

Irrigation Institutions in India With Special Reference to Maharashtra State

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Role of institutions (Water Users' Associations) in water management is not a new phenomenon as far as India is concerned. In the name of *kudimaramat*, the users (farmers) were involved in tank repairs, management works, distilling of tanks, removal of weeds, distribution of water and collecting revenue even during the 17th and 18th century much before the British rule. Unfortunately, due to various reasons, the users' participation in water management has declined drastically over the years. Now, partly because of pressure from the donor agencies such as the World Bank, the users' participation in irrigation water management has become a widespread strategy in all countries in Asia including India. In India, more emphasis was given to users' participation in water management only after the announcement of the National Water Policy: 1987 & 2002, wherein gradual involvement of farmers in system management was advocated.

Studies carried out in different countries including India have clearly established that users-managed systems outperformed the systems that are managed by the irrigation agencies. While the irrigated area managed by the Water Users' Associations (WUAs) is very limited as of today in India, a significant progress has been made, at the policy level, in bringing more irrigation systems under WUAs in the recent years. In Maharashtra, significant progress has taken place since 1992 as the irrigation department has been encouraging the farmers to form WUAs by explaining its advantages. As a result of the continuous effort by the irrigation department and non-governmental organisations, about 822 WUAs have been functioning at different levels in Maharashtra as of September 2001. While there are no two opinions about the importance of WUAs in increasing the performance of irrigation system, there is no guarantee that WUAs would improve the performance of irrigation system, as the interference of government agencies is still considerable. It is also reported that the most part the outlet and canal committees are there only in name; they are not consulted on substantive issues; nor are department officers required to follow their advice. There is also considerable reluctance, if not opposition, from the operational staff of irrigation departments to involving users in management; and even users themselves tend to be apathetic to the idea. However, not many studies have analysed how the new (WUAs) irrigation institutions established with the support of government agencies are functioning at the field and whether WUAs are able to fulfill the objectives for which the same is established. It is in this context, an attempt will be made in this study to bring out the overall functioning of different irrigation institutions (lift irrigation user's association, canal irrigation users' association, etc) using both primary and secondary level information.

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I. Introduction

The technological change of mid 60s brought forth importance of irrigation along with seeds, fertilisers, pesticides, and improved cultivation practices. During the last two decades the role of subsidies and expenditure on irrigation became an important issue in the academic debate and led to the thinking of transfer of irrigation management to the users due to heavy cost. Transferring responsibility of irrigation management has come to be seen as a way to reduce pressures on the State finances and to address to environmental sustainability. The issue of management of irrigation became prominent from two important point of views. First reason is that the irrigation sector continues to consume a large amount of budgetary resources and has remained far from self-supporting. The net returns to investments did not commensurate with the efforts made in the sector. In addition to that, the pricing of resource has also remained sub-optimal for quite some time and this has led to larger and compounding inefficiencies in the sector. Secondly, irrigation being the largest user of water, its influence on the environment and the consequent degradation has created a deep concern. It has been reported that large amount of land resources are degraded mainly due to inefficient use of water and this has inflicted cost on both sides namely on the slowing down investment in the sector and in the resource use pattern. Inefficiency in resource use is caused by exogenous and endogenous factors. The former refers to the organisational structure of irrigation department whereas; the later includes farm level inefficiencies. All this has led to a strong view of transferring irrigation management to user groups. On this background the concept of Participatory Irrigation Management (PIM) became stronger and even at the policy level decisions are being taken to expedite the process of transfer. In the present paper, we attempt to analyse the institutional aspects of irrigation management as reflected from the literature and through a few case studies. Our attempt here is to analyse the role of institutions under different settings and property regimes. The focus is on the sustainability of institutions.

II. Technology and Growth

In the theory of production economics, technological change leads to a shift in the production function thereby increasing allocative efficiency and the production process efficiency. The inducement for growth thus comes through the change that

takes place together in production as well as in the composition of production. But the path that induces growth through technology and thereby initiates development has an important aspect of institutional facilitation, which is overlooked often. The presence of institutions actually facilitates the conduit. In any economy, the process of transformation through technology has a strong interface with the existing as well as emerging institutional structures. Similar is the case of changes that have occurred through the technological revolution of mid-60s. In a common parlance, the technological change is attributed to the miracle seeds, use of fertilisers and pesticides, availability of irrigation and cultivation practices. It should however, be noted that along with the technological components that have prevailed in the process of growth a significant share was contributed by the institutional changes that have taken place. Simultaneously technological change is often induced either by practice or through an external force. Either ways it intercepts the production process not from within but induces the change. Whereas, institutions are formed (if not already existing) in order to bring an aggregate change in the use of factors and facilitate the production process.

