Asian Resonance

Irrigation in Andhra Prdesh The Rise and Fall of Tanks

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Abstract

The total irrigated area in Andhra Pradesh is 48.21 lakh hectares (44%) in 2008- 09 have decreased to 42.15 lakh hectares showing a decrease of 12.57 percent in 2009-10. The gross irrigated area across the sources has gone up consistently by over 25 percent during each period namely 1996-97 – 2009 -10. The net area irrigated in the State decreased to 42.15 lakh hectares in 2009-10 as against 48.21 lakh hectares in 2008-09 showing a decrease of 12.57 percent due to decrease in tank irrigation. The canal irrigated area in the State had increased from 12.92 lakh hectares to14.46 lakh hectares during 1955-56 to 2009-10. Tank irrigated area in the State has decreased from10.68 lakh hectares to 3.32 lakh hectares during the last 54 years. Tank irrigated area has increased to 11.51 lakh hectares in 1960-61 and latter it starts declining and reached 3.32 lakh hectares in 2009-10.Tank irrigation in 2009-10 accounted for only 7.88 percent of the total irrigated area as compared to 38.88 percent in 1955-56 showing a decrease of 79.26 percent. Well irrigated area in the State in total area has increased from 2.84 lakh hectares to 22.84 lakh hectares during the last 54 years .Well irrigation in 2009-10 accounted for nearly 54.19 percent of the total irrigated area as compared to only 10.34 percent in 1955-56 showing an increase of 426 percent.

Keywords: : Irrigation, Tank Irrigation, Well Irrigation, Canal Irrigation, Hectares, Reservoir, Rise and Fall.

Introduction

Andhra Pradesh is rightly called “A RIVER STATE” as it is blessed with Major River Systems like the Godavari, Krishna, Pennar, Vamsadhara and 36 other rivulets. The state’s share of dependable flows at 75% dependability from the river systems is estimated at 2764 TMC (Thousand Million Cubic Feet). This breaks up into 1480 TMC from the Godavari River system, 811 TMC (800 TMC +11TMC regeneration) from the Krishna, 98 TMC from the Pennar and the rest from other rivers. The entire dependable water share of Krishna River is fully harnessed through the construction of several reservoirs and barrages.

Andhra Pradesh has a heritage of irrigated agriculture dating back to several centuries. In the past, during the periods of Kakatiya and Vijayanagar Kingdoms, several tanks and diversion systems were constructed and wells dug which are still operating and productive. During the pre-independence period, the Godavari Delta, the Krishna Delta, the Pennar Delta, the Kurnool-Cuddapah Canal, Khanapur, Mahaboob Nagar, Pocharam and Nizamsagar irrigation systems were constructed by the then rulers. After independence, high priority was given to irrigation development.

Objective:

The main objective of this paper is to examine three major sources of irrigation (Canals, Tanks and Wells) in Andhra Pradesh and explain their variation over time.

Methodology:

The present study is purely based on secondary data. The secondary data was collected from various issues of Economic Surveys, Five Year Plans, Directorate of Economics and Statistics, AP Abstract, AP Socio Economic Survey and journals and books.

Result and Discussions

The total irrigated area in Andhra Pradesh is 48.21 lakh hectares (44%) in 2008-09 has decreased to 42.15 lakh hectares showing a decrease of 12.57 percent in 2009-10. The region wise irrigated area in the State is as follows:

Region-wise irrigated area in Andhra Pradesh is presented in table -1. Among the three regions of Andhra Pradesh, Coastal Andhra

Pradesh occupies first place in area irrigated (51%) followed by Telangana (39%) and Rayalaeema (10%).

