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Water Pricing and Decentralized Irrigation Management in
Andhra Pradesh — Schism between Objectives and Realities

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Abstract

Installation of decentralized management institutions and collection of near economic value of water are considered important for efficient water management especially in irrigation sector in developing countries. The rationale and objectives of such initiatives are improved revenue collections, minimized wastage of water, enhanced operation and maintenance, efficient and equitable service delivery, and environmental improvements. An innovative experiment for decentralized irrigation management was initiated in Andhra Pradesh (AP), India, under Participatory Irrigation Management programme. As part of this initiative, policy, institutional and fiscal reforms were carried out for achieving the set objectives. AP Farmers' Management of Irrigation Systems Act was passed in 1997 with objectives of ensuring equitable and reliable water supplies, bridging the gap between irrigation potential created and utilized, entrusting operation and maintenance of systems to elected Water User Associations (WUAs) and efficiency in water usage and tax collection. Greater responsibility was accorded to elected representatives of water users through forming of nearly 10,000 WUAs with the responsibilities of irrigation management. Similarly, under fiscal reform, water charges were enhanced by three times as a step towards realization of economic value of water. In this study the authors intend to evaluate and assess the extent to which the above objectives have been achieved. Further, it will examine the systemic and policy limitations, if any that inhibit realization of the objectives. The focus of the study will be on the water pricing aspects of the reforms in irrigation management. Preliminary evidences suggest that there is no synchronization between the revenue collection and the amount of water released due to lack of coordination between the concerned departments such as revenue and irrigation departments. This lack of functional integration is one of the major limitations in the water revenue collection and management. Because of electoral compulsions the commitment of the state to implement the intended change process is slow which in turn puts limitation on the management process. There is only additionality to management structure and limited coordination between power and function resulting in notional managerial autonomy.

Keywords: Decentralization, equity, water institutions, water pricing, water user associations

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Introduction

Decentralization of water management, particularly in irrigation sector is considered as a means to achieve water use efficiencies. Experience across the world shows that centralized control, heavy capital investment, complicated technical system, distribution of water and collection of water charges by the state failed to live up to the expectations in either providing water properly or in collecting water charges resulting in a major gap between promise and performance. Given the compulsions of electoral politics in developing countries there has been either unwillingness to charge adequate user charges or unwillingness to pay on part of the water users which result low level equilibrium (Baza and Ahmad 2002). The consequences of under pricing of irrigation water are captured in Fig. 1. As a result, most of the irrigation systems are in a dilapidated condition affecting the operation and maintenance (O&M) of the systems and improper water allocation to the farmers and loss of revenue to the state. Some of most cited problems in this regard are:

- Inadequate cost recovery
- Waste of water
- Improper operation and maintenance
- Poor service delivery
- Environmental degradation
- Increasing inequity

