IRRIGATION MANAGEMENTS IN KERALA (INDIA) – REVIEW

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ABSTRACT

The benefits from irrigation projects in India are not in proportion to the investment on them and steps were taken to bring down the expenditure. Attempts were initiated for participatory Irrigation Management to increase farmers' direct involvement in irrigation management, which ultimately results in the transfer of authority and responsibilities from the government, either in full or in part, to farmer organizations. Under a pilot study, one branch canal each of Neyyar (Olathanni) and Malampuzha (Kuthannur) projects were taken up with the objectives: to learn from the experiences on a small-scale manageable irrigation system by implementing, monitoring and learning; to help in testing the appropriateness of various PIM elements to local conditions; to demonstrate the possibility of PIM in Kerala; and to evolve a practicable and replicable strategy for the implementation in all irrigation projects of Kerala state. The pilot projects were being implemented by handing over the control and management of the two branch canals to the farmers. The projects encouraged collective farming, ensured the involvement of women in irrigated cultivation, promoted cooperation with panchayats, departments and other agencies and linked the farmers to the marketing sector. As the government had transferred some responsibilities of Irrigation Management from government agencies to Water Users Associations (WUAs), the villagers including farmers participated in the maintenance of the water management structures with a sense of ownership. The functions of these associations such as the acquisition and distribution of water, maintenance and repairs, fixation and collection of water charges, punishing defaulters within the areas of the WUA and resolving disputes among water users in the area of operation seemed to be an effective strategy for ensuring farmer/users participation in management of water for irrigated agriculture.

INTRODUCTION

Optimal utilization of the water resources through appropriate conservation and management measures assumes critical importance in sustaining the life support systems. The demand for water in Kerala (India) is mainly for domestic, agriculture, prevention of salt water intrusion, and generation of electricity. The annual yield of water in Kerala state in a normal year is around 7030 crore cubic meters and the ground

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water resource available is estimated at 7048 MCM. The utilizable water resources is around 4200 crore cubic meters. Nearly 40 % of the available resources are lost as run off causing heavy floods. Kerala would require around 3000 crore cubic meters of water for agriculture, 750 crore cubic meters for domestic use and 1220 crore cubic meters for prevention of salt water intrusion. The pattern of demand for water is undergoing gradual but continuous changes towards increasing pressure for drinking and other household and commercial needs relative to the demand for irrigation.

Since the dawn of Indian Independence, the importance of water resources development in India was accorded due recognition and massive irrigation projects were created. Keeping in line with the national pattern and on the lines of earlier projects for rice growing areas, Kerala also relied on the development of major and medium irrigation projects. In each Five Year Plan, priority in resource allocation was given for the development of major and medium irrigation projects. Out of Rs. 2997 crore invested so far, major and medium irrigation projects account for Rs. 2072 crore, utilizing 69 per cent of the total. But such huge investment has not succeeded in generating commensurate increase in the area irrigated or in productivity or in returns. Even in the case of rice crop, the incremental yield, which the irrigation support could bring, is not significant.

The average annual potential in different rivers of India is estimated at 1,880 km^3 (Table 1). India has a large number of major rivers well distributed over the entire area. The average annual potential in different rivers of India is estimated at 1,880 km3 (Table 1).

Table 1. Water Resources Potential in the River Basins of India

Name of the River Basin	Average Annual Potential in the River (km3)	Percent Expected Storage to Average Annual Flow
Indus (up to border)	73.31	23
a) Ganga	525.02	16
b) Brahmaputra and others	597.04	11
Godavari	118.98	35
Krishna	67.79	5
Cauvery	21.36	38
Pennar	6.86	40
East flowing rivers between Mahanadi and Pennar	16.95	17
Brahamani and Baitami	36.23	48
Subernarekha	10.79	30
Sabarmati	4.08	41
Mahi	11.83	47
West flowing rivers of Kutch		52
including Luni	15.10	
Narbada	41.27	52
Tapi	18.39	77
West flowing rivers from Tapi to Tadri	109.01	12
West flowing rivers from Tadri to Kanyakumari	89.84	13
Area of inland drainage in Rajasthan desert - -	-	-
Minor river basins draining to Bangladesh and Myanmar	31.00	-
Total	1,879.45	20

Source: Gupta, *et al*., 2000.