III. Role of Institutions

III.i. Some Theoretical Aspects

Any development process presumes three levels in achieving its goal. Of these, 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 in proper direction. The third stage is a crucial one, which translates growth into development through a conduit of either existing or newly constituted institutional structures. This transfer remains only as a component of the growth process but the role of institutions is quite crucial. Thus the failure of translation of growth into development rests on the fulcrum of institutions. This has been brought forth historically in different case studies by North and Thomas, 1970; North, 1990. Institutions in general understanding are the rules 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 government, administrative arrangement 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 a clear therefore, that the complex of institutions governing irrigation sector has three different actors. Among these we have the state and state governed laws, the interdepartmental linkages in administering irrigation (Revenue and Irrigation Department) and private property regimes in terms of land ownership and tenancy contracts. In this entire framework the institutions intervene exactly like technological parameters in shifting the production function upwards, but unlike technological change, institutions do not alter the physical quality of resources. Institutions generally interface with resource allocation, the formal government laws, and the stakeholders. 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 influenced the making of the institution. Institutional theory from the angle of production economics helps in answering many of these pertinent issues where an interface occurs between 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 (Ostrum et al.1994, Sengupta, 1991). Moreover institutional-economic analysis provides answers to some important questions. I.e. " What are the conditions wherein individuals realize the necessity of collectiveness and under what conditions they will co-operate?" For example it helps to predict the conditions under which farmers are willing to go in for collective action as regards the management of irrigation water resources. 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 in generating predictable outcomes from planned inputs.

III.ii. Historical Evidence of Institutional Interventions

There is an overall agreement that institutions strengthen the transformation process towards overall development. It has been an experience since the beginning

of this century that institutions have played an important role in enhancing growth, attaining better distribution, and creating an atmosphere towards increased economical welfare. In the early part of this century the formation of institutions essentially with the state initiative was not as common as it became after the independence. Cooperatives, labour institutions and legal framework were made stronger during those days. However, during the pre-independence days the informal institutions were quite strong. These included social institutions like caste, family, village religious groups, sect groups and other such institutional bodies. Traditional village institutions also played a very significant role. Among the village institutions, land ownership rights, village functionaries and their economic rights, social hierarchies depending on economical hierarchy were the prominent ones. Similarly, the traditional institutions governing natural resource were also quite significant. In the post independence period, initially the community development institutions at village level were established and the development process towards the village passed through the Community Development network. This was followed by a strong initiative towards obtaining an egalitarian land distribution through a series of reform measures in the land market. Thus land reform came up as a recognised institutional intervention. The evidence shows that we achieved mixed results on land reforms across the States. Whatever may be the measure of success, it is quite clear that land reforms could obtain the complete elimination of intermediaries and protected the tenants. Though it could not achieve the distribution of the land acquired the reforms succeeded in changing the agrarian structure to a large extent. Close on the heels of land reforms were the reforms in the rural credit structure as well as the price policy reforms. All these led to a sea change in the rural institutional structure. The traditional village institutions managing natural resources including water were quite prominent in village. In the north and east India, the village bodies managed the use rates of natural resources but in the south and western India institutions existed by type of resources. Irrigation was managed through Phad system in west whereas by Khudimarammat in the south. Traditional institutions emerged in the socio-cultural milean.

IV. Irrigation: Participation and Institutionalisation

As mentioned earlier irrigation sector has the inefficiency syndrome for two important reasons. First the sector has not been able to generate the minimal

expected returns from the investment in the sector. This is mainly due to the higher operation and maintenance costs as well as the expenditure on the man for managing sector. The second important reason for inefficiency arises due to indiscriminate use of water, which remains uncontrolled due to the absence of proper information and guidance. Such information guidance has to be provided to water users either through the institutional sector of the state government or through the public institutions established for the purpose. The administrative control of the sector spans over three institutional regimes. It is first the state and the administrative mechanism that enters the picture. It is not only the water rates and returns to the natural resource use that only matter but the typology of expenditure also decides the low rates of returns. The second institutional regime pertains to the village level institutions that are of formal nature. The literature suggests that the horizontal integration between different regimes make it difficult to effectively ensure efficiency in the sector. The third institutional regime refers to the water users associations (WUAs). These can be either of formal type established with the state support or of the informal nature initiated and established by the users themselves. In any such case, a few important aspects of the formation of institutions are quite crucial to establish effectiveness. We discuss below a few of these.

