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Agriculture and Irrigation Development in the state of Andhra Pradesh

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Abstract:
The main objective of the paper is to analyze the cropping pattern and **irrigation** development in **state** of Andhra Pradesh**.** This study is completely based on the secondary sources of data. The secondary data collected from the publications of various organizations viz. the Department of Agriculture and Irrigation, Directorate of Economics &Statistics, Gollagpudi, Vijayawada, various Socio-Economic outlooks, Statistical Abstracts of Andhra Pradesh, Agriculture census; Ministry of Agriculture, Government of India.
Keywords: : Irrigation, Agriculture development, Gross & Net irrigated area, Food grains Production, and cropping pattern.

1. Introduction

India is predominantly an agricultural and rural country. An overwhelming majority of her people live in the countryside. "Indian villages are endowed with inadequacy of planned resources, low productivity of land and labour, large scale unemployment and underemployment, under-developed secondary and tertiary sectors, increasing population, illiteracy and inefficient delivery system. A significant part of population in rural areas is living below poverty line". Therefore, there is an urgent need to develop rural areas especially agricultural sector, more especially dry lands.

Land and water are the most important natural resources. These are not only precious physical resources but also eternal living components. These resources are also elastic in usage. Yet, human interventions in the guise of development have more often than not resulted in exploitation of these natural resources. It is more true with the basic production sector like agriculture which primarily depends on the natural resources.In India agriculture and allied activities contribute even now, 19 per cent to the Gross Domestic Product (GDP) and provide employment to 59 per cent of the total work force. It continues to be the most crucial sector of the economy. Any development in this sector has a direct impact on poverty eradication.

Efficient and sustainable use of natural resources has become the sine qua non for economic prosperity, especially in resource poor countries, more especially so in agriculturally dominated countries such as India, where more than two-thirds of the cropped area is dependent on rainfall without any protective irrigation facilities. The promotion of appropriate technologies and development strategies in rain fed areas potentially resulted in multiple benefits such as ensuring food security, enhancing viability of farming and improving the employment opportunities.

The course of agricultural production in India since the inception of planning has gone through two broad phases. Phase one i.e. until the mid sixties, the increase in production which came mainly through additions to cultivated area; and phase two which began in the mid sixties with the green revolution which brought improvements in yields of crops. But unfortunately the green revolution is confined to only small pockets of the country, and hence the stagnation of production and productivity has been observed in all major food crops of dry land agriculture. This has led to the widening of regional disparities between dry land and irrigated areas. Also

the rapid agricultural development in the green revolution areas has been more or less tapering off. This does not imply that new breakthroughs or extensions are not possible in the green revolution areas. However, in the long run, agriculture has to look beyond the green revolution areas for untapped potential for growth, India needs to produce 300 mt. of food grains by 2010 to feed even increasing population. This requirement can not be met from irrigated regions alone. The irrigation potential is 178 mt. only. The second green revolution should benefit all regions and areas. In this context, rain fed farming and has a crucial as well as a critical role to play in dry land agriculture

2. Review of Past Work

There is no doubt that irrigation has been playing a substantial role in stepping up the growth of the agricultural sector in India as well as Telangana. Over the past several decades, a lot of studies have been undertaken to study the irrigation impact on agriculture development in India and also at the state level. A comprehensive literature review has become a central part of any study. The existing relevant literature on irrigation and agriculture development has reviewed with special reference to agriculture, cropping pattern, cropping intensity, sources of irrigation etc. Dhawan (1983)focused on the role of irrigation to mitigate instability in agricultural production in Tamil Nadu state. He found that during the drought in the state follow a strategy of protecting crop productivity farmers are at the expense of shrinkage in irrigated acreage and, in years of above-normal rainfall utilising extra water availability, by increasing acreage under irrigation.

Rada(2016)found that irrigation has substantially contributed to India's recent (during 1980-2008) agricultural growth. Area of cropland expansion largely reflects double-cropping, which itself has been facilitated by irrigation. Irrigation technologies have largely enabled that expansion of agricultural area through double-cropping, boosting yields, and an expansion of the production technology in the direction of greater outputs.

