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**Irrigation Reforms in Andhra Pradesh, India**

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# Irrigation Reforms in Andhra Pradesh, India

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*In 1997, the state of Andhra Pradesh (AP), India embarked on an ambitious program of reform to its irrigation sector. In this large agricultural state, irrigation management has been revolutionized by transferring responsibility for the operation and maintenance (O&M) of irrigation schemes to groups of farmers. In total, 10,292 Water User Associations (WUAs) have been created. The reform required a number of very difficult changes, as the role of irrigation agency is gradually shifting from service provider to facilitator, and reform has not come without resistance and conflict. However, early indications are overwhelmingly positive, as many irrigation systems are realizing increased revenues, an increase in irrigated area, and enhanced involvement of farmers in the operation of irrigation.*

*The Water User Associations (WUAs) and 174 Distributory Committees (DCs) were created through a democratic process of elections. The APFMIS Act gives the state the power to create WUAs and federate WUAs into higher-level committees. Reform has made the irrigation agency accountable to the Farmer Organizations, and resulted in the tripling of water charges and linking the money collected to the costs of operating and maintaining irrigation systems.*

*Change in the irrigation sector is only a portion of a series of reforms initiated over the last five years under the dynamic leadership of Chief Minister Chandrababu Naidu. The programs aim to modernize AP's government and vitalize its economy by making the providers of services such as irrigation, education, and health accountable to users and other stakeholders. The emphasis is on making the reform process participatory through a process of extensive public consultations, and on achieving quick results.*

*Reform will go a long way towards making the irrigation sector sustainable. The goal of the reform will be achieved when WUAs in AP become sustainable by raising funds for irrigation operation and maintenance on their own. Water sector reforms in Andhra Pradesh break new ground for reforms in the water sector in India. Several states in the India have launched similar programs with AP as a role model.*

## **Background**

The State of Andhra Pradesh, one of the Southern States in India, has launched a series of actions over the last five years, aimed at empowering stakeholders under the dynamic leadership of the Naidu Administration. The reform process is a part of a statewide policy of administrative reform defined by the Chief Minister. It aims to modernize AP's government and vitalize its economy by making the providers of services such as irrigation, education, and health accountable to users and other stakeholders. The emphasis is on making the reform process participatory through a process of extensive public consultation of stakeholders, and on achieving quick results.

The Naidu Administration has facilitated stakeholder consultations in key areas, focusing on natural resources, employment generation, and human resource development to tackle the complex problems of poverty, unemployment, and environmental degradation.

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<sup>1</sup> Raymond Peter was formerly the Secretary of Irrigation, in the Government of Andhra Pradesh and was instrumental in designing the reform process in the water sector.

## Philosophy of *Janmabhoomi*

The overarching philosophy of the government has been *Janmabhoomi*. It is a process and not another government program to promote self-help and community work. *Janmabhoomi* creates an enabling environment to launch several innovative approaches to ensure people's participation in development through Water User Associations, *Vana Samrakshana Samithies*<sup>2</sup>, DWCRA<sup>3</sup> Groups and CMEY<sup>4</sup> Groups. The program *Prajala Vaddaku Paalana*<sup>5</sup> is yet another novel initiative to redress the long-felt needs of the people at the village level and bridge the gap between the administration and the citizens. Box 1 shows the types of stakeholder groups consulted by the government of AP.

<b>Box 1. Stakeholder Groups Consulted in AP</b>	
<b>Key Sector</b>	<b>Type of Stakeholders</b>
Natural Resources	Water User Associations <i>Vana samrakshana samithies</i> Watershed Committees
Employment Generation	DWCRA DWCUA CMEY
Human Resources Development	School Education Committees Mothers Committees

The potential of the communities has been tapped through their active involvement and participation in *Sramadanam*. People's participation forms the core of the innovative approach adopted by *Janmabhoomi* to bring about social transformation and the development of the downtrodden and the deprived sections of the society. People organize themselves, identify their needs through *Gram Sabha*<sup>6</sup> and other grassroots organizations, and participate in the design and implementation of solutions. This approach has given a voice to the people, enabling them to express themselves and solve their own problems.

*Janmabhoomi* provides the appropriate environment for people's participation in decision-making. This in turn enhances the confidence of the people. It can be seen as a people-centered development process aimed at rebuilding the villages and towns and establishing an ideal society

<sup>2</sup> Vana Samrakshana Samithies – Joint forest management groups

<sup>3</sup> DWCRA – Thrift groups of women, for the development of women and children in rural areas

<sup>4</sup> CMEY – Chief Ministers Employment for Youth

<sup>5</sup> *Prajala Vaddaku Paalana* – a program where the administration visits villages to ascertain grievances and take follow up action

<sup>6</sup> *Gram Sabha* – A meeting of villagers under the leadership of the their president (Sarpanch), usually to discuss problems in the village and make decisions

which embodies and cherishes the concept of hard work, honesty, team work, cooperation, accountability, and transparency, leading to the achievement of excellence in all walks of life.

Reforms in the irrigation sector were among the first in a series of reforms launched by the state. The success of Water User Associations in the state has prompted the government to launch similar strategies in other sectors. The process of reform is both difficult and complex. It demands a high level of commitment, open minds, and flexible options for change. Introducing change in any organization is often viewed with suspicion and apprehension. The people’s vigorous response to the reform program is what makes Andhra Pradesh unique.

## The Irrigation Sector

Andhra Pradesh is endowed with very rich water resources and is appropriately called a river state. Waters flow in the large rivers Krishna, Godavari, and Pennar and in several minor rivers. The state is broadly divided into three major agro-climatic zones: the Telangana area, comprising the northern part of the State; the Coastal Region, covering the coast along the Bay of Bengal; and the Rayalseema Region covering the southern part of the state. Table 1 outlines the major river systems contribution to AP’s water resources.

**Table 1. Water resources in Andhra Pradesh**

<b>River System</b>	<b>Drainage area in AP</b> (Thousands of km)	<b>Percent of total drainage area</b>	<b>Assessed annual yield in AP</b> (Millions of hectares)
Godavari	73.2	26.5	4.23
Krishna	74.4	26.9	2.30
Pennar	48.1	17.4	0.28
Nagavalli	4.8	1.8	0.14
Vamsadhara	1.9	0.7	0.04
Other minor rivers draining into the sea	74.2	26.8	0.79
<b>Total</b>	<b>276.7</b>	<b>100.0</b>	<b>7.78</b>

As irrigation has been the primary source of agricultural growth in AP, it has always been accorded top priority by the state. Traditionally, the irrigation sector has been the largest consumer of plan funds next to the power sector. Over the years, the state has been able to create an irrigation potential of 4.84 million hectares through 15 major irrigation projects, 75 medium irrigation projects, and approximately 12,264 tanks<sup>7</sup>.

Traditionally, individual farmers have irrigated from wells—groundwater irrigates about 2.2 million ha. Around 11 million ha, or 40% of the state’s geographic area, is sown to crops. About half of that is under irrigation. Therefore, the performance of irrigated agriculture is

<sup>7</sup> These tanks are in addition to the tanks vested under the control of the *gram panchayat*. Numbering 60,000, they mainly used for drinking water, watering cattle, and small-scale irrigation.

critical to AP's growth. Table 2 shows the historical investment in irrigation infrastructure in AP.

