'Jalayagnam' to Quench the Thirst of Farmers for Irrigation in Andhra Pradesh: Wither Regional Disparities

Motkuri, Venkatanarayana and Salla, Satyanarayana

Centre for Economics and Social Studies, Hyderabad

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Motkuri Venkatanarayana

Research Consultant, Centre for Economics and Social Studies, Hyderabad.

venkatanarayan@gmail.com

And

Salla Satyanarayana

Abstract

The present paper made an attempt to bring out the scenario of the continuity in the historical legacy of regional disparities in Andhra Pradesh, especially in terms of irrigation infrastructure, even in the current policy initiatives. In the process it examines the facts and figure about the status of irrigation systems, potentials created and utilized capacities and the new policy initiative, 'Jalayagnam', undertaken in the state.

It is observed from the analysis that while the regional distribution in major and medium dams completed to the date indicates the predominance of Coastal Andhra region especially when one takes into account the irrigation potential created and in the case of the minor irrigation the Telangana region is overloaded with them where the region's contribution is relatively the highest among the regions of Andhra Pradesh. In the recent policy initiatives in irrigation infrastructure development especially the project 'Jalayagnam', the region-wise number of projects that are proposed and the size (no of Acres) of Ayacut Development and the Estimated Cost in the completion of the projects undertaken in Andhra Pradesh, has shown that ***there is continuity in regional disparity in spite of the promises of regionally balanced development*** owing to the absence of unbiased planning while creating irrigation infrastructure in the state under the welfare maxim 'equity' where the most disadvantaged needs much more attention and is supposed to get the higher proportion allocation of funds.

(Key words: *India, Andhra Pradesh, Telangana, Regional Disparities, Irrigation, Agriculture and Irrigation*)

* This paper is a piece of our ongoing research work on regional disparities in Andhra Pradesh particularly issues related to agrarian economy (structure, pattern, relations and growth) that includes the Irrigation (Nature, Levels, Sources, and other aspects). Mail: venkatanarayan@gmail.com.
The first author is Consultant at Centre for Economic and Social Studies, Hyderabad. The Second and third authors are in Government Service (School Teachers), Government of Andhra Pradesh.

''Jalayagnam' to Quench the Thirst of Farmers for Irrigation in Andhra Pradesh: Can it Wither Regional Disparities

Motkuri Venkatanarayan and Salla Satynarayana

I. Introduction

The development of water resource is critical to several aspects of welfare of the people and thereby the development of the society. In the development discourse irrigation has been identified as the leading input for the growth of agriculture (Ishikawa, 1967). Increased and assured irrigation facilities will surely lead to greater investments in inputs by the farmers, and therefore it raises the growth of agricultural output. It is an established fact that agriculture is the main source of livelihood for human beings, hence the increase in the standard of living is associated with the growth and development of agriculture.

The importance of irrigation in the economic development may be seen in terms of stabilization of the agricultural production, increased cropping intensity, productivity of land and labour, and production thereby leading to the growth of agriculture (see Boyce, 1987). Also, it increases the employment generation and thereby well-being of the people. In Indian context, while recognising the value of irrigation for agriculture there has been efforts in developing irrigation infrastructure since and prior to independence. Over the period, there has a been tremendous improvement in the cultivable area brought under the different irrigation sources. Nevertheless, there exist regional disparities across region/state and regions within the states where it is highly concentrated in some pockets[1]. When it comes to the state of Andhra Pradesh, fifth largest state in terms of population in India, irrigation has been a central concern and area of activity ever since its formation, however the existing regional disparities within the state in irrigation infrastructure has been of great concern and turned the attention of people, politicians and that of the intelligentsia within and outside the state. The state has not been serious towards the issues especially in the case of irrigation. It is observed from the analysis that the continuum of missing correspondence between the specific policy decision and the outcome[2].

In this context, the main objective is to bring out the continuity of historical legacy of regional disparities especially in terms of irrigation infrastructure, even in the current policy initiatives in the context of Andhra Pradesh, a South Indian State. In the process the paper examines the changing role of state, changing priorities, missing targets, diversion of attention/funds while attending to the irrigation infrastructure. The analysis is carried out by the facts and figures of

the status of irrigation system, their potential capacities, and the capacity contemplated and utilized. It also extends to the new policy initiative in the form of 'Jalayagnam' undertaken by the present government.

Having said, the paper is organized in the following manner. While the first section gives an introduction to the research problem, the second section describes the methodology particularly the data sources that are used in the analysis. Third section presents the current status of the Major and Medium Irrigation Projects in terms of their completion, contemplation and their on-going stage across prime regions of Andhra Pradesh and it includes a description of an innovative policy initiative in irrigation water management. Fourth section analyses the status of the 'minor irrigation' projects. An important recent policy initiative 'Jalayagnam' and its commitment and projects undertaken, is discussed in the fifth section. Finally, the continuity of historical legacy of the regional disparities is presented in the last section.

II. Methodology: Data Sources

The study utilises different data sources, which includes Statistical Abstract of Andhra Pradesh, data provided by the Department of Irrigation and Command Area Development (I&CAD), the Report on 3rd Minor Irrigation Census of Andhra Pradesh. The Season and Crop Report and 'Agricultural Census Report' of Andhra Pradesh, also found to be useful. In addition, NSSO (1998-99) 54th round's unit level record data is utilised for the analysis[3].

Minor Irrigation Census

To identify the minor irrigation schemes/project, it needs the building up of the database. In this regard, a detailed census of minor irrigation works was first recommended by a Sub-committee on Irrigation Statistics set up by the Planning Commission in the year 1970. As a result the Minor Irrigation Division of the Ministry of Water Resources, Government of India have been implementing the Centrally Sponsored Scheme "Rationalisation of Minor Irrigation Statistics (RMIS)". Under this scheme, cent percent cost of Statistical Cell is provided to the State by the Ministry of Water Resources. The Cell monitors the progress of development of Irrigation through Minor Irrigation Schemes on quarterly basis and carries out the Census of Minor Irrigation Sources on Quinquennial basis (GOAP, 2004).

The first census was taken up during the year 1987-88 with agriculture year 1986-87 as the reference period. The second census was taken up during the year 1994-95 with Agriculture year 1993-94 as the reference period. The third census is undertaken during the period 2001-

02 with the agriculture year 2000-01 as the reference period, in the series. In Andhra Pradesh, the census covered all the Minor Irrigation sources, which were utilized for agricultural production having cultivable command area up to 4,942 acres or 2000 hectares. A minor irrigation scheme is identified with reference to the source of water, pattern of lift, ownership etc[4]. It enumerated inventory of all such sources (Dug Wells, Shallow Tube Well, Deep Tube Wells, Surface Flow Irrigation and Surface Lift Irrigation), both public and private, whether in use or in disuse, besides the collection of particulars relating to potential created, potential utilized and the reasons for under utilization. The information with respect to the size, type of the source and other relevant data too are collected. Therefore the Minor Irrigation Census stands as a good source to analyse the current status of minor irrigation system and existing regional disparities.