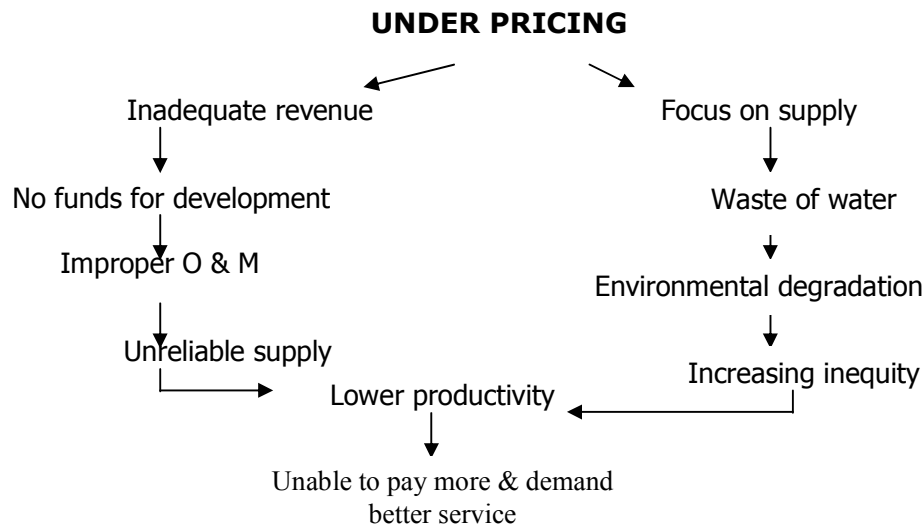
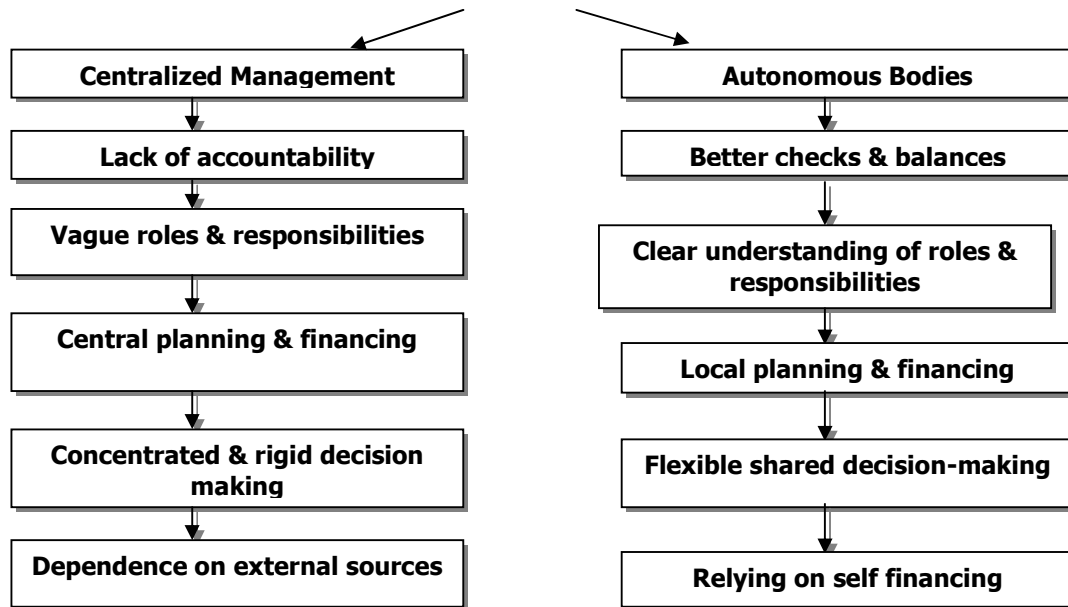


Figure 1 Consequences of under pricing of water

To overcome these systemic limitations there have been efforts towards decentralization of irrigation system with user managed participatory irrigation systems. In this process of decentralization users involvement in irrigation managed ranges from supervision, financing, decision rules, fixing user charges to operation and maintenance, collection of user charges, monitoring and evaluation of systems etc. A critical dimension of the irrigation management which is sought to be addressed to reform process is water pricing and realization of these prices fixed (see Fig. 2). As water pricing is being increasingly recognized as a key instrument for improved water allocation, better conservation and quality preservation. (Bazza and Ahmad 2002), Water Users Association (WUAs) formed towards decentralized irrigation management had a significant role to play in this direction. This was seen as a viable solution for water management, particularly in water deficit areas.

Fig. 2 Autonomous Bodies can Rationalize Prices



Water Institutions

Across the world irrigation systems were developed by governments and are managed by huge centralized bureaucracies. There are few some small-scale irrigation schemes, which were developed by local communities and managed by them. The institutional component of irrigation broadly comprised of water rights, policy and administration. Water law is another important element of institutions governing the irrigation sector. Where ever there are unclear definitions, obsolete clauses and uncertainties in water laws they are limiting the sustainability and efficiency of irrigation system management. Hence a clear and unambiguously defined water law improves the efficiency in disposition of water disputes, allocation of water at different points and inculcation of compliance culture with prevailing norms and procedures. As described earlier water management agencies are related to government and they have had a pervasive role in the allocation of water. The government administration is responsible for revenue generation, reducing operational cost, efficient, reliable and equitable allocation of water. Historically, governments have provided de facto subsidies to the agriculture sector as a result the user charges collected in most cases were not even fully recovering O & M costs leave alone capital costs.