IV.1. Collective Action and Irrigation Management

The importance of institutional arrangements dealing with water planning and management has been increasingly recognized. But what makes individuals come together for collective action? Collective action is used to describe the process and consequences of individual decisions to voluntary co-ordinated behavior. In reality, individuals associate themselves for a collective action with an objective to face the uncertainties and to search for solutions wherever possible. The individual not only gets an identity but also security in the process of collective action. 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.

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. These analyse use formal models derived from the theory of repeated games to challenge the dominant thesis on the unfeasibility 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. 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. Even then, the contrasting schools of 'rational choice' and 'moral economy' construct rather similar images of collective action. In "Rational Choice" associated with Thomas Hobbes and Adam Smith, a person is first of all a rational self interested individual (*Homo economicus*), While in "Moral Economy" associated with Durkhem, a person is firstly a social being (*Homo Socialisticus*) guided by social norms and then only an individual. The collective behaviour is modeled in the moral economic framework, there it is argued that under the pressure of risk aversion the farmers develop collective social insurance mechanism. It has been argued in the literature that Scots assumptions of a risk aversion or safety first are not necessarily the only reasons of collected action and David Fenny (1983) has argued incorporation of market as an important factor in leading to collective action. Therefore, in any analysis of collective action the immediate issue is analyses of the conditions under which collective action emerges, becomes effective, and is sustained over time.

The conceptual framework to develop collective action keeping in view water resources sector is developed here. The Water Users Associations (WUAs) are formed through the synthesis of physical, technical, social, economic parameters. Policy and agency inducing such formations support these. But all these act at different levels. Initially it is the technical and physical parameters that decide the formation. This is supported and reinforced by the other four components. 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 condition of the resource. These also decide the sustainability of WUAs.

In any irrigation management system, the concerned groups can 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, iii. Farmer's 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.

IV.ii. The Process of Formation

The process of formation of WUAs emerges through different theoretical constructs. As discussed earlier the moral economy framework and the collective action framework are predominant among the rest. Social engineering, scarcity of resources, inability of the state to ensure fair distribution and increasing inefficiencies in use of resources contribute towards organising an user 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 a firm setting whereas, the self-initiated will be informal and

thus a fragile setting. The process goes through three stages namely 1. Felt need (by State, NGO or by stakeholders), 2. External conditions, 3. Internal structure and 4. The formal process.

The pressure of inefficiencies due to the earlier management practices, improper distribution of water, ill maintenance of the system, economic non-viability and inefficient use together provoke the initial process. 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 contours of the proposed structure, the legal and the enforcement framework and the process of conflict resolution. Thus the process of emergence is dictated by these components.

BOX 1

External conditions:	Internal structures
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Origin • Membership definition • Size • Leadership roles and specialization • Socioeconomic heterogeneity • Rule enforcement • Water distribution • Conflict resolution

IV.iii. 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. This ensured a continuation of the state control 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 (See Lele and Patil 1994). Experience from Andhra Pradesh is however different. In Andhra Pradesh, it is reported that the State Government through its functionaries initiated steps to form WUA. (See K V Raju 2000). It is an accepted fact that with the initiative from the state, the WUAs will be more stable but one cannot opine about their efficiency and effectiveness. Theoretically, as Vedeld puts it, village polity and its nature in terms of political homogeneity of heterogeneity decides the sustenance of the group (Vedeld 2000). It is possible to form a group induced under the state efforts even under politically heterogeneous situations but its sustenance 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 takes place and only at that moment collective action on the part of the actors is feasible. 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.

IV.iv. 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 does 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 in binding. In the private property regime the required conditions 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 failed in resource management. Any collective action stemming out of private property regimes therefore should have a better conflict resolving mechanism and a clearly defined framework.

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: 1. There are no conflicts of ownership. 2. State is not the solely dictating partner, 3. Formation of the users' association relaxes the state control, 4. Local level flexibility is feasible in organising the institutions, 5. The use rates can be clearly defined (see Deshpande and Nikumbh, 1993).

V. Ground Water Irrigation: Managing in a Private Regime

The initiative for ground water development and use has always rested with individual farmers exploiting and using the resource at their own will. Govt. neither stimulates nor regulates the exploitation directly and effectively. This has led to the abuse of the resource in a spatially and temporally differentiated manner resulting in inequity, inefficiency, and interference. The direct participation of govt. in ground water development has been limited to state tubewell programmes. Govt. institutions dealing with ground water- the Central Ground Water Board, State Ground Water Departments, NABARD, etc. have been playing the role of observing institutions than monitoring bodies. Therefore, we have large patches of 'gray' and 'black' regions depicting shortage of ground water with various intensity. As regards the ownership of resources is concerned, ground water presents a typical case of ownership. The key feature that distinguishes ground water markets from other forms of irrigation institution is that water pumped is assumed to be the property of the pumper. But a water seller neither owns nor produces the water they sell, in effect what the water sellers do is to lease or sell the service of their irrigation equipment and enjoy ownership rights over the community groundwater resource (Tushar Shah 1993).