Table -1
Region-wise Irrigated Area in Andhra Pradesh

Region	Area Irrigated (Hectares)	Extent (%)
Coastal Andhra Pradesh	24,52,234	51
Rayalaseema	4, 85, 387	10
Telangana	18,85, 630	39
Total	48,23,251	100

Source: AP Socio Economic Survey, 2010-11

Table – 2
Net Area Irrigated in Andhra Pradesh by Source
(Lakh Hectares)

Year	Canals	Tanks	Wells	Other Sources	Total
1955-56	12.92	10.68	2.84	1.03	27.47
1960-61	13.31	11.51	3.28	0.99	29.09
1970-71	15.79	11.12	5.10	1.13	33.14
1980-81	16.93	9.00	7.76	0.94	34.63
1990-91	18.68	9.69	13.04	1.65	43.06
2000-01	16.49	7.27	19.54	1.98	45.28
2005-06	15.72	6.62	19.87	1.72	43.93
2006-07	16.22	6.02	20.73	1.55	44.52
2007-08	16.10	5.85	22.87	1.62	46.44
2008-09	16.70	6.48	23.23	1.80	48.21
2009-10	14.46	3.32	22.84	1.53	42.15

Source: AP Abstract, Directorate of Economics and Statistics, Hyderabad.

Gross and Net area Irrigated:

The net irrigated area has been increased from 27.47 lakh hectares in 1955-56 to 42.15 lakh hectares over the years due to increase in well irrigation and canal irrigation. The net area irrigated in the State has decreased to 42.15 lakh hectares in 2009-10 as against 48.21 lakh hectares in 2008-09 showing a decrease of 12.57 percent due to decrease in tank irrigation.

The gross irrigated area across the sources has gone up consistently by over 25 percent during each period namely 1996-97 – 2009 -10. In the case of 2003-04, the gross irrigated area declined to 47.81 lakh hectares but expanded subsequently in 2006-07. The gross area irrigated in the State has decreased to 57.65 lakh hectares in 2009-10 as against 67.41 lakh hectares in 2008-09 showing a decrease of 14.47 percent due to decrease in tank irrigation. The source wise net and gross irrigated area in the State is presented in table -2 and table- 3.

Table -3
Gross Area Irrigated in Andhra Pradesh by Source
(Lakh Hectares)

Year	Canals	Tanks	Wells	Other Sources	Total
1996-97	21.99	9.69	23.91	2.23	57.82
2000-01	22.02	7.98	26.93	2.23	59.16
2001-02	20.89	6.34	26.18	2.08	55.49
2003-04	15.13	5.38	25.73	1.57	47.81
2004-05	17.30	5.15	25.63	1.79	49.87
2006-07	22.98	6.96	28.91	1.84	60.69
2007-08	22.50	6.69	31.74	1.92	62.85
2008-09	23.76	7.26	34.17	2.22	67.41
2009-10	18.65	3.71	24.98	10.31	57.65

Source: AP Abstract (Various Years), Directorate of Economics and Statistics, Hyderabad.

Table -4
Growth of Net and Gross Area Irrigated in Andhra Pradesh
(Lakh Hectares)

Year	Net Area Irrigated	Gross Area Irrigated
1955-56	27.47	32.00
1975-76	34.37	45.28
1996-97	43.95	57.82
2000-01	45.28	59.16
2005-06	43.93	59.96
2008-09	48.21	67.41
2009-10	42.15	57.65

Source: AP Abstract, Directorate of Economics and Statistics, Hyderabad.

It can be seen from the table – 4 that the net and gross area irrigated in the State has increased from 27.47 lakh hectares to 42.15 lakh hectares and 32.00 lakh hectares to 57.65 lakh hectares respectively from 1955-56 to 2009-10. But the gross area irrigated was decreased to 57.65 lakh hectares in 2009-10 as against 67.41 lakh hectares in 2008-09 showing a decrease of 14.47 percent. The net area irrigated in the State decreased to 42.15 lakh hectares in 2009-10 as against 48.21 lakh hectares in 2008-09 showing a decrease of 12.57 percent due to decrease in tank irrigation.

Tables 2, 3 and 4 indicate that the main sources of irrigation in Andhra Pradesh are wells, canals and tanks.