The per capita availability of water per year in India is abysmally low (2,200 m^3). India is endowed with 4 percent of world's water wealth but the manifold demands imposed by the exploding demographic pressure may further reduce the per capita availability by 50 percent in 2025. The Water Resource Commission (WRC) estimated that the water requirement for agriculture sector will be two-fold and for other sectors such as domestic and industries seven-fold in 2025 at the current rate of water use. This will make agriculture a more precarious enterprise and necessitate a comprehensive planning for irrigation in India. The prime requisite for efficient use of water resource is to conserve it and to make it available at the site of use. But the optimum benefits from irrigation water are seldom realized. Only 20-40 percent of the irrigation water released from the reservoir is effectively used for crop production. The yield of food grains under irrigation is only 2.5 mt/ha as against the potential of 4.5 mt/ha. The potential created in the country increased from 26.26 million ha in 1956 to 89.44 million ha in 1997, with the gaps between the potential created and that utilized increasing from 1.22 million ha in 1956 to 8.75 million ha in 1997 (Gupta et. Al, 2000). Hence there is an urgent need to improve the system performance through efforts like Participatory Irrigation Management (PIM).

IRRIGATION AND WATER RESOURCES MANAGEMENT

Even though minor irrigation schemes are best suited for irrigation in Kerala, adequate priority was not given the allocation of resources, or in technical studies or in the study of economics of such projects. The government had formulated a Community Irrigation Project to develop ground water resources in Thrissur District with the active participation of the beneficiary communities. Through this project 131 bore wells have been drilled. The progress of implementation of the National Hydrology Project is slow and the physical achievement so far include installation of ten river gauge stations, nine new meteorological stations, four first grade laboratories and one second grade laboratory. The project will be completed in 2008.

Table 2. Status of Major Irrigation Projects

Status of Major irrigation Projects					
Completed Projects		Ongoing Projects		Projects under Investigation	
Sl. No.	Name of Project	Sl. No.	Name of Project	Sl. No.	Name of Project
1	Malampuzha	1	Kallada	1	Vamanapuram
2	Mangalam	2	Muvattupuzha	2	Chaliyar
3	Peechi	3	Idamalayar	3	Meenachil
4	Vazhani	4	Karapuzha	4	Aralam
5	Pothundi	5	Kuriyarkutty Karappara	5	Palakappandi
6	Gayathri	6	Chamravattom B/R	6	Payaswini
7	Cheerakuzhy	7	Thrithala B/R	7	Munnamkadavu
8	Walayar	8	Attappady	8	Project in Kabini Basin
9	Chalakudy	9	Banasurasagar		
10	Neyyar				
11	Pamba				
12	Periyarvalley				
13	Chitturpuzha				
14	Kuttiyady				
15	Chimmoni				
16	Kanakkankadavu B/R				
17	Pazhassi				

The state government had envisaged in the eleventh Plan, a strategy for water resources development and utilization for irrigation and other purposes, recognizing water as a scarce economic resource as well as common property and ensuring its utilization and management with utmost care and prudence. The key elements of this strategy are: Ongoing projects taken up years ago would be completed during the plan period, Revamping of 1st and 2nd generation irrigation projects would be taken up to improve the current level of utilization by taking into account the changes that have taken place

over time and bringing about necessary modifications. This will be done in partnership with local governments and user groups.

Table 3. Ongoing Major Irrigation Projects

Name of Project	Starting year	Original estimate (Rs. crores)	Revised Estimate as per 1999 schedule of rates (Rs. crores)	Scheduled year of completion	Expected cost* (Rs. crores)
Muvattupuzha	1974	20.86	515.00	2003-04	581.47
Karappuzha	1975	7.60	253.00	2004-05	234.43
Thrithala	1998	19.00	26.60	2004-05	19.46
Chamravattom	1985	13.27	120.00	2004-05	9.99**
Banasura sagar	1979	8.00	50.00	2004-05	59.26
Idamalayar	1981	17.85	412.00	2007	254.31