**Table 2. Profile of AP's plan expenditure and irrigation potential created**

Period	Amount Spent (Million Rs.)			Irrigation Potential Created (Million ha)		
	Major & Medium	Minor	Total	Major & Medium	Minor	Total
Pre-Plan Period 1951	-	-	-	1.33	1.37	2.70
First Plan (1951-56)	375	35	410	0.08	0.03	0.10
Second Plan (1956-61)	574	44	618	0.18	0.02	0.20
Third Plan (1961-66)	915	186	1,101	0.37	0.05	0.42
Three Annual Plans (1966-69)	609	108	717	0.08	0.04	0.12
Fourth Plan (1969-74)	1,187	182	1,369	0.19	0.06	0.25
Fifth Plan (1974-78)	2,691	388	3,079	0.21	0.09	0.31
Two Annual Plans (1978-80)	2,577	238	2,815	0.15	0.06	0.21
Sixth Plan (1980-85)	7,296	411	7,707	0.31	0.08	0.39
Seventh Plan (1985-90)	13,064	1,314	14,378	0.09	0.07	0.16
Annual Plan (1990-91)	2,828	478	3,305	0.01	0.01	0.02
Annual Plan (1991-92)	3,339	486	3,825	0.01	0.01	0.02
Total	35,455	3,869	39,324	3.00	1.88	4.88
Eighth Plan (1992-1997)	22,653	1,869	24,522	0.04	0.04	0.08
Grand Total	58,108	5,738	63,846	3.05	1.92	4.96

Notes for Table 2:

1. The above figures do not include expenditure on CADA up to the end of the Seventh Plan.
2. The above figures are adopted from *Eighth Five-Year Plan (1990-95)*, AP-F&P (PLG) Department, Volume 11, October 1990.

### Landholdings in AP

The average land holding size in AP is 1.56 ha, with irrigated farms averaging 0.88 ha. Land distribution in the state is highly skewed. Farms considered small and marginal cover half of the irrigated area. A majority of farmers (79%) work on these marginal farms. Only 6% of the irrigated land consists of farms of more than 10 hectares.

Irrigation produces nearly two thirds of the cereal crops grown in the state and more than half of the fruits and vegetables. Seventy percent of the irrigated area is under cereal crops, mostly rice. Other food crops cover 14% of the irrigated area; these include chilies, fruits, and vegetables. Oilseeds cover 12%, and the remainder is made up of non-food crops such as tobacco, sugarcane, and cotton.

### **Structure of the Irrigation Administration in AP**

The irrigation sector<sup>8</sup> is under the Irrigation and Command Area Development Department (I&CADD).<sup>9</sup> The administration of the irrigation sector is carried out at three levels. First, the highest level of government oversight comes from the Minister of Major and Medium Irrigation, the Minister of Minor Irrigation, the Principal Secretary of I&CADD, and three to four secretaries, each of whom are assisted by three to four deputy or joint secretaries.

The second level is made up of the heads of several departments: the Engineer in Chief of Irrigation and Administration, the Director General of the Water and Land Management, Training, and Research Institute (WALAMTARI), the Commissioner of the Command Area Development Authority (CADA), and the Director of the Groundwater Board.

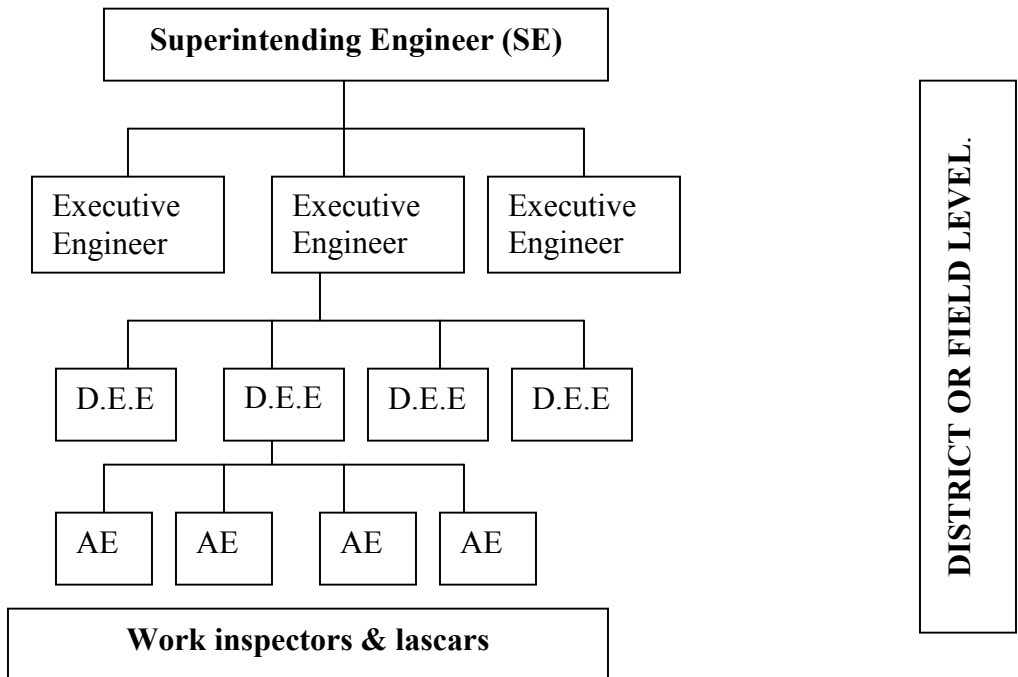
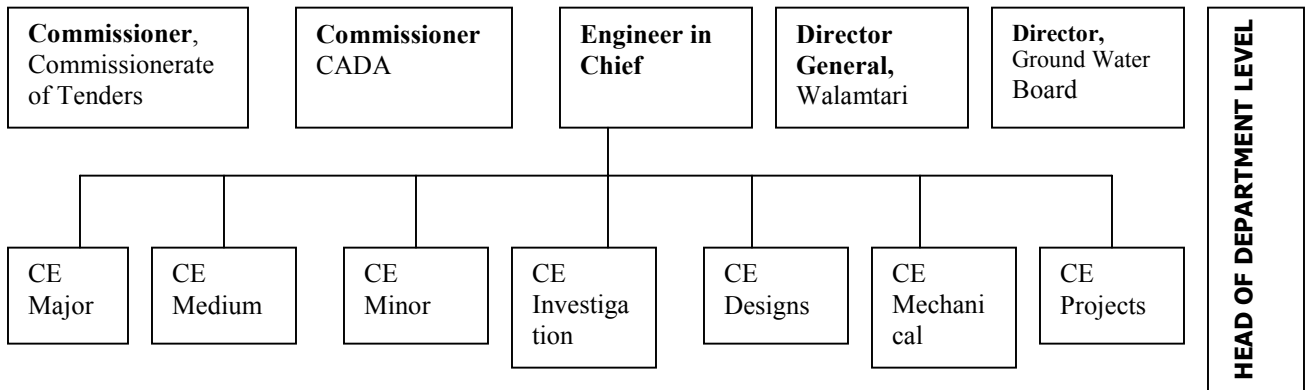
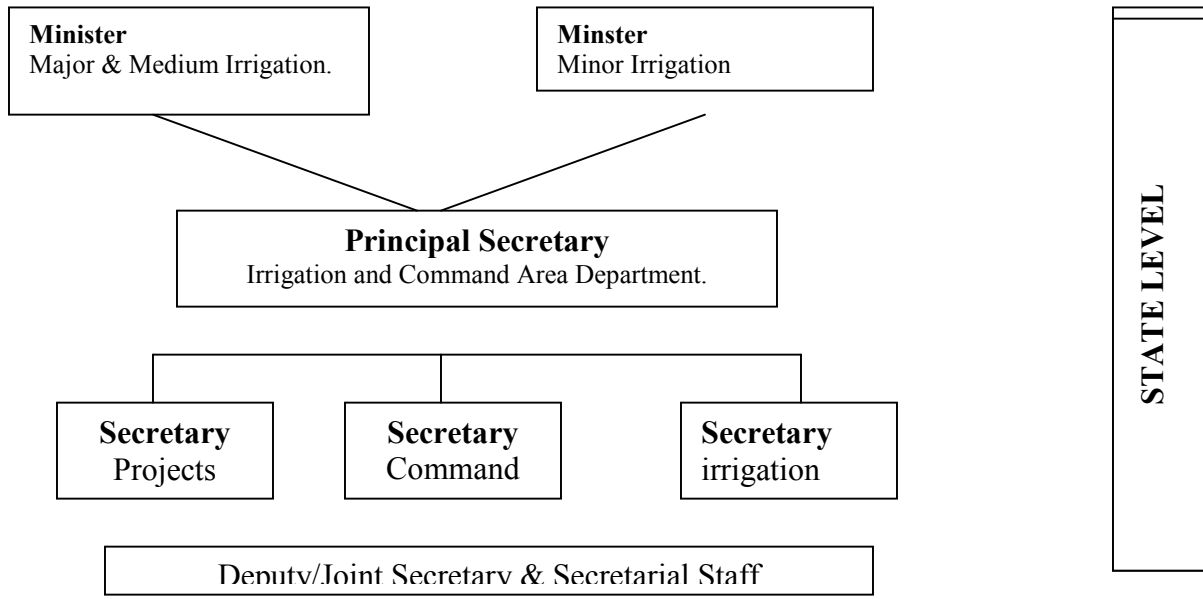
The third level is responsible for field operations at the district level. One or more districts are under the control of a superintending engineer. A district may have one or more executive engineers heading its irrigation division. Traditionally each irrigation division has three to four subdivisions and is manned by a deputy executive engineer. The assistant engineer subdivides each subdivision into three or more sections. One or more work inspectors may assist each assistant engineer. The *lascars* are the lowest rung in the Irrigation Department. Lascars work as gatekeepers and assist in the distribution of water. Box 2 shows the structure of the irrigation department at the State and District Levels.