III. Major and Medium Irrigation

Andhra Pradesh stands at a high pedestal in the irrigation map of India with its rich water resources with major rivers like Godavari, Krishna, Pennar and Tungabhadra and many other medium and minor rivers altogether around 37 in number (GOAP, 2005b:p.61). The state economy is mainly agriculture dependent especially in terms of employment and livelihood. The mean annual rainfall is observed to be 858 mm, of which about 670 mm (i.e. 78 per cent) is contributed by the south-west monsoon and the rest is by north-east monsoon (ibid). There are, in fact, wide variations in water resources and rainfall within the state across different agro-climatic regions. There have been efforts towards enhancing irrigation infrastructure[5] while utilizing these natural water resources which are handy to the state. The state's share of dependable water flowing at 75 per cent dependability from the river systems is estimated at 2764 TMC[6] while the break up shows as 1480 TMC from the Godavari river system, 811 TMC (800 TMC and 11 TMC regeneration) from the Krishna[7], 98 TMC from the Penna and the rest from all other remaining small and medium rivers. Although most of the dependable water flow from the Krishna is utilized, the Godavari water is yet to be harnessed[8]. From the total geographical area of the state 2.74 lakh Sq Kms, the total cultivable land is around 392.70 acres, of which 292 lakh acres is, in fact, under actual cultivation. Within the cultivated area, the land irrigated through different irrigation sources is 133.11 lakh acres, or about 40 per cent of the cultivated land[9]. The utilization pattern of water resource along the river valleys shows it is less in the actual catchment area but more towards the plains and the command area.

There are 43 ongoing projects in the state, of which 26 are in major sector and 17 are in medium sector, in addition to the completed projects of 12 in major and 83 in medium sector (GOAP, 2005a). Some of these ongoing projects have been grounded recently with the assistance of NABARD, JBIC, and World Bank and have shown a sign of good progress in the irrigation infrastructure. Still there are miles to go in the near future for creating more Irrigation infrastructure with the completion of all on-going projects. At this juncture, the state government has launched a massive programme to complete 30 Major and Medium Irrigation Projects within a period of 2 to 5 years investing nearly 46,000 crores in the same period with the participation of Banks and other Financial Institutions (GOAP, 2005).

Table 1: Status and Number, their irrigation Potentials and the Cost of Major and Medium Irrigation Projects across Region in Andhra Pradesh, 2000-01

S no	Region	Completed dams		On going dams			Contemplated Dams		
		P	IPC	P	IPE	Estd. Cost	P	IPCnt	Estd. Cost
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
Major Irrigation Projects									
1	Coastal Andhra	5	26.58 (62.6)	7	17.9 (43.9)	3271 (19.6)	3	18.58 (43.4)	11231 (51.8)
2	Rayalaseema	3	5.48 (12.9)	6	8.12 (19.9)	5930 (35.6)	1	7.88 (18.4)	3310 (15.3)
3	Telangana	4	10.37 (24.4)	10	14.7 (36.1)	7457 (44.8)	5	16.4 (38.3)	7158 (33.0)
Total (AP)		***12***	***42.43 (100)***	***23***	***40.73 (100)***	***16658 (100)***	***9***	***42.86 (100)***	***21699 (100)***
Medium Irrigation Project									
1	Coastal Andhra	31	41.81 (45.0)	12	19.84 (22.6)	512 (65.5)	2	4.73 (24.7)	329 (28.5)
2	Rayalaseema	21	16.86 (18.1)	1	24.50 (27.9)	129 (16.5)	0	0	0
3	Telangana	31	34.27 (36.9)	4	43.48 (49.9)	141 (18.0)	12	14.39 (75.3)	825 (71.5)
Total (AP)		***83***	***92.94 (100)***	***17***	***87.82 (100)***	***782 (100)***	***14***	***19.12 (100)***	***1154 (100)***

Note: 1. ***P*** – Number of Projects; ***IPC*** **-** Irrigation Potentials Created; **IPE -** Irrigation Potentials Estimated; **IPCnt** - Irrigation Potentials Contemplated; **2.** Figure representing IPC and IPE are presented in lakhs acres; Estimated Cost is presented in Rs. Crores; **3.** Figures presented in parenthesis represent percentages.

Source: Irrigation & Command Area Development (I&CAD) Department, Govt. of Andhra Pradesh (2005)

In spite of the state of Andhra Pradesh being one of those Indian states having relatively better irrigation infrastructure, the regional disparities within the state in harnessing surface water sources and installing irrigation infrastructure become a matter of concern. It so in the context of the promise of regionally balanced development in Indian Planning; and the political demand of separate statehood for the Telangana. In addition, the current phase of agrarian distress and farmers' suicides aggravates the problem (see Simhadri and Rao, 1997; Revathi, 1998).

The regional distribution in terms of number of major and medium dams, which have huge capacity to irrigate large area under cultivation, completed so far shows a predominance of Coastal Andhra region especially when one takes into account of the irrigation potential created (see Table 1). Among the on-going as well as contemplated irrigation projects there is

a clear-cut variation, across these prime regions. The deprivation of the Telangana in providing irrigation infrastructure is explicit. Despite the fact that people of Telangana region represent account for 40 per cent of the total population and the share of gross cropped area for 38 per cent in the state, the share of the region in terms of irrigation potential created or estimated (IPC and IPE) is much below their legitimate share.

Table 2: Percentage Distribution of Area Irrigated (including NAI, AIMO and GAI) under Canal Irrigation by Size (Major, Medium and Minor) of the Project across Regions of Andhra Pradesh, 2000-01

Sno	Region	Major			Medium			Minor		
		NAI	AIMO	GAI	NAI	AIMO	GAI	NAI	AIMO	GAI
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
1	Coastal Andhra	83.7	92.3	86.4	74.2	77.9	74.5	79.6	82.3	80.0
2	Rayalaseema	8.4	1.8	6.8	7.9	-	7.4	0.6	1.2	0.7
3	Telangana	7.0	5.9	6.8	17.8	22.1	18.2	19.7	16.5	19.3
Andhra Pradesh		***100***	***100***	***100***	***100***	***100***	***100***	***100***	***100***	***100***

Note: **1.** ***NAI*** – Net Area Irrigated; ***AIMO*** – Area Irrigated More than Once; ***GAI*** – Gross Area Irrigated; **2.** Figures presented in col. 3 to 11 are percentage contribution of each region to the state.

Source: Department of I&CAD, Government of Andhra Pradesh, Hyderabad.

When we considered the Canal (or surface) Irrigation under different sizes (Major, Medium and Minor) of the irrigation systems, the area irrigated (in terms of either NAI, AIMO or GAI) is more concentrated in the Coastal Andhra region while the Telangana as well as Rayalaseema have shown a very insignificant share in the total (Table 2).

