

## **Community Management of Water: Experience and Issues**

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### **Introduction**

India has the dubious distinction of managing one of the world's largest irrigation sector as well as confronting several complex issues culminating into operational inefficiency of the sector. Various dimensions of these problems have been discussed in a number of studies as precursors to reform measures indicated earlier (GoI 1972; World Bank 1981; Abbie, *et al* 1982; Dhawan 1988a; Ruth, Meinzen-Dick 1994; World Bank 1991a,b; Vaidyanathan 1999). These reviews have made a detailed analysis and provide prescriptions ranging from financial management to institutionalising the distribution but invariably in a comparative static format. Following these, a number of administrative steps were taken to enhance the operational efficiency of the sector but precious little could be achieved. As a result, the ulcerating issues causing inefficiency have continued to dog the sector and surprisingly, some of the issues as well as the solutions are of vintage origin reiterated with renewed vigour.

The first ever review of irrigation sector of the country was made way back during British rule by an independent Commission constituted for the purpose. The First Irrigation Commission was a first systematic document: Following severe famines at the end of nineteenth century, and with the background of the report of the Famine Commission of 1898, the First Irrigation Commission (1901-03) was constituted to examine the developmental issues confronting irrigation sector in British India. It was recorded that during 1878-80, only 292 lakh acres of net sown area was under irrigation (Report of the Famine Commission, 1878-80), but by 1901, the Irrigation Commission estimated the area under irrigation at 441 lakh acres, recording an impressive growth. Interestingly, out of this, only 186 lakh acres was through the State owned sources of irrigation and 255 lakh acres was from private sources (First Irrigation Commission Report 1901-03). After that and in about two and a half decades i.e., by 1925-26, the net area irrigated in British India increased to 467 lakh acres (Royal Commission on Agriculture, 1928), with an increment of about a lakh acre per year. However, even with this increase the proportion of protectively irrigated area was only 11.8 per cent of the net sown area. The net sown area increased with a higher rate of growth and not only irrigated area lost pace with it, many new schemes were still to become operational. During twenties and thirties and with the vision of persons like Sir M Visvesvaraya, a few large irrigation schemes were designed and brought into existence. That gave a fillip to the development of the sector, and the area irrigated increased by about 8.3 million hectares (see, Table 1) in a span of about two decades.

**Table 1: Estimates of Irrigated Area in British India**

<b>Year</b>	<b>Irrigation Area (Govt &amp; Pvt) by all Sources of Irrigation (Million Hectares)</b>
1978-80	11.82
1901-03	17.85
1921-26	20.56
1947-48	28.20

Sources: i. *Report of the Indian Irrigation Commission*, Govt of India, 1901-03  
ii. *Royal Commission on Agriculture in India*, Govt. of India, 1928.  
iii. *Agricultural Statistics of India*, Govt. of India, 1950.

The First Irrigation Commission analysed the irrigation works keeping in view its two components, namely, productive irrigation and protective irrigation. The returns to investment was treated as a major issue for deliberations and therefore, only the schemes which could yield revenue were to receive immediate attention. The growth of irrigation sector in the following decades till 1947, treaded the path marked by the First Irrigation Commission's report and that laid down by the Royal Commission on Agriculture. The focus was on productive large irrigation schemes, and protective irrigation was incidental. At the time of independence, the total irrigated area of undivided India was 28.2 million hectares or 20 per cent of the net cropped area under irrigation, of which 19.2 million hectares were in the present Indian territory and the rest (8.8 million hectares) were located in the north-west region that went to Pakistan. After all these developments, the bitter fact remains that despite the expansion in the irrigated area till 1950, about 80 per cent of the agricultural land was still at the mercy of monsoon and operational inefficiencies of the sector accumulated throughout the five decades before independence. The astonishing similarity of the issues discussed in the reports of the First Irrigation Commission (1901), Deccan Canal Review Committee (1932), the Second Irrigation Commission (1972) and the Water Policy (1987) bear testimony to this fact.

Irrigation sector in India has undergone a complete metamorphosis through the five decades that followed independence. The planning for development of irrigation during the pre-independence period helped a great deal to set the vision for the future development of this vital sector. The roots of a good number of irrigation schemes designed and executed during the first three Five Year Plans can be traced back to their planning in the pre-independence era. These schemes assumed greater significance in the background of slow growth in agricultural sector during fifties. No wonder, in the wee years of independence, Pandit Jawaharlal Nehru described Bhakra Nangal as one among the 'temples of modern India'. During the First Five Year Plan, it was envisaged that in a period of fifteen years, the irrigated area under the multi-purpose projects would be doubled and hydro-power capacity would be increased from 2.3 million KW to 9.3 million KW. (GOI, Review of the First Five Year Plan, 1957). Bhakra-Nangal, Hirakud, Damodar, Chambal, Kosi, Rihad, Koyna and Krishna river basin projects were initiated during this initial phase with dual objectives. The policy thrust was very clear and it was more favouring the multi-purpose irrigation projects with equal (if not more) emphasis on generation of hydro-electricity. A need for harnessing water resources for irrigation was intensely felt during the food crisis of mid-sixties and a forceful public investment strategy was put in place in order to step up the development of irrigation. Development of minor irrigation sector received significant attention. This was complemented by other technological and institutional inputs but irrigation decisively played the crucial

pivotal role in the green revolution strategy. Most of the measures undertaken towards reform during these years appear to be *ad-hoc* in nature and resemble a fire-fighting approach. Consequently, the inefficiencies in management continued unabated in the sector. A systematic review of the reform process, therefore, would help our understanding of the lacunae.

## II. An Overview of the Reform Process:

As we have seen above, the Indian irrigation sector has crossed various landmarks of reforms beginning with the Famine Commission Reports of 1880 and 1898 to the water policy documents of the nineties. The Famine Commissions had indicated the necessity of providing protective irrigation to the most deserving regions in order to alleviate the impact of monsoon failures. The philosophy of development of irrigation during those years was to provide protective irrigation to the water stressed regions. But a quick departure came in the form of the recommendations of the First Irrigation Commission 1901-03, which emphasised on the 'productive' aspect sidelining the 'protective' aspect of irrigation. The emphasis of the Irrigation Commission report was on the financial viability of the irrigation works in India. After classifying into 'Productive' and 'Protective' works, the Commission emphasised the 'productive' aspect. Despite the experience of the famines during the eighteenth century the preference to 'productive' irrigation against protective irrigation was justified with a unique argument. We quote:

"Every extension of irrigation increases the security of the food supply of the country in years of drought, and, in these days of cheap railway freights, the produce of irrigation can be carried to those parts in which it is most required. For these reasons we think that the programmes of future expenditure on irrigation works should provide for the construction of *as many productive works as can be proposed in whatever parts of the country they are situated, and without reference to the urgency of protection for the locality*" (emphasis added) (GoI 1903: 35).

A clear departure away from the protective irrigation advocated in the Famine Commission reports of the late 19<sup>th</sup> century came to be established here onwards. As productive works became the engine of development, returns to investment naturally occupied the driver's seat. This trend took a slight diversion towards promoting multi-purpose schemes including hydro-power generation to accommodate the demand for the energy of the nation. Naturally, the commercially viable schemes were prioritised, planned and implemented. The location and design of irrigation systems during the pre-independence period, therefore, were geared towards hydro-power generation coupled with provision of irrigation water to the command areas.

Private irrigation and minor irrigation works received significant attention in the First Irrigation Commission Report. Working of the private canals, tanks and well irrigation was reviewed from the development, maintenance and ownership points of view. Being easy on design and operations, tank irrigation was a dominant source of irrigation and during those days it was managed by the community. The Commission also indicated sharing of risk in the case of failures in well irrigation (GoI 1903: 54) and recommended incentives for maintaining tanks (GoI 1903: 45). In the presence of tank irrigation and existing dug-wells, other minor irrigation works received little attention and remained out of focus till the early years of independence. In fact, the development of minor irrigation was rather neglected during the early phase of

development of irrigation in India due to over-emphasis on surface sources of irrigation.

The First Irrigation Commission Report (1903) emphasized the need for irrigation along with suggestions for its development in various provinces of the country. The Commission studied meticulously the track record of the present works and across provinces provided detailed cost of irrigation to be undertaken during the next two decades. These were worked out in detail in the provincial chapters (Part II). The approach of the Commission can be summarised in their words as

"We have endeavoured to distribute the proposed expenditure between different provinces in accordance with what we conceive to be the requirements and capacities of each; and as it can never be said in what part of the country famine may next occur, we think that protective operations should be undertaken in accordance with some definite scheme, in all provinces" (GoI 1903: 42-43).