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<sup>8</sup> Irrigation in India is a state subject; hence, each state government has a varying departmental structure depending on the extent of irrigated area.

<sup>9</sup> The Command Area Development program was formulated by the government of India to bridge the gap between the irrigation potential created and actually utilized in the 1970s. The program gave a thrust to on-farm development activities. Andhra Pradesh had major projects such as the Sriramsagar Project, Nagarjunasagar Project, Tungabhadra Project, and the Vamsadhara project, in addition to 10 medium irrigation projects under the CADA program.

**BOX 2 SHOWING THE STRUCTURE OF THE IRRIGATION DEPARTMENT IN A.P.**



## **Types of Irrigation Projects in Andhra Pradesh**

Irrigation projects in Andhra Pradesh have been divided into three categories based on the size of the irrigated area.<sup>10</sup> Major irrigation schemes have command areas of more than 10,000 ha. Medium irrigation projects have command areas ranging from 2,000 ha to 10,000 ha.

Minor irrigation projects have command areas less than 2,000 ha and usually include smaller irrigation schemes such as lift irrigation or schemes with water sources like tanks, diversion weirs, and open head channels. Traditionally, minor irrigation projects and groundwater are under the guidance of the Minor Irrigation Department, while the major and medium irrigation projects are under the Major Irrigation Department.

## **Performance of the Irrigation Sector**

Despite major plan investments in irrigation by the Government of Andhra Pradesh (GOAP) which have increased the irrigation potential, most systems are in disrepair and dilapidated due to inadequate maintenance. This has led to the shrinkage of command areas. Irrigation systems are characterized by low irrigation efficiencies and tail-end deprivation.

An anarchic situation existed in established commands, where head-enders appropriated most of the water for themselves. This situation was exacerbated by a lack of coordination among the various Departments of Irrigation, Agriculture, and Revenue. The gap between the potential irrigated area created and the actual utilization, popularly known as the “gap area” has been estimated at about one half million hectares.

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 of most systems. Most of the agency’s O&M funds were being spent on staff salaries; very little was being spent effective maintenance. This has led to the siltation of major canals and drains and damage to their lined sections.

In addition, dissatisfied farmers seeking more water, or water deliveries at the appropriate time, have tampered with irrigation structures causing further damage. Such unauthorized irrigation led to a low collection of water charges by the Revenue Department, as the measured water supplied was quite low<sup>11</sup>. The situation in AP is representative of the prevailing conditions in other Indian states. The need for change and reform had become obvious.

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<sup>10</sup> Irrigation schemes are usually classified on the basis of the investments made on the irrigation schemes. The Andhra Pradesh Farmers Management of Irrigation Systems Act 1997 has for the first time classified the schemes on the basis of irrigated area.

<sup>11</sup> The low collection of water charges is partly due to the misclassification of lands into dry and wet during the localization process, and the low priority accorded to collections by the government after 1984-86, when the land tax and the village officer system were abolished. However, owing to a Supreme Court judgment, the village officer system was reintroduced as the village administrative officer. Nevertheless, the village records substantially degenerated and most land records are outdated.

## **Irrigation Management Reform**

A major component of the reform to the irrigation sector was aimed at giving a greater role to farmers in irrigation management. To determine a suitable framework for increasing farmer participation, a series of public consultations were conducted throughout the state in most major irrigation commands. This consultative approach marked a dramatic departure from the usual way governments work.

Initially, the consultations were met with severe cynicism and indifference by both farmers and agency staff. Within the Irrigation Department, most viewed the current sordid state of affairs as a result of inadequate budgets and increasing political interference. It was felt that adequate infusions of cash for O&M would substantially improve irrigation system performance. Farmers approached the public consultations with a mixture of curiosity and cynicism. While there was great apprehensions toward the new approach, things became clear as several actions followed, one reinforcing the other. This sort of a systematic and persistent approach is what makes the program unique.

### **Public Consultations**

Beginning in April 1996, a series of public consultations were held in centrally located places in command areas of major projects. These informal discussions gave a tremendous amount of input to the government for use in designing a suitable plan of action. The first round of public consultations was used to elicit the viewpoints of the farmers and Irrigation Department staff. Subsequent rounds employed a more structured framework for discussion.

The objective of the government was to understand the viewpoints of all concerned. Therefore, participation in the public consultations was not restricted to farmers, but also included politicians, political parties, researchers, and the press. In AP, this was perhaps the first attempt by the government to seek out the viewpoints of beneficiaries and the parties likely to be affected. The consultations have enabled the government to steer the reform process in a transparent manner. From the beginning, there was as no clearly defined blue print to guide the actions of the government. Rather, the state has attempted to adopt a learning process approach, continually incorporating feedback to guide the reforms.