Table 3: Region-wise the share of the Size (Major, Medium and Minor) of the Irrigation System to the total Irrigated Area (in terms of NAI, AIMO and GAI) under all these Irrigation Systems together: Andhra Pradesh, 2000-01

Sno	Region	Major			Medium			Minor		
		NAI	AIMO	GAI	NAI	AIMO	GAI	NAI	AIMO	GAI
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
1	Coastal Andhra	87.0	95.8	89.1	9.9	2.7	8.2	3.0	1.6	2.7
2	Rayalaseema	88.9	98.7	89.4	10.9	-	10.3	0.2	1.3	0.3
3	Telangana	69.9	85.0	72.6	22.9	10.6	20.7	7.2	4.4	6.7
Andhra Pradesh		***85.8***	***95.1***	***87.8***	***11.1***	***3.1***	***9.4***	***3.2***	***1.8***	***2.9***

Note: 1. ***NAI*** – Net Area Irrigated; ***AIMO*** – Area Irrigated More than Once; ***GAI*** – Gross Area Irrigated; **2.** Figures presented in col. 3 to 11 are percentage contribution of each level (major, medium and minor irrigation) to the total of all levels by region.

Source: Department of I&CAD, Government of Andhra Pradesh, Hyderabad.

Whereas the region-wise percentage distribution of the contribution by size (Major, Medium and Minor) of the Canal Irrigation Project to the Irrigated Area (in terms of either NAI, AIMO or GAI) within the regions, indicates that, under canal irrigation, major irrigation projects contribute, as high as 90 per cent in Coastal Andhra and Rayalaseema and 70 per

cent in Telangana region (Table 3). Having seen the composition of the irrigation systems by its level/size of the project and the concentration in terms of percentage contribution of each level/size across regions, one may infer the predominance of coastal Andhra in terms of the concentration of irrigation infrastructure. In other words, across the size/level of irrigation projects, it is the major irrigation that contributes to the lion's share of the total surface irrigation and it is highly concentrated in coastal Andhra region. Therefore, it is explicit that the rest of the state including Telangana region has an insignificant stake in the surface irrigation.

a. Water Users' Association: An Innovation in Participatory Water Management

Having observed the irrigation (especially surface irrigation) system suffering from poor maintenance since their construction, lack of accountability and responsibility of the stakeholders, the state has taken up a step towards the institutional reform to rectify these malaises. Transfer of (surface irrigation) water management to the farmers', who are the main stakeholders and beneficiaries of the facility, is the major step. In this regard the state government has brought an Ordinance to make the farmers' organizations more focused on water management and to bring in transparency and accountability (GOAP, 2005).

In April 1997, the Legislative Assembly of the State of Andhra Pradesh approved[10] the Act on Farmers' Management of Irrigation Systems[11]. The management of close to 5 Million hectares of command was to be brought under the control of several millions of farmers[12]. The Act seeks to make the management of the State's irrigation systems client-driven and operation and maintenance user-financed, over a period of time. The Government of Andhra Pradesh, however, has been assisted by the Institute of Resources Development and Social Management (IRDAS) in this regard[13]. Over 10,000 Water Users Associations (WUAs) were created in July and August 1997 and in November 174 Distributory Committees were constituted in the State[14]. The area of each WUA was split into four to ten territorial elective constituencies, depending on the extent of command area under a WUA, to ensure fair representation of all upstream and downstream farmers in the Managing Committee of the WUA, a useful idea that may merit replication outside the state[15]. Engineers of Irrigation and Command Area Development Department (I&CADD) were made accountable to the Presidents of the Water Users Associations & Distributory Committees[16]. This together with the planned user control over the maintenance charges is the heart of the reform[17].

At another level WUAs were given budgets for maintenance and rehabilitation works at the rate of Rs. 247 per hectare and the work has to be prioritized on the basis of joint

walkthroughs with their engineers (competent authority). The WUAs ended up undertaking 90% of the works themselves[18]. This innovation broke with the routine in which department of I&CAD engineers identified the repair works and estimated its cost and then contracted the work to private contractors whom they supervised themselves[19]. The WUAs were given, the responsibility to, plan the system maintenance and improvement, and prepare and implement the plans for the distribution of water. The role of the irrigation department has undergone a total reversal from that of a ``doer'' to a ``facilitator''.

During the first year of operation, the served area of the command increased by 200,000 hectares[20]. During the next phase, a massive public information campaign was set up to establish the 10292 WUAs. Workshops were held with WUA presidents and I&CADD staff to establish the new accountability relationship and to define the new procedures. Workshops were also held with the Agriculture and Revenue Departments, for whom the reforms had many implications[21]. The reformers are the first to stress that the training component needs serious attention, as does the reform of the department of I&CAD and the reorganization of the collection of the fees. Presently the Water Charges are collected by the Revenue Department and remitted to the Government Treasury. The maintenance grant is being separately given to the Irrigation Department. A linkage is to be forged wherein the WUAs have to be involved in the collection of water charges over a period of time through a mechanism in transition[22].

Despite the noble idea/concept[23], the functioning of the system with a new institutional changes left the remarks of well below the expectation in the process as well as the output. The study based on the situation six years after the WUAs came into existence provide a comprehensive view on the status and functioning of these associations in the state (Reddy and Reddy, 2005). It is observed that a) despite the substantial amounts of money spent on the reform process, it was used mainly for improving the ailing irrigation systems rather than strengthening formal institutional structures; b) in contrast with the fact that WUAs are to be promoted as non-political institutions, the political and elite sections involvement dominate its functioning; c) devolution of powers to WUAs has become a nightmare, as most of the important functions like assessment, collection of water charges, sanctioning of work, etc., remain in the hand of the irrigation department.

IV. Minor Irrigation

Minor irrigation system has played a vital role in ushering the growth and development of agricultural output and enhanced the food security in drought prone areas and in areas outside

the command/catchment area of the major and medium irrigation projects. It is, therefore, given high priority to the completion of on-going minor irrigation schemes in the State as well as in the whole country and to take up new schemes wherever feasible[24].

Minor irrigation, under Irrigation and Command Area Development (I&CAD) Department mainly deals with the surface flow irrigation and supply of water through (a) system fed tanks; (b) non –system tanks or isolated tanks; and (c) direct irrigation under the control of Panchayathraj Department. The chief engineer of Minor Irrigation is looking after construction and restoration of minor irrigation tanks about eleven thousands (exactly 11,277) which would irrigate an ayacut of 28.53 lakh acres (see Table 4). During the past few years, 260 minor irrigation schemes have been completed by incurring an expenditure of Rs. 158.70 crores to benefit an ayacut of 45,850 acres. About 198 minor irrigation schemes are currently under execution at a cost of Rs. 131.00 crores to benefit 64,415 acres[25] (GOAP). According to the *third minor irrigation census*, with 2000-01 as the reference period, there are 20.36 lakh minor irrigation sources in the state and it is an increase of 22.32 per cent when compared the previous i.e. second minor irrigation census, which has 1993-94 as the reference period.