The Commission also concentrated upon the administrative mechanism of levying water rates and indicated the future requirements of the investment capital. It recommended 65 lakh acres of area to be brought under surface irrigation at a cost of Rs. 4,400 lakhs (p.41). The volumes of the report on provinces of India include the details of the schemes which were classified into 'productive', 'intermediate' and 'protective' schemes. The Commission also provided guidelines about the financial returns expected from these schemes (GoI 1903: 42).

One of the important issues addressed by the First Irrigation Commission was the distribution of water among the cultivators. The problem was not as severe as it is felt today, but it is interesting to note that the Irrigation Commission as well as the Royal Commission on Agriculture strongly recommended to hand over the distribution of irrigation water to the cultivators below the main distributary. We quote:

*"The view taken by the Indian Irrigation Commission was that it would be a great advantage both to the Government and the cultivators, if the latter could be induced to take over their supplies at the outlets, to arrange all details of internal distribution between themselves and to relieve the canal administration of all further responsibility and of the great expense of recording the details of the irrigation and of making the final measurements and assessments" (GoI 1928: 336).*

Similar views were expressed in the Report of the Deccan Canals Financial Improvement Committee (1932) and by Sir M. Visvesvaraya in the Report of the Irrigation Inquiry Committee, Govt. of Bombay, (1938). Sir M. Visvesvaraya recommended

*"to entrust the distribution of water to the cultivators themselves wherever practicable by organising irrigation co-operatives or panchayats for the purpose" (Govt. of Bombay 1938: 54).*

But despite these recommendations, the distribution of water continued under the control of irrigation bureaucracy. This issue featured in most of the discussions about the sector all through the century and every time it posed as a fresh issue with similar solution. It is rarely that the first Irrigation Commission

report or the other documents are referred in this context by academics engaged in analyzing the irrigation sector of India (this includes Dhawan 1988a&b; GoI, Vaidyanathan 1992, 1999; Ruth-Meinzen-Dick and Svendsen, 1994; Hooja *et al* 2002).

In the post-independence period, the Second Irrigation Commission (1972) is a monumental landmark in the process of reforms. The document spread over two volumes analyses most of the important issues confronting the sector during that time. It focussed mainly on the 'protective irrigation' as an important devise for providing a suitable backup to agricultural production. This was quite expected as the report came at a time when the country was undergoing a severe drought of the century. Similarly, the concerns of the ongoing transformation in the agricultural sector due to the Green Revolution were also quite visible. This had the backdrop of various academics recommending inter-linking of rivers and Garland Canal, keeping in view the aggregate water balance of the country (K L Rao, Dastur and the like).

The Second Irrigation Commission laid emphasis not only on the planned development of irrigation in the drought-prone areas of the country as a priority task but also recommended on reforming the structure of administration of the sector including water rates, investment and return on investment. Its emphasis was very clearly on achieving optimum productivity per unit of water and better returns to investment. The Commission dealt elaborately on the issue of water rates and recommended 5-12 per cent of the gross value of output as the criteria for fixing the water rates. It also suggested to review this policy every fourth year which was rarely followed. Not many of these recommendations were translated into clear policy options.

Close on the heels of the report of the Second Irrigation Commission came Chaturvedi's Second India Study on Water (Chaturvedi 1976). The Second India Study incorporated discussions on various aspects of irrigation development that included: need to reduce wastage of irrigation water, productivity per unit of water, role of ground-water and its use, water conservation and the problems of water quality. The Study pointed out serious organizational inadequacies in water resource planning, lack of effective mechanism to deal with inter-state river disputes and recommended detailed interactive system planning models reflecting value of water for economy and society (Chaturvedi 1976). The returns to investment measured through the magic number of cost-benefit ratio held the entire attention of irrigation economist during those years (Sovani 1976). We find an exhaustive review of the financial issues confronted by the irrigation sector in the two important documents coming from the World Bank (Duane 1975 and Abbie *et al* 1982). The suggested reforms from these documents stressed upward escalation of water rates, justified both on theoretical as well as financial grounds. The upward revision of water rates also received a strong support from other analysts of the irrigation sector (Ansari 1968; Prasad and Rao 1985; Gustafson 1985).

The documents with the World Bank's initiative on financial reforms in irrigation sector emphasised correction of the revenue-expenditure imbalance. The focus was on financial viability and administrative bottlenecks, largely dealing with public irrigation systems. These problems dominated the debates for the last three decades with little success. Following the recommendation of the Second Irrigation Commission nothing substantial was achieved in correcting the financial problems in the sector. During late eighties, this issue again attracted the attention of the

analysts in the irrigation sector. This problem of heavy capital investment and ever increasing variable cost was highlighted initially in a document issued by the Central Water and Power Commission (1957) and subsequently, underscored by many along with the cost and time overruns of the project. The World Bank Review team had recommended during the early seventies an institutional process of management of the major irrigation system, following which the Command Area Development Authorities were established. Despite these institutions, Irrigation sector (specifically the major irrigation) continued its drag on the exchequer of the country. The revenue generated was far from meeting the cost of providing irrigation and the gap between revenue and expenditure was widening over time. Vaidyanathan Committee (1992) dealt with this issue in a greater detail both on theoretical as well as on empirical front but administratively the recommendations were not holistically implemented. The problem of financial mis-match thus continued. A systematic attempt was made to revitalize the sector by institutionalizing water distribution through Participatory Irrigation Management (PIM) networks (Hooja *et al* 2002).

Among other issues, the problems of distribution (Water Users' Associations), economic viability and sustainability of major irrigation systems, efficiency in water use, and environmental externalities of excessive irrigation also featured prominently in the debates. This debate was participated by many academics as well as attended by a few Government Committees to conclude that given the inefficiencies major irrigation is not the only deserving candidate for further investment on pure economic criteria. Under the force of these arguments, the earlier problems of time or cost over-runs, investment priorities between sources of irrigation and administrative reforms in irrigation management took a back seat. Over-exploitation of groundwater resources came up as an important issue as a result of the failure of the State to provide irrigation to the most deserving areas and absence of any such controlling policy towards minor irrigation (Saleth 1996; Dhawan 1993).

It is interesting to note that the emphasis, by the mid-seventies was shifting away from surface irrigation under major schemes towards minor irrigation. Consequently, the reform process was oriented more towards providing irrigation to the more deserving drought-prone areas through privately owned sources of groundwater irrigation. Even though the State policy emphasized (through investment priorities) surface irrigation schemes including construction of dams, barges and canal systems, well irrigation as a private source of water extraction was increasing substantially. This was prominently visible after the lending to the primary sector increased with easy access to the required capital. The nationalization of commercial banks in the late 60s, and the demand-driven irrigation development pushed up the growth in well irrigation in the drought-prone areas. On the one hand, there was a complete policy void about harnessing groundwater resources, whereas, on the other hand, easy access to credit for minor irrigation facilitated massive growth in well irrigation. As could be expected, the groundwater resources started depleting very fast and thus, the emphasis shifted from dug well to bore-well irrigation. The decades of seventies and eighties witnessed unprecedented growth in the use turned exploitation of groundwater with the help of private resources on the one side, and availability of energy and water lifting devices, on the other. By the mid-seventies, ground-water irrigation became a prominent and a competitive source of irrigation.

### III. REINVENTING PARTICIPATION IN IRRIGATION MANAGEMENT

During the last two decades the role of subsidies and expenditure on irrigation has become an important issue due to increasing fiscal deficits. It is found that the gap between revenue generated in the irrigation sector and the expenditure incurred has been increasing at a very fast rate. Operational inefficiencies and revenue non-compliance were identified as the major reasons. This rekindled the thinking of transfer of irrigation management to the users to reduce the cost and to increase revenue compliance. In this context, the age-old solution of transferring responsibility of irrigation management came to be seen as the only succor to reduce pressures on the State finances and also to address to the question of distribution of water. The issue of management of irrigation thus became prominent from three important points of view. First, the net returns to investment did not commensurate with the efforts in terms of investment or operation and maintenance cost. Second, the pricing of the resource had also remained sub-optimal for quite some time and this led to compounding the inefficiencies in the sector along with mounting burden of subsidy. Third, irrigation sector being the largest user of water, its influence on the environment and the consequent degradation (especially the groundwater sector) created a deep concern. It has been reported that large amounts of land resources were degraded mainly due to inefficient use of water and this caused the slowing down of investment in the sector as well as the resource use pattern. It is in this background that the concept of Participatory Irrigation Management (PIM) re-emerged as a solution to correct most of these maladies.