The irrigation management institutions are politically governed and the determination of cost depends upon the political orientation of the government. Owing to the fact that the rural elites have a strong voice in governments in developing countries user charges tend to be meager.

Water Pricing

Pricing of Irrigation Water is not only a critical determinant of financial capability and sustainability of the institutions managing the water resources but also a mechanism for ensuring the level of services provided by these institutions. Water pricing is one of the key instruments for demand side management of irrigation water use. There are different approaches (See Table 1) that deployed for fixing of irrigation water tariff across the world. Each approach has its own merits and demerits depending on the socio-economic and political situation anyone or combinations of criteria are used in fixing Tariffs. Thus water pricing is subject to a number of distortionary constraints, and various political and social dimensions must be taken into account when implementing a pricing mechanism (Ehrensperger D. V. D., 2004)

| Table 1. Criteria for Tariff Fixation | |
|--|---|
| Criteria for Tariff Fixation | Details |
| 1. Area based | 1. (a) A fixed rate per hectare of farm, where the charge is not related to the area irrigated, the crop grown, or the volume of water received. In this form it is usually part of a “two part” tariff – designed to cover the fixed costs of the service. |
| | 1. (b) A fixed rate per hectare irrigated. The charge is not related to the type of crop grown, or actual volume of water received (except that a larger irrigated area implies a greater volume of irrigation water). |
| 2. Crop based | 2. A variable rate per irrigated hectare of crop i.e., different charges for different crops, where the charge is not related to the actual volume of water received, although the type of crop and area irrigated serve as proxies for the volume of water received. |
| | 3. (a) A fixed rate per unit of water received, where the charge is directly related to, and proportional to, the volume of water received. |
| 3. Volumetric | 3. (b) A variable rate per unit of water received, where the service charge is directly related to the quantity of water received, but not proportionately (for example, a certain amount of water per hectare may be provided at a low unit cost, a further defined quantity at a higher unit cost, and additional water above this further quantity at a very high unit cost.) This method is referred to as a rising block tariff. |
| 4. Tradable Water Rights | 4. Under tradable water rights, the entitlements of users in an irrigation project, or more widely, other users, are specified in accordance with the available water supply. Rights holders are allowed to buy or sell rights in accordance with specified rules designed primarily to protect the rights of third parties. Sales require authorization by a licensing authority or may have to be approved through the courts without reference to any specified authority. |

Source: Facon Thierry, 2004.

Institutional Reforms

Institutional reforms in irrigation management stem from the perception that exiting institutions and regulatory arrangements led to an inefficient allocation of resources of production and inadequate attention to environmental conservation (Beare et.al, 1998). Water institutions, i.e., formal as well as informal water law, water policy and water administration are undergoing remarkable changes worldwide. (R. Maria Saleth and Ariel Dinar, 2000). The old development paradigm, centered on centralized decision-making, administrative regulation and bureaucratic allocation, is gradually paving way for a new paradigm rooted in decentralized allocation, economic instruments and stakeholder participation.

Although the scarcity value of water is increasing but the politically rooted system of public provision and subsidized water charges insulate the water economy from the influence of actual market forces. Low water charges and poor recovery rates risk undermining the efficient maintenance of existing water infrastructure as well as additional investment in future water development projects.