Sanjukumar (2015) attempted to understand the irrigation is the essential input for increasing agricultural output, therefore, the development of irrigation has been a key approach in the development of farm sector in the country. He analysed in this study various kinds of irrigation and the impact of irrigation on agriculture. About 60% of farming in India is dependent on monsoons. Moreover, this study explained details on irrigation management for main crops in India like rice, wheat, maize, pulses and oilseeds.

Dhawan (1992) focused on the stylized fact that the development of irrigation is the main key to raising the intensity of cropping in monsoonal climate. He examined the actual impact of irrigation on cropping intensity in India. The study showed that definite evidence of the close relationship between irrigation development and the growth in intensity of cropping.

Karunakaran (1998) had examined the impact of irrigation on the intensity of cropping and pointed out the existence of vertical expansion of the cropped area leading to an increased intensity of cropping using secondary data from 1969-70 to 1993-94 in Tamil Nadu. Despite a decelerating trend in tank irrigation in the state, the study observed a positive substantial impact on cropping intensity and intensity of areas source more than once. Finally, the study concluded that the influence of irrigation has been felt in the maximum use of land. Narayana and Narayanan Nair (1983) emphasized on assessment of the impact of irrigation on agricultural output in Kerala and also to identify the main constraints on the development of irrigation. Authors found that irrigation has some impact on stabilizing and improving yields of autumn crops but not winter and summer crops. The lack of any substantial impact of irrigation

on crop output is due to poor irrigation water management. The conclusion derived is not supporting with many other studies which have shown that increase in irrigation facilities will lead to increase in productivity per man and per unit of capital.

3. Objective:

The main objective of the paper is to analyse the cropping pattern and irrigation development in state of Andhra pradesh .

4. Methodology

This study is completely based on the secondary sources of data. The secondary data collected from the publications of various organizations viz. the Department of Agriculture and Irrigation, Directorate of Economics &Statistics, Gollagpudi, Vijayawada, various Socio-Economic outlooks, Statistical Abstracts of Andhra Pradesh, Agriculture census; Ministry of Agriculture, Government of India.

5. Analysis and Discussions

Until 1953, the area of this state was in the territorial jurisdiction of Madras Provincial State, and in that year, the state of Andhra Pradesh was bifurcated from Madras Province and was formed into a separate state with the state capital at Kurnool. Later with the martyrdom of 'Amarajeevi' Sri Potti Sreeramulu, the state of Andhra Pradesh was formed on 01.11.1956 duly merging certain Telangana districts with Karnataka state and delineating Bellary area to merge with Karnataka state. Later on in coastal region Prakasam district was formed with some areas bifurcated from Guntur district. Until formation of Telangana state, the state of Andhra Pradesh comprises of '23' districts, i.e., '9' Coastal districts, '10' Telangana districts and '4' Rayalaseema districts and Hyderabad is the capital city of the state. Later on, on 2014 June 2nd Telangana State separated from United Andhra Pradesh. And the state remains with '13' districts of Coastal and Rayalaseema. i.e. '9' Coast districts, '4' Rayalaseema Districts and now, Amarawathi (Guntur) became the new capital of Andhra Pradesh.

6. Cropping Pattern in Andhra Pradesh

Climate, rainfall, soil resource availability and etc cause shifts in cropping, since the cultivation, production and productivity are completely determined by these changing factors. In this point of view here in tables-1. Statistics regarding shifts in cropping pattern is presented which is further analysed. Out of 160.20 lakh hectare total Geographical area in the state, net area sown was accounted for 37.35 % and the total cropped area was about 46.51 % of the total area during 2023-24. Of the 75.80 lakh hectares total cropped area, 67.56 % was under food crops and 32.44 % was under Non-Food crops during the year 2023-24. The table area under total Cereals and Millets is 27.51 lakh hectares and the area under pulses is 11.09 lakh hectares in 2017-18.

