Working Paper No. 141

The Guiding Visible Hand of Participatory Approaches to Irrigation Management

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August 2003

Abstract

The analysis in this paper focuses on participation of the stakeholders in large-scale canal irrigation systems including the socio-economic aspects in the process of setting up PIM. Participation is believed to impact not only the efficiency and sustainability of water use but also the financial performance of the systems. The paper argues that the difference in the mode of programme implementation between Andhra Pradesh and Gujarat exerts an influence on the function and performance of the local institutions created as well as on the level of peoples' participation in irrigation management. In this context, the dwindling faith in PIM programme is highlighted with the help of the review of studies.

The irrigation sector reform process began with aspirations of extending the democratic management by users so that the costs of service delivery could be minimized as the efficiency improves. Empirical evidence, however, suggests that though there are positive impacts of PIM on the distribution of benefits, the costs are uncertain especially for the poor farmers. The process and forms of new institution influenced by political and historical context in which the reforms are situated is emphasized. In the analysis, though a legal solution toward voluntary action is considered an inferior option to collective action, yet, it appears to be a enabling device to manage collective resources. Evidently then, participatory irrigation management programme appears to rely on the guided, and not so invisible hand, to assume that individual behaviour is privately oriented yet, by binding the individuals by rules, desired publicly oriented results could be produced. Perhaps, a legal definition of cooperation may hold partnerships together, but at different levels of efficiency and institutional performance.

JEL Classification: ***D73, D78, P13, P32, Q25, Q28***

Keywords : ***Access to water; Participatory irrigation management transfer (PIM); Irrigation management transfer (IMT); Process documentation; Water users association; Participatory approaches; Legislation***

Acknowledgement

This paper is based on the larger ongoing studies on irrigation being carried out by the water Research and Network Cell at the Institute. We sincerely thank the Ford Foundation, New Delhi for the financial support. An earlier version of this paper was presented at the national Seminar on Water held at the CESS, Hyderabad. We thank the participants for comments. Our special thanks are to Dr. Peter Mollinga for his detailed comments and suggestions. We wish to thank Mr. Harish Joshi for the research support and Ms. Sheela Devadas for word processing. The usual disclaimers apply.

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R. Parthasarathy and Jharna Pathak

1. Introduction

Irrigation systems were traditionally managed by the government decisions and for quite sometime now the efficacy of these decisions have been tested and found to have faced serious problems relating to water use efficiency and water distribution. Across different systems and states in India, governments, however experience shortage of funds to carry out necessary R&R works of the system. At many places, canals were laid at uneven level and structures were in bad shape, which results in frequent breaching of canals. Consequently, reliability of water at scheduled time was not taken care off. During the last decades, the development literature stressed the importance of social groups and communities to solve a wide range of problems that neither the market nor the state can effectively tackle alone. All these experiences stem from the belief in the invisible hands theory, which emphasises that in the pursuit to maximise private gains, economic welfare of the society is also maximized.

It was since the mid-1980s that governments, NGOs and international agencies worldwide have been engaged in Irrigation Management Transfer (IMT) in one role or the other. Managerial and financial responsibilities of the public schemes are being handed over to newly set up Water User Associations (WUAs) with a view to improve water rights of farmers *inter alia* the use efficiency of the infrastructure. The goals were three-fold. First, IMT was expected to boost productivity by harnessing farmers' local knowledge, entrepreneurial skills and their interest in ensuring effective water services. Implicitly it was expected that though participatory irrigation management is, 'not a panacea for all water management issues, (it) can go a long way in ensuring efficient running of canals, optimum on-field water application and reuse or proper drainage of the excess water from irrigation systems and farmers' fields' (Hooja and Joshi 2000). Second, the accompanying reform of often-inefficient yet costly state irrigation bureaucracies was supposed to lead to better water services and, lastly, to minimise the government expenditure.

Results of past experience indicate that the goals have become much less ambitious. Today, IMT is considered successful if it just "saves the government money, improves cost-effectiveness of operation and maintenance while improving, or at least not weakening the productivity of irrigated agriculture" (Vermillion, 1997). In spite of the initial faith on this programme, its expectations are dwindling, which is the result of disappointing evaluations of past experiences. Productivity gains have hardly been reported. Recent evaluations of past IMT programmes show a clear trade-off between past modes of IMT and poverty alleviation (Shah et al. 2002). To some extent, it was assumed that IMT is class neutral. However, the mode of IMT, as implemented till now, appears to work only in non-poor, high-performing, business-like agriculture in countries like the USA and New Zealand or on large farms in South Africa, Mexico, and Turkey. In schemes in the middle- and low-income countries with a heterogeneous composition of farmers in the command areas, IMT could only succeed where farmers with the largest holdings became the "champions," for example, in Colombia (Ramirez and Vargas 1999) or Sudan (Narayanamurthy et al. 1997). For poorer farmers in Sudan and in many smallholder irrigation schemes, especially in sub-Saharan Africa, withdrawal of state support has led to partial or full collapse of the scheme, with negative consequences for both productivity and poverty. The pattern was similar in Kenya (Mutero et al. 2001) Zimbabwe (Manzungu et al. 1999) and South Africa (Shah et al. 2002). Some argue that IMT could have been successful if the process had been right, that is, if it had been more gradual, with an emphasis on institution building and training, and with better-defined water rights. Others are sceptical. In many smallholder schemes backward-linkages with the suppliers of input and credit and forward-linkages with markets are so weak that only a comprehensive package of production-enhancing strategies can render irrigated agriculture profitable enough to pay increased water prices (Shah et al. 2002). These and other factors have also impacted on the extent of participation of users in the newly set up programme; some would argue that extent of participation has also impacted the expected results of the IMT programme.