Table 4: Region-wise Number of Minor Irrigation Schemes and the Potential Capacity Created: Andhra Pradesh, 2000-01

Sno	Region	Number	Potential Created
1	*2*	*3*	*4*
1	Coastal Andhra	4670 (41.4)	11.9 (41.7)
2	Rayalaseema	1544 (13.7)	3.91 (13.7)
3	Telangana	5063 (44.9)	12.72 (44.6)
Andhra Pradesh		***11277 (100)***	***28.53 (100)***

Note: 1. Potential Capacity Created (col. 4) is in terms of lakh acres; **2**. Figures in parenthesis are percentages.

Source: I&CAD Department, Govt. of Andhra Pradesh (2005)

Table 5: Sources-wise Number of Minor Irrigation Sources Created and the Area Irrigated: Andhra Pradesh, 2000-2001

Sno	Source Type	**No of Sources**	GIPC	GIPU	**Diff** (Col (4-5))
1	*2*	*3*	*4*	*5*	*6*
1	Dug Wells (DW)	1185219 (58.2)	1735996 (33.1)	1040639 (30.8)	1040639 (59.9)
2	Shallow Tube Wells (STW)	656359 (32.2)	1291743 (24.6)	1010390 (29.9)	1010390 (78.2)
3	Deep Tube Wells (DTW)	87482 (4.3)	298768 (5.7)	242503 (7.2)	242503 (81.2)
4	Surface Flow Irrigation (SFI)	82443 (4.0)	1736806 (33.1)	954258 (28.2)	954258 (54.9)
5	Surface Lift Irrigation (SLI)	21493 (1.1)	188538 (3.6)	132009 (3.9)	132009 (70.0)
All Sources		***2035696 (100)***	***35324136 (100)***	***3379799 (100)***	***3379799 (64.35)***

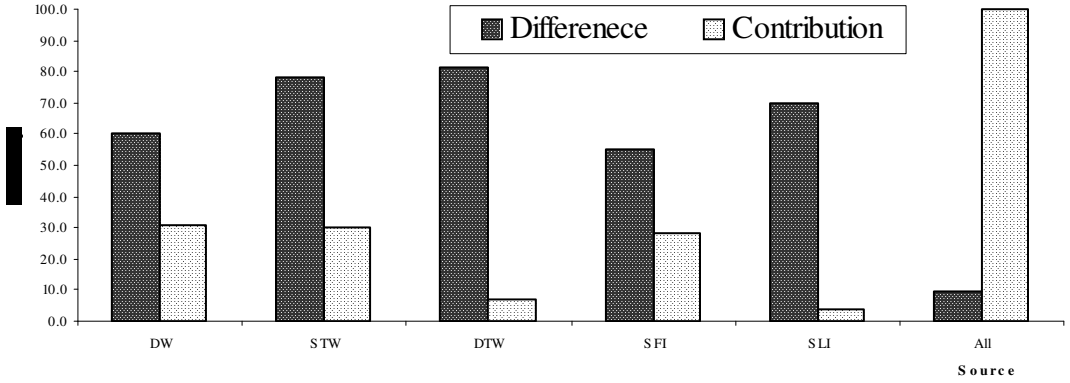
Note: **1.** ***GIPC***: Gross Irrigation Potential Created; ***GIPU***: Gross Irrigation Potential Utilised; 2. Figures in parenthesis are percentages.

Source: 3rd Minor Irrigation Census

Among the total number of minor irrigation sources, the lion's share is that of Dug Wells (58.2 per cent) followed by Shallow Tube Wells (32.2 per cent) and the rest of the sources (DTW, SFI and SLI) were contributing little in the total number of sources of minor irrigation

(See Table 5). However, of the total minor irrigation sources that involved with the Gross Irrigation Potential Created[26] (GIPC), the major share is contributed by DWs followed by SFIs and then STWs. Similar is the situation with the contribution of the above mentioned minor irrigation sources to the Gross Irrigation Potential Utilised[27] (GIPU) i.e. Actual Area Irrigated (AAI).

Figure I: Source-wise Percentage Difference between GIPC and AAI and Contribution Each Source to the Total Difference.



There exists a huge difference between GIPC and AAI that indicates the negligence of the state government in materialization of the potential area created under minor irrigation to the actual area irrigated (See Table 6). Among the different minor irrigation sources, the difference is observed to be highest among STW followed by DTW, SLI, DW, and SFI. Whereas the major contributing sources of minor irrigation to the total difference observed are DW followed by STW and SFI (see Figure I).

Table 6: Region-wise Number of Minor Irrigation Sources Created in Andhra Pradesh during 3rd Minor Irrigation Census (2000-01)

Sno	Region	DW		STW		DTW		SWIS		SWLIS	
1	*2*	*3*		*4*		*5*		*6*		*7*	
1	Coastal Andhra	203861	(17.2)	145812	(22.2)	30662	(35.0)	31057	(37.7)	417807	(25.1)
2	Rayalaseema	246085	(20.8)	86928	(13.2)	52351	(59.8)	13235	(16.1)	401189	(24.1)
3	Telangana	735273	(62.0)	423618	(64.5)	4469	(5.1)	38151	(46.3)	845208	(50.8)
Total (AP)		***1185219***	***(100)***	***656359***	***(100)***	***87482***	***(100)***	***82443***	***(100)***	***1664204***	***(100)***

Note: **1.** ***DWs*** – Dug Wells; ***STWs*** – Shallow Tube Wells; ***DTWs*** – Deep Tube Wells; ***SWISs*** – Surface Water Irrigation Schemes; ***SWLISs*** – Surface Water Lift Irrigation Schemes.

Source: 3rd Minor Irrigation Census

It is noteworthy to observe that the region-wise distribution of the number of different minor irrigation sources present a clear picture of the regional variations in concentration of the source where the Telangana region accounts relatively more number of different minor irrigation resources and therefore the contribution of the region is relatively the highest in this context among the prime regions of Andhra Pradesh (see Table 6).

The contribution of the Telangana region in terms of different minor irrigation sources to the state is the highest in all these sources except DTW in which case the highest contribution is concentrated in the Rayalaseema region (see also Figure II). It is natural that given scanty rainfall and frequent drought conditions, it becomes a necessity to go for deep tube well.