Globally most of the reforms initiated were driven by government budget deficits to finance the operation of irrigation systems. Due to rapid expansion in irrigated areas worldwide many governments especially in developing countries started finding it difficult to finance the recurring costs of irrigation. Government financed bureaucracies tend to lack the capacity to be effective providers of water services to the large number of farmers especially the small and marginal ones (Douglas L. Vermillion, 1999). From a global perspective the institutional reform process initiated in the 1980's is still going on, some countries are ahead and moving rapidly and others with slow pace. While countries like Australia, Mexico, Turkey, Chile, China, some states of the USA, and

Sri Lanka are moving with a sound pace in countries like India, Brazil and Pakistan there are impediments to implementation of reform agenda in irrigation management. Though India has been slow in introducing institutional reform in irrigation management but there has been some provincial (i.e., state) efforts towards reforming the sector especially through external aided interventions. One such initiative has been World Bank funded project in Andhra Pradesh. In the following sections an outline of irrigation sector in AP along with an evaluation of the institutional reform in irrigation sector is presented.

Section II

As the fifth largest state in India Andhra Pradesh (AP) with a population of about 75 million has a geographical area of 27.68 mha wherein 47 percent (12.9 mha) is under cultivation and the net sown area is about 11.04 mha (4.88 mha irrigated). Irrigated agriculture constitutes 40 per cent of the AP's cropped area and contributes over 60 per cent of its agricultural production. The ultimate irrigation potential from all sources is estimated to be 9.50 mha which includes 7.30 mha from surface water and 2.20 mha from ground water (Raju 2000).

Imperatives for Irrigation Sector Reforms in AP

Despite major plan investments in irrigation by the Government of Andhra Pradesh (GOAP), which have increased the irrigation potential, most systems are in dilapidated condition due to inadequate maintenance. Irrigation system in AP is characterized by low irrigation efficiencies and tail-end deprivation. Lack of established operation and maintenance (O&M) procedures, inadequate funds for O&M, and ad hoc expenditures by the Irrigation Department have compounded the unsatisfactory performance (Pangare 2002). Most of the agency's O&M funds were being spent on staff salaries; very little was being spent effective maintenance. This has direct impact in terms of the shrinkage of command areas, siltation of major canals and drains and damage to their lined sections (Pangare 2002).

Despite massive investment (Rs. 25,000 million in the Eighth Plan, 1992-93 to 1996-97), around 24 per cent of the plan expenditure the performance of irrigation sector has been low. Over the years the irrigated area is also declining from around 4.3 mha in 1991-92 to 2.8 mha in 1997-98 is actually irrigated. In fact weak performance of irrigation sector is one of the major factors for the low levels of agricultural productivity in AP. Inadequate maintenance of the infrastructure is evident from the expenditure incurred towards O & M which was Rs. 99 per hectare, as against the Tenth Finance Commission (1997) recommendation of Rs.300 per hectare for major and medium irrigation projects. Over 75% of the O&M expenditure was spent on wage bills leaving very little amount for maintenance works (Raju 2000). The equitable distribution of water between the farmers at the head and the tail end was a serious concern which has resulted serious tensions between farmers and has a negative effect on the revenue collection, O&M of the system. Inadequate cost recovery was one of the most important detriments having impact on the irrigation revenue and O&M costs.

All the above stated factors have necessitated the reform in the irrigation water management sector in AP. Thus undertaking a major paradigm shift the decentralization of the irrigation management was initiated in the state through Andhra Pradesh Farmers' Management of Irrigation Systems (APFMS) Act in 1997. The important features of the Act includes transfer of power for the management of irrigation to the elected members of Water User Associations (WUAs) through creating new autonomous institutions as legal entities., upgrading O&M infrastructure, WUAs involvement in efficiency improvement measures. As part this initiative every irrigation system was divided into units of operation i.e., at the project level Distributory Committees (DCs) and WUAs at primary channel level. The jurisdictions of the WUAs were delineated on hydraulic basis. All the farmers within the command area including title holders and tenants were compulsorily made members of the WUA with voting rights.

The main responsibilities of the WUAs included: (a) maintaining of irrigation system within its command area, (b) preparation of operational plans at the beginning of the crop season, (c) ensuring equitable distribution of water and resolving conflicts among members, (d) maintaining the records, accounts, conducting social audits etc. Under this act the irrigation department officials are made accountable to the WUAs.