This paper explores some of these issues in the light of the experiences in Andhra Pradesh and Gujarat. Though, only these two states are taken for analysis, yet the results are hopefully pointers for many generic issues discussed. The following section reports some of the results on the impacts of IMT programmes on the distribution of the benefits (e.g., access to water) and costs among poor and non-poor farmers. Section 3 discusses some of aspects of WUAs formed under IMT and their functioning. Section 4 attempts to draw a theoretical frame based on the

empirical results obtained in the participatory process. The last section summarises the analysis.

The empirical analysis of this paper is based on the survey, which was undertaken in seven WUAs in Andhra Pradesh and Gujarat during 1999-2000. However, the discussion on the analysis is also based on the process documentation research carried out on the PIM programme in Gujarat from 1996. The WUAs were selected from the major agro-ecological regions of the two states. The three WUAs in Andhra Pradesh (Ellabotharam, Peddapalakaluru and Jantaluru) are from the Telangana, Coastal and Rayalseema regions respectively, and were chosen randomly from the largest irrigation schemes in these regions. In Gujarat, two WUAs were selected randomly from the pilot PIM schemes in the dry North Gujarat region (Thalota and Laxmipura) and two from the Central South region (Tranol and Digas). NGOs are the implementing agencies of the two Northern WUAs while the Irrigation Department (ID) supports the Southern WUAs. The main characteristics of these WUAs are provided in the annex.

The total sample consisted of seven hundred farm households operating holdings in the command area of these WUAs during the year 1998–1999 and the interviews took place from the end of 1999 through the beginning of 2000. Further a total of sixty-seven committee members of the WUAs were also interviewed. The selection of the seven hundred farm households was stratified and included landowners of four size classes of operational holding: less than 0.5 hectare, from 0.5–1 hectare, from 1–2.5 hectares and above 2.5 hectares. A fifth category consists of tenants who cultivated leased-in land in the command area. The operated landholding of such tenants did not exceed 1 hectare. This design allowed in identifying farm-size-related patterns in the variables of crop choice; plot location, access to water, and impact of IMT on both access to water and participation in WUAs. Findings are presented for two size categories. The smallest three classes of owners and tenants operating less than one hectare each are regrouped as “small farmers” (totaling 490) and the two categories with operational holdings above 1 hectare are regrouped into the category of “large farmers” (totaling 210).

In an agriculture-based rural economy, land is the single most important asset that, for example, led to several poverty-focused land reforms in the past (Sobhan 1993; Dev et al. 1994; World Bank 2000). Therefore, relative farm sizes within the same scheme are supposedly a proxy for *relative* income out of agriculture, and systematic farm-size-related differences in variables are a good proxy for

differences in class within a given WUA. However, other factors that influence the outcome of PIM are the location of the plot, that is in the head or tail reaches of the system, crops grown and, as is the case in many rural economies today, diversification of household incomes (For a detailed discussion on the results see, van Koppen et. al., 2002).

Farm-size-based differential access to irrigation water in canal irrigation command areas was measured, first by comparing the number of reported waterings received from canals or other irrigation sources for main crops in a scheme by farmers from different holding sizes. Second, a comparison was made between farmers' judgments of the required number of waterings and the actual number of waterings reported to have been received. In Andhra Pradesh access to water was assessed for the *kharif* (monsoon season) 1998–1999. In this southern State, the irrigated area is generally the largest during this season. The major crops grown in the study WUAs are paddy and maize as predominantly food crops, and cash crops of cotton, chilli and groundnut. In Gujarat, the dry *rabi* (winter season) is the most important for irrigation. The major crops are wheat and cash crops of mustard and tobacco. Access to water was studied for the nine hundred and ten plots in both States with these three main crops. For assessing effects of IMT on access to water, differences before and after IMT in timeliness, quantities, and reliability of water services, as well as perceived changes in productivity and incomes, were taken into account, and for the whole irrigated holding.

Essentially, there are two elements crucial for the functioning of the WUAs: financial and institutional aspects (for a detailed discussion the financial aspects see, Parthasarathy (2000) and Parthasarathy 2003). Institutional element like participation is believed to contribute and impact upon not only the efficiency and sustainability of water resource use but also the financial performance of the systems. This paper aims to deal with this aspect in greater detail. One of the crucial aspects for the levels and effectiveness of participation is the mode of conceiving and implementing the programme. The difference in approaches between Andhra Pradesh and Gujarat is therefore, expected to influence the functions and performance of the WUA as well as the level of farmers' participation in irrigation management. As we would argue, the level of participation of member farmers has been the willingness to participate in a new institution, which is a function of the expected outcomes of the programme. In the present case, the analysis is presented in the reverse order. First, the outcomes of the PIM programme as implemented in the two states are discussed. For this discussion,

one economic parameter – access to water; and one social parameter – the extent and level of participation of ordinary members and committee members in various WUA activities are analysed. As mentioned, the approaches to PIM are different in the two states and these differences were found to affect the outcomes. In the following section therefore, IMT programmes as implemented in the two states are discussed briefly.

