



Cropping Pattern of Paddy in Andhra Pradesh

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Abstract: *This paper studied about the background information of paddy, Andhra Pradesh and its agriculture system and changing agrarian structure in our state. The analysis is based mainly on secondary data which was collected from the RBI data of Agriculture, vision 2030 Of Agriculture and survey of Andhra Pradesh 2013-14. Rice is the Principal food crop cultivated throughout the state providing food for its growing population, fodder to the cattle and employment to the rural masses. Andhra Pradesh has three major river basins (Krishna, Godavari and Pennar) and five other smaller ones drains in to the Bay of Bengal. Mechanization increases land productivity by timely completion of farm operations. It increases labour productivity and reduce drudgery of human and animals. It increases production by precision and efficient placement of inputs such as seed, fertilizer, chemicals and irrigation water. Agriculture with more than half of the State's population still dependent for their livelihoods either wholly or significantly on some form of farm activity, expansion of farm incomes continues to be the potent weapon for reducing poverty. Rapid and sustainable growth in Agriculture has been identified not only as a key driver for economic development but also for achieving self-sufficiency and ensuring food security to the people. The cropping pattern in Andhra Pradesh has undergone significant changes over time.*

Key Words: *Paddy, Cropping pattern, Mechanization, Technology and irrigation.*

Introduction

Andhra Pradesh is the fifth largest state in India accounting for 9 and 8 percent of the country's area and population respectively. The state has agriculturally prosperous area in the coastal districts (9 districts), an economically and socially backward area in Telangana (10 districts), a drought prone area in Rayalaseema (4 districts) and a fairly extended tribal belt, along the Northern and North-Eastern regions. Andhra Pradesh has three major river basins (Krishna, Godavari and Pennar) and five other smaller ones drains in to the Bay of Bengal. The state has 972 km long coastal line, generally even, along its eastern border, abutting the Bay of Bengal.

Rice is the Principal food crop cultivated throughout the state providing food for its growing population, fodder to the cattle and employment to the rural masses. Any decline in its hectareage and production will have a perceivable impact on the state's economy and food security. In A.P rice is mostly cultivated under irrigated eco-system under canals (52%), tube wells (19.31) tanks (16.2%), other wells (8.8%) and other sources (3.7%).

Rice is grown in diverse environment starting from below sea level to mountain top above 5000 m. It grows in temperate, tropical as well as sub-tropical climate. It grows in upland, lowland and deep water conditions. It can be sown in dry seed bed, wet seed bed or can be transplanted in puddled field. In lowland paddy



cultivation the application of nitrogenous fertilizer in the form of prilled urea or urea super granule below soil surface has been found more efficient by many research workers. Broadcasted nitrogenous fertilizer is lost by volatilization, runoff, leaching and denitrification. A low cost USG applicator for point placement was developed at CRRRI, Cuttack. Similar tool was also developed at Orissa University of Agriculture and Technology. It was observed that USG applied at 7.5 cm depth gave higher grain and straw yield. The field capacity of the applicator was 0.02 ha/h and field efficiency of 93.68%. A press wedge 2 row USG applicator was also developed at Orissa University of Agriculture and Technology, Bhubaneswar (Orissa). The field capacity of the applicator was 0.063 ha/h with field efficiency of 93.97%. Indian farmers mostly use local sickle made by village blacksmiths. These sickle wear out quickly. Improved high carbon steel sickle such as Naveen sickles of CIAE, Bhopal, Maharashtra Agroindustries Corporation and Gujarat Agro industries Corporation sickles are more efficient and do not wear out quickly. The First powertiller operated vertical conveyer reaper windrower was made in China in 1976.

Background Information

Rice is cultivated in 113 countries and it is the staple food of more than 50 percent population of the world. About 90 percent rice area exists in Asia. It is cultivated in 22% gross cropped area (44.9 million hectares during 2001-02) in India and peak total rice production of 93.34 million tons was achieved during 2001-02. However the rice production fluctuates depending upon the weather conditions. During the sixties India became self-efficient in food grain production but the

benefit was restricted to irrigated areas and rich farmers. The average rice yield in India is only 2.09 t/ha, as compared to 6.58 t/ha in Japan and world average of 3.91 t/ha. In Asia, more than 60% farmers have land holding size less than 2 ha. Therefore technology for small holding size plays a very important role in developing countries. Mechanization increases land productivity by timely completion of farm operations. It increases labour productivity and reduce drudgery of human and animals. It increases production by precision and efficient placement of inputs such as seed, fertilizer, chemicals and irrigation water. Mechanization decreases cost of production by reducing labour needed for particular operation and economy of power and other inputs. Use of tractors in Punjab reduced land preparation labour but employment increased in irrigation, plant protection, harvesting, threshing and post-harvest processing. In most of the countries of South Asia (Bangladesh, India, Pakistan and Sri Lanka) there was 15% increase in male agricultural labour force between 1960-80 while tractor population rose to more than 20 times from 0.8 million to 18 million.