Table -5
Canal Irrigated Area in Andhra Pradesh

Year	Area (Lakh Hectares)	Percentage in Total area
1955-56	12.92	47.03
1960-61	13.31	45.75
1970-71	15.79	47.65
1980-81	16.93	48.89
1990-91	18.68	43.38
2000-01	16.49	36.42
2005-06	15.72	35.78
2008-09	16.70	34.60
2009-10	14.46	34.31

Source: AP Socio Economic Survey, 2010-11

Sources of Irrigation in Andhra Pradesh:
Canal Irrigation

The principal projects providing irrigation are the new barrages to replace the old anicuts on the rivers Godavari, Krishna, Tungabhadra and the Penna, and the new dams/Reservoirs and canal systems of Nagarjunasagar, Tungabhadra High and Low Level Canals, Sriramsagar, Somasila, Vamsadhara and Yeleru. On the Godavari, the original anicut built between 1844 and 1851 in four sections has been replaced by barrages at the same places, Dowlaiswaram, Ralli, Maddur and Vijjeswaram providing a potential of 5.02 lakh ha in East and West Godavari and Krishna districts.

The Prakasam barrage at Vijayawada was the first project taken up after the Andhra State came into being in 1953, this replaced the hundred year old anicut and serves 4.96 lakh ha in Krishna, Guntur, Prakasam and West Godavari districts. The Kurnool Cuddapah Canal (KC Canal) carrying the Tungabhadra water from the anicut at Sunkesula to fields in Kurnool and Cuddapah districts since 1866 has been improved and strengthened to provide water to 1.21 lakh ha. The Nellore and Sangam anicuts also of the last century irrigate 0.79 lakh ha in Nellore district. The Tungabhadra project, (High and Low Level Canals) taken up prior to Independence carries water to 1.05 lakh ha in drought prone Anantapur, Cuddapah and Kurnool districts. Vamsadhara and Yeleru serve 1.18 lakh ha in Srikakulam and East Godavari districts. The Kadam project, built between 1949 and 1965, irrigates 0.26 lakh ha in Adilabad. The Rajolibanda Diversion Scheme, consisting of an anicut across the Tungabhadra, upstream of the Sunkesula anicut/barrage, was constructed between 1953 and 1958 to carry water to 0.35 lakh ha in the drought prone Mahaboobnagar district. The Nizamsagar project built between 1924 and 1931, and modernized fifty years later, benefits 0.97 lakh ha in Nizamabad district.

The Sriramsagar Stage-I, work on which started in 1963 to create a potential of 3.92 lakh ha, has been partially completed to supply water to 2.87 lakh ha and irrigates 1.28 lakh ha in the less developed districts of Adilabad, Nizamabad, Karimnagar, Warangal and Khammam. The largest of the works nearly completed is Nagarjunasagar, with a potential of 8.95 lakh ha, most of which is already created, and currently provides water to 8.10 lakh ha. The Tungabhadra High level Canal Stage-II and the Pulivendula Branch canal initiated in 1967 and 1973 respectively to add a potential of 1.14 lakh ha, have generated a capacity of 0.64 lakh ha and have been irrigating 55,000 ha in the last few years. Somasila reservoir across the Penna upstream of the Nellore and Sangam ayacuts was started in 1975 to stabilize the flow to 1.04 lakh ha and to create a fresh potential of 38,000 ha. It has stabilized supply to about one lakh ha and covered an additional area of 6,000 ha, in the Nellore delta.

Telugu Ganga Project was started in 1983 with a commitment to supply 15 TMC of water to Chennai city for drinking and to provide irrigation to 5.75 lakh acres in the drought affected areas of Kurnool, Cuddapah, and Chittoor and Nellore districts. The project is in advance stage of implementation. Construction of the Sicilian Right Branch Canal in Kurnool district, Srisailam Left Bank Canal, renamed as A Madhava Reddy Canal in Nalgonda district, the Tungabhadra High Level Canal Stage-II in Anantapur district, the Somasila Stage-II in Nellore district and the Priyadarshini Jurala Project in Mahaboobnagar district are also in good progress.

The existing medium irrigation projects irrigate 2.75 lakh ha, those under construction are designed to irrigate 2.06 lakh ha and those on the drawing boards 2.30 lakh. There are over 12 thousand minor irrigation tanks with an ayacut of less than 2000 ha in the State some of them built a thousand years ago. There are 22 lakh dug wells and bore wells, of which nearly 1 lakh have oil engines and 20.78 lakhs have electric motors.