2. IMT in the Two States

The two IMT programmes selected for this study are the Andhra Pradesh Farmers Management of Irrigation Systems (APFMIS) Act of 1997 and the Government of Gujarat Resolution on Participatory Irrigation Management 1995 (Parthasarathy 2000). In Gujarat, either the Irrigation Department (ID) or an NGO acts as the implementing agency in these pilot schemes. As Table 1 summarises, the reform adopted in Andhra Pradesh is unique for its scale, encompassing all irrigation systems in the State and including all tiers in the schemes. The line departments, rather than NGOs or the ID, were used for institution building.[1] Immediately after its adoption, District Collectors arranged the election or appointment of committee members who hold office for five years. This was accompanied by large publicity campaigns and training programmes, with strong political support from the highest levels. The World Bank co-funded a massive operation of repair and rehabilitation (R&R) that started four months after the elections (Raju 2000). Subsidies were directly channelled to the new WUAs avoiding ID staff costs and the costs for contractors. This smart channelling raised the amounts available on the ground and fostered farmers' eagerness to repair "their" schemes (Raju 2000). Water fees are set by the government (tripled just before adoption of the Act) and the revenue department continues fee collection as part of the land tax. In contrast, in the thirteen pilot schemes in Gujarat transfer of water distribution and water fee collection aspects is in progress. The obligations include filling and collecting demand forms as required in the *sejhpali* system in Gujarat and collection of fees and partial handover to the ID. The pilot schemes are scattered and federation with adjacent blocks into higher tiers is neither foreseen nor was possible in the short term. In both States, canals remain government property and major rehabilitation continues to be the responsibility of the IDs.

[1] Bruns (1999) highlights the global uniqueness of bypassing the vested interests of the ID by taking the route of the regional and local administration.

2.1 Impact of IMT on Access to Water

Improved access to water was an important objective of the Andhra Pradesh FMIS Act and the Gujarat PIM Resolution. As described earlier, up till now repair and rehabilitation (R&R) work constituted the most important component to reach the goals of IMT in both States. R&R included earthen work, removal of shrubs and weeds, desilting and lining of canals, pitching, repairs and construction of various structures and placing of pipelines and in some cases, closing of illegal outlets. Moreover, in Andhra Pradesh, access to water could also be improved by the new options at least in theory, as farmers could communicate with one another through the WUA, Distributary Committees and through the higher ID staff at distributary level. In Gujarat, on the other hand, once irrigation management is handed over, WUAs themselves are entitled to distribute water. Formal turnover had taken place in two WUAs, Thalota and Digas.

2.1.1 Improved Access to Water

Table 2 presents the proportion of households that had reported improvements in access to canal water after IMT. Improved access to water after IMT was often reported by both small and large farmers and in tail, middle, and head reaches of the command areas. However, the variation between WUAs was strong. The highest proportion of households (46 per cent) is in Thalota, where the support by an NGO has been exceptionally intensive (Parthasarathy and Iyengar 1998). It is mainly this exceptional result that renders the average of Gujarat (25 per cent) higher than that in Andhra Pradesh (15 per cent). Apparently, implementation by an NGO is not a sufficient condition *per se*, because the same NGO was the implementing agency in Laxmipura where the reported rate of improvement is one but the lowest. The low improvement in Ellabotharam, as reported by only seven per cent, is partly because the main canal was still under construction. Jantaluru is located in the tail end of a system, where water still fails to reach even after R&R. Peddapalakaluru with the highest improvement reported (28 per cent) lies in the coastal area where improvements are generally considerable (Raju 2000). Besides the impact on access to water, the other change IMT or PIM could potentially bring about is the extension of irrigated area.

2.2 Extension of Irrigated Area

Only two percent of the respondents in Andhra Pradesh and three percent in Gujarat reported an increase in the area under cultivation due to R&R works. The average size of land gained was 0.66 hectare per farmer in Andhra Pradesh and 1.1 hectares per farmer in Gujarat. The few newly irrigated plots were both in the head and tail reaches belonging to both among small and large farmers. It was difficult to obtain scheme-level aggregate data of extended area in Andhra Pradesh because before APFMIS the Revenue Department tended to underreport irrigated areas. When the grants for R&R became proportional to reported irrigated area, farmers who have more accurate knowledge often suggested adaptations. For example, the official figure in Peddapalakaluru that reports an increase of two thousand hectares is probably so high because of these effects. According to the President of Peddapalakaluru, eight hundred and six hectares out of which seven hundred and sixty six hectares belong to a State agricultural experiment farm have been added. In Ellabotharam forty-two hectares were to be added.[2]

Scheme-level aggregate data in the Gujarat WUAs showed small extensions. In Thalota one group of farmers on about nine hectares who never received water earlier, benefited from the repair of the underground tube well pipeline. Shah (2000) reports a total increase of one hundred and twenty one hectares since 1996. In Tranol earthen canals were cemented but this work was only completed for those parts of the canal where the WUA President and Committee Members had their lands. This added twenty-one hectares of irrigable land. Farmers from one distributary strongly complained that they were left out in the joint survey and that water has still failed to reach their plots but there was no follow-up on their complaints. These examples highlight inequities intrinsic in the adopted mode of IMT in which priority setting for R&R works can easily be dominated by the stronger sections of society that obtain leadership positions apparently without much accountability to members. Evidently then the benefits of PIM programme depend to a large extent on the extent of participation by members.

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[2] As Jairath (1999) noticed, changes in the records of the Revenue Department and ID are difficult to interpret because they do not clarify the “quality of irrigation.” Water once touched the tail after fifteen years. The amount of water and the irrigated area were also found to be entered in the records but it is still to be seen what this means for the user.