### **SRSP Pilot Project**

In 1996, two non-governmental organizations (NGOs), IRDAS and SONAR, conducted a pilot project in the *Sriramsagar* project in Karimnagar District. The results of the pilot project<sup>12</sup> encouraged the government to adopt a concrete plan of action.

A key result of the pilot was the finding that substantial improvement in the operation of the irrigation system were realized when farmers in the head, middle, and tail end of the command

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<sup>12</sup> A pilot project was set up subsequent to the visit of a team of officers to Mexico organized by the government of India and EDI, World Bank in 1991. Two groups of distributaries in the *Sriramsagar* project were identified in a total extent of 65,000 Ha. Two NGOs, IRDAS and SONAR, were given the task of constituting WUAs on a pilot basis.

came together to consult with and negotiate with each other. The pilot also revealed that small interventions, such as removal of accumulated silt and weeds and minor repairs to structures, yield dramatic results. Box 3 shows the terms of reference for NGOs working with groups of farmers.

### **Box 3. The Terms of Reference for NGOs**

1. Identify a model for creating Water User Associations.
2. Evaluate the present system of water supply and suggest modifications.
3. Establish a methodology for optimizing the use of water by farmers
4. Train the farmers
5. Identify incentives for effective functioning of WUAs

Contrary to popular belief, most works that are considered technical can be undertaken by farmers themselves with no compromise in quality. Some cooperating engineers developed “layman’s techniques” for farmers who take up operation and maintenance works. Even though the pilot study only covered a relatively small area, its results were highly significant to the state government, as they showed a possible strategy that could be adopted throughout the state, namely one of farmer participation in O&M.

### **Role of the Government of India**

The Government of India<sup>13</sup> began an aggressive campaign to promote participatory irrigation management through national seminars and workshops in the 1990s. It also funded a study by the non-governmental organization SOPPECAM to formulate model legislation. These initiatives provided a platform for debate and discussion on participatory approaches to irrigation management.

In general, there was a broad consensus for the creation of Water User Associations (WUAs). These associations would be registered under existing laws such as the Cooperative Act or the Societies Act. A confederation of WUAs would then sign a Memorandum of Understanding with the Irrigation Department. They would decide on mutually agreeable terms regarding water supply, maintenance, and collection of water charges. Pilot schemes in the states of Maharashtra and Gujarat were highly successful.

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<sup>13</sup> Irrigation is a State subject in India. The Ministry of Water Resources basically deals with international boundary disputes and interstate allocation of water. The Ministry of Water Resources also funds State Governments under the Command Area Development Programme to develop the irrigation potential created but not realized. On 50:50 basis.

## **Problems of Scaling Up**

The problem facing GOAP was how to scale up PIM to a statewide level using the lessons learned from pilot projects in AP and other states. A number of issues warranted more detailed debate and analysis, including: the wide diversity in irrigation schemes; problems of absentee landlordism, large numbers of unregistered tenants, encroachers and unauthorized cultivators, and the lack of a uniform legislation.

In the absence of comprehensive legislation<sup>14</sup> on irrigation in Andhra Pradesh, it was decided to create new legislation exclusively to enable participatory irrigation management. Feedback from the public consultations became the main input in drafting the law. The legislation was subjected to several rounds of discussion among the various stakeholders. The Andhra Pradesh Farmers' Management of Irrigation Systems (APFMIS) Act was enacted in 1997. The act was the first legislation of its kind in India.

The state government decided to extend participatory irrigation management to all parts of the state at one stroke. The GOAP felt that, in order for the reform to be successful, the following were important considerations:

- i. To ensure equitable distribution of benefits of the reform
- ii. Provide uniform legislation
- iii. Completely involve the Irrigation Department and the Government
- iv. Spread the new paradigm across the whole area in the shortest possible time

Without adequate monitoring, this approach to reform ran the risk of ending in disaster. The actions taken by GOAP continuously over a period of time ensured that this would be only a remote possibility. A major constraint for implementing such a major program is the diversity of agro-climatic zones and types of irrigation schemes in the state. Despite the difficulties of implementing a single model across a variety of schemes, the state was committed to giving the farmers a new role in managing irrigation, and all projects, big and small, old and new, were included in the reform.

## **The APFMIS Act**

The Andhra Pradesh Farmers Management of Irrigation Systems (APFMIS) Act of 1997 was a revolutionary piece of legislation. It was the first of its kind in India, seeking to bring a paradigm shift in irrigation management. The act contains broad provisions relating to the types of irrigation schemes, tiers of Farmers Organizations (FOs), elections, functions of FOs, resources, and penalties for offenses. Detailed provisions relating to the actual working of WUAs are given in the Rules.<sup>15</sup> Box 4 lists some of the most important features of the law.

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<sup>14</sup> Prior to the APFMIS Act 1997, most provisions relating to violations in water use, giving permissions for the use of water was done under the Boards Standing Orders (BSOs) in AP by the Revenue Department. The BSO provided regulatory and punitive clauses and was administered by the Revenue Department.

<sup>15</sup> Some of the important rules under the APFMIS act are:

G.O. Ms. 45 dated April 30, 1997 relating to constitution of farmers organizations.

G.O. Ms 541 dated December 12, 1997 relating to the functions of the Farmers organizations.

The Election Tribunal Rules. The Amendments to the APFMIS Act.

**Box 4. Salient Features of the APFMIS Act**

- Transfer of power for the management of state-owned assets
- Creation of new autonomous institutions as legal entities
- Areas defined on a hydraulic basis
- Equity achieved within the structure of a WUA by introducing the concept of territorial constituencies
- All land holders in possession of land in an irrigation system become WUA members with voting rights
- One member, one vote
- Elections by secret ballot
- Functional and administrative autonomy
- Freedom to raise resources
- Resolution of disputes and compounding of offenses
- Simplified procedures for taking up works
- Five-year tenure for Farmer Organizations
- Irrigation Department, as competent authority, is made fully accountable to the Farmer Organizations
- Right to recall an elected member after one year
- Social audit and annual accounts audit

**Process of formation of Water User Association:**

The APFMIS Act forms the legal basis for the formation of a WUA in the State of Andhra Pradesh. Detailed rules have been separately notified for the delineation, notification and functioning of the WUA. The process of formation of a WUA is relatively simple and entails the following steps:

1. **Delineation of a WUA:** The area proposed to be constituted into a WUA is delineated by the irrigation agency, under an irrigation project either in full or in part depending on the irrigation system. In the case of a minor irrigation tank, the area could be as low as 60 ha to a maximum of 2000 ha. In the case of major irrigation scheme it could be on the average be about 1,500 to 3,000 ha. While delineating natural and administrative boundaries are preserved as far as possible. Delineation is done on a hydraulic basis.
2. **Notification of a WUA:** The District Collector of the District in which the WUA is located notifies the proposed WUA in the District Gazette and calls for objections. After hearing the objections a final notification is made in the District Gazette and the WUA is constituted. Along with the WUA a competent authority to the water user association is notified by law. The Competent authority provides technical advice to the WUA and assists in the technical supervision of the works undertaken by the WUA.