It can be seen from table 5 that the canal irrigated area in the State had increased from 12.92 lakh hectares to14.46 lakh hectares during 1955-56 to 2009-10. Even then, its relative importance has comedown from 47.03 percent to 34.31 percent showing a decrease of 27 percent. The table also indicates that the main source of irrigation in Andhra Pradesh is canal irrigation, but the importance of canal irrigation was decreased from the inception of economic reforms in Andhra Pradesh.

Tank Irrigation

The role of tank irrigation in south India is well known to historians of the area. The enormous numbers of inscriptions at tank sites and in temples proclaim the active role of Chola, Pandya, Vijayanagar and kakatiya kings and viceroys in the construction of tanks. Some tank irrigated lands were granted tax-free to temples for performance of ritual: as also to carpenters, masons, boatmen fishermen, water regulators and others for the upkeep and maintenance of tanks and de-silting operations. Other inscriptions also show the builder to be a private individual seeking merit by dedicating tank irrigated lands to the temple or investing for his own benefits.

While the state or donor underwrote the capital costs, “tank committees” carried out maintenance operations. This seems to have been the great strength and resilience of the south Indian agrarian society when faced with war and conquest and the successive dissolution of one state and the rise and dominance of another. In short, south India owes the survival of its culture, religion and ritual to the independent economic base built around “tank and temple”

By the 13th century, the moral incentives were strengthened when the construction of tanks was included among the seven acts of charity, which were considered especially meritorious. The construction of

tanks had become the major investment activity for rulers and their local potentates. So common were these tanks, that the padma purana (Circa 750BC) has an entire chapter on ritual for the consecration of tanks.

Suitability

The topography and rain fall pattern in Andhra Pradesh particularly in Telangana and Rayalaseema regions made tank irrigation an ideal type of irrigation. The dense forest cover and generally favourable soil structure helped in promoting paddy cultivation under tanks and shallow rock below facilitated ground water storage and recharge, and consequently exploited by wells.

Table - 6 indicates that there was a loss in tank irrigation from 1955-56 to
2009-10 of 68.91 percent of 7.36 lakh hectares due to general decline of tank irrigation in Andhra Pradesh. As we have seen, tank irrigated area in the State has decreased from10.68 lakh hectares to 3.32 lakh hectares during the last 54 years. Tank irrigated area has increased to 11.51 lakh hectares in 1960-61 and latter it starts declining and reached 3.32 lakh hectares in 2009-10.Tank irrigation in 2009-10 accounted for only 7.88 percent of the total irrigated area as compared to 38.88 percent in 1955-56 showing a decrease of 79.26 percent. This is due to problems of siltage, encroachment of Sikham lands, lack of renovation of tanks etc. This indicates a shift of primacy from tank irrigation to well irrigation.

The decline in tank irrigation is curious and needs a close study, especially as its advantages are obvious. First, it is a type of irrigation favoured by the terrain and its topography. Second, it is a quick gestation project where paddy fields can be brought into cultivation in short order. Third, the system of maintenance is well- established and can be continued on lines similar to the past. Fourth, the technology is simple and needs no sophistication. Fifth, tank irrigation is more amenable to farmer's control than irrigation under canal systems.

Well Irrigation

Well irrigation has been in existence in Andhra Pradesh for a long time though the human and animal labour costs of lifting water using traditional devices have been the main hurdle in its growth. Even in time monsoon failure and consequent famine in the late 19th century, well irrigation has been able to hold its own as it relied on ground water. Yet, its growth took off only after the beginning of rural electrification programme. Most, if not all, the investment in wells is privately funded and productivity tends to be high as farmers have flexibility in selection of crop pattern and also cultivate more crops in a year per acre irrigate (and many of them commercial crops of higher value than food crops) than is done under other sources of irrigation.