3. Institution Building and Participation in WUAs

The evident minimal condition for participation is awareness about the very existence of a WUA. From Table 3, it is apparent that there are still many respondents who are completely unaware of the existence of a WUA. Lack of awareness among respondents is higher in Andhra Pradesh (52 per cent) than in Gujarat (22 per cent). The shorter time span and immense scale in Andhra Pradesh could have played a role. Moreover, the average number of farmers involved in one WUA in Andhra Pradesh (1,342) is also much larger than that in Gujarat (180). Thus, creating awareness even among half of the irrigating farmers in the whole State about new management forms is an indeed an achievement. The generally stronger stakes of farmers in agriculture in Andhra Pradesh than in Gujarat may also be an explanatory factor. As expected, awareness was highest in Thalota (93 per cent) where an NGO had strongly intervened.

3.1 Members' Participation in WUA Activities

Figure 1 summarises the level of involvement of farmers in the various activities of the WUA. In spite of the higher rates of awareness in Gujarat overall rates of active participation in institution building, R&R, water distribution and fee collection is generally similar in Gujarat and Andhra Pradesh. The highest rate of participation is found in Gujarat in attending annual meetings (22 per cent). In all WUAs large farmers dominate in meetings. However, also in both States, small farmers participated relatively more often than large farmers in the R&R work including the joint survey. Thus, most small farmers who are aware of the WUA also participate in the work of the WUA but were not in decision-making bodies.

The very active involvement of tenants in Andhra Pradesh is noticeable. The proportion of tenants contributing labour to R&R works is the highest of all twenty seven percent, whereas only sixteen percent of small landowning farmers and nine per cent of large farmers do so. Their attendance at meetings is similar to that of farmers with equally smallholdings (9 per cent). In contrast, in Gujarat tenants are virtually inactive in the WUA. Even in Thalota only two tenants participated in R&R works but they did not attend meetings. Although the formal position of tenants in the new WUAs in Andhra Pradesh is slightly weaker than for landowners their involvement in meetings, especially in R&R, is relatively stronger than in Gujarat where they have no formal status and where they do not participate.

These results underscore the contribution of small farmers and of tenants in Andhra Pradesh toward the upkeep of the infrastructure. Their strong stakes in irrigated agriculture and higher dependency on canals is certainly one of the reasons. This implies that their continued support is important for sustainable self-management. Plausibly, small farmers' limited participation in meetings could become a major obstacle for their continued support. This exclusion limits their benefits from information sharing, e.g., on water schedules upstream and within the scheme.

3.2 Committees

Under the PIM programme in Gujarat, the implementing agencies largely steered the composition of committees through their motivation efforts. After five years of implementation, these efforts were still found being confined to the leading sections of the society. This pattern came out sharply in Thalota and Tranol where the motivation process was limited to better-off Patel community members while ignoring other castes. The formal rule is that command area farmers elect committee members and they in turn, elect among themselves the office bearers consisting of a chairman, a secretary and a treasurer. Usually, constituent villages are also represented. However, *de facto* implementation is often rather symbolic, without any contest.

The overview of committee members' participation in the various WUA activities is shown in Figure 2. The degree of participation in Andhra Pradesh is generally higher than in Gujarat, especially in R&R. The involvement of committee members in Andhra Pradesh in water distribution is high (58 per cent), given the unchanged involvement of the *laskars*, the local staff of the ID. This may reflect a partial overlap between the new WUA committee and the existing local water distribution arrangements in Andhra Pradesh where, below the outlet, a *neeruganti* (a paid local person) distributes water under supervision of a *calava pedda* (an elected, unpaid authority). The message that some local office bearers read in the new government support is significant. In Jantaluru, local office bearers seeing the funds flowing to the WUA started demanding remuneration from the government for their work.[3]

[3] Raju (2000) observed the reaction of some local water distributors vis-à-vis the flow of money for the establishment of the new WUA: "Then, let the WUA president and TC members do all."