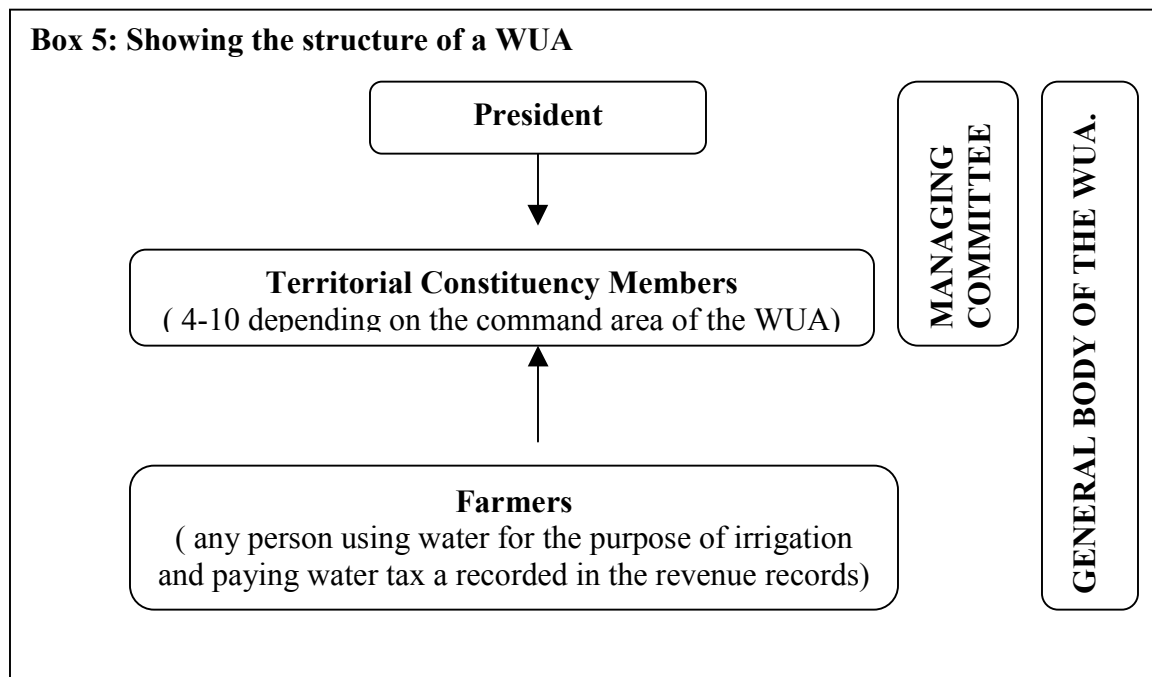
3. **Elections to the WUA:** The Commissioner CADA, is the Authority who notifies the process of election to the WUA. The District Collector of the District concerned issues the election notification. The process of election starts with the following sub processes:
  - a. **Preparation of electoral rolls:** All the members of a WUA who use water and pay water tax as recorded in the revenue records (Adangal) and who are 18 years and above are the voters of a WUA. The electoral rolls are prepared territorial constituency wise listed against each survey number ( a basis for the land holdings in a village). The voter's list is then issued village wise.
  - b. **Calling for nominations:** The District collector issues a schedule for calling for nominations of interested candidates for the post of President and Managing committee of the territorial constituency. A time frame for the scrutiny and withdrawal of nominations is specified in the election schedule and final list of contesting candidates is put up on the notice board.
  - c. **Election Process:** On the specified date, the elections are conducted. Each voter casts his vote. The candidate securing the maximum number of votes is declared the winner. In some cases the elections may be unanimous. The consensus candidate is then declared as the winner. The winner is administered an oath and handed over the election certificate.
  - d. **Setting up of the WUA office:** The WUA notifies a place as its office and the work begins for a period of five years the tenure of the WUA. Where a vacancy arises due to the death or resignation of a WUA President or a member, the District Collector similarly fills up the vacancy after following a similar process.
  - e. **Election Disputes:** Where a dispute arises in the election of a member, the aggrieved could redress in the District Civil Court as an election dispute. All the District Civil Courts have been designated as the election tribunals for the purpose of the election disputes.
4. **Elections to Distributory Committees:** The elections to the Distributory committees are similar to that of the WUA. The District Collector notifies the date of the election to a distributory committee and calls for nominations. On the same day the elections to the Distributory committee is conducted by a show of hands. The only difference being that the number of persons participating in the poll is restricted to the number of Presidents of the WUAs, notified in a Distributory Committee.
5. **WUA to have Bank Account:** Each WUA or a DC has a separate bank account. The president and a member are the signatories to the Bank Account.

## Farmer Organizations

The term Farmer Organization (FO) covers different types of organizations, namely the Water User Association (WUA), the Distributory Committee (DC), and the Project Committee (PC). The primary body is the Water User Association. The number of tiers of Farmer Organizations in an irrigation system depends on the type of the irrigation system. Thus, minor irrigation systems, which are typically less than 2,000 ha, have a single-tier system with one WUA. Medium irrigation systems (2,000-10,000 ha) have a two-tier system, made up of WUAs and a PC. Major irrigation systems (more than 10,000 ha) have a three-tier system, made up of WUAs, DCs, and a PC.

A WUA is created by delineating a portion of the command area<sup>16</sup> under an irrigation system. The managing committee of a WUA includes the WUA president and four to ten territorial constituency members. The area of a WUA is subdivided in order to equitably handle water management, maintenance, and governance. The area covered by a WUA ranges from 60 to 3,500 hectares. WUAs in the delta regions tend to have larger areas of up to 4,500 ha. In areas with rugged topography, WUAs cover about 1,000 ha. In most projects, however, the size of a WUA is around 600 ha to 1,000 ha.

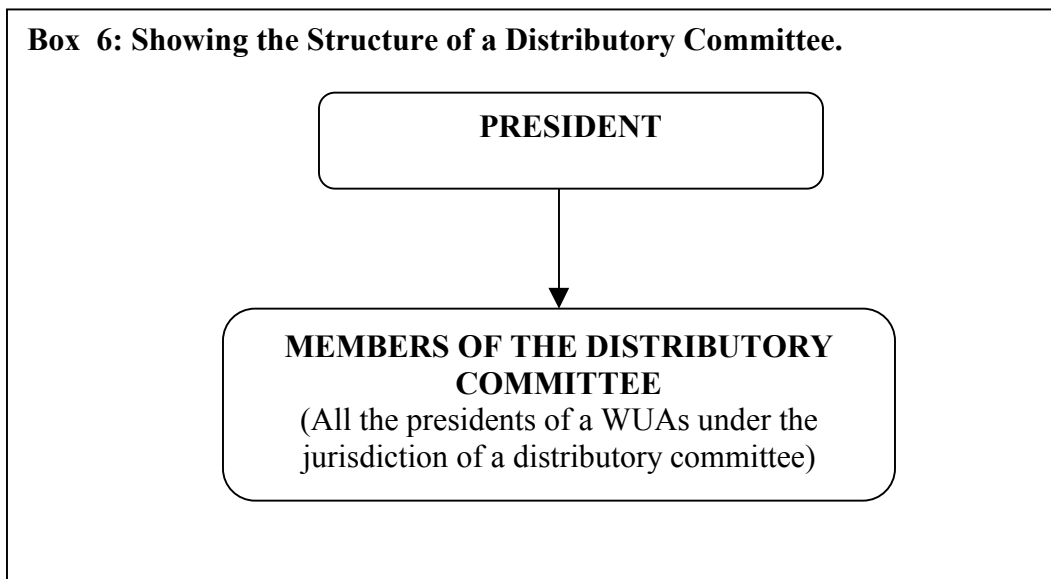
Elections to the WUAs are conducted through a democratic process of secret ballots. The election procedure is akin to the *gram panchayat* election, so farmers are quite familiar with the election process. The electoral process has several advantages in enabling the election of a leader of choice. Being the first election, the elections were apolitical. Subsequent elections may however be much more vigorously contested. Each farmer has a vote regardless of the extent of his or her land holdings. Box 5 shows the typical structure of a WUA.