Right from the beginning of planning, irrigation sector has been keeping alive various facets of development debates on economic as well as on political fronts. It is also a well documented fact that the sector promoted deepening of the political process that interfaces with many reform measures undertaken (Sudhir Bhongale, *Panyache Rajkaran (Politics of Water) Marathi*). The situation is the same in most of the states in India, therefore the controversies involving efficiency of investment in irrigation sector have assumed greater significance. The problem of inefficiency in operation and poor returns to investment were recognised during 1930s. Following this, the surface irrigation projects came under sharp criticism for inefficiency in operation, capacity utilisation, distribution gains, cost & time over runs (Govt. of Bombay 1932). The solution recommended was the management of the system by the users and that continued till eighties (Malhotra 1982). Recently the controversies involving environmental externalities dominated the scene. At the same time, the inconclusive controversy of big dams *versus* no dams also rocked the country. This debate spurred many side issues but fortified stands about construction of dams continued without much change. The issues of water use efficiency; environmental externalities; handing over irrigation management to the users; and inability of the water rates to meet the operation and maintenance costs became shaper and featured with renewed concerns. Most of these ended up with the institutional solution of Participatory Irrigation Management that was implemented and found difficult to hold ground as it had to break through the irrigators-polity-bureaucracy stronghold. The solution was always recommended with renewed enthusiasm. During mid-nineties it began with a big bang and a strong theoretical build up behind its introduction. Supported by the World Bank (1998), it was accepted as a ready solution in a few states (Andhra Pradesh, Maharashtra, Karnataka). In this paper,

we attempt to analyse the institutional aspects of irrigation management as reflected from the literature and with the help of a few case studies. Our attempt here is to analyse the role of such participatory institutions under different settings and property regimes.

#### **IV. Role of Institutions: A Theoretical Scaffolding**

Any development process presumes three levels in achieving its goal. The first stage begins at the preparation for the process of development that essentially requires inducing growth in the first place. Availability of investment and resources for achieving such growth is an important component at this stage. The second step is to ensure the quality of growth and its structural placement. In other words, the two stages together involve identifying the weak and strong spots of the economy and ensure that the resources are directed towards their optimal use. The third stage is a crucial one, which translates growth into development through a conduit of either existing or newly constituted institutional structures. Distribution is the core of such process. This transfer even though remains only as a component of the growth process, the role of institutions is pivotal. Thus the failure to translate growth into development rests on the fulcrum of such distribution-oriented institutions. This has been brought forth historically in different case studies (Vermillion 1997; Groenfiedt *et al*/1998; Oblitas *et a.*/1999).

Institutions are defined as the rules or norms governing any social and economic process. These can be formal institutions initiated and directed by the state or informal institutions established by the stakeholders or emerging through cultural dynamics. In the context of irrigation, institutions include laws and policies of the State, administrative arrangements for operation and maintenance of the irrigation systems, land, labour and capital use in the irrigation systems and interface of the stakeholders in terms of informal institutions. It is, therefore, clear that the complex of institutions governing irrigation sector has three different actors namely, the State, polity and the irrigators. Among these the State and State governed laws through the interdepartmental bodies administering irrigation (Revenue and Irrigation Department) are important. These are interfaced with the private property regimes in terms of land ownership and tenancy contracts. In this dual control framework the theoretical behaviour of institutions is exactly like technological intervention that shifts the production frontier upwards, but unlike technological change, institutions do not alter the physical quantum of resources. Institutions help to maneuver the resource allocation, the formal government controls and help the stakeholders to modify the final impact. Such interface essentially creates a kind of reaction depending on the property regime, the people involved, and the state control. In addition to this, the natural resource use parameters also influence the making of these regulatory institutions.

Institutional theory from the angle of production economics helps in answering many of the issues where an interface occurs between the State initiated structures and the user groups. Focusing on costs and benefits, incentives and penalties, to individual actors, institutional analysis demonstrates the economic rationality of co-operation and possibility of co-operative equilibrium outcomes from competitive games (Ostrom 1992; Sengupta 1991). Moreover, institutional-economic analysis also provides answers to the important question namely: What are the conditions wherein individuals realize the necessity of collectiveness and under what conditions will they co-operate? It also helps to predict the conditions under which

farmers are willing to go in for collective action as regards the management of irrigation water resources by themselves. Institutional economic analysis therefore, offers the possibility of the kind of prediction and generalization of the theory of co-operative action which developmental agencies require for generating predictable outcomes. Our analysis is placed in this context both in terms of theoretical arguments and empirical support.

## **V. Collective Action and Irrigation Management<sup>1</sup>**

The importance of institutional arrangements dealing with water planning and management has been assuming increasing importance. But what makes individuals come together for such collective action is an intriguing question and that decides the sustenance. Generally, individuals associate themselves for a collective action with an objective to face the uncertainties and in search of the solutions to the problems confronted. Since individuals face a number of problems, insolvable on their own, they tend to assemble together to find solutions and this becomes an immediate necessity rather than a choice. In such process an individual not only gets an identity but also security through collective action.

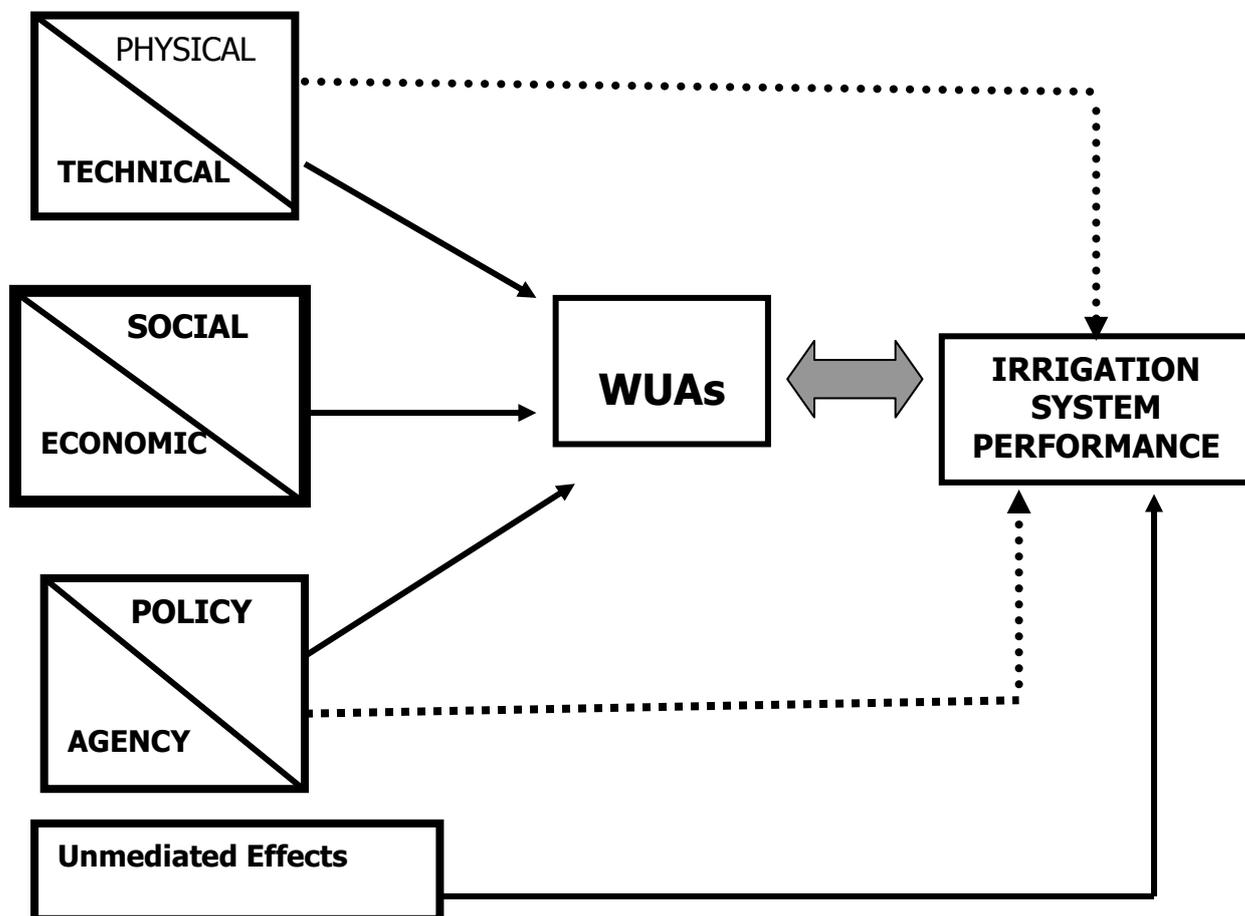
There are various schools of thought which explain collective action. The first (and most recent) draws on an institutional economic analysis of local forms of collective action to derive generalized principles for collective action (North and Thomas 1970; Bardhan 1993). These analysts use formal models derived from the theory of repeated games to challenge the dominant thesis on feasibility of collective actions among rational self-interested individuals. The second school emphasizes the force of tradition, social rights, value systems and moral codes in generating and preserving co-operative management of resources to ensure, among other things, a minimum food security for community members (Ostrom 1992). Collective dependence on local resources is often institutionalized in religion, folklore, and tradition. These two schools of collective action arise from two strongly established traditions in social sciences, namely, the schools of 'rational choice' and 'moral economy'. The constructs are rather similar in terms of images of collective action but differ in their philosophical base. In "Rational Choice" associated with Thomas Hobbes and Adam Smith, a person, first of all is a rational self-interested individual (*Homo economicus*), while in "Moral Economy" associated with Durkheim the person is first a social being (*Homo Socialisticus*) guided by social norms and then only an individual. The collective behaviour modeled in the moral economic framework presumes that under the pressure of risk aversion the farmers develop collective social insurance mechanism. It has been also argued in the literature that assumptions of a risk aversion or 'safety first' are not necessarily the only reasons of collective action and incorporation of market as an important factor in leading to collective action is essential (David Fenny, 1983). Therefore, in any analysis of collective action the immediate need is the analysis of the conditions under which such collective action emerges, becomes effective, and sustains over time.