The Farmers' participation would be introduced in a big way. For all new local irrigation schemes, beneficiary contribution to the tune of 15 per cent of the capital cost would be insisted on. The entire operation and maintenance would be handed over to water users' groups formed for the purpose. Local level Water Resources Development and Management through participatory approach is given thrust during the 11th Plan with a view to attain sustainable local self sufficiency regarding water requirements including irrigation requirement of the area. Participatory Irrigation Management is an attempt to increase farmers' direct involvement in irrigation management, which ultimately results in the transfer of authority and responsibilities from the government, either in full or in part, to farmer organizations. Under this study, one branch canal each of Neyyar (Olathanni) and Malampuzha (Kuthannur) projects are taken up with the objectives: to learn from the experiences on a small-scale manageable irrigation system by implementing, monitoring and learning; to help in testing the appropriateness of various PIM elements to local conditions; to demonstrate the possibility of PIM in Kerala; and to evolve a practicable and replicable strategy for the implementation in all irrigation projects of Kerala. An evaluation of the participatory irrigation management done on a pilot basis in the management of the Olathanni branch canal of Neyyar and the Kuthannoor branch canal of Malampuzha to the farmers had shown that these projects had encouraged collective farming, ensured the involvement of women in irrigated cultivation, promoted cooperation with panchayats, departments and other agencies and linked the farmers to the marketing sector. The benefits from participation irrigation projects were in proportion to the investment on them because of the short time taken for their completion. The legal, social and technical situation prevailing in the State for implementing irrigation management with the farmers' participation in the irrigation projects of the State is highly encouraging to give shape to a suitable system for it. Two

proposed Participatory irrigation management schemes in Kerala are the Palakapandi and Meenachil river valley schemes in Palakkad district.

In the minor irrigation sector, the 'the transfer' is full, and in the major/medium irrigation systems, with the state responsible for more tasks at higher levels of the system (main system), and farmer organizations responsible for more at lower levels (branch canal/ distributory level). Efforts to bring transfer of management and PIM are often initiated by governments because of shortage of funds to maintain and manage the irrigation systems, inability to collect the water charges from farmers and poor record management performance. Command Area Development Authority (CADA) in Kerala has formed about 4,000 outlet-based farmer associations in the completed irrigation commands, in addition to several canal committees, and project committees. The PIM implementation agency will at the apex level organization. Opportunity for women involvement is given through inducting spouses of landowners in the farmer organizations. The recently enacted irrigation law has given legal sanctity for PIM in Kerala.

PARTICIPATORY IRRIGATION MANAGEMENT / IRRIGATION MANAGEMENT TRANSFER (IMT)

There is a lot that is wrong with the way government irrigation systems are run in India. Their actual commands fall far short of design commands; the quality of irrigation service on offer is often hopeless; the maintenance and repair of the head-works and canal systems are poor. Worst aspect is that their users have little role in the management of the system and therefore have no stake in its upkeep. Irrigation fees charged are a small fraction of the amounts farmers commonly pay for pump irrigation; and the fees actually collected are a small fraction of those charged. Clearly, at this rate, India will soon face erosion of a huge irrigation capital it built at a massive investment. What might be the approaches to reversing this invidious trend? The dominant answer, it is widely claimed, is involving farmers in managing their irrigation systems either through Participatory Irrigation Management (PIM) or Irrigation Management Transfer (IMT). The Canal irrigation system experts (Manas Dasgupta, 2004) have found most of the existing projects in the country faulty in design and maintenance, leading to the deprivation of farmers, particularly in the tail-end. They have recommended a system managed by farmers' organizations to remedy the situation.

The present system of water management in the country does not provide for collective efforts in self-governance by the users. In most irrigation projects, farmers' involvement is lukewarm. Traditionally the role of water users in operation and maintenance (O&M) of irrigation sources has been informal and community based. It is an informal farmers group with one or two organizers. This group controls the organization and collects nominal fee from farmers fixed by collective decision. Water masters work in small areas of about 40 ha and distribute water among different water outlets after receiving from the Public Works Department [PWD]. Irrigators irrigate the field and the area of operation per irrigator is about five ha for double crop wetlands and about 10 ha for single crop wetlands.

Bringing farmers into group action and involving them in planning of water management strategy, accommodating all their genuine needs will make them work voluntarily for the success of the system. PIM is ' for the farmers', ' by the farmers' and 'with the farmer's. Participatory Irrigation Management (PIM) is advocated as a new paradigm for efficient irrigation of irrigation system of the country. The PIM in general refers to involvement of farmers in all aspect of management of irrigation system such as planning and development of the system, Operation and Maintenance (O&M), collection of water charges, allocation of water, resolution of conflicts etc Farmers, who are the main stakeholders of the irrigation system, were found to have stronger inclination to manage the irrigation system most efficiently, once the same are legally transferred to their associations. For obtaining optimum benefits from the existing irrigation projects, all beneficiaries under it should actively participate in decision making process of water utilization, maintenance and management.