<sup>16</sup> The command area of a project is the area irrigated by the project. It is popularly referred to as the Ayacut in South Indian States.

Each farmer has one vote regardless of the extent of his land holdings. This levels out the representation of large and small farmers. An analysis of the elections shows that nearly half of the elections were unanimous and the other half were contested. Unanimous elections were mostly in the minor and medium irrigation projects, which are mostly homogeneous. Elections in the major irrigation projects, which may be made up of a number of factious villages, were intensely contested. The district administration was fully involved in the process of the election. The total expenditure towards elections was Rs. 110 million (\$2.5 million).

Table 3, below, shows the distribution of WUAs in AP. A large portion of the irrigated area (73%) comes under the control of only 2,100 WUAs, or 20% of the total number of WUAs. Table 4 shows the types of individuals elected by farmers to represent their interests in either the WUA or the Territorial Constituency (TC).



Presently the State of Andhra Pradesh has constituted 10,292 Water user Associations and 173 Distributory committees. Box 6 shows the typical structure of a DC. The final tier in the irrigation Systems namely the Project committee is yet to be constituted. These at present are manned by the Irrigation Agency itself. The most important change that has been brought about in the irrigation sector has been the constitution of farmers organisation in an irrigation system,. Any O&M work to be taken up has to be necessarily executed by the WUA or the DC concerned. In the case of a project committee the works are to be taken up only after consultation with the Distributory committees. This is in a way has brought about a total change in the manner in which irrigation systems are now run in the State.

To give a wider representation, the WUAs and DC have also been notified in the Irrigation Development Boards of each of the district and CADA Boards. Hitherto the Member of the Legislative Assembly and the Member's of Parliament represented the IDB's. The IDB's are chaired by the District Collector and is an advisory body to review the development of irrigation

activities in the district. The IDB also recommends to Government the closure and opening of canals and the likely area to be thrown under irrigation in the district under a project.

**Table 3. Distribution of Water User Associations in AP**

<b>Name of the District</b>	<b>Major</b>	<b>Medium</b>	<b>Minor</b>	<b>Total</b>
Adilabad	35	27	221	283
Anathapur	46	7	305	358
Chittoor	0	51	644	695
Cuddapah	74	8	644	358
East Godavari	106	12	225	343
Guntur	245	8	81	334
Khammam	51	5	181	845
Krishna	189	12	288	237
Kurnool	116	12	153	489
MahabubNagar	21	31	478	281
Medak	0	12	585	530
Nalgonda	91	45	541	677
Nellore	110	58	695	863
Nizamabad	78	13	267	358
Prakasham	124	5	317	446
Ranga Reddy	0	3	165	268
Srikakulam	37	28	459	524
Vishakhapatnam	28	18	375	421
Vizianagaram.	0	22	439	461
Warangal	29	18	683	730
West Godavari	71	6	217	294
<b>Total</b>	<b>1,700</b>	<b>411</b>	<b>8,181</b>	<b>10,292</b>

Source: Commissioner CADA, Government of AP

**Table 4. Background of presidents and territorial constituency members in AP**

<b>Background</b>	<b>WUA Presidents</b>	<b>Territorial Constituency Members</b>
Farmers	8,544	39,606
Business	213	438
Public Representatives	183	151
Professionals	58	118
Service Personnel	40	63
Contractors	35	35
Industry	27	54

A large number of WUAs that have been created are responsible for the minor irrigation tanks which are scattered throughout the state. Historically, tank irrigation has been a part of the village polity and hence there has been no major change in the way tanks are managed from before the reform.

The major change in irrigation management has been greater role of the WUAs, rather than the irrigation agency. Another major shift, especially in major and medium irrigation projects, has been the realignment of boundaries. New boundaries are not necessarily contiguous with existing village boundaries. It has been necessary to redraw boundaries on a hydraulic basis and prepare new records.

### **Implementing Reform**

The AP reform has been highly successful due to its timely linkage with a World Bank loan under the Andhra Pradesh Economic Restructuring Project (APERP). The \$141 million loan is essentially designed to support the WUAs. The APERP Program plans for minimum rehabilitation of 2.45 million ha under various irrigation projects. Minimum rehabilitation is envisaged at an amount of Rs. 1350/ha (\$30/ha). Important features of the APERP Program are highlighted in Box 7 below.

#### **Box 7. Salient features of the Andhra Pradesh Economic Restructuring Project Assisted by the World Bank.**

The Irrigation Component of the Andhra Pradesh Economic Restructuring Project (APERP-IC) provides support totaling US \$142 million to the Government of Andhra Pradesh's irrigation sector reform program. The APERP-IC's main components are:

**Irrigation Performance Improvement.** This component consists of: (i) minimum rehabilitation of the State's most needing major and medium irrigation schemes (2.45 million ha) and (ii) recurrent maintenance on major, medium and minor schemes (3.7 million ha) to ensure their sustainable functioning (with declining Bank financial assistance for maintenance ending in March 2000).

**Scheme Improvement/Modernization and Farmer Turnover (SIFT).** Piloting of more intensive modernization on selective projects.

**Agricultural Intensification.** Intensification of agricultural extension services to FOs, training and skills development of Agriculture Department staff, dissemination of information and productivity-enhancing agriculture technologies, and on-farm demonstrations.

**Institutional Development of FOs and Government Departments.** Making newly formed FOs fully functional and improving management capabilities through training for farmers, government staff and NGOs

The government of Andhra Pradesh made a conscious decision to disburse the amount over a period of three years. This has two distinct advantages: (1) WUAs gain experience in undertaking O&M works; and (2) the Irrigation Department and Finance Department have time to develop new procedures for dealing with user organizations. Disbursing the loan amount in increments also ensures its effective use. The program's scope is large, and therefore requires a great deal of careful planning. The ultimate goal is complete takeover of O&M activities by Farmer Organizations

Reform of any kind is initially painful because it implies changing from high spending levels to lower more frugal ones. In this case, the reform is aimed at empowering farmers and reducing the role of the irrigation agency.

### Water Charges

The reform in Andhra Pradesh was made possible by two major decisions made by the state:

- Tripling of water charges and linking of water charges to O&M
- Linking the WUAs with a program of minimum rehabilitation

Increasing the water charges by three times is an action, which most governments would shy away from. The increase was made possible in a novel manner. First, water charges were equated with the price of a bag of paddy. Second, the administration decided on a policy of giving the revenue collected from water charges back to the farmers to fund O&M activities.

The farmers revolted against the sudden raise in water charges. After a great deal of debate in the State Assembly, it was decided to reduce the water charges to Rs. 497 per hectare, three times the original figure. Table 4 shows the increase in water charges following reform.