This conceptual framework keeping in view collective action in water resource sector can, therefore, be represented aptly in a diagram (see, Figure 1).

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<sup>1</sup> Portions of this section draw on author's earlier work Deshpande and Mini (2003)

**Figure 1: Factors Affecting WUA's Role in Irrigation System Performance**



The conceptual framework to demonstrate collective action keeping in view water resources sector is depicted here. The Water Users Associations (WUAs) are formed through the synthesis of physical, technical, social and economic parameters. Policy and agency represented by political institutions induce such formations and sustain them. But all of them act at different levels. Initially, it is the technical and physical parameters that decide the formation. This is reinforced by the social and economic factors. The political intervention is a crucial deciding factor here. Finally, the agency and policy sustain these. In addition to this the formation of an institution is decided mainly by the homogeneity of the community involved. It is a direct function of the interests and matching of these interests among the members of the institution. The formation of WUAs has also a strong link with the performance of the irrigation system and the physical conditions. Sustainability of an institution, therefore, hinges on the process of its emergence, interface with the society and State and the physical condition of the resources in question.

## VI. The Process of Formation

As seen above, the process of formation of WUAs emerges through different theoretical constructs. These include the 'moral economy' framework and the 'collective action' framework. Social engineering, scarcity of resources, inability of the state to ensure fair distribution and increasing inefficiencies in use of resources contribute towards organising an users' association. In the context of an irrigation system the WUAs originate either from an external initiative (i.e., State initiated or NGO initiated) or from the indigenous efforts of the water users. The differences in the two approaches are that the former one will be more legalistic, formal and therefore, initially these will be firmly grounded but unsustainable in long run whereas, the self-initiated efforts will be informal and thus may have a fragile setting however sustainable in long run. The process goes through four stages namely; (i) felt need (by State, NGO or by stakeholders), (ii) external conditions, (iii) internal structure, and (iv) the formal process.

The pressure of inefficiencies due to earlier management practices, improper distribution of water, ill maintenance of the system, economic non-viability and inefficient use together provoke the initial process whereas, external factors decide the structure and functioning of WUAs, which include (a) the physical and technical aspects of the irrigation systems. (b) the social and economic contexts in which they operate and (c) the government and policy forces which regulate the WUAs and the irrigation system. All these factors together set the precondition for the emergence of a WUA. But these cannot be independent of the internal structure of the proposed association. The internal structure includes the interface with the contours of the proposed structure, the legal and the enforcement framework and the process of conflict resolution. The process of emergence is dictated by various components (as shown in Box 1).

**Box 1**

<b>External conditions</b>	<b>Internal structures</b>
Physical and technical factors: Water scarcity Technology and infrastructure Social and economic factors: Market penetration Farmer incentives Financial viability Local social organization Policy and government factors: Policy environment Legal framework Agency structure and incentives	Origin Membership definition Size Leadership roles and specialization Socioeconomic heterogeneity Rule enforcement Water distribution Conflict resolution

### VI.1. Generalisation *versus* Local Specificity

WUAs in India originated either through initiatives from a few NGOs functioning in these regions or by the interested individuals. A large number of them, in search of a tight legal framework, got registered as registered societies under Societies Registration Act or the state Co-operatives Act (Datye and Patil 1987; Lele and Patil 1994). This ensured a continuation of the state control albeit in a different form. In fact the very establishment of such users' association faces difficulties

wherein, the state functionaries refuse to share their responsibilities with others (Lele and Patil 1994). Experience from Andhra Pradesh is in a similar pattern, but entirely different. In Andhra Pradesh, the State Government through its functionaries initiated steps to form WUA. (Joshi and Hooja 2000). It is an accepted fact that with the initiative from the state, the WUAs become stable but their efficiency and effectiveness cannot be granted (Jairath 2001).

Theoretically, as Vedeld puts it, village polity and its nature in terms of political homogeneity (or heterogeneity) decides the sustenance of such group (Vedeld 2000). It is possible to form a group induced under the state efforts even under politically heterogeneous situations but its sustenance or effective working is doubtful. As an alternative if the collusion and collective action germinates out of the pre-formation constraints and without any external force, it remains more stable. Jean Jacques Laffort (1997) argued that let the collusion take place and only at that moment collective action on the part of the actors will emerge successfully. This requires the agents to have two sets of information, namely, the information about the mutual and collective requirements and the contours of mismanagement in the earlier regime. All this leads to the fact that organisations are readily feasible, largely effective and stable over time if these are formed with complete information of local level problems. A corollary of this is that the institutions sustain only till the conflict (collusion) situation prevails. It is likely to collapse under the pressure of the market interface with local polity and with the difference private vs. social gain.

## **VI.2. Property Regime**

Any collective action is associated with the typologies of property regimes under which it originates. In a private property predominant resource the collective action does not originate unless the pre-conditions are very strong. The conflict resolving mechanisms either established by the state or by the state-sponsored agencies do not function satisfactorily in a private property predominant regime. The sustenance of collective action is also jeopardised in a private property regime unless the external conditions are not sufficiently strong and binding. In the private property regime the necessary condition for initiating collective action will require the failure of the state and/or the market in the process of conflict resolution. More than that, the message should go very clearly to the actors (participants) that the state/state agencies had failed in resource management. Any collective action stemming in the private property regime therefore will aim at a better conflict resolving mechanism than resource conservation system.

Formation of a users association in the domain of Common Property Resource or Open Access Resource is not as difficult as that under a private property regime. However, if the ownership status is of mixed nature then the stability of the user groups gets affected. In a purely 'non-private ownership' situation, the feasibility of users' association is dictated mainly by the inability of the state in ensuring the welfare of the user groups and such interventions by the state which provoke conflicting situation. The social engineering of the formation of an users association becomes much easier in the common property regime mainly due to five reasons namely: (i) there are no conflicts of ownership, (ii) state is not the solely dictating partner, (iii) formation of the users' association relaxes the state control, (iv) Local level flexibility is feasible in organising the institutions, and (v) The use rates can be clearly defined (see, Deshpande and Nikumbh 1993).