As a measure to steer user charges towards realistic pricing government increased the water charges from Rs. 60 to Rs. 200 per acre (see Table 2), though initially it proposed Rs.350 but changed after protests from users. This was a leap forging step as water user charges in the state have been stagnant since 1988. The new water rates were intended to cover about three-quarters of the required O&M needs.

Table 2 Water Charge changes under Irrigation Reform Initiative in AP (Water Charges per Acre)

| Crop Type | Major & Medium Irrigation | | Minor Irrigation | |
|-----------------------------------|---------------------------|---------|------------------|---------|
| | Pre-revised | Revised | Pre-revised | Revised |
| First or single wet crop | 60 | 200 | 40 | 100 |
| Second & third wet crop | 60 | 150 | 40 | 100 |
| First irrigated dry crop | 40 | 100 | 20 | 60 |
| Second & third irrigated dry crop | 40 | 100 | 20 | 60 |
| Long duration crop | 120 | 350 | 80 | 350 |
| Aquaculture (per year) | 0 | 500 | 0 | 500 |

Note: Pre Revised= with effect from 1-7-1986, Revised= with effect from 1-7-1996;
Source: Venkateswaralu D, 2002

Process of Reform

Across the state 10,292 Water User Associations (WUAs) were formed for managing both minor and major irrigation water distribution system (Table 3). Unlike the prevailing practices there were large numbers of public consultations with user groups including the small and marginal farmers in most of the irrigation command areas for eliciting their concerns. World Bank support mentioned earlier was used for rehabilitation and operation and maintenance (O&M) for a period of five years so that foster sense of ownership through improved quality of service after transferring of management to WUAs.

Table 3 Water User Associations Notified and Formed in A. P

| Type of Irrigation System | Total No. of WUAs Notified | Total No. of WUAs Formed | Election Withheld |
|---------------------------|----------------------------|--------------------------|-------------------|
| Major | 1700 | 1645 | 55 |
| Medium | 411 | 401 | 10 |
| Minor | 8181 | 7754 | 427 |
| Total | 10292 | 9800 | 492 |

Source: Irrigation and Command Area Development Department, GoAP.

A period of four years is relatively short span to evaluate the success or failure of the institutional reform programme, but an analysis of the successes registered and the discernible failures can throw some light on the impact of the reform process for enabling mid-course corrections so as to streamline the policies, programmes and projects.

Increase in Area

While the publicly available data does not allow any state wide evaluation of the improvements in area under cultivation for a given quantity of water but there are some project specific studies to understand this dimension. Study of Sriramsagar Project demonstrates that there has been an increase in reported irrigated area after the handing over the management to WUAs (ie. in June 1997). There was no increase in total water supplied after the piloting and in fact less water was used then previously. The total water consumed in the project during 1997 was 2800 m³ while in 1996 some 4300 m³ were used. The figures show more than a doubling of gross irrigated area (Kharif and Rabi seasons*), with two-thirds as much water (Oblitas 1999).

Primary reason attributed to this immediate increase are increased maintenance work in terms of cleaning of canals and watercourses, which facilitated water to reach those areas where it never reached earlier. This apart, there was increased monitoring on the efficiency of utilization of water,

* Kharif crop is a rainy season crop and Rabi crop is a winter crop;

and a conscious effort on the part of the WUAs to minimize water losses. An important aspect which needs to be borne in mind understanding this acreage increase i.e., under the management of the WUA, farmers are more willing to report irrigated area than previously to the revenue department officials. Even if one discounts this increase in reported area, there has been a general net increase in the irrigated area.