Figure 1
Proportion of Households Participating in WUA Activities by Farmsize

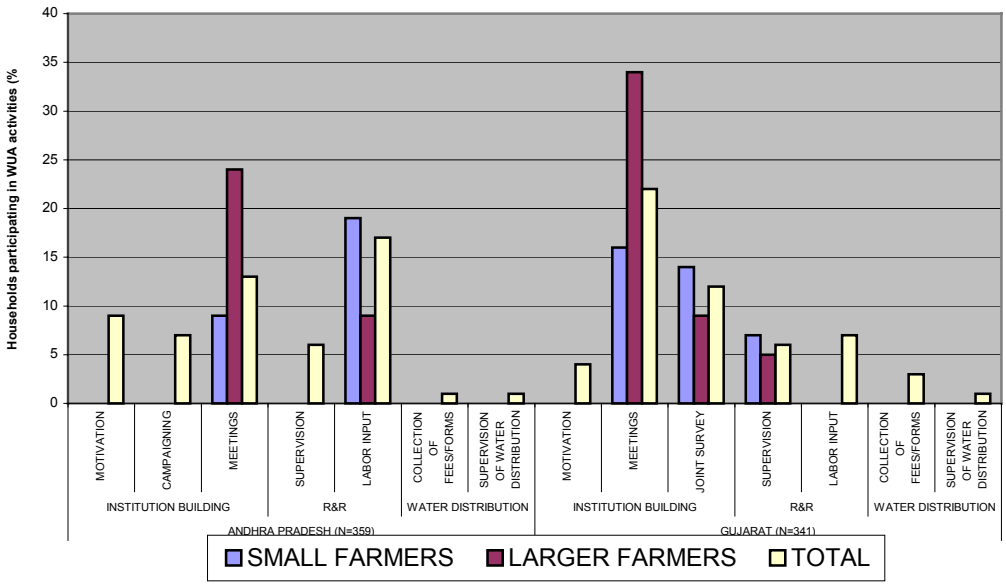
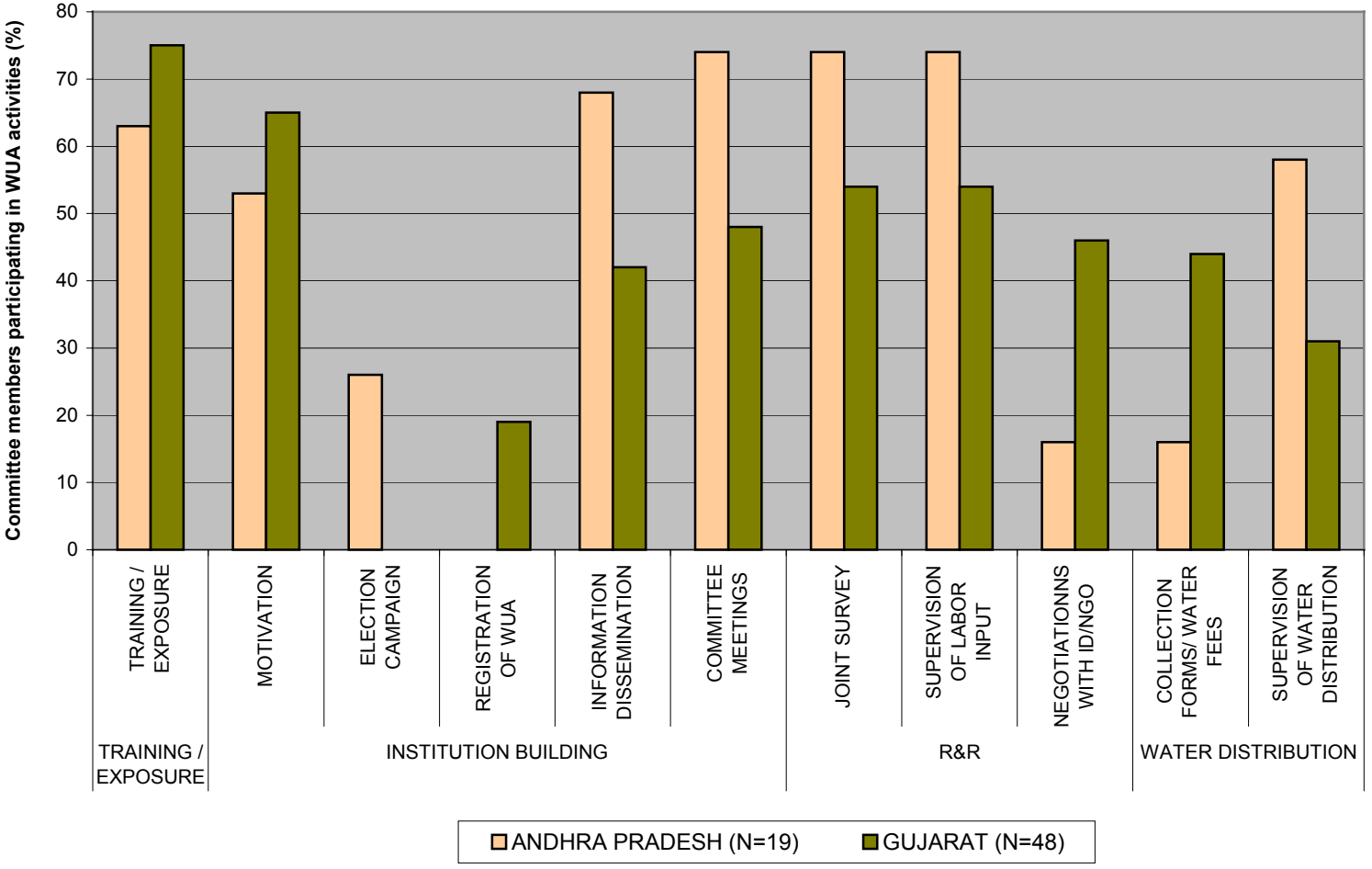


Figure 2
Proportion of Committee Members Participating in WUA Activities



One of the reasons for the low participation in WUA activities is reportedly the absence of direct relationship between participation and access to water. From Table 4, it is evident that insufficiency of water in the reservoirs (39 per cent) and location of plots (26 per cent) are the reasons for inadequate access to water. Obviously in irrigation, timely and reliable water supply is important dimensions toward realizing the potential of water. And a majority of farmers and some of the WUA presidents have reported that they managing supply part of the irrigation water are beyond their scope of functions. These problems seem to have crucial bearing on the levels of participation in the WUA activities.

Evidently, the reform process needs to take cognisance of the supply aspects too. It is true to a large extent that the evolutions of the present PIM / IMT models have their roots in the criticism of too much emphasis on the supply aspects, including the engineer-led departmental approach. While appreciating this aspect, it would rather be naive to expect that in the emphasis of demand-side management, supply-side aspects could be completely neglected. In the Andhra Pradesh case, the FMIS Act does provide for multi-level platforms for negotiations and allocation of water in a system. This however only addresses only a part of the supply-side problems or difficulties.

4. IMT Approaches and Participatory Models

The future of IMT in Andhra Pradesh would expectedly be built upon sound fundamentals laid in the past years: first, its scale; second, the legal options for multi-tiered farmers' involvement implemented, so the organizational structure is evolving through which expectedly many challenges including increasing demands on multiple uses can be addressed. So far they have not been addressed;[4] third, on the ground, improvements in access to water were tangible, thanks to smart, quick and heavily subsidised R&R works.