## VII. PIM In Retrospect

Participatory Irrigation Management is not a new concept in India's irrigation sector. Historically, whenever the inefficiency of irrigation sector was discussed the often sought solution was to hand over the distribution and management of irrigation system to the users. In the Indian context, irrigation was largely managed by the village communities from the ancient period and it is only during the nineteenth century that the State control emerged significantly. The First Irrigation Commission (1901-03) strongly recommended the management of the water distribution by the cultivators but the State consolidated control through legal instruments during 1919. The Royal Commission on Agriculture (1928) reiterated the recommendation of participatory management very strongly. It was in the context of the prevailing water use inefficiency and financial problems that the Royal Commission sought this solution. The Deccan Canal Inquiry Committee (1932), after reviewing the costs of operation and maintenance, on the one hand, along with the income from water rates, on the other, recommended management of the distribution system by the groups of irrigators. Followed by this, the architect of India's irrigation sector, Sir M. Visvesvaraya, in the Irrigation Inquiry Committee report emphasised handing over the irrigation distribution to village panchayat. Probably, all these recommendations did not receive the favour of irrigation administrators, who enjoyed the stronghold on the sector. The 'Temples of Modern India' continued to be constructed along with '*Agraharas*' (vicarages or priest homes), and it was difficult politically to wean away the bureaucracy from the operation and maintenance' function. Robert Wade argued that corruption 'system' which involves generation of illicit revenue and centred on control of personnel transfers, is an important supply side reason for poor performance of canal irrigated agriculture (Wade 1982). He clearly emphasized that "it is safe to say that engineers can, and many do, earn many times their annual official income in these various ways. Our illustrative figures given above are from an upland area, and there is reason to think that on the more fertile, intensively irrigated coastal deltas, the profitability of O & M posts is considerably higher" (Wade 1982:302). A little is done to correct the system and as a policy solution Participatory Irrigation Management is suggested by many. Can PIM solve this problem efficiently? Probably, under-estimating the fact that even in a Participatory System the 'Players' (stakeholders) do not change and O & M will continue to stay as the major 'milking cow'.

After independence, the First Plan document laid emphasis on peoples' ownership of the project in the context of betterment levy to quote "that people in every area should feel that the project included in the Plan is their own and they should make special sacrifices for getting it completed" (GoI 1957:166). During the sixties and seventies the emphasis was more on creating new irrigation facilities and therefore, the distribution down the canal system was not a prime issue under discussion. However, Warabandi, Phad System (Punjab, Haryana and Karnataka) and Shej Pali (Maharashtra) were the methods of water sharing discussed widely in the literature. The Second Irrigation Commission did not consider irrigation management by irrigators as an important component of improving efficiency. Chapter XII of the report deals with administration and organisation of irrigation projects. While analysing the dual control of revenue and irrigation department on water distribution in southern states, The Commission taking a purely administrative and technocentric view recommended "the southern States and Maharashtra, might consider making the Irrigation Department responsible for the management of water from the source to the field" (GoI 1972: 299-300). The issue of irrigators managing

the water distribution thus remained in cold storage till early eighties. Bottrall's work on comparative study of management and organisation of irrigation works for the World Bank again reopened the issue (Bottrall 1981). Several studies came after that highlighting the advantages and effectiveness of farmers managed irrigation systems (Wickham, 1985; Rao and Sundar 1985; Vaidyanathan 1994).

Farmers' Management of irrigation system received a clear boost after 1991. In 1992, of the four significant documents addressed parallel policy issues one came from the World Bank and another in the form of the Vaidyanathan Committee Report from the Planning Commission (Parlin and Lusk 1991; World Bank 1991b; Cornea and Menizen 1992; GoI 1992; Salman 1997). The third and fourth were detailed studies by senior scholars in the field. These documents emphasised irrigation command areas to be handed over to WUAs.

By early nineties, it was emphasized that World Bank supported irrigation projects were required to provide the responsibility of recovery of the Operation & Maintenance (O & M) to the beneficiaries. Water Users' Associations came as one of the recommendations of many studies by early nineties as an additional institution to correct the ulcerating problem that dogged the sector for decades, albeit, with a hope to correct systemic problems deeply rooted with the irrigators' polity. The World Bank documents recommended upward revision of water rates to cover O & M costs but little thought was given to the rationality of such costs and the context of the increasing trends in these. It was ironical that on one side the O & M cost was increasing unabatedly with swelling irrigation bureaucracy along with unwarranted expenditure on various construction activities, whereas, on the other side, the maintenance of the irrigation system was deteriorating significantly restricting water use. But emphasis was more on the recovery of O & M costs through increased water rates than correcting the systemic problems of increasing cost in the sector. The issue picked up significantly with Andhra Pradesh setting a role model and a World Bank handbook issued in 1998. At the country level, the Union Ministry of Water Resources offered incentives to the States to initiate farmer managed irrigation systems under minor irrigation projects. This initiative came in 1985 and the Ministry also provided guidelines for implementation. In the Seventh Five Year Plan, a Centrally Sponsored Scheme under Command Area Development was introduced. Under this scheme, a subsidy of Rs.100 per hectare was offered for first two years and Rs. 75 per hectare for the third year, for encouraging farmer managed irrigation system. The National Water Policy of 1987 also reiterated "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". Following this, the three plan documents as well as the policy statements reinforced the argument. A national conference on PIM was held in 1995 and that was followed by State and regional conferences in 1987. The euphoria caught up and quite a few analysts contributed significantly to the issue (see Joshi and Hooja 2000; Hooja, Pangare and Raju 2002). Certainly, this was not different than what Sir Visveswaraya had envisaged but came into practice only with pressure from an outside institution.

### **VIII. The Evidence from Field**

In the background of the framework of WUAs developed above we have taken up a few case studies to analyse the precondition for the emergence, process of formation and characteristics for their sustenance. We have attempted here cases

from three different domains, namely, the associations in canal irrigated region of two different types, and one from groundwater irrigated region. The rationale behind viewing the collective action from these three dimensions is to bring forth variations due to different property regimes. In a surface irrigated regime, the State has a stronger control on formation as well as sustenance of a user institution. To some extent, tank command areas have private as well as public control on the emerging institutions. We came across a tank command area managed by minor irrigation department or by village communities. Private individuals rarely owned a tank and management of privately owned tank was quite sporadic. In contrast to these two situations, the groups sharing groundwater had complete private ownership on the system.

### **VIII.1 Surface irrigation: Institutionalisation in a State regime<sup>2</sup>**

The experience of PIM in Andhra Pradesh is always cited as an ideal example in the country. Significant amount of work is done in the State and therefore, it provides a good example to begin this empirical review. Andhra Pradesh had its own share of the problems of the irrigation sector. It is one of the leading States in investment in irrigation and also in irrigation reforms. Like most of the states, Andhra Pradesh experienced an increasing trend in irrigation expenditure with little gain in area under irrigation (Reddy 2002). In the last decade, on the lines of other reforms, even the institutional reforms in irrigation sector in Andhra Pradesh have been attracting attention of academics and international agencies. The reform process included: providing a proper legal framework for the Participatory Irrigation Management (PIM), financial autonomy for the WUAs and large scale training programmes for the participants. Incorporating these aspects Andhra Pradesh government issued a "White Paper" on irrigation, which included various problems of the sector and the policy steps. The issues were discussed threadbare in the State assembly and as a consequence, Andhra Pradesh Farmers' Management of Irrigation Systems Act (APFMIS Act) was passed in April 1997. A step towards creating a legal institution, but by-passing the problems of higher level inefficiency. The existing irrigation and Command Area Departments continued as parallel institutions and steps were initiated to improve operation and maintenance through WUAs (Reddy 2002, 2003).

PIM in Andhra Pradesh dealt with the efficiency of water use by operating on the supply side problems and ensuring financial viability of the irrigation systems. The impact of PIM on cost of maintenance and resolving the problem of inequity in distribution is also an important component. The aim was to reduce the sphere of responsibility of the government and entrust the user groups the task of maintenance, management and water allocation. The simple logic behind the suggestion rests on the assumption of higher efficiency in resource management by the user group. The Farmers Management Irrigation Systems Act 1997 (APFMIS) was passed with the object to provide legal support to the participatory irrigation users organisations. Initially in 1984, the AP government passed Command Area Development Act that required the formation of "Pipe Committees", this was followed by APFMIS Act and thus another chain of institutions to deal with the problem, ironically the participants remained the same. The irrigation sector policy statement, that went through discussions during 1997-98 was issued under the title "Reforming the Irrigation Sector for Sustainable Management and Development". Andhra

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<sup>2</sup> This section draws from the earlier work of the author Deshpande and Mini (2003)

Pradesh has shown path for establishing and working of the PIM system but the problems need to be viewed carefully. Jasveen Jairath (2001) attempted an assessment of WUAs through an elaborate fieldwork and the outcome of her painstaking exercise opens up quite a few questions.