The increase in the area irrigated during the last four years (after reforms) can be seen in the table 4 given below:

Table 4 Increase in Kharif Area Irrigated (in acres)

| Year | Total Command | Area Irrigated Wet | Irrigated Dry | Actual Command Irrigated |
|------|---------------|--------------------|---------------|--------------------------|
| 1995 | 30860 | 3020 | 3498 | 6518 |
| 1996 | 30860 | 6907 | 2863 | 9770 |
| 1997 | 30860 | 9280 | 5350 | 14637 |
| 1998 | 30860 | 13147 | 5402 | 18549 |
| 1999 | 30860 | 18366 | 6003 | 24369 |
| 2000 | 30860 | 18505 | 6003 | 24508 |

Impact on productivity

Along with the increase in net area under irrigation through improved water supplies and O&M works, the productivity of various crops has been increased. According to the study by K.V Raju, in most of the areas shift was towards rice cultivation both in Kharif and Rabi season. In Bannuvada village-WUA area, in the Kharif season, rice was grown in 3,011 acres; total Rabi crop area was also 3,000 acres. In Duggirala-WUA area, the net profit from Kharif rice is Rs.8, 000 to 10,000 per acre, according to farmers. In Rabi, the entire 6,727 acres are cultivated; area under rice cultivation has increased from 600 acres before WUA to 2,500 acres after carrying out all physical works.

Increase in Water charges

Irrigation water user charges have always been a sensitive and politically charged issue in India as a result successive governments across the country have been dodging to scale them up. Even in AP the user charges have remained unchanged for long periods of time. The nominal nature of these charges does not enthuse collection agencies (revenue departments) to focus their attention towards realizing them. As a result the recovery rates are very poor. For example in Miryalguda Mandal, Nalgonda district of AP show that a maximum of 64 percent (of the total demand) collections during Rabi season of 1988-99 only. The collections during Kharif were nil. The total demand collected for the year works out to barely 10 percent. Looking at the accumulated picture of collections and balances due, the arrears amount to more than Rs. 2 crores against most recent collections of less than Rs. 38 lakhs, i.e., more than 84 percent of water tax is due as of date from this Mandal. The farmers in this region certainly cannot claim to suffer from water scarcity.

Raising the fees by itself is not sufficient to increase irrigation revenues. Infact, the steady increase in the official water rates has not resulted in more prudent use of water. The critical question is the extent of compliance with these rates. Evidence from the field points to large variation in the payment pattern. Defaulting on payments irrigation fees consistently by tail-enders from the field sample was rooted in their poor access to irrigation from the main source. As noted above, there was a categorical and explicit refusal on their part to pay the water tax till the irrigation service was improved. Fee collection at the tail end continued to be marginal even after the reforms. Thus claims of providing assured irrigation to the tail areas are not tenable. Even farmers in the head-reach areas, which have been getting adequate water consistently, appear to have defaulted on their payments. We have already discussed the evidence from Miryalguda Mandal in this context. The water rates have been revised upwards by more than 100 percent after PIM in AP. Data from MRO's office in NSP area, on the water charges collected; do indicate marginal increase in the absolute quantum of revenue collections. But when this is compared with the revenue expected as per the demands, the amount collected at higher rate per acre may correspond to a smaller proportion of area cultivated or fewer persons paying their dues. Added to this are the collections made but not deposited. Disaggregated data is required to come to a firm conclusion. It is not clear; therefore, whether the higher fee collected reflects the fee for larger

acreage or higher rates charged for a smaller area. This does point to the caution required to interpret the statistics. And simple claims of higher revenues are not necessarily reflective of higher rates of fee collection. It can in fact conceal lower rate of fee collection. The point is that these issues cannot be sorted apriori but have to be analyzed in-depth for which disaggregated data is required.