FORMAL WATER USERS' ASSOCIATION (WUA)

Despite the recognition of the importance of farmers' participation in irrigation management by the National Water Policy of 1987 and the Committee on Pricing of Irrigation Water-1992, (INCID, 2000), the progress in this direction has been tardy. The Water Users' Association (WUA) is a three-tier system of water monitoring organization. The unit for the association is one sluice (command) area and all the landowners in the area will be the members of this association and they will elect the executive committee and the office bearers. The second tier, the farmers' council (FC) comprises an irrigation division, the area of which may vary from 1,000 ha to 2,000 ha. The President and General Secretary of the farmers' association will be the ex-officio members of this council, which will have office bearers elected by the general body. The management of the irrigation division will vest with the FC. The third tier, which is an apex body, is the farmers' federation. The general body elects the executive committee; the President and General Secretary of the FC shall be ex-officio members. This federation shall also have an advisory council. The main functions and responsibilities of the WUAs are: To monitor, regulate and distribute the irrigation water on an equitable basis among the farmers in the sluice; To maintain on-farm development (OFD) structures constructed below the outlet point; and To solve the irrigation disputes or problems that may arise from time to time.

It is estimated that only 862,563 ha are being managed by WUAs in the various Indian States, accounting for only 1.62 percent of the total irrigated area (Palanisami and Paramasivam, 2000). Table 4 provides an overview of the extent and performance of WUAs in a few selected States of India.

Table 4. State wise number of water users associations and area covered by them

Sl. No	Name of State	Number of WUAs	Hydraulic level at which formed	Approximate area covered ("000 ha)
1.	A.P.	10292	Minor	4800.00
2.	Assam	17	Minor	6.00
3.	Bihar	1	Distributary	12.20
4.	Goa	42	Minor	5.00
5.	Gujarat	476	Minor & LIS	19.00
6	Haryana	2575	Outlet	200.00
7	H.P.	875	Minor schemes	35.00
8	J&K	1	Minor	1.00
9	Karnataka	760	Minor	138.38
10	Kerala	3930	Outlet	148.48
11	M.P.	1470	Minor	1495.00
12	Maharashtra	247	Minor	91.62
13	Manipur	62	Minor	49.27
14	Orissa	164	Minor	73.75
15	Rajasthan	417	Minor	185.67
16	Tamil Nadu	7725	Minor	474.28
17	U.P.	1	Minor	1.00
18	West Bengal	10000	Tube wells	37.00
	Total	39055		7772.65

Although the role of women in cultivation has long been accepted and documented, it has never been extended to irrigation and irrigation management. The prevalent belief is that irrigation is not a woman's domain. The government's National Water Policy (1987) recommended farmer participation in irrigation management as a strategy to bring about structural reform. In Gujarat, the implementation of the National Water Policy guidelines was initiated on an experimental basis in the district of Bharuch. The results proved so encouraging that in 1995 the state government declared a policy on Participatory Irrigation Management (PIM), along the lines of the national policy, encouraging farmer participation in the planning, implementation and management of direct and indirect irrigation projects, and seeking the co-operation of voluntary organizations. Participatory irrigation Management refers to programmes that seek to increase farmers' direct involvement in irrigation system management - either as a substitute or complement for the state role. This generally leads to some form of joint management or co-management of irrigation systems with the state responsible for more tasks at higher levels of the system and farmers organizations responsible for tasks at lower levels.

In Bharuch district, PIM has been initiated (Advaita Marathe, 2003) with support from the Aga Khan Rural Support Programme (India), a non-communal, non-profit rural development organization with a focus on natural resource management. The core concern of AKRSP (I) is organizing communities and building their capacity to manage their resources. The organization encourages the participation of women in its programmes. When AKRSP (I) first undertook the PIM projects on a pilot basis, not much attention was paid to the involvement of women in managing irrigation systems. This was chiefly because the role played by women in irrigation and the productive use

of water is virtually invisible. However, growing awareness within the organization led to conscious efforts to involve women in the canal irrigation management societies and to change the perception that women could not handle matters of irrigation, or were not concerned with it.

Women were involved as nominal members only; only landowners were made regular members. As nominal members, they had no say in the decision-making. Slowly, however, following the organization's proactive efforts at involving women in the CIS and management committees, people began to be convinced that involving women would bring about overall development within the village community. In fact, their involvement is now visible in every aspect of PIM, whether it is motivating farmers groups, overseeing canal construction, repair and maintenance, committee decision-making, framing the rules for water distribution, setting the terms for irrigation, water distribution and administration, liaising with government agencies, etc. The only problem, as perceived by the women, is monitoring water distribution at night, as alcoholism is rampant in the region.