The APFMIS Act: i) facilitates WUAs to resolve conflicts themselves; ii) allows improvement of the irrigation systems by the WUAs based on resources raised by the WUAs or from out of the grants given by the government as a percentage of water charges collected from the WUAs; iii) allows access to information by the WUAs on scheme operations; iv) requires the preparation of an operational plan and maintenance plan by the WUA; v) provides freedom of cropping pattern to farmers; and j) contains procedures and guidelines on accounting, social auditing, water budgeting, election procedures, and other administration. Till 31 May 1999, the total number of WUAs formed was 10,292; that included 1,699 major, 413 medium and 8,180 minor projects. Elections were conducted for 9,797 WUAs (in minor projects, only for 7,749 WUAs). In the case of 495 WUAs, elections were not held for various reasons. The assistant engineer at the WUA level and the Deputy Executive Engineer at the DC level have been designated as the competent authority (CA) who can record the works carried out, prepare bills and recommend payments clearly indicating the fact that crucial decisions remain with them.

PIM experience in Andhra Pradesh developed during the nineties with a strong push by the Telugu Desam Party government led by Chandrababu Naidu. Analysts have pointed out various stages in the reform process in Andhra Pradesh. Broadly, one must note four pointers emerging out of the analyses of this experiment. First, the experiment began with a complete understanding between political and administrative systems in the State. Through the political system, it was woven upwards with the help of party cadres. Administratively, as most of the easier functions were to stay put under the present bureaucracy whereas, the difficult (irritating) responsibilities were to be transferred to WUAs; it was quickly acceptable. Second, the emergence of these reforms have a long drawn history and thus it gradually descended to receive acceptance from the stakeholders. The history began with 'Pipeline Committees' and went through various stages to receive complete acceptance by 2001, when the landmark decision of apportioning actual water cess for operation and maintenance was taken (Hooja *et al* 2002: 6). Third, the analysis of impact of the WUA by Pangare (2002) indicated increased irrigated area, better collection of water taxes, emergence of new leadership, and improved quality of operation & maintenance cost. Fourth, the success, however, has quite a few overtones. Pangare noted that "In many cases, the WUA President being a dominant person, acted as a contractor and took on the works himself resulted in the siphoning off funds or sub-standard works. Because of his position and fear no one in the WUA complained. As the officials have to pass the bills of the sanctioned works, the compliance with the President has increased their rent-seeking behaviour" (Pangare 2002: 49). A similar observation was made by Reddy (2003). In conclusion, the reforms in Andhra Pradesh have a lot more to achieve on the front of its sustenance. From a theoretical point of view it probably will result in creating another set of redundant institutions with a new found source of corruption and use of State funds. On a positive side, probably we will end up with a model participatory experiment if corrective measures are taken on way of its implementation.

## VIII.2 WUA: Gundur Case

Another interesting case is that of the association, which began with the users' initiatives and the administration was an involuntary partner. WUA functioning in the village Gundur of Koppal district of Karnataka presents such situation. It is one of the few associations functioning actively for a few years and provided a useful laboratory for the study of collective action. Farmers' comprehension of the principles of water management suggested that poor management by the State agencies led to excess of water availability in some areas and deficiencies elsewhere. It is the water scarcity in the presence of poor management that forced the farmers to maintain sub-distributory and field channels collectively by undertaking weeding and silting once in a year before the irrigation season starts. Since they did not receive grants from any source, the association itself generated financial and technical assistance. Collective action thus relates to the benefits they receive from maintenance and the stress on resource distribution. Along with the irrigation infrastructure, the facilities for transport and communication also facilitated the activities by making it easier for members to meet, travel along the system and to monitor compliance. All the members of the association grew only paddy, since they felt that it was the only assured crop and with good roads and connections the farmers would have better access to markets. Hence, the market penetration increased the economic returns to agriculture, and thereby the incentives of farmers to participate in WUA.

More than any single factor, long-run sustainability of the association depends upon sufficient incentives to farmers to participate and this also increases the feasibility of the association. This includes more efficient and reliable water delivery, control over water, augmented farm productivity and farm income, empowerment of farmers etc. Viability of the association is partly due to the process of farmers making investment in maintenance and cleaning of nalas. They had no hesitation to pay water charges to the association as well as to the revenue department. Some of the farmers were also of the opinion that water rates could be hiked to promote judicious use of water. This association is stronger in spite of the fact that the group is heterogeneous in their social background and economic status. Both the local and migrated farmers are the members of the association.

As the members of the association live in a single village the disputes are generally settled in the context of shared dependency and loyalty to the leader. Moreover, water related disputes are very rare as water is sufficiently available. Financial transactions and records are open for verification. A few farmers verify the records and their verifications are authenticated by their signature or thumb impressions. Therefore, transparency and accountability together has strengthened the collective action. Effectiveness of the association in encouraging members to contribute to group effort revealed that given a conducive environment, timely and reliable water supply and political leadership, groups will emerge and survive where a critical mass of individuals have practical knowledge of the potential gains from the action.

There are a few interesting points that emerge out of this case study. The association was formed by the stakeholders under the stress conditions caused by mis-management of water distribution. The scarcity of the resource, good understanding of the technology, availability of infrastructure and market links helped the formation of the group. Its viability and strength was derived out of the

incentives in terms of a just distribution system as well as a good experienced leadership. Despite the fact that the group was heterogeneous it has developed a sustainable conflict resolving mechanism and rule enforcement. The sustenance could be achieved largely due to availability of water through collective pressure on the irrigation bureaucracy.

The case discussed earlier had the benefit of user initiative even though it worked in close association with the irrigation bureaucracy. Here, the administration was an involuntary partner and had little influence in functioning of the group. But we have deliberated below about the groups, which were initiated at the intervention of the irrigation department.

### **VIII.3 The case of WUA formed by Command Area Development Authority (CADA)**

In order to ensure proper supply of water in the tail-end area of the project in Raichur and Bellary districts, 16 WUAs were formed with the initiative from CADA. In order to enable the society to take off in the initial stages, a Central Sector Scheme was formulated (to form WUAs) and implemented to provide money to meet the established cost and other contingent expenses. It was programmed to provide financial assistance in the form of managerial subsidy for a period of three years of study undertaken to see the functioning of the WUAs revealed the fact that all the associations had become defunct. An attempt is made here to analyse what were the contributing factors for the failure of collective action. Water did not reach the tail-end of the project, due to indiscriminate use of water in the higher reaches of the distributory without discipline and the sub-distributory systems have become inoperative. As a result neither the agency nor WUAs were able to prevent crop failure. As water became very scarce, even perfectly coordinated actions and investments could not solve the water shortages and thus these cases provided insignificant motivation for collective action. As a result and due to the non-availability of technology and infrastructure the sub-distributory system became

**Table 2: WUAs Formed with State Initiative and Failed to Sustain**

<b>Name of WUA</b>	<b>Taluk</b>	<b>Year of Registration</b>	<b>Extent of Land in Hect</b>	<b>No. of Farmers</b>
1. Jowka	Hospet	1991	825	200
2. Mannur Sugur	Sirguppa	1991	1,018	100
3. Amarpur	Bellary	1991	1,325	200
4. Bandral	Sirguppa	1992	503	100
5. Karur	Sirguppa	1992	1,000	100
6. Kolor	Bellary	1992	243	100
7. Andral	Bellary	1992	1,440	200
8. Chaganur	Bellary	1992	488	100
9. Balkundi	Sirguppa	1998	480	100
<b>Total</b>			7,322	1,200
1. Dhadesugur	Sindhanur	1990	799	100
2. Somalapur	Sindhanur	1992	1,000	100
3. Diddigi	Sindhanur	1992	800	100
4. Manvi	Manvi	1992	1,000	100
5. Gadar	Raichur	1992	501	100
6. Sindhanur	Sindhanur	1993	550	100
7. Belliganur	Sindhanur	1996	875	100
<b>Total</b>			5,525	700
<b>Total 1+2</b>			12,847	1,800

\*Note - from November 1997 Raichur district has been bifurcated into two districts: Koppal and Raichur. Raichur district is undivided here

Source: CADA, Munirabad

inoperative and reduced the incentives for WUA activity. This reflected on the sustenance and financial viability. It is found out from the farmers that if WUAs had to function, immediate repairs and rehabilitation of the canal system should be undertaken first by the irrigation department. And the rehabilitated canal system should be handed over to the associations, which would create a source of income to the association in the form of water rates, and this would be an incentive for the farmers to maintain the system efficiently. Neither CADA officials nor their nominees of the association spent time with the irrigators. No emphasis was given to help the farmers to identify their problems, bring out alternative solutions and assist the irrigators in identifying appropriate strategies. This failed the formation and sustenance of the group.