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[4] One such challenge is, for example, to deal with head-tail inequities. For this, Distributary and Project Committees need more real executive powers. Technological measuring devices to implement new rules and support from external parties to support the weaker parties' claims are needed. Another main challenge is the development of new, performance-based linking of services and payments that renders the irrigation bureaucracy more accountable to farmers at all levels (Svendsen and Huppert 2000).

In the pilot participatory irrigation management schemes in Gujarat, access to water improved for a slightly higher proportion of farm households than in Andhra Pradesh. The scale of pilot-projects is very limited; and raising farmers' involvement to higher levels of WUA federations looked impossible. Farmers' response to the efforts of external agencies to hand over managerial tasks was lukewarm but NGO involvement in some WUA areas was able to induce substantial impacts though difficult to replicate. Partly as a result of these shortcomings the pace of the programme became a cause of concern. The Government of Gujarat realizing these is in the process of framing an Act similar to the Andhra Pradesh model that would make PIM compulsory for agricultural users across the state. In Andhra Pradesh and to a lesser extent in Gujarat, small farmers' stakes in improved canal irrigation were reflected in their higher participation rates in the joint survey and R&R works than large farmers.

Parthasarathy et al, (2001) believed that incremental returns that member farmers expects from a WUA may be an important factor that influences individual decision to participate in WUA activities. So far, no study has concluded that the formation of WUAs has led to an increase in agricultural productivity or income to the farmers. It is well known that these benefits arise from adequate and timely supply of water or lower cost of irrigation. For the WUA to be an effective tool, however, participation by member farmers in its various activities is a necessary condition[5]. How far this condition is met was evident from the discussions on the participation of farmer-members and the committee members in Andhra Pradesh and Gujarat. There were two contrasting approaches to the implementation of the PIM programme. In both the cases, the level of participation was found to be low. In fact, it is well known that neither the departmental staff nor the WUA members were found to be actively promoting and participating in the programme. This is true of PIM programme elsewhere too (Vermillion, ed. 1997).

In a broad sense, there is a Hobbesian case in this situation. Both forms of PIM programme have enunciated a hierarchical solution to the dilemmas of cooperative action. More so in Andhra Pradesh than in the Gujarat model. A legal solution toward voluntary action is clearly an inferior option to collective action. Nevertheless, it is preferable to the default anarchic state of "might is right" nature of water distribution methods; the virtue is, collaboration is attainable by individuals who are unable to trust their neighbouring landlords. What the PIM through

[5] It should also be recognised that WUAs have limits in influencing the supply of water.

legislative Act tests is the Hume's "mutual-aid-game" played by two farmers where cooperation is sustained, because of necessity. Typically in a society with dense networks of political and civic engagement, on spotting bad practice it is easier to quote law to make defection riskier. The Gujarat case points out that seeking to build cooperation from every participant does evolve neither "always defect" nor "reciprocate partnership" as contingent convention. Simply put, a legal definition of cooperation can hold partnership together, may be at different levels of efficiency and institutional performance.

In both the Andhra and Gujarat case, the evolution of the models has their history. While the NGOs' experience in implementing participatory models was the base for looking toward and subsequently adopting the Philippines case in Gujarat, in the case of Andhra Pradesh, irrigation sector reform was only a part of the Government's reform agenda in other spheres of development. In most other cases too, the reform measures involved substantial role of the government and legislature. Historical points can sometimes be extremely crucial in consequences. As "new institutional researchers" emphasise that institution evolve through history (Putnam, 1993). However, it also seems that social set up conditions and gets conditioned by history in its response to the evolving institutions. "Though institutions evolve through history, they do not reliably reach unique and efficient equilibria" (March and Olsen, 1989). Institution in a broad sense to mean "the rules of the game in a society" is self-perpetuating, even when they become socially irrelevant; socially inefficient (see for a lucid discussion, North, 1990). It is so because it easier for an individual agent to adapt to the "framed rules" rather than evolving one.

However, the danger in this method should be recognised. The informal rules, societal norms, etc. change more slowly than those of the formal rules and hence 'defection' or 'plain shirking' to fully participate is evident in the earlier analysis (also see, Parthasarathy, 2000). Further, voluntary cooperative behaviour is difficult to rationalise as a means to self-interested objective. Cooperation – foregoing free ride - demands either compulsion or an internalised social ethic (Putnam, 1993). In the present context, participation, voluntary or otherwise, in a collective good cannot be expected to be achieved merely by legislating specific collective objectives. This is because, at the individual or even WUA level, personal participation is neither sufficient nor necessary to secure the collective objective. In a sense this appears as a variant of the classical prisoners dilemma.

The conventional response to this problem is to reconnect individual and collective wisdom in two ways; through command and control or through incentives. While the legislative approach to the PIM programme has a blend of both these responses, the Gujarat model so far has an emphasis on the incentive based approach[6]. As the preceding discussions point out, purely or largely incentive driven approach has failed to have the desired impact. Partly because incentives can satisfy only the sum of individual actions that is to a WUA, whereas collective action is a sum of individual preferences. Therefore, to influence individual preferences it is necessary that the incentive or reward programme is directly targeted, rather than expecting the improved efficiency (through collectives) to do the trick. The crucial difference between preferences and behaviour developed by Sen (1973) rests on the notion that the market behaviour of individuals may not reveal their underlying preferences because of built-in social conventions or norms that are necessary to orient individual behaviour with individual preferences. The need arises where the behaviour of individuals without such conventions or norms interacts in a harmful way with the similar behaviour of others. This is not to say that evidence for cooperative behaviour even in managing irrigation is not found. In fact, there are ample evidence and case studies to support existence of such cooperatives. Yet, these examples are in smaller command areas or in isolated pockets of large-scale systems. The difficulty in replicating these successful models on a large system raises the questions regarding the significance and conditions in forming collectives. In some sense, the PIM programme set up with legislation, in parts, relies on the invisible hand to square the private and common interests. That is the managed participatory irrigation management programme, relies on the guided, not so invisible hand, to assume that individual behaviour is privately oriented yet, by binding the individuals by rules, desired publicly oriented results could be produced. While this could be a necessary condition, the sure test for collectively directed norms is that collective benefits have to be judged by the relative costs in the aggregate as they carry a substantial net cost for a significant number of individuals. As mentioned, Gujarat is in the process of setting up a PIM programme based largely on the Andhra Pradesh model. In Gujarat too, the present reform agenda has its prime focus on water management with little agency reform.