Well irrigated area includes the area irrigated both open wells and tube wells. Well irrigated area in the State in total area has increased from 2.84 lakh hectares to 22.84 lakh hectares during the last 54 years .Well irrigation in 2009-10 accounted for nearly 54.19 percent of the total irrigated area as compared to only 10.34 percent in 1955-56 showing an increase of 426 percent (See table-7). The chief component of growth is the tube well segment, which is highly expensive in terms of both capital and operating costs and is entirely dependent on the availability of ground water and cost and availability of power.

Table -6
Tank Irrigated Area in Andhra Pradesh

Year	Area (Lakh Hectares)	Percentage in Total area
1955-56	10.68	38.88
1960-61	11.51	39.57
1970-71	11.12	33.55
1980-81	9.00	25.99
1990-91	9.69	22.50
2000-01	7.27	16.05
2005-06	6.62	15.07
2008-09	6.48	13.44
2009-10	3.32	7.88

Source: AP Socio Economic Survey, 2010 - 11

Table -7
Well Irrigated Area in Andhra Pradesh

Year	Area (Lakh Hectares)	Percentage in Total area
1955-56	2.84	10.34
1960-61	3.28	11.28
1970-71	5.10	15.39
1980-81	7.76	22.41
1990-91	13.04	30.28
2000-01	19.54	43.15
2005-06	19.87	45.23
2008-09	23.23	48.18
2009-10	22.84	54.19

Source: AP Socio Economic Survey, 2010-11

Table - 8
Region-wise and Source-wise Irrigation facilities in Andhra Pradesh

Source	Coastal AndhraPradesh	Rayalaseema	Telangana	Total
Canals	75	9	16	34.60
Tanks	56	7	37	17.30
Wells	26	18	56	48.10

Source: AP Socio Economic Survey, 2010-11

Region wise and source wise irrigation facilities in Andhra Pradesh is presented in Table-8. The table reveals that among the three regions of Andhra Pradesh, Coastal Andhra region largely depend on canal and tank irrigation, while Telangana region depend on well irrigation. The main source of irrigation in Coastal Andhra Pradesh is canal irrigation; while well irrigation is the prime source of Telangana and Rayalaseema regions. State as a whole, well irrigation occupies a predominant role in total irrigated area.

Conclusion:

The economy of the State is basically agrarian in character. The percentage of irrigated area is very low i.e., below 40 percent. The plan allocations by the state Government for irrigation had been declining from plan to plan. Though the state is well endowed

with natural resources and minerals, it is lagging behind other states in the country with regard to per capital income, literacy level and other parameters. Though there is an increase of 20 percent of irrigation facilities through canal irrigation during the last 54 years of state formation. The tank irrigation declined from 10.68 lakh hectares in 1955-56 to 9.00 lakh hectares in 1980- 81, to 7.47 lakh hectares in 2000-01 and it remained at 3.32 lakh hectares in 2009-10, while well irrigation increased by more than seven times during the same time. It is significant to note that the tube well irrigation also increased by leaps and bounds.

The Gross area irrigated has been increased from 32 percent in 1955-56 to 57.65 percent over the years due to increase in dug wells and bore wells. The percentage of irrigated area under food crops is higher in Coastal Andhra when compared to Telangana and Rayalaseema. At the same time, due to indifferent attitude of the successive governments most of the age-old irrigation tanks were prone to siltage and ultimately decline in irrigation potentiality from 10.68 lakh hectares in 1955-56 to 3.32 lakh hectares in 2009-10.

To sum up, the State is lagging behind in respect of agricultural, industrial sectors. Similarly overall Human Development Index is also much below number of states in the country. Region wise also except those Southern coastal districts - East Godavari, West Godavari, Krishna, Guntur, Prakasam and Nellore shared major gains of development leaving other regions far behind. The whole situation is that during the last 54 years, Telangana and Rayalaseema regions were neglected on irrigation front as a result, agricultural development suffered while Coastal districts have been reaping the benefits of canal irrigation. Non-agricultural sectors also could not develop due to lack of agricultural development. Hence poverty, unemployment, hunger and suicide deaths have become common in backward regions. Hence, unrest and agitations have been erupted. Under these circumstances, there is a need to reverse the process of development to correct regional imbalances.

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