Figure II: Region-wise Distribution of the Different Minor Irrigation Sources in Andhra Pradesh

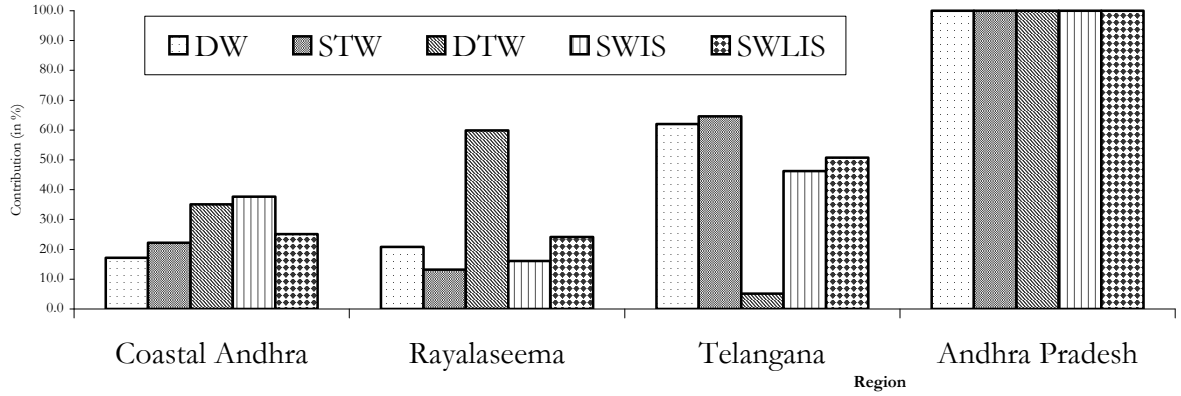
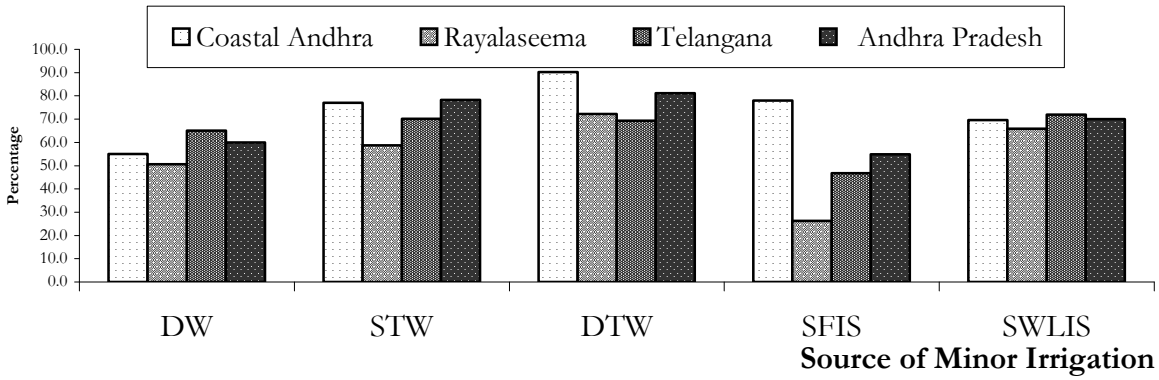


Figure III: Source-wise gap in Minor Irrigation between GIPC and AAI (AAI as a % of GIPC) across Regions of Andhra Pradesh: Third Minor Irrigation Census, 2000-01



It is already mentioned above that there is a wide gap between the irrigation potential created (GIPC) and the utilized (AAI) and it is varying across sources of minor irrigation. Likewise there are variations across regions of the state in terms of the gap between GIPC and the AAI by source of minor irrigation (see Figure III). The gap is seen in terms of AAI as a percentage of GIPC where 100 per cent indicates that there is a gap and a decline in the percentage value indicates, the widening gap.

V. JALAYAGNAM: A Project to Quench the Thirst of Farmers' for Irrigation

An increase in the population is posing a new challenge to the state for harnessing the untapped water resources for increasing the irrigation potential which in turn contributes to the growth of agriculture, as there will be an increase in the productivity of agriculture and

thereby creating rural employment. The agrarian crisis experienced in the recent past in Andhra Pradesh and political demands of separate statehood especially for Telangana where the problem is predominantly linked with agriculture development and irrigation, pressed the necessity to expand irrigation infrastructure across the regions of the state and particularly in backward regions like Telangana (for instance see Simhadhri and Visweswararao, 1997; Revathi, 1998).

The present government has gone ahead with its election promise of completing all pending projects, including the linking of the Krishna and the Godavari rivers. In this regard, the Project `Jalayagnam' is proposed by the present state government to, fulfill its election promises and put off the fire raised in terms of recent agrarian crisis, which involves the lack of irrigation infrastructure in spite of the state having the potential water resources. The commitment of 'Jalayagnam' is to allow the water to flow in the new channels of Irrigation, bringing relief to the rural farming community, who are looking for assured water supply for the years to come. The project aims at the completion of 31 irrigation projects at a projected cost of Rs. 46,000/- crores. In the past 50 years, a total Ayacut of 65 lakh acres (26 lakh hectares) was developed in the State. The project 'Jalayagnam', is to be completed in five years, and is expected to double the area under irrigation[28].

Table 7: Region-wise No of Projects Proposed, the Ayacut Development and the Estimated Cost in the Completion of the Projects Undertaken in 'Jalayagnam': Andhra Pradesh, 2005

Sno	Region	No.	Ayacut	Estimated Cost
1	***2***	***3***	***4***	***5***
1	Coastal Andhra	22	3637719 (43.8)	19665 (45.7)
2	Rayalaseema	11	1760500 (51.2)	9022 (21.0)
3	Telangana	26	2911638 (35.0)	14307 (33.3)
Andhra Pradesh		***59***	***8309857***	***8309857 (100)***

Note: **1.** Figures in col.4 are in No of acres; **2.** Figures in col.5 are in Cr Rs.; **3.** Figures presented in parenthesis represent the percentages.

Source: Department of I&CAD, Govt. of Andhra Pradesh (2005).

Even under the auspicious Programme of 'Jalayagnam', the Region-wise number of Projects that are Proposed and the Size (Number of Acres) of Ayacut Development and the Estimated Cost in the Completion of the Projects that are undertaken in Andhra Pradesh show that there is a continuity in the regional disparity in spite of the promises of regionally balanced development. It is explicit that though the number of projects are relatively more in Telangana region in comparison with the Coastal Andhra, the size of the Ayacut development and estimated cost in the completion of the projects undertaken were at varying levels (see

Table 7), wherein both these aspects undermined Telangana people in spite of their desperate need for irrigation infrastructure.

VI. Discussion: Continuity of the Regional Disparities

From the above analysis it is explicit that there is a continuity of historical legacy of regional disparities especially in terms of irrigation infrastructure, even in the current policy initiatives. The regional distribution in terms of number of the major and medium dams, which have huge capacity to irrigate large area under cultivation, completed so far, shows the predominance of Coastal Andhra region especially when one takes into account the irrigation potential created. Also, among the on-going as well as contemplated irrigation project, there is a clear-cut variation across these prime regions.