Finally, because irrigation agencies were traditional engineering organizations, the professional reward was always identified with the design or efficient implementation of physical projects, and not in the routine O and M or dealing with farmers' demand which ultimately resulted in the failure of collective action. In the absence of pressure from the user groups this was neither attempted nor feasible.

Financial assistance by way of managerial subsidy for a period of 3 years given by CADA provided incentives for 16 WUA to be registered. However, after three years of checkered functioning, the efforts did not impact on quantity as well as intensity. While non-receipt of salary dampened the enthusiasm among the employees of the association, the difficulties in procuring water made the members of the association lose faith towards the group functions. The Tungabhadra project

also presented a similar picture and WUAs created in a top-down administrative fashion generally lived a very a short life.

There are quite a few important parameters for a WUA to be successful. First of all, the WUA should be reducing the role of irrigation administrator and at the same time enhancing the role of water users in effective water use. The handling of operation and maintenance funds need to be carefully watched and audited as mismanagement of such funds is more a rule than exception. Second, homogeneity of the group, its flexibility, political entrepreneurship are essential ingredients for WUA. An exercise of forcibly forming WUAs may not ensure the presence of these characteristics and therefore, the group will not be sustained on socio-psychological count. Third, the capability of WUAs will depend on structural conditions of the group (social, political and economic), norms of relationship with bureaucracy, clarity in the structure and the method of such exercise. Fourth, democratic decision-making and adherence to the agreed rules of management, control of the management committee help in effective functioning of WUAs. Last, most of the times the sustenance of such WUAs, especially after the withdrawal of the key organisers comes into question. Such sustenance is possible only when the catalytic agency maintains at least minimum stake from the beginning.

It is quite intriguing that the command area development authorities will continue to stay put in their positions, whereas at the same time WUAs will be entrusted with the responsibility of operation and maintenance. It is well known that there exists significant transaction costs in the irrigation sector of the country (see, Wade 1988) and with WUAs a new stage is created for passing the money through. In the present scenario a CADA will continue to spend on the staff and the manpower and in addition to this, the WUAs will have the authority to spend on operation and maintenance. Any vivid observer of rural India will certainly remark that we are opening other floodgates (WUAs Chairmen, members) in addition to the already existing (CADA) on country's resources. Reddy (2002) observed that many Chairmen of WUA in Andhra Pradesh have metamorphosized into a new incarnation as 'civil contractors' to undertake operation and maintenance on behalf of the WUAs. A clear evidence of a sinecure.

Historical development of institutional systems in India clearly shows that we dismantle the existing structures in order to create new institutions with little improvement. This is done overlooking the fact that the cost of old structures continues to drain the state resources in addition to the resources required for the new administrative structures. More prominently, the old institutions (like CADA) continue to exist with the same inefficiency and culture. Sometimes, even when the inefficient institutions are dismantled the very same people are drafted to run the new form of institutions under the ill-founded expectation of increased efficiency. Ironically the decision to introduce these sinecures and structures originates from the noble objective of saving and efficient use of resources. But finally culminates into increasing the financial burden on the State exchequer with the same inefficiency.

## **IX. Groundwater- Pani Panchayat as an institution of collective action<sup>3</sup>**

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<sup>3</sup> This section derives from the earlier work of the author See Deshpande and Reddy (1999) and Deshpande and Jyotishi (2000)

'Pani Panchayat' was started in the background of the severe drought of 1972-73 in the State of Maharashtra. During the drought year a forum of Industrial Technologists was organised under the leadership of Shri Vilasrao Salunke in Western Maharashtra to suggest ways and means to deal with the drought situation. The group went around the drought-affected region and felt that only collective action could help mitigate the effects of drought. Similarly, they also wanted that drought preparedness could be organised in a similar manner. The choice was quite difficult. Maharashtra being a hard rock aquifer region groundwater was not plenty in supply so that each farmer could have an irrigation well. The water impounded in the percolation tanks was to be utilised and the natural feasibility was to get a group organised to share groundwater.

As a first step, in the process, a trust under the name Gram Gaurav Pratishthan (GGP) was registered in the year 1974. As an initial step, the GGP leased-in a 16 hectare plot of land on a long-term basis at Naigaon in Saswad taluks for the work. It had set its objectives focussing on the drought preparedness and sharing of the resource. The objectives were:

- ❖ To provide initially relief to the farmers of Purandhar taluk (Pune district) by improving their economic conditions and to remove the cause of recurring droughts.
- ❖ To create facilities to raise their social and economic conditions to attain welfare of the people in this taluks.
- ❖ To conduct research studies in socio-economic conditions, so that the urban interest will be linked with the process of creating integrated rural development.
- ❖ To do all such lawful things as are conducive or incidental to the attainment of all the above aims and objectives. (Deshpande and Jyotishi 2000)

The experience of the Naigaon farm from 1974 to 1979 and a continuous thinking about the GGP's objectives gave rise to certain principles in water sharing. Shri Salunke started a farmer's co-operative lift irrigation scheme with the initiative of the farmers. The initial scheme started at Naigaon itself. Seven basic guidelines were formulated to run the scheme. These were as follows:

- ✓ GGP would help in formulating group lift irrigation scheme of cohesive groups. Individual schemes would not be taken.
- ✓ The sharing of water was on the basis of the number of members in the family and not in proportion to the land owned by them. Every household would get water rights to the maximum of 2.5 acres with an allocation of 0.5 acre per capita. The land in excess should remain under rainfed conditions. This particular clause incorporated the principle of equity in water sharing.
- ✓ The beneficiary should not have exclusive rights to irrigation. These would not be attached to the land. If the land was sold, water rights would revert back to the Trust.
- ✓ All the members would contribute 20 per cent of the capital cost in cash initially, the balance 80 per cent would be provided by GGP in the form of interest free loan (wherever, subsidy was not available) or 50 per cent would be met from Government subsidy and remaining 30 per cent would be given by GGP as interest free loan.

- ✓ The landless labourers would also share water on a similar basis. He could enter into a contract with the cultivator and use his water right on that land.
- ✓ High water consuming crops like sugarcane, banana, paddy would not be included in the cropping pattern of the beneficiaries.
- ✓ The project would be entirely administered by beneficiaries with the help of 'Panch Committee' from among themselves.

(Deshpande and Reddy 1990) and (Kolhe *et al* 1986)

With these principles and the administration left to the beneficiaries, the first scheme started functioning in 1979 itself. The functional steps in the Pani Panchayat scheme were simple and easy to operate. Once the beneficiaries decided to form a lift irrigation society, they should prepare the documents required for operating the society. These included the record of rights, cropping pattern, no dues certificate from bank/village accountant and a consent letter. An account was to be opened in the bank jointly with a representative of GGP and Gat Pramukh (group incharge). A Panch Committee was formed which will acquire the necessary land for pump house, pipelines etc. A sevak (worker) was appointed by GGP to operationalise the water distribution according to the fixed timetable given by Panch Committee. The Committee was established to resolve the difficulties, problems and tensions, amongst the beneficiaries. The Panch Committee was also expected to ensure the recovery of Pani Patti (Water charges fixed on crop/acreage basis) and the contribution towards the loan of GGP.

The basic philosophy of Pani Panchayat is to share water on certain commonly agreed principles. These principles foster the people's participation in three different ways. *Firstly*, every one in the group shares the concern about the principles laid down. Therefore, it is rarely that, one comes across the violations of the regulations. *Secondly*, the scheme is operated on horizontal basis rather than vertical administrative principles. This binds the partners into a theme for mutual development. *Thirdly*, GGP's help is always available on large number of technical and other matters. This fosters the tie between nodal agency and the scheme (Deshpande and Reddy 1990).

Pani Panchayat movement had faced a rough weather sometime back and the momentum came down. Among many factors, three important factors were responsible for this situation. First hurdle came in the form of a parallel lift irrigation scheme promoted through Government programmes. This scheme also had the advantage of subsidy. It was, therefore, quite natural for the rich elements of the society to take advantage of the state run scheme, rather than forming a group on the basis of the Pani Panchayat principles. These principles would not serve the interests of those who were influential in the society and consequently, with the Government. Secondly, the scheme involve curbing private profits and use rights of a group and promoting the same among the weaker sections. Any such social engineering approach would confront difficulties because of the neglect of the interests of 'haves'. Pani Panchayat was not an exception to this. There are certain examples where, outside elements took interest in blocking the spread of the schemes. Lastly, a resource-based scheme could not remain away from politicisation.