As a result of their involvement, the lives of these women have undergone a complete transformation. They are much more confident and have taken control of their lives, those of their families and also that of the community. Other notable changes are an increase in their knowledge base and increased mobility. Where earlier they did not venture outside the village, they now walk into any government office, interacting with government officials. Their tolerance of injustice has been considerably lowered, as is evident in their personal lives.

However, it's not as though the women's involvement has been accepted without protest. Many women faced, and continue to face, social disapproval and familial opposition. The myth that women have no role to play in irrigation management has been shattered, by the Gujarat and Kerala government's Participatory Irrigation Management Policy.

CONSTRAINTS TO PIM

A farmer will join and work with WUA, if they get water when they need it and the costs that he has to incur are lower than the benefit envisaged. The current water rate structure in public systems is cheaper than that of privately managed irrigation system. Profit from irrigated farms is only 2.25 times that from rain-fed farms and expenditure is two times higher. The net benefit per ha per farm works out to only Rs.476, which is too low an incentive to take to irrigation (Patil, 1994). The irrigation agency needs to supply water in adequate quantities during different growth phases of the crops. A volumetric pricing system or rationing of water and an incentive to farmers to efficient use of water are essential to encourage farmers to WUA. The misplaced apprehension is that the O&M costs besides increased water rates will have to be borne by them deter many farmers from taking to the system. But the reality is the phenomenon of underutilization or mismanagement of utilization. Farmers have no confidence that they will get water when they need and there is no penal measure, if water is not delivered on stipulated dates.

The management of real water managers in the field namely, farmers and the inter-relationships with the requirements and the distribution agencies are not recognized specifically to each irrigation projects. This arises because attention is usually concentrated on hydrological, engineering, agricultural and economic aspects in all the irrigation projects. Factors like size and homogeneity of group, the motivation of farmers and the conducive environment of the farmers are not taken into cognizance.

Another deterrent is the tail-ender's problem, wherein the fields of the farmer at the tail-ends within the potential localized areas do not receive water. In fact about 18-20 percent of the localized areas at the tail-ends do not receive irrigation water in most of the projects. The in-discipline of the users is also another causal factor for the malady of the system. The farmers in the upper reaches by virtue of their advantageous positions draw more water illicitly and convert irrigated dry areas into wet areas, depriving the legitimate share of the tail-end farmers. In order to irrigate the land in the shortest time possible, the farmers in their indiscretion cause damage to the sluices and effect breaches in canals.

The malady and failure of many WUAs is ascribable to lack of: (a) policy and legal support from the government; (b) authority and power to the WUAs; (c) financial support to the WUAs; and (d) cooperation and support from the irrigation agencies. The local governments do not accord necessary recognition for the existing WUAs for their autonomous functioning. The lack of an enabling law for the establishment of WUAs is also a major impediment in the introduction of PIM. There is need to have a separate legislation for the formation of WUAs.

FUTURE PROSPECTS OF PIM

Besides providing right amounts of water at right time and at right place, attaining high water efficiency requires that the crop yields be maximized with given amount of water by improved agronomic practices for high yields and thus elevate water use efficiency such as the emerging trend of less water demanding perennial crops in lieu of seasonal crops. Currently, the technology concerning optimal irrigation scheduling and agronomic practices for increasing water use efficiency of crops is dismally modest. The manageable area for effective and efficient functioning of the FC with active involvement of majority of farmers need to be limited to 500- 1,250 ha.

To encourage formation of WUAs, the government may usher in incentive policies such as priority for infrastructure modernization. The irrigation water may be provided only in bulk rather than to individual farmers, to motivate and organize farmers through the cadre of trained organizers.

There is a need for mass media support for effective diffusion of the technology. The multitudinous benefits of PIM should be disseminated through seminars, workshops, group discussions, wall posters, notices, leaflets, folders, debates, all propaganda etc. Moreover, multi-tier training to policy-makers, irrigation management functionaries and farmers should be organized.

CONCLUSION

Against the backdrop of diminishing water resources and mounting water scarcity, the concept and practice of PIM has assumed a critical role in irrigation management. WUA, an adjunct of PIM serves as the fountainhead of an assortment of benefits, but the establishment and functioning of WUAs is confronted with constraints. The WUAs would enjoy complete freedom of choice in following cropping pattern and WUAs would be empowered to decide water charges for their members and non-members. Impartial and in-depth analysis of these deterrents and implementation of appropriate strategies can make the practice of PIM more viable and vibrant. Will PIM or IMT salvage India's public irrigation systems? Or is there need to think of and experiment with alternative strategies of vitalizing this important sector?

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