Among food crops paddy being an important crop occupies about 31.57 per cent of the gross cropped area in 2023-24. Among cash crops the share of Ground nut is decreasing from 14.47 to 8.81 per cent in 2024 followed by cotton accounting for 10.44 per cent of the gross cropped area. The percentage of area under food crops is 52.71 per cent in 2019-20, where as in 2023-24 it is 54.57 per cent to total gross cropped area is under food crops.

Rice, being the staple food of people in the state, it is obvious that it will be cultivated in large extension of area where irrigation is provided. The percentage of area under rice cultivation was 32.07 per cent in 2019-20, it decreased to 31.57 per cent to the gross cropped area in 2023-24. An increasing trend is observed in the area under cotton crop. It was 4.41 per cent in 2019-20 and gradually increased and reached to 10.44 per cent by 2023-24. Whereas it

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is observed that there is a declining trend in case of other crops such as Groundnut, Seasamum, Tobacco and Blackgram. The percentage of area under Groundnut is 16.50 per cent in 2019-20 and declined to 8.81 per cent in 2023-24. An increasing trend is observed in the cultivation of commercial crops, such as Chillies. Chilies, another core commercial crop, which occupied about 3.83 per cent to the gross cropped area in 2023-24. It is observed from the analysis there is a shift in the cropping pattern of Andhra Pradesh, as commercial crops are replaced by food crops.

Table-1 Cropping Pattern in Andhra Pradesh -2023-24 (In Percentages)

Major Crops	2019-20	2020-21	2021-22	2022-23	2023-24
Rice	32.07	29.12	27.75	31.79	31.57
Jowar	1.02	1.84	2.06	1.45	1.04
Bajra	0.56	0.39	0.71	0.61	0.37
Total cereals	**33.66**	**31.36**	**30.53**	**33.85**	**39.25**
Horsegram (Kulthi)	0.37	0.34	0.35	0.35	0.24
Greengram (Mung)	1.94	1.68	1.61	1.65	1.08
Blackgram (Mash)	4.49	5.83	4.87	3.26	5.12
Redgram	3.43	2.27	2.57	2.27	3.59
Bengal gram	5.49	5.96	7.15	5.81	4.88
Cow gram	0.09	0.10	0.15	0.15	0.25
Other Pulses	0.08	0.10	0.12	0.16	0.16
Total Pulses	**15.89**	**16.28**	**16.81**	**13.64**	**15.32**
Total food grains	**52.71**	**51.87**	**52.19**	**52.67**	**54.57**
Groundnut	16.50	14.09	14.54	14.47	8.81
Seasamum	1.13	0.66	0.55	0.75	0.49
Safflower	0.01	0.00	0.00	0.00	0.31
Total Oil Seeds (Edible +Non (ExcludingEdible)AreaCoconut)	**18.41**	**19.19**	**18.71**	**17.69**	**13.54**
Chillies	1.37	1.97	1.52	1.62	3.83
Turmeric	0.22	0.32	0.23	0.22	0.21
Sugarcane(Gur)	1.76	1.97	1.95	1.88	1.90
Mangoes	3.03	2.97	2.99	3.14	3.15
Banana	0.66	0.75	0.78	0.75	0.74
Cashewnut	1.51	1.60	1.53	1.48	1.49
Potato	0.01	0.02	0.02	0.02	0.02
Onions	0.34	0.50	0.32	0.32	0.33
Cotton (Lint)	4.41	5.87	7.40	8.32	10.44
Mesta	0.29	0.32	0.18	0.11	0.12
Tobacco	1.72	1.53	1.63	1.76	0.86
Total Cropped Area	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Directorate of Economics and Statistics, Government of Andhra Pradesh, Vijayawada

7. Irrigation in Andhra Pradesh

Irrigation is one of the prominent factors in agricultural production. The main sources of irrigation and the extent of area under those sources of irrigation are presented in the tables from 2 to 4. In the year 2023-24 major portion of gross cropped area extending to 13.24 lakh hectares is under canal irrigation and irrigation through tube wells stands at second place with 15.62lakh hectares. Tanks have their proportionate share respectively providing to 2.69 Lakh hectares in facilitating the crops with irrigation. Other sources of irrigation do have their part in