**Table 4. Water charges per acre by crop type before and after revision (Rs./ha)**

Crop Type	Water Charges Per Acre Category I+		Water Charges Per Acre Category II++	
	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

+ Permanent Irrigation Sources; ++ Irrigation Sources for at least 4 months.

\* Pre-revised effective from July 1, 1986; \*\* Revised effective from July 1, 1996.

Source: Government of AP

The AP government has established a policy whereby WUAs will begin to collect the water charges in their areas of operation. Finally, the government will hand over collection responsibilities to the WUAs. This will necessarily be a slow process since WUAs need to build up the capability and confidence to assess, levy, and collect water charges. Water charges being collected are to be distributed to the various tiers of farmer organizations in the ratios given in Table 5 below.

**Table 5. Distribution of water charges among the different tiers of Farmer Organizations and the local body (Gram Panchayat)**

Level	Major Irrigation Schemes	Medium Irrigation Schemes	Minor Irrigation Schemes
<i>Water Tax (Rs./Acre)<sup>17</sup></i>	<i>Rs. 200</i>	<i>Rs. 200</i>	<i>Rs. 100</i>
Irrigation Department	Rs 100	Rs. 100	nil
Water User Association	Rs. 50	Rs. 60	Rs. 90
Distributory Committee	Rs. 20	n.a	n.a
Project Committee	Rs. 20	30.	n.a
Gram Panchayat	Rs.10	Rs.10	Rs.10

### Minimum Rehabilitation

The minimum rehabilitation program was executed through the Farmer Organizations. Farmers were exposed to a new working environment—they had to negotiate for machinery at cheaper rates, persuade the village to take up maintenance works, and maintain records to enable payment. A “mobilization advance” was made available for farmers to start the works. Subsequent payments were given on actual taking up of work. Maintenance works have been taken up by WUAs during the last three fiscal years, 1998, 1999, and 2000.

So far, 49,000 works have been taken up at a cost of Rs. 4 billion (\$94 million). Dramatic results were achieved during the first year. An additional area of 207,288 ha was opened to irrigation. Farmers in all commands have been able to get an additional production of 5-10 bags of paddy. Farmers now conduct participatory walkthroughs along with the irrigation agency, prioritize works, and take up works on their own.

<sup>17</sup> Water tax in Andhra Pradesh is levied under the A.P. Water Tax Act. The tax is collected by the Revenue Department which is under the control of the District Collector. The water tax is levied on the basis of a crop/acre/season.

In general, the cost of works done by WUAs is 20% lower than works are let out to contractors. Most works are done at the estimated rate. This is a sharp contrast to the ad hoc manner in which the irrigation agency paid for O&M. The biggest advantage of the reform program has been that maintenance works are taken up throughout the irrigated command area by all WUAs at the same time. The irrigation agency has maintained responsibility for works on the main canals and headworks, however, as project committees have not yet been formed. Box 8 lists some of the major achievements of WUAs under the reform program.

#### **Box 8. Achievements of Irrigation Reform in AP**

- Bridging the gap to the extent of 207,000 ha
- Earlier transplantation in 200,000 ha
- Relief from submersion in delta areas due to improvement of drains
- Timely receipt of water in tail ends. Some of the areas have reported receiving water for the first time in the last 15 years.
- Maintenance works and employment generation throughout the state
- Reduction in the cost of works
- Empowerment of farmers to manage irrigation systems
- Closer supervision of works
- Beginning of a sense of ownership by farmers
- Choice in prioritizing works
- Execution of works by themselves
- Closer interaction of farmers with the Irrigation Department (ID)
- Reorientation of ID role
- Unification of diverse groups around water

#### **Assessing the Reform Program**

The reform program launched in Andhra Pradesh is both bold and innovative. It attempts to tackle the root cause of poor system performance and unsustainable operation by addressing key issues: institutional structure, incentives, accountability, transparency, and sustainability. The reform is pragmatic and establishes horizontal linkages between the WUAs and their counterparts in the irrigation agency. The reforms have been politically acceptable—the recent reelection of the administration indicates continued support for the reforms.

The reforms are still a work in progress. In the future, linkages need to be established which will make WUAs independent of government support. At present, the irrigation agency has been maintained intact. Because of this, there has been less resistance from the irrigation agency. However, the agency must define a new role for itself and attempt a suitable institutional restructuring. Ultimately, WUAs will need to pay the salaries of the staff attached to them. This may be made possible when GOAP continues further in the reform process.

Another major weak link has been the issue of accountability. This is in part due to the vaguely specified responsibilities of the “competent authority” over the WUAs under the Act. The WUAs need to be given more control of the field staff in the service relationship. The links with the Departments of Agriculture and Revenue continue to be weak. Mechanisms to ensure accountability must continue to be evolved. Also, the roles and responsibilities of all agencies concerned must be further defined. In the long term, there is a need to transfer the complete O&M functions to the Farmer Organizations. Box 9 below gives an idea of the steps that AP has followed in going about the reform process.

<b>Box 9. The Eight-Step Process of PIM</b>	
Stage One:	Generating political support at the highest level - this is essential to provide the required motivation
Stage Two:	Creating a favorable environment
Stage Three:	Developing legal framework
Stage Four:	Formation of Farmer Organizations - WUAs and Distributory Committees
Stage Five:	Implementing the program with clarity of roles of the Farmer Organizations, the Irrigation Department, and other government agencies
Stage Six:	Capacity building of WUA, the Irrigation Department and other government agencies
Stage Seven:	Ensuring transparency, accountability in the working of FOs and social audit
Stage Eight:	Monitoring and mid-course evaluation

The reforms have substantially shifted the responsibility for maintenance functions. However, new ground has to be broken in the field of water management by the users themselves. Farmers have the strongest incentive to provide the services effectively and efficiently. There is a further need to ensure that transactions by the leaders of the Farmer Organizations are made openly and in full view of the farmer-members.

Transparency is critical if the organizations are to progress further. To a large extent transactions are captured in the accounting system. There is a need to put in place simple, standardized procedures for accounting and finance. The AP government has already developed a finance module in consultation with chartered accountants.

The AP Model will be complete when the WUAs are federated into project committees. Continued support and training are required. The awareness base must be expanded to include the farmers. While the awareness of the WUA presidents and managing committee members is quite good, the awareness of the farming committee needs to be made the focus of the training

program. Farmer Organizations will become more responsive only when the farming community starts demanding more responsive and equitable service. This constant dialogue would also enable resolution of disputes. Rather than having the irrigation agency undertake capacity building measures alone, it will be far more effective to (1) foster interactions among Farmer Organizations themselves, (2) enlist the assistance of NGOs, and (3) make use of local training institutes.

### **Replicability of the AP PIM Model**

Irrigation management reform in Andhra Pradesh represents a mixture of top-down and bottom-up processes, each reinforcing the other, organized in a relatively short period of time. Like all participatory programs, there are imperfections in the system that can be remedied over time. A massive reform program such as this one runs the risk of failure if it is not backed up by adequate finances and followed up with a systematic program over at least five years.

Most irrigation systems are deteriorated or fully dilapidated. In this condition, there is little incentive for farmers to take them over. The Participatory Irrigation Management (PIM) program must address the issue of rehabilitation of irrigation systems. In the case of AP, rehabilitation has been done by the Farmer Organizations themselves.