It may be illustrated with the facts that the situation prior to the integration of Andhra and Telangana to form Andhra Pradesh in 1956, there were about 4.3, 1.9 and 12 lakh acres of cultivated land irrigated under major, medium and minor (surface) irrigation projects respectively and altogether it was 18.2 lakh acres in Telangana, whereas it was 30.65 in Andhra region (Vidyasagarrao, 2006: p.303). During the period of 1956-2004, land irrigated under major irrigation increased from 4.3 to 11.8 lakh acres while there has been a decline in the land irrigated under medium and minor irrigation (land under medium and minor irrigation fell to 1.2 and 5.0 lakh acre respectively. The revealing fact is that well-established minor (surface) irrigation system[29] in Telangana has been neglected without replacement in the sense that not much initiatives in creating public surface irrigation system.

Despite, the minor irrigation system (in terms of private initiatives – ground water lifting) still caters the needs of a large number of farmers in Telanga and Rayalseema region[30]. The region-wise distribution of the number of different minor irrigation sources presents a clear picture of regional variations in its concentration, wherein the Telangana region accounts relatively more number of different minor irrigation sources that cater to the irrigation needs of the farmers and therefore the region's contribution is relatively the highest among the prime regions of Andhra Pradesh. The contribution of the Telangana region is the highest in all these sources except DTW. As a matter of fact, within the minor irrigation it is the exploitation of the groundwater that contributes more to the total minor irrigation than the surface minor irrigation (also see Venkatanarayana and Satyanarayana, 2006).

Under 'Jalayagnam' programme, the region-wise number of projects proposed; the size (no of Acres) of ayacut development; and the estimated cost in the completion of the projects

undertaken in state, has shown that there also exists the regional disparity. Though the number of projects proposed are relatively more in Telangana region in comparison with the Coastal Andhra region, when we consider the size of the Ayacut development and estimated cost in the completion of the projects undertaken, they were at varying levels where both these aspects undermined the desperate need for irrigation infrastructure to cater the Telangana farmers. If at all, the state governments ambitious project 'Jalayagnam' is successful, it is expected to bring about 39.83 and 107.20 lakhs acres of cultivable land under irrigation in Telangana and Andhra respectively (Vidyasagarrao, 2006:p.304). In terms of the ratio of the irrigated land under cultivation between Andhra and Telangana regions, at the time of state formation it was in the ratio of 1:2 whereas at the end of the project 'Jalayagnam', if they are completed, the ratio would rise to 1:3 ratio. These facts and figures reveal the absence of unbiasedness against the objective of regionally balanced development in the process of creating irrigation infrastructure. The welfare maxim 'equity' where the most disadvantaged needs much more attention and is supposed to get the higher proportion in allocation of funds, is altogether ignored in the development initiatives.

* * *

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Appendix Tables

Table A1: Source-wise Area Irrigated across Prime Regions in Andhra Pradesh, 2004-05

Sno	Region	Canal									Tanks			Well
		Major projects			Medium projects			Minor projects						
		NAI	AIMO	GAI	NAI	AIMO	GAI	NAI	AIMO	GAI	NAI	AIMO	GAI	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
1	Coastal Andhra	966652	337577	1304229	110531	9410	119941	33870	5568	39438	321371	18737	340108	206068
2	Rayalaseema	96607	6542	103149	11837	-	11837	270	83	353	29218	6827	36045	113935
3	Telangana	81249	21465	102714	26577	2670	29247	8377	1114	9491	126501	12249	114252	705630
Total (AP)		1154508	365584	150092	148945	12080	161025	42526	6765	49291	477100	37813	490405	1025633

Note: **NAI**: Net Area Irrigated; **AIMO**: Area Irrigated More than Once; **GAI** : Gross Area Irrigated
Source: 3rd Minor Irrigation Census.

Table A2: Region-wise Number of Irrigation Sources, Ownership and their Usage and Water Lifting Devices: Andhra Pradesh, 2000-01

Sno	Region	Total	Owned by		In Use	Not in Use			Water Lifting Devices	
			Govt.	Indv		Temp	Aband	Dest	Electric	Diesel
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
Dug Wells (DWs)										
1	Coastal Andhra		1747	171279	170958	16829	1840	2338	74872	40878
2	Rayalaseema		1106	2210218	177096	22577	4370	6152	215688	21650
3	Telangana		4012	700938	598339	57474	4471	5144	684799	35182
4	Andhra Pradesh		6865	1082435	946393	96880	10681	13634	975359	97710
Tube Wells (TWs)										
1	Coastal Andhra		1046	137351	139911	3566	-	464	125341	18455
2	Rayalaseema		344	82356	84388	1438	-	821	84835	999
3	Telangana		609	409894	412704	5727	-	3923	418486	1175
4	Andhra Pradesh		1999	629601	637003	10731	-	5200	62866	20629
Deep Tube Wells (DTWs)										
1	Coastal Andhra		339	29351	30185	270	-	60	*30126*	-
2	Rayalaseema		188	48369	51090	734	-	264	*51790*	-
3	Telangana		148	3903	4326	50	-	25	*4269*	-
4	Andhra Pradesh		675	81623	85601	1054	-	349	*86185*	-
Surface Water Irrigation Schemes (SWISs)										
1	Coastal Andhra		27388	654	29259	1031	120	53	-	-
2	Rayalaseema		11248	607	7034	4713	116	65	-	-
3	Telangana		18474	5180	18688	13982	342	423	-	-
4	Andhra Pradesh		57110	6441	54979	19726	578	541	-	-
Surface Water Lift Irrigation Schemes (SWLISs)										
1	Coastal Andhra		348	4537	6032	291	16	-	5434	730
2	Rayalaseema		33	2371	2498	73	5	-	2513	58
3	Telangana		881	13477	14887	244	28	-	13997	914
4	Andhra Pradesh		1262	20385	23417	608	49	-	21944	1702

Note: 1. ***DWs*** – Dug Wells; ***TWs*** – Tube Wells; ***DTWs*** – Deep Tube Wells; ***SWISs*** – Surface Water Irrigation Schemes; ***SWLISs*** – Surface Water Lift Irrigation Schemes, ***Govt.*** – Government; ***Indv*** – Individuals; ***Temp*** – Temporarily; ***Aband*** – Abandoned; ***Dest*** – Destroyed; **2**. For Deep Tube Wells (DTWs) the Water Lifting Device is ***Submersible***.
Source: 3rd Minor Irrigation Census.