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irrigation which is being provided to 1.10 lakh hectares. In respect of canal irrigation, it has had decreasing trend from 2018-19 to 2023-24. As the irrigation from wells and tube wells provide adequate facility it has been replaced by tanks well irrigation and so there is gradual increasing trend. Variations regarding gross cropped area and net sown area as well as gross irrigated area and net irrigated area are analysed. However, more than 58 per cent of the gross cropped area is being facilitated without irrigation. Out of the gross area irrigated in the state, 8.22 % was under tanks, 47.75 % was under tube wells and 1.56 % under wells, 40.48 % was under canals and 3.36 % under other sources. The net irrigated area is reported as 26.03 lakh hectares during 2023-24.

The total net area irrigated was decreased by 2.75 lakh hectares during 2019-20 over 2023-24. Out of the total 26.03 lakh hectares of net area irrigated, 9.79 per cent was under tanks, 38.72 per cent was under canals, 46.13 per cent was under tube wells, 3.76 per cent under other sources. Out of the gross area irrigated in the state, West Godavari has the largest extent with 15.70 per cent followed by 13.94 per cent in Guntur, whereas the same is low in Vishakhapatnam with extent 3.69 per cent followed by Anantapuram district 3.94 per cent. Total food grains occupied by 69.58 per cent and total food crops occupied by 88.15 per cent of the gross area irrigated in the state during 2023-24. The irrigation intensity is 126 at state level and found to be high in Guntur (164.19), East and west Godavari districts with 137 and 153 respectively. And irrigation intensity is very low in Vizayanagaram (89.44) and Visakhapatnam District with 98 during 2023-24.

Table-2 Gross Area Irrigated by Different Sources in Andhra Pradesh (In Lakh Hectares)

Sources of Irrigation	2019-20	2020-21	2021-22	2022-23	2023-24
1. Canals	16.53	18.57	18.09	16.35	13.24
2. Tanks	3.12	3.36	3.46	2.98	2.69
3.Tube Wells	15.25	15.17	15.94	15.86	15.62
4. Dug Wells	0.59	0.59	0.44	0.41	0.51
4. Other Sources	1.41	1.39	1.31	1.20	1.10
Gross irrigated area	38.13	39.85	39.16	36.56	32.71

Source: Directorate of Economics and Statistics Andhra Pradesh, Gollapudi, Vijayawada

Table-3 Net Area Irrigated by Different Sources in Andhra Pradesh (In Lakh Hectares)

Sl. No.	Sources of Irrigation	2019-20	2020-21	2021-22	2022-23	2023-24
1	**Canals**	13.56	13.56	13.44	12.59	10.08
2	**Tanks**	2.87	2.99	3.10	2.76	2.55
3	**Tube Wells**	10.82	11.36	11.62	11.97	12.01
4	**Dug Wells**	0.37	0.37	0.28	0.24	0.41
5	**Other Sources**	1.16	1.08	1.08	1.00	0.98
	Net irrigated area	28.78	29.36	29.52	28.56	26.03

Source: Directorate of Economics and Statistics, Andhra Pradesh, Gollapudi, Vijayawada

Table-4 Irrigation Intensity 2023-24 (Area in lakh hectares)

Sl. No	District	Net Irrigated area	Area Irrigated More than Once	Gross Area Irrigated	Irrigation Intensity
1	Srikakulam	2.16	0.47	2.27	105.09
2	Vizianagaram	1.80	0.28	1.61	89.44
3	Visakhapatnam	1.26	0.17	1.24	98.41
4	EastGodavari	3.45	2.05	4.76	137.97
5	WestGodavari	3.86	2.45	5.91	153.11

6	Krishna	3.55	1.19	4.20	118.31
7	Guntur	3.10	1.16	5.09	164.19
8	Prakasam	1.54	0.01	1.90	123.38
9	S.P.SNellore	3.20	0.87	3.63	113.44
10	Y.S.R	1.58	0.13	1.60	123.27
11	Kurnool	2.09	0.74	6.34	103.35
12	Anantapur	1.94	0.44	2.33	120.10
13	Chittoor	2.00	0.47	2.11	105.50
	Andhra Pradesh	31.58	**10.49**	**39.85**	126.19

Source: Directorate of Economics and Statistics, Gollapudi, Vijayawada.