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[6] The incentives are fifty percent rebate on the total water charges collected toward operation and maintenance fund and for managerial expenses of the WUA. There is also a provision for Central and State governments contributing four hundred rupees per hectare in CAD areas.

Table 5 indicates the expected funds requirement over a three-year period toward setting up the programme. As expected, the major fund requirement is to carry out repair and in some cases rehabilitation of the systems.

5. Summing Up; Limits of Participatory Approach to PIM

The large-scale canal irrigation is viewed and functions more like a collective good. The question that arose while attempting to improvise the management and performance of the system is whether a collective good could be best managed by cooperatives. Towards this end, the analysis sought evidence and found that; (a) the level of participation in the WUA to be low, (b) management through WUAs could address only demand and distribution of water related problems but have very little scope to tackle supply of water, (c) the supply of water including quantity and timeliness along with location of plots seem to be crucial factors influencing access to water by members of WUA; and, (d) while the incentive based approach could not influence any of these issues, the command and control based approach seems to have made some difference to formation and functioning of collectives. In all these, however, the impacts (not the outcome) of peoples' participation appear to be an adjunct rather than establishing a clear causal relationship.

The irrigation sector reform process began with aspirations of extending the democratic management by users so that the costs of delivery of service could be minimised while the efficiency improves. This paper sought to highlight the factors that contribute toward realization of reform strategies. The analysis is not complete in the sense the impact of social contexts on the new institutions was not traced. We recognise the importance of this aspect. The one important lesson that could be gleaned from the analysis is that political and historical context of the reform profoundly influence the process of new institutions formed. Thus in the case of Andhra Pradesh irrigation sector reform set in a context of wider reform measures could bring about compliance to an Act that sought farmer management compulsory (FMIS). This aspect too requires a more in-depth analysis as it promises to be a rich repository of knowledge with lessons for governance and creating people-centred institutions.

In the sphere of economic and social activity, which the irrigation sector reform tends to correct through involving the users and other stakeholders including the government, action taken by individuals seems to be inadequate to bring about

an efficient change process. Partly, it seems that the economic rationale of individual participation weakens as the proportionate importance of the canal water declines in cultivation of his/her land. Add to this the fact of importance and social relevance of an individual participation in a large command area enterprise - the irrelevance of participation or not in a seemingly routine administration that is entrusted to a WUA becomes clear. However, in the realm of scarcity of water and good administration, individuals may come closer to achieving a communal objective if they are nudged into believing that private preferences are additive and the outcome would be a non-zero sum game. Essentially then, pursuit of collective action contributes to improvement of the collective good, though the costs are not clear. This is so because the activity has to be deliberately organised under existing standards of the system and social norms. However, as the analysis pointed out and the paper has argued, the managed participatory irrigation management programme relying on the guided visible hand may bring about a change in the individual behaviour by binding the individuals with rules toward the desired publicly oriented results. Thus, a legal definition of cooperation may hold partnerships together, perhaps at different levels of efficiency and institutional performance.

Table 1: Main Characteristics of IMT Programmes in Andhra Pradesh and Gujarat

Particulars	Andhra Pradesh Farmer Management of Irrigation Systems Act 1997	Participatory Irrigation Management Policy Gujarat 1995
Scale	All systems; 10,292	Some of the 13 pilot WUAs
Tiers	WUA at lowest tier, Distributary Committees (DCs) at next level, and Project Committee (PC) at main system level	WUA
Implementer	ID and District Administration	ID or NGO
Membership in command areas	Stipulated in APFMIS Act: all land users and owners, if title is recorded or can be shown[7]	Voluntary: landowners; shares at nominal rates
Members' rights	Stipulated in APFMIS Act: one vote per farmer to elect President and one vote to elect Territorial Committee member; right of recall	Cooperative Law: if committee elections are held, usually one vote per farmer
Formation of WUAs	Statewide by District Collectors in April 1997; either by election or by consensus-based appointment of Presidents and Territorial Committee; WUA presidents elected DCs Committees in November 1997; PCs not formed yet	Parallel to R&R; voluntary; upon registration as Cooperative
R&R	Statewide; all tiers	Some of 13 pilot WUAs
Subsidies R&R	Fixed grants/ha; fivefold increase with IMT to Rs 250/ha;[8] financed by World Bank	Need-based grants up to Rs 500/ha; financed by the State
Identification and implementation of R&R	WUA participates in joint survey; ID authorizes and disburses funds to WUA; WUA implements (no contractor)	WUA participates in joint survey; ID approves; WUA implements
Setting and collection of fee rates	Rates tripled; Revenue Department still collects fees as part of land tax; fee recovery and R&R grants will be connected; land tax will be delinked from water fees, so WUA will set, collect and partly manage fees.	WUA sets rates, collects fees, and hands 50% of fees over to ID, if paid timely
Water distribution	ID, as before IMT (rotation; below outlet locally); in future stronger accountability of ID staff for water distribution to WUA, DC and PC	Higher tiers: ID and WUA to fill/collect forms (*sejhpali*); lowest tier: WUA

Source: Adapted from van Koppen et al., 2002

[7] As stipulated in the Amendment through Andhra Pradesh Legislative Bill no. 32 of 1998 of November: "any person who is in lawful possession and enjoyment of the land under a water source, on proof of such possession and enjoyment in a crop year, may claim membership notwithstanding whether he is a recorded landholder or not" (Rao et al. 1999).