Table A3: Region-wise Distribution of Number and Area (in Hectors) Irrigated Under Different Source of Irrigation: Andhra Pradesh, 2000-01

Sno	Region	DW			STW			DTW		
		No	GIPC	AAI	No	GIPC	AAI	No	GIPC	AAI
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Coastal Andhra	203861	270779	148906	145813	331010	254896	30662	149721	135147
2	Rayalaseema	246085	426469	215720	86928	162613	195557	52351	136628	98752
3	Talangana	735273	1038748	676013	423618	798120	559937	4469	12419	8604
Andhra Pradesh		***1185219***	***1735996***	***1040639***	***656359***	***1291743***	***1010390***	***87482***	***298768***	***242503***

Note: 1. ***GIPC***: Gross Irrigation Potential Created; ***AAI***: Actual Area Irrigated; **2.** Figure representing ***AAIC& GIPC*** are presented in the form of number of Hectares.
Source: 3rd Minor Irrigation Census

Table A4: Region-wise Distribution of Number and Area (in Hectors) Irrigated Under Different Source of Irrigation: Andhra Pradesh, 2000-01

Sno	Region	SFIS			SWLIS		
		Number	GIPC	AAI	Number	GIPC	AAIC
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Coastal Andhra	31057	631628	492786	417807	109495	76177
2	Rayalaseema	13235	268480	70591	401189	17510	11529
3	Talangana	38151	836698	390981	845208	61533	120480
Andhra Pradesh		***82443***	***1736806***	***954358***	***1664204***	***188538***	***132009***

Note: 1. ***GIPC***: Gross Irrigated Potential Created; ***AAI***: Actual Area Irrigated; **2.** ***SFIS*** – Surface Flow Irrigation Scheme; ***SWLIS*** – Surface Water Lift Irrigation Scheme.
Source: 3rd Minor Irrigation Census

Table A5: Proposed Projects in Telangana Region Under the Jalayagnam

Sno	Name of the Project	Ayacut	Estd. Cost	Districts benefited
1	*2*	*3*	*4*	*5*
1	Godavari LIS-I	123000	900	Warangal
2	Godavari LIS-II	285000	-	Warangal
3	Alisagar LIS	53793	2108	Nizamabad
4	Gutpa LIS	37793	145	Nizamabad
5	SLBC	300000	635	Nalgonda
6	SRSP II	440000	935	Warangal,Nalgonda Karimnagar
7	Flood flow from SRSP	220000	2421	Warangal,Nalgonda Karimnagar
8	Bhima LIS	203000	1570	Mahaboobnagar
9	Kalvakurthi LIS	250000	1500	Mahaboobnagar
10	Nettampadu LIS	200000	50	Mahaboobnagar
11	Sripada LIS	200000	4088	Karimnagar
12	Dummugudem LIS –I	36000	3166	Khammam,warangal
13	Dummugudem LIS-II	364000	3458	Khammam, warangal
14	Lendi	22000	110	Nizamabad
15	Suddavagu	14000	48	Khammam
16	Palemvagu	10132	62	Adilabad
17	Komarambeem	24500	62	Adilabad
18	Peddavagu (jagannathpur)	15000	6	Adilabad
19	Nailwai project	13000	48	Adilabad
20	Ralivagu	6000	30	Adilabad
21	Gollavagu	9500	43	Adilabad
22	Mathadivagu	8500	28	Adilabad
23	KoilsagarLIS	50250	.85	Mahaboobnagar
24	Kinnerasani	10000	114	Khammam
25	Modikuntavagu	13590	115	Khammam
26	Gundilavagu	2580	21	Khammam
Total		***2911638***	***19666.85***	

Note: 1. Ayacut figures (col.3) are in acres; Estd. Cost – Estimated Cost of the Project are in crore Rs.
Source: Department of I&CAD, Govt. of Andhra Pradesh, 2005.

Table A6: Proposed Projects in Rayalaseema Under the Scheme of Jalayagnam

Sno	Name of the Project	Ayacut	Cost	Districts Benefited
1	*2*	*3*	*4*	*5*
1	Telugu Ganga	300000	1821	Kurnool, Kadapa, & Chittoor
2	Guru Raghavendhra LIS	17500	58	Kurnool
3	KC Canal	264000	232	Kurnool, Kadapa
4	Galeru–Nagari SS	325000	2800	Kakapa, Chittoor, & Nelloor
5	P.A.BR –II	50000	625	Ananthapoor
6	Handri-Neeva Sujala Sravanthi	602000	3000	Ananthapoor, Kadapa, Kurnool, & Chittoor
7	Chirtavathi B R	38000	60	Kadapa
8	GNSS FFC from OWK	5000	197	Kurnool
9	Modernisation of Pulivendula B C	60000	100	Kadapa, Ananthapoor
10	Modernisation of Mylavaram	75000	-	Kadapa
11	Veligallu	24000	129	Kadapa
Total				

Note: **1.** Ayacut is in number of Acres; 2. Est. Cost – Estimated Cost, the figures are in crores
Source: Department of I&CAD, Govt. of Andhra Pradesh, 2005.

Table A7: Proposed Projects in Andhra Region Under the Scheme of Jalayagnam

Sno	Name of the Project	Ayacut	Est. Cost	Districts Benefited
1	***2***	***3***	***4***	***5***
1	Vamshadara - II	107280	863	Srikakulam
2	Tadipudi LIS	206000	240	West Godavari
3	Pushkaram LIS	186000	300	East Godavari
4	Somashila	95000	485	Nellore
5	Venkatanagaram Pumping	36000	108	East Govadari
6	Pedderu Reservoir	17467	384	Visakapatnam
7	Maddigeda	4000	7	East Godavari
8	Suram Palem	21970	443	East Godavari
9	Yerrakalava	24700	124	West Godavari
10	Kovvada Kalava	17739	52	Wesr Godavari
11	Peddagedda	12000	32	Vizayanagaram
12	Tarakarama Thirtha Sagar	24700	43	Vizayanagaram
13	Bhupathi Palem	23086	77	East Godavari
14	Musurumilli	22643	164	East Godavari
15	Swarnamukhi	11500	42	Nellore
16	Thotapalli Barrage	18400	415	Vizianagaram, and Srikakulam
17	Janjhavathi Project	24700	103	Vizaanagaram
18	Pulichintala	1308000	600	Krishana, West Govdavari & Guntur.
19	Gundlakamma Project	80060	184	Prakasham
20	Ramateertham B R	72874	415	Prakasham
21	Velugonda Project	438000	1660	Prakasham
22	Polavaram Project	72000	7981	East & West Godavari, Krishna, & Vizag.
Total		**3637719**	**14307**	

Note: 1. ***Ayacut*** is in number of Acres; **2**. ***Est. Cost*** – Estimated Cost, the figures are in crores.
Source: Department of I&CAD, Govt. of Andhra Pradesh, 2005.

End Notes

[1] For instance, the state like Punjab is having almost 90 percent of net sown area as irrigated whereas the state like Rajastan has very little. Within the states, for example western region of Uttar Pradesh is better than eastern region. Similarly the case of the state of Andhra Pradesh where the historical legacy of the regional disparities in irrigation infrastructure and thereby the growth of the agriculture continued.

[2] There are several presumptions; perhaps all they may not be valid, relating the decisions with results/outcome.

[3] In this round information on cultivation practices in India was collected along with the information on common property resources (Survekshna, April 2004).