It is the ownership of a ground water exploitation device that decides the access as well as ownership and therefore inequity in access has been one of the typical problems. As a component of natural resources, ground water should be shared by a number of users. Equal rights over ground water resources are not

effectively enforced for all members of the community; hence the owners of water extracting machine (WEM) are able to usurp others' share without having to compensate the community. This causes the problem of well interference in the absence of equal access and results in efforts by farmers to evolve a variety of contractual relationships. For e.g. In many parts of Gujarat, it is for a well owner to lay underground pipelines through neighbours fields at his own cost, and dissuade them from establishing their own WEMs by informal long-term contracts for the supply of water at mutually agreed prices (Tushar Shah 1988).

Large water sellers are known as water companies-partnership of 7-150 partners, jointly owning and operating a WEM, and who invests primarily for selling water to other farmers. This is being attempted in some parts of the country. In Narsanda village of Kheda district, a co-operative tubewell has been in successful operation since 1952. The association controlling this has been selling water to members and non-members at different rates, but lower than the market prices and has distributed bonus to members and out-competed many a neighboring private seller. However, another such co-operative tubewell, started in Bamroli by the leaders of the Narsanda co-operative themselves, failed (Shah 1993). Similarly in Mehansa and Ankalav, water companies have proliferated and are doing well- more professional in managing business, keep regular accounts, issue printed receipts, distribute profits at the year end etc. In Navli and neighbouring Karamsand village of Kheda district in Gujarat sellers made efforts to unionise in the late 1960s and a pump owners association was registered and still exists, but later on, well owners went about doing precisely what they thought was in their best individual interest (Shah 1993).

V.iii. Ground water- Pani Panchayat as an institution of collective action

'Pani Panchayat' was started on the background of the severe drought of 1972-73 in the State of Maharashtra. During the drought year a forum of Industrial Technologist 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 can help to 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 can have 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 ground water.

As a first step, in the process a trust under the name Gram Gaurav Pratishtan (GGP) was registered in the year 1974. As an initial step GGP leased-in a 16 hectares 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.

1. 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.
2. To create facilities to raise their social and economic conditions to attain welfare of the people in this taluks.
3. To conduct research studies in socio-economic conditions, so that the urban interest will be linked with the process of creating integrated rural development.
4. To do all such lawful things as are conducive or incidental to the attainment of all the above aims and objectives.

(GGP, 1983)

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:

1. GGP would help in formulating group lift irrigation scheme of cohesive groups. Individual schemes will not be taken.
2. The sharing of water is 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 shall remain under rainfed conditions. This particular clause incorporated the principle of equity in water sharing.
3. The beneficiary shall not have exclusive rights to irrigation. These will not be attached to the land. If the land is sold, water rights shall revert back to the Trust.
4. All the members would contribute 20 per cent of the capital cost in cash initially, the balance 80 per cent will 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.

5. The landless labourers will also share water on a similar basis. He could enter into a contract with the cultivator and use his water right on that land.
 6. High water consuming crops like sugarcane, banana, paddy will not be included in the cropping pattern of the beneficiaries.
 7. The project should be entirely administered by beneficiaries with the help of 'Panch Committee' from among themselves.
- (GGP, 1983) 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 must 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 (See Deshpande and Reddy, 1990).

Pani Panchayat movement had faced a rough weather some time 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 are influential in the society and consequently with the Government. Secondly, the scheme involves curbing private profits and use rights of a group and promoting the same among the weaker sections. Any such social engineering approach will 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 have taken interest in blocking the spread of the schemes. Lastly, a resource-based scheme can 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 can 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 monitors the conflict resolution and ensures participation. The ground rules guarantees and rules out the possibility of out liers and ensures sustainability. The process is thus a well set process and likely to sustain.

Conclusion:

The present paper is an attempt 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. We have chosen irrigation institution as platform since water has been a focal point of many micro as well as macro level conflicts. Though functions of institution will involve a host of requirements such as efficiency in resource use, allocative efficiency, environmental interface, sustainability and conflict resolution. But all these functions 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.

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