[8] In 2003, US$1.00=Indian Rs 47.00.

Table 2: Distribution of Households Reporting Better Access to Canal Water due to WUA

WUA	Andhra Pradesh				Gujarat				
	Ellabo-tharam	Peddapa-lakaluru	Janta-luru	Total	Tha-lota	Laxmi-pura	Tranol	Digas	Total
Better access	9 (7)	33 (28)	12 (10)	54 (15)	52 (46)	11 (12)	9 (9)	13 (33)	86 (25)
Total	121 (100)	118 (100)	120 (100)	359 (100)	113 (100)	91 (100)	98 (100)	39 (100)	341 (100)

Note: Figures in parentheses are percentage to total.
Source: Household survey, GIDR.

Table 3: Distribution of Households Unaware of the WUA, by Farm Size

Farm Size	Andhra Pradesh			Gujarat		
WUA	Small Farmers	Large Farmers	Total	Small Farmers	Large Farmers	Total
Ellabotharam/Thalota Unaware	46 (51)	2 (6)	48 (40)	8 (10)	0 (0)	8 (7)
Total	90 (100)	31 (100)	121 (100)	83 (100)	30 (100)	113 (100)
Peddapalakaluru/ Laxmipura Unaware	50 (56)	6 (21)	56 (47)	21 (34)	4 (13)	25 (27)
Total	89 (100)	29 (100)	118 (100)	61 (100)	30 (100)	91 (100)
Jantaluru/Tranol Unaware	61 (68)	20 (67)	81 (68)	24 (35)	8 (27)	32 (33)
Total	90 (100)	30 (100)	120 (100)	68 (100)	30 (100)	98 (100)
Digas Unaware	-	-	-	4 (44)	5 (17)	9 (23)
Total				9 (100)	30 (100)	39 (100)
Total Unaware	157 (58)	28 (31)	185 (52)	57 (26)	17 (14)	74 (22)
Total (All)	269 (100)	90 (100)	359 (100)	221 (100)	120 (100)	341 (100)
Significance χ^2	Ellabotharam, Peddapalakaluru total: Significant at 0.005 level			Laxmipura: Significant at 0.05 level Total: Significant at 0.025 level.		

Note: Figures in parentheses are percentage to total given in each column
Source: Household Survey, GIDR

Table 4: Percentage Distribution of Households Reporting Reasons for Not Getting Adequate Water After IMT: Andhra Pradesh

Reason	Ellabotha-ram	Peddapala-kaluru	Jantaluru	Total
Tail\location	6.0 (6)	33.3 (14)	45.2 (42)	26.4 (62)
Poor R & R work	1.0 (1)	14.3 (6)	--	3.0 (7)
Head reachers divert	7.0 (7)	7.1 (3)	9.7 (9)	8.1 (19)
Insufficient supply	75.0 (75)	--	18.3 (17)	39.1 (92)
No change\reason	2.0 (2)	38.1 (16)	24.7 (23)	17.4 (41)
Poor WUA	9.0 (9)	7.1 (3)	2.2 (2)	6.0 (14)
Total (N)	100	42	93	235

Note: Figures in parentheses are numbers of total observation
Source: Household Survey, GIDR

Table 5: Estimated Requirement of Funds for Launching PIM Programme in Gujarat

Overall fund requirement	Total Rs. (crores)	% to grand total	Rs/ha
Pre-launch	2.00	0.49	13
During launch			
Capacity building	30.30	7.43	202
Transaction cost*	69.50	17.04	463
Monitoring and evaluation	0.90	0.22	6
Reward	5.00	1.23	33
R&R	300.00	73.58	2000
Total	407.70	100	2718

- Overheads for PIM Facilitating Team (Rs. 67.5 crore) and advertisement cost (Rs. 2 crore).

Source: Task Force Committee Report, GOG (2003)

Annex

Characteristics of study WUAs.

States/ Details	Gujarat				Andhra Pradesh		
WUA village(s)	Thalota	Laxmipura	Tranol	Digas	Ellabotha-ram	Peddapala-kaluru	Jantaluru
Canal scheme	Dharoi	Dantiwada	Mahi Kadana	Ukai-Kakrapar	Sriramsagar	Nagarjunas agar	Cuddapah-Karnool and Tungabhadra
Region	Mahesana	Patan	Anand	Bharuch	Telangana	Coastal	Rayalseema
Water supply	Scarce	Scarce	Perennial	Perennial	Scarce	Perennial	Scarce
Main irrigation season	Rabi	Rabi	Rabi	Rabi	Kharif	Kharif	Kharif
Two main crops	wheat mustard	mustard wheat	tobacco wheat	sugarcane wheat	paddy maize	Cotton Chili	groundnut paddy
Command area (ha)	224	246	356	921	464	2,600	1,369
No. of villages/ territories	1	2	1	12	4	12	12
No. of WUA members	210	174	168	169	500	2,325	1,200
Implementing agency	NGO	NGO	ID	ID	ID	ID	ID

Source: Household Survey, GIDR.

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