Employing the FOs to perform the minimum rehabilitation has two major advantages. First, FOs are exposed to the procedures of undertaking maintenance and rehabilitation works. Second, in carrying out the works, the Irrigation Department (ID) and FO are in constant interaction. The new relationships and procedures that are formed early on give considerable time for adjustments and mid-course correction. The GOAP has issued more than 100 government orders and memos to make this happen. Unbundling procedures that have evolved over the last two hundred years is no easy task to achieve!

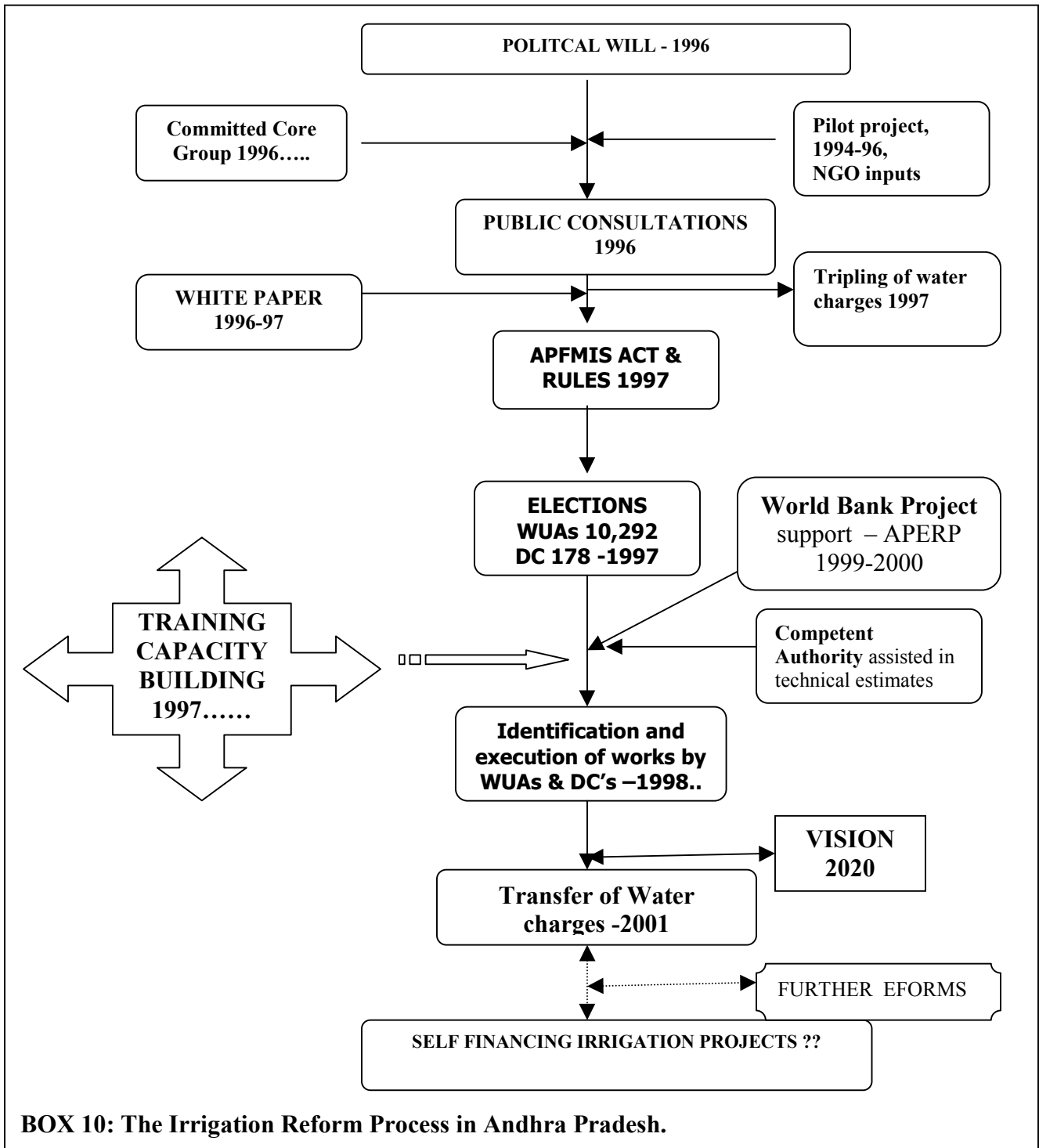
The GOAP has sought to implement the PIM approach throughout the state quickly and uniformly. Box 10 below, shows the irrigation reform process in Andhra Pradesh. In a democratic society, bringing about change is sometimes an uphill task. The process of public consultation is a novel and important feature of the AP program. Follow-up, with assistance from the World Bank-assisted APERP project has also greatly contributed to the success of the program. Further refinements have been introduced in AP's *Irrigation Sector Policy Paper*<sup>18</sup> and later reaffirmed in AP's *Vision 2020*.<sup>19</sup>

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<sup>18</sup> The Irrigation Policy articulates the state's vision for the irrigation sector and sets out the reform agenda.

<sup>19</sup> Published in 1999, the Vision document reflects the vision of the state in 14 key areas identified as growth engines, and is essential to the government's planning process.

The reform process has been firmly underpinned by a clear legal framework and a committed program of minimum rehabilitation. Reform is not possible without the tremendous energy and support of all concerned: farmers, the Irrigation Department, NGO's, and political leaders. Farmer participation makes sense to both the government and the farmers. Linking water charges to O&M costs has also been vital to the program's acceptance by the farming community. Farmer satisfaction with the program has served to further reinforce the progress of reform. The state has thus become a facilitator in the process.



**BOX 10: The Irrigation Reform Process in Andhra Pradesh.**

## Summary and Conclusions

The Irrigation reforms in Andhra Pradesh, breaks new ground in India. Several states have already launched similar initiatives based on the program in A.P. The PIM program in Andhra Pradesh is the first large-scale program of its kind in India and is comparable in scope to programs launched in Mexico and Turkey. The program is quite novel in its approach. An enabling legal framework was created, followed by creation of Farmer Organizations throughout the state. The strength of the program lies in its linkage with timely funding support by the World Bank through the Andhra Pradesh Economic Restructuring Program (APERP). The APERP has further refined AP's strategy by laying down guidelines through the irrigation sector policy. Farmers have a new role to play. The PIM program has enabled a forum for an active dialogue in the irrigation sector. In the context of upper riparian states completing the long pending irrigation projects in the state, the platform could well be used as an excellent tool for debate in water management, crop diversification and improving irrigation efficiency.

For the first time in AP, the focus has been on the linkage of water charges to the operation and maintenance of the system. An explicit linkage justifies increases in water charges.

The PIM program has also empowered farmers. Farmer Organizations have dramatically changed the socioeconomic landscape of irrigated areas. They have given impetus to several new initiatives in the education and health sectors.

The consistent high priority attached to the program by the government has strengthened the PIM program and fostered acceptance by the ID and FOs. The program, launched in 1997, has been able to steer through three intensive operation and maintenance cycles with a fair degree of success. The strength of the program lies in its attempts to ensure transparency and accountability and a systematic process of capacity building. Thus, the program thus paves the way for a new era in irrigation reform in India.

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