[4] Different water lifts operating on the same source such as river, tank and well will normally constitute different units. In some cases two or more independent lifts would be applied to raise the water to the required heights. In such case, the intermediate lifts will not contribute independent units but will be required to be treated as part of one unit.

[5] Building dams under major and medium projects, providing subsidies for tapping ground water while drilling wells and energizing (electricity) the water lifting equipment.

[6] TMC- Thousand Million Cubic Feet.

[7] In fact the entire dependable water of Krishna is almost fully harnessed (GOAP, 2005; p.61).

[8] , wherein on an average 3000 TMC of water flows unutilized and wasted into the sea.

[9] Out of which 111.13 lakh acres from the Irrigation Department sources, 14.90 lakh acres under Panchayat Raj Department, mostly irrigation tanks and about 7.75 lakh acres is under the APSIDC and the rest of the land is rain-fed.

[10] The goal is clear: the Government wishes to make the irrigation schemes financially viable through farmer's management. But it also says that it has no road map showing the way. 'White Paper', in June 1996, to communicate its diagnosis of the irrigation sector. It subsequently discussed it in numerous district level meetings. From these discussions it concluded that farmer empowerment and management had to be at the heart of the reform and that it had to be bold and comprehensive rather than gradual. Extensive discussions took place across the state, and the Government participated in series of workshops seminars with the Press, the

Legislature, political parties, District Collectors and Magistrates, farmers, the Irrigation Department etc. Through these consultations, the Government shaped the reform, using the outputs of the consultations to draft a law `` The Andhra Pradesh Farmers' Management of Irrigation Systems Act 1997". As a consequence, this law was adopted unanimously.

[11] The irrigation reform process is part of a statewide policy of administrative reform defined by the Chief Minister. It aims to modernize AP's government's apparatus and to revitalize its economy by making the providers of public services such as primary education and health care accountable to committees of local users, by involving users and other stakeholders in the management of forests, watersheds and irrigation systems and by rewarding innovation. The emphasis has been both on making the reform process itself participatory through extensive consultation of stakeholders and on obtaining quick results, partially in response to the fact that election were not more than four years away.

[12] As a matter of fact, many of them lacking in literacy and operating subsistence oriented holdings of less than 2.5 hectares.

[13] It has been fueled by this vision and committed itself politically to make this radical reform happen.

[14] Elections were held using secret balloting. Administrative boundaries were redrawn to give the new WUAs hydrological boundaries and full control over the operation and maintenance of their canals.

[15] Most WUA Presidents, appear to be small farmers; 42 percent declare owning less than 2.5 ha and 31 percent declare owning farms of between 2.5 ha and 5 ha. WUA presidents declaring that they own over 5 ha constitute 23 percent of the total. Head end farmers do not appear to be over-represented, possibly due in part to the establishment of the Territorial Constituencies.

[16] while remaining on the Department's payroll.

[17] Assistant Engineers on Government built schemes are now accountable to WUAs, between one to four WUAs in Major Irrigation Schemes and many more on minor irrigation tanks. In both cases, their job performance evaluation depends in part on how their WUA bosses assess them. As the transfer rolls on, Deputy Executive Engineers are made answerable to the federation of WUAs at the secondary level called the Distributory Committee. In due course, the Executive Engineers, formerly in charge of the entire scheme, will be made answerable to the Scheme Committee, called Project Committee.

[18] contributing their own labour, hiring labour and hiring excavators from contractors.

[19] According to I&CADD the quality of the repair and rehabilitation work was at least as high as the work done previously by contractors and the total volume increased considerably.

[20] This year also marked an increase of 10% in agricultural productivity which was in all likelihood was due both to good rains and the establishment of a platform where the farmers organizations could negotiate and maximize water distribution. Water was reported to have become available at the tails two to three weeks earlier than usual, which may have been an outcome of the reform through the combined effect of conveyance improved through repairs and rehab and more responsive management. The early arrival allowed earlier transplanting may have increased crop yields with about ten percent.

[21] Most importantly, two state-level conventions were held in 1998 assembling all 10292 WUA presidents. They were asked to fill in questionnaires that were machine readable and tabulated on the spot by scanning, to provide feedback. In addition, questionnaires were sent to WUA Managing Committee members to allow the Government to have their view as well. These sessions have led to a new class of leadership which is gradually becoming more vocal and articulate.

[22] The process in Andhra Pradesh has now set up a dynamic situation, which is constantly under review. The rationale behind this campaign was that Government expectation that farmer control over maintenance and repair would increase farmer support for the reform, as it appears to have done.

[23] of Water Users' Association, an innovation Participatory Water Management, for the management of water resource for the irrigation while making the end receivers (i.e. farmer) as part of the management and thereby increasing the efficiency of water use for irrigation.

[24] Recently Minor Irrigation department is planning to constitute a commission with experts from Irrigation, Forest and Revenue Departments to identify minor irrigation resources and make full use of them. The commission would advise the Government on how available minor irrigation resources could be effectively used. The department was allocated Rs. 600 crores in the current budget, which was an all-time record.

[25] Simultaneously a major program has been initiated to rehabilitate old minor irrigation schemes under a phased program. Out of a total of 12,264 schemes in the State, 2,934 schemes have been taken up for minimum rehabilitation at a cost of Rs. 136.18 crores under the APERP Program. Additional 3,000 schemes are proposed to be taken up at an estimated cost of Rs. 172 crores by utilising the savings under the AP.III Irrigation Project.

[26] It includes the total gross area proposed to be irrigated under different crops during a year by a scheme. The area proposed to be irrigated under more than one crop during the same year is to be counted as many times as the number of crops grown and irrigated.

[27] It includes the gross area actually irrigated during the reference period out of the gross proposed area to be irrigated.

[28] **Approved projects:** Totapally Barrage, Vamshadara, Pulichintala, Gundlakamma, Somashila, KC Canal, SRSP-II, Flood Canal, Bhima LIS, Kalvakurthi LIS, Alisagar LIS, Gupta LIS, and Godavari LIS. The government also announced the commencement of work on irrigation projects without waiting for clearances from the Central agencies. The other works planned are: The SRBC (Srisailam Right Bank Canal), the Jurala and K.C. Canal modernisation (for which clearances have been secured); the Guru Raghavendra and Penna Ahobilam Balancing Reservoir Stages I and II (which need no clearances); the Pulichintala and Beema projects (which need only environmental clearance); and the Telugu Ganga, the Srisailam Left Bank Canal and the Kalwakurthy, Nettempad, Koilsagar, Galeru-Nagari, Handri-Neeva and Veligonda projects (these have no clearance and are based on the utilisation of surplus water).

[29] Minor irrigation emerged as the major source of irrigation for the farmers in the backward regions like Telangana and Rayalaseema.

[30] The minor irrigation by definition includes both the surface as well ground water sources.