The success of Pani Panchayat was in the form of the spread of the schemes and their effective implementation over the years. Theoretically, the success of Pani Panchayat could be attributed to the process of social engineering through which it was established. As a first step, there was the severe stress on the resources and

the stakeholders gathered together under the agreement to share it. Second important aspect was the structure of the institution, wherein, three segments worked in close collaboration with each other. The Panch committee monitored the conflict resolution and ensures participation. The process is, thus, a well set process and likely to sustain.

## **X. Sustenance and Economic Viability**

### **X.1 Preconditions and Intra Institutional Structure**

Emergence of an institution goes through two important domains, namely, the preconditions of the emergence of an institution and the intra institutional factors that are conducive to its establishment. The preconditions of an emerging institution necessarily require the earnestly felt-need by the stakeholders. Such need arises out of the stress conditions imposed by the earlier system of management or due to the material changes that occur in the process. In the literature, the homogeneity of the group is stressed as one of the important prerequisites in forming an institution. However, there is a strong relationship between the felt need and the extent of homogeneity of the group. These are selected inversely as, even under an extreme stress, the most heterogeneous group will come together in order to form an institution. It is however, different matter to discuss the sustenance of such group over years. Another important issue that comes for discussion here is the condition that defines an acceptable stress level by the group in terms of resource sharing. The extent of departure from such acceptable stress level pre decides the favorable conditions for existence of an institution.

The intra institutional requirements for sustenance and economic viability of an institution include quite a few factors. Among these the important ones are the definition of membership and the role of members, mechanisms set in order to resolve conflicts and enforce the basic institutional trade. The qualities of leadership as well as the financial stake also count as important intra institutional preconditions. The size of the institution matters significantly as the larger institutions have lesser control and multifarious leadership often working at cross interests.

### **X.2 Extra Institutional and Regime Specific Conditions**

Sustainability of any institution in a medium term perspective hinges upon the threat perception from within and from outside the institutional domain. The extra institutional factors include economic and social factors that are prevailing in the region. Market, financial institutions and other local organisations have a significant impact on the sustainability of a resource using institution. The policy environment and the legal system that governs the areas of interest to the institution make an impact on the sustainability. Specifically the extra institutional conditions are location related and have a clear interface with the society. The technology, the infrastructure and the interaction of the state with the institutions decide the pattern and the process of the emergence of an institution.

### **X.3 Economic and Financial Stability**

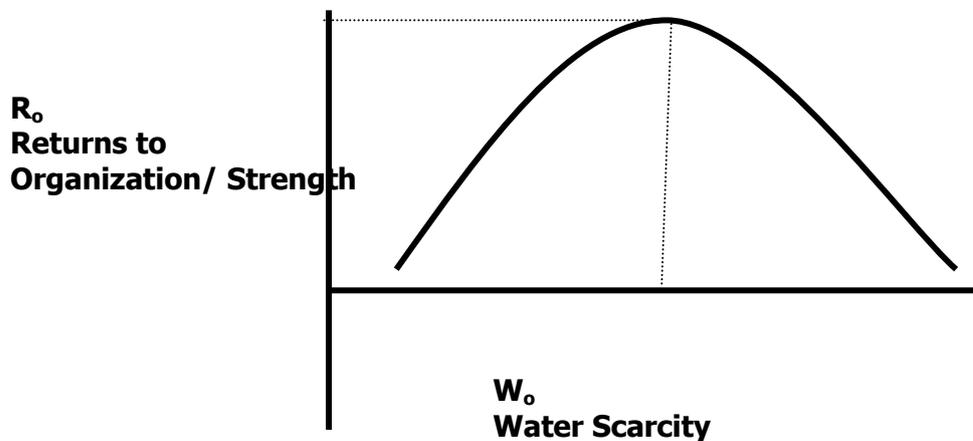
Stability of an institution and its sustenance depends upon the financial control that the institution exercises on its members. This linkage is more important from the point of view of obtaining a long-term sustainability. If the beneficiaries

have a clear access to the financial matters and there is a clear transparency in the financial affairs of an institution the stability of the institution is more assured. Similarly, the interface of an institution with the environment has a telling effect on its continuance. Any negative externalities that emerge out of the functioning of the institution may jeopardise not only the financial stability but also the economic viability of the system. In this process the relationship between the partners namely state, members of the institution, market and other local organisations have to be carefully observed.

#### **X.4 Optimising the Gains**

In any institutional setup the sustainability of the institution relates directly to the process of optimising its effective components. As we have mentioned above, the stakeholders in the formation and sustenance of the institution here involve the state department of irrigation, the beneficiaries who directly benefit out of irrigation, the individuals who are not the members of the institution but also receive and depend on the same resource, other social and financial institutions and the conditions of the market in the region. The optimality of gains will require a clear computation of who gains from the formation and sustenance of institution and how such gains are spread over the stakeholders. It is the optimal solution in terms of balance between the positive and negative externalities that decides sustenance of the institution. Sustainability automatically ensures optimum gains to its partners. We hypothesise here an existence of an inverted U type of relationship between water scarcity and returns to organization.

**Figure 2: Relation Between Water Scarcity and Returns to Organisation**



Here, we define the returns not simply in monetary terms but also in terms of aggregate welfare gains. When water supply is plentiful, there is a little reason for farmers to organize as they have the necessary water. As water becomes very scarce, even perfectly coordinated actions and investments cannot solve the water shortages and thus the benefits from organizing are lower. Areas with moderate water scarcity therefore have higher returns to the organization. The relation between the external condition and internal structures are organic. They are not linear relationships, which can be quantified even if we could measure them more objectively. The effect of some of the factors on performance is complementary and others are substitutable to some extent. When considered together they did offer useful insights. By incorporating relationship that affect water use at a more micro

level, it is possible to gain a more process-oriented understanding of how external conditions (physical and technical, social and economical, policy and governance) work as they affect people's behavior regarding water. Such an understanding is significant not only at a theoretical level but also allows a better appreciation of how larger social forces influence the actions of users within a community and is therefore indispensable if one has to begin to move toward institutional solutions to the problems of resource management.

An attempt has been made to see the manner in which WUAs make, follow or break formal and informal rules regarding the resources they control. The extent to which their autonomy of action is constrained, modulated and facilitated by their interactions with the state and internal differentiation within the community along the basis of caste, class or economic and social status are also given importance. All these factors are critical in understanding how resource will be used.

## **XI. Conclusions**

In this paper, an attempt has been made to understand collective action and formation of institutions in three different resource regimes. An institution is basically a mechanism, which helps to bring in allocative and production efficiency. Thereby we recognise its presence and impact in terms of a shift in production surface almost similar type as that of technological change or infrastructure. Though functions of an institution would involve a host of requirements such as efficiency in resource use, allocative efficiency, environmental interface, sustainability and conflict resolution, all these functions would alter according to property regimes and local level conditions. Our three case studies bring forth the minimal role of the state-initiated institutions, strong interface with property regimes and factors leading to sustainability of the water user's institutions.

In any irrigation management system, the concerned groups could be categorised into three important hierarchical groups, namely: i. Public administration or the organising agencies like CADA or irrigation Department, ii. Local level organisational structure like Zilla Parishad, and iii. Farmers' groups and individual farmers, their interests, aspirations and limitations. The transfer of irrigation management from government to the WUAs implies, to a large extent, the failure of the interfaces at the three levels mentioned above. Researchers in the irrigation management sector believe that the irrigators have an untapped wisdom and local knowledge, which can help, in taking a quicker and more effective decision. More than that this will also manage the supply situation more effectively. In order to understand the possibility of shifting from a publicly managed domain of managing irrigation to a participatory management of irrigation, the mapping of the communities, farming systems, reaction of the community concerned and the net gains out of such exercise of collectivisation becomes an essential requisite. Gordon (1987) while elaborating the social aspects of irrigation development brought forth these issues. Managing irrigation through the community participation requires fuller understanding of the social engineering in that region. Jamie Morrison and Ian Carruthers have attempted to establish that the imposition of organisational structure may be occurring in the enthusiasm of pushing through the irrigation management transfer to the stakeholders. This, they argue, should not be occurring without any regard to the existing institutional setting and that failing to take note of such institutions may bring the performance of PIM below the level of expectation. Management models, which aim to give farmers the response of the four decision-

making, cannot be imposed from above. Such reforms must come from below and with a fuller understanding of the existing community structure existing at the grassroots. If there is an imposition of sets of rules and organisational structure formed by the irrigation researchers generalising on the understanding of a few communities will find difficulty in enforcement mechanism.

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