Irrigation Intensity = Gross Area Irrigated/ Net Irrigated area*100 Size of operational Holdings in Andhra Pradesh

Agriculture is almost exclusively carried in private individual holdings in Andhra Pradesh. As it is shown in the table-5, the average size of operational holding is 1.06 hectares in 2020-21. The same declining trend is observed in all farm size groups in respect of their holdings.

The total number of large farm holdings represented 0.26 per cent to the total holding operating 3.75 per cent of total operated area in 2020-21 with 15.28 Average size of farm holding. And the number of Marginal farm holdings accounts for 65.39 per cent operation 26.68 percent of the total operated area with 0.43 hectares of average size farm holding. Though there are large variations in the number of holdings between Marginal (65.39 percent) Small (20.88 percent) and Semi medium (10.45 percent), the area operated is found to be same level and equally distributed. In Andhra Pradesh there are 76,21,118 of farm holdings operating 80,96,441 hectares of land.

Table-5 Distribution of Land Holdings by size classes in 2023-24

Sl. No.	Size of Holdings	No.of Holdings	Percentage of Total	Area	Percentage of Total	Average Size of Holdings (Hectares)
1.	**Marginal (Below '1' hectare)**	5904039	69.26	2336409	29.19	0.40
2.	**Small (1.00 – 2.00 hectares)**	1646246	19.31	2334052	29.16	1.42
3.	**Semi Medium (2.00-4.00 hectares)**	769843	9.03	2019757	25.23	2.62
4.	**Medium (4.00-10.00 hectares)**	189034	2.23	1038254	12.97	5.56
5.	**Large (Above 10.00 hectares)**	14748	0.17	276000	3.45	15.49
	Total	8523910	100.00	8004472	100.00	1.06

Source: Director of Economics and statistics Government of Andhra Pradesh, Gollapudi, Vijayawada

8. Conclusion

Agriculture being the prime occupation in the state, majority of people constituting 70.53 per cent (349.67 lakhs) are living in rural areas and the remaining 29.47 per cent (146.10 lakh) live in the urban areas. The rainfall of Andhra Pradesh is influenced by both the South-West and North-East monsoons. While the rainfall in these monsoons accounts for 53.40 per cent and 37.40 per cent respectively to the total actual rainfall in the state.

Net area sown was accounted for 30.40 percent and the total cropped area was about 32.71 percent of the total area during 2023-24. More than 50.39 per cent of the gross cropped area is being facilitated with irrigation. Out of Gross Area Irrigated in the state, 8.22 percent was under Tanks, 40.47 percent was under Canals, 47.75 percent was under Wells and 3.36 percent under Other Sources. Out of the Gross Area Irrigated in the state during 2023-24, total food grains occupied by 54.57 percent and total Food Crops occupied by 88.15 percent. The irrigation intensity is 126.19 at state level and found to be high in Guntur and west Godavari districts with 166 and 153 respectively. And irrigation intensity is very low in Vizinagaram (89.44), Visakahapatnam (98.41), Kurnool (103) and Chittoor District with 105 in 2023-24.

Of the total cropped area 81.27 lakh hectares, 67.56 percent was under food crops and 32.44 percent was under non- food crops during the year 2023-24. The total number of large farm holdings represented 0.17 per cent to the total holding operating 3.45 per cent of total operated area in 2023-24 with 15.49 Average size of farm holding. And the number of Marginal farm holdings accounts for 69.26 per cent operation 29.19 percent of the total operated area with 0.40 hectares of average size farm holding.

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