The second cause of low revenue collections is the misreporting of revenue which has actually been collected. It works as follows: if a farmer owns 'X' acres of land, he pays revenue for 'x-a' acres only on the understanding that it is not entered in the official records. Such an arrangement is mutually beneficial to the VAO (local collecting authority as representative of the revenue department) and the farmer. While the former pockets the collection, the latter has to part with fewer funds. This would also depress the financial returns for the WUA, as these are proportional to irrigated areas. Therefore, the reason for low returns is three-fold one, due to under-reporting by revenue department data collectors, i.e., VAOs, two, due to noncompliance by water users as result of poor water service delivery and consequent lack of motivation to pay their dues and three, due to default on payments in spite of getting water. Recently the department has initiated a policy of conducting a 'joint azmaish' (supervision), i.e., a combined assessment by four persons, one each from the department of agriculture, irrigation and revenue and the local WUA office-bearer. This is a welcome development and is gradually being implemented in more and more areas under canal commands. However, there is a resistance in grounding this method of irrigated area assessment by the local revenue person as it threatens their ability to manipulate statistics. In such situations the irrigation and revenue departments maintain separate records and the ID does not sign the joint azmaish. It is Bureau of Economics and Statistics and is considered the authoritative figure by the Chief Planning Officer for the purpose of development planning. There is thus a significant discrepancy between the data on area irrigated from the two sources.

In spite of the fact that operation of the water distribution system is still in the hands irrigation department there are no operation plans being prepared and there are no financial contributions from WUAs even the membership fee from farmers is not being collected. Owing to availability of World Bank funds the O & M costs are met through this source (Lele S et al, 2001). Funds allocated to WUAs and Irrigation department for maintenance is based on the reported acreage. There are systemic incentives for all the players including Irrigation Department, WUAs, Distributory Committee etc to report increased acreage but as long as the collection of user charges are not the responsibility of WUAs the distortion are bound to exist. The user charges even to this day continue to be collected by the Revenue Department which has not undergone any reform process in this initiative. As a result there is discrepancy in the acreage irrigated as reported by WUAs and by revenue department.

Given the current institutional and operational dynamics of irrigation sector with business as usual scenario there is no scope for WUAs managing the irrigation system on their own without government support. Unless there is a proper alignment of functions, powers and responsibilities whereby these WUAs as service providers also made responsible for collection of user charges so as to ensure accountability in the level of service delivered. Various studies have documented the perceptions of the farmers it was found that there was not much resistance to paying higher charges for water provided the quality aspects of service are strictly adhered. (Jairath, 2002). This is particularly true of small and marginal farmers who are at the tail end. The important condition of payment was the dependent on the irrigation service. As of now, although expectations are raised, there is little likelihood of the tail areas getting the water due to them. Payment of water cess from them will correspondingly be negligible. Increasing water rates will by itself provide little relief to the public exchequer. This is probably a matter of time, as water rates are a very small percentage of total cost of production (less than 5%).

From the cost of production data collected for a small sample of farmers, it was found that water cost, as per the new rates, amounted to maximum of 5 percent of the total annual paid out costs of production. This is of the same order as for the Mexican program of PIM, where the corresponding figure varied between 3 percent to 5 percent (Johnson, 1997). The monthly cost of water per acre would work out to be not more than Rs. 20. Thus it is not the 'high' rates per se which might depress the revenue collections and eventual sustainability. Rather it is the institutional mechanism for water cess collection which continuous to be with the revenue

department (not the provider of service) and secondly the effective delivery of water to the tail area –a categorically stated objective of the PIM reforms. This in turn provides the basis of insisting on better compliance to terms of payment. Farmers were very categorical about payment of water fees only if they got good service. Thus for the majority however it was not the high rate but poor irrigation that was a matter of concern.

Conclusion

The irrigation water pricing is a complex and multifaceted issue as seen in case of Andhra Pradesh. While appreciating the boldness with which the reforms have been introduced one need to learn from this initial experience that if devolution of powers to user organizations is not carried out through a change management process the outcomes of reforms would be marginal and would belie the expectations. There is need to give strategic focus in bringing out functional integration through legal and institutional changes in irrigation sector in Andhra Pradesh. Currently the managerial space provided to WUAs is limited to determine the operation and maintenance which does not enthuse their participation in irrigation management. Devolution of powers to WUAs is a next stage of desirable change so as to allowing them to responsibly operate irrigation system (fixing of tariffs, irrigation water supply, O & M responsibility, collection of user charges etc) with greater autonomy. With out such changes the purpose for which reform is initiated gets defeated.

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