This paper explained about a brief profile of Andhra Pradesh and its agricultural sector is provided the criticality of this sector in ensuring sustainable and inclusive growth in the State economy. The change in the cropping pattern over the last few decades and the importance of rice as a crop in the State is also highlighted in this paper. It covers the important trends in production of rice in the State since the 1970s. This analysis has been attempted with the objective of ascertaining whether the supply glut during the year 2010-11 is a temporary phenomenon or is permanent in nature



and whether permitting export of rice is a viable solution at the current juncture.

Andhra Pradesh and Its Agriculture: A Brief Profile

The State of Andhra Pradesh is geographically the fourth largest State and fifth most populated State in India. The State Domestic Product (SDP) of Andhra Pradesh recorded a growth of 7.9 per cent in the first four years of the 11th Plan period (2007-11) as compared with the nation's GDP growth rate of 8.2 per cent. During the year 2010-11, the agricultural sector in the State contributed 25 per cent to its SDP, while industry and service sectors accounted for 50.6 per cent and 24 per cent, respectively. In spite of producing only 1/4th of SDP, the agricultural sector remains the backbone of the State economy as it is the source of livelihoods to major proportion of the State's population. The State has a work participation rate (defined as workers per 100 population) of 38.1 per cent compared to the national average of 25.6 per cent. The State has a total workforce of 34.9 million, of which 29 million are main workers and 5.9 million are marginal workers. The agricultural and allied sector in the State directly supports 67 per cent (17.2 million main plus 4.5 million marginal workers) of its total workforce. Out of the agricultural workers, 43 per cent are cultivators and 57 per cent are agricultural labourers. The State under its land use had a net sown area of 37.2 per cent; among the rest 11.5 per cent was under current fallows, 9.2 per cent was under cultivable waste, 7.6 per cent was uncultivable waste, 22.6 per cent was under forests and 9.4 per cent was under non-agricultural use during 2008-09. The relatively large percentage of land under current fallows results in volatility in

agricultural output as it fluctuates depending on the behavior of rainfall in the State. Gross Cropped Area (GCA) forms around 47 per cent of the total land, with 9.15 per cent area sown more than once. The total Net Sown Area (NSA) ranges between 11.3-12.8 million hectares, depending on the rainfall. Similarly, the GCA ranges from 12.8-13.8 million hectares.

Changing Agrarian Structure

Agriculture with more than half of the State's population still dependent for their livelihoods either wholly or significantly on some form of farm activity, expansion of farm incomes continues to be the potent weapon for reducing poverty. Rapid and sustainable growth in Agriculture has been identified not only as a key driver for economic development but also for achieving self sufficiency and ensuring food security to the people. Over the decades, Andhra Pradesh has witnessed a gradual transformation in the agriculture sector.

An important change that has occurred in the structure of operational landholdings in the last sixty years (during 1950-2010) is that the share of small and marginal farmers has grown from 56 to 84 per cent and the share of the area under them has increased from 18 to 49 per cent. The share of medium farmers has gone down from 33 to 16 per cent. However, the area of their landholding has increased marginally from 44 to 45 per cent. The share of big farmers has shrunk to less than 1 per cent with landholding of around 6 per cent (Table 1). The underlying fact about the structure is that it is overwhelmingly dominated by a class of 'small/marginal-producer-farmers' – a section most vulnerable to the vagaries of markets, institutions and environment.



Table 1: Class- wise Relative Shares of Operational Holdings in Andhra Pradesh (per cent)

Type of farmers	Year					
	1956-57		1980-81		2005-06	
	Holdings	Area	Holdings	Area	Holdings	Area
Marginal Farmers(0-1ha)	38	8	51	13	62	23
Small Farmers(1-2ha)	18	10	22	17	22	26
Medium Farmers(2-10ha)	33	44	25	50	16	45
Large Farmers(>10ha)	9	38	2	20	<1	6

Source: Department of Economics and Statistics, Government of Andhra Pradesh.

Changes in the Cropping Pattern:

The cropping pattern in Andhra Pradesh has undergone significant changes over time. As the cultivated area remains more or less constant, the increased demand for food because of increase in population and urbanization puts agricultural land under stress resulting in crop intensification and substitution of food crops with commercial crops. Agriculture in the State has witnessed

significant changes in cropping pattern during the last four decades. These changes are marked by changes in the area under different crops as well as in agricultural seasons. First, there has been a significant shift in area under food crops to non-food crops; area under food crops declined from 70.4 per cent during 1970-73 to 53.6 per cent during 2009-11 – a fall of around 17 per cent (Table No 2).

Table-2: Changes in Cropping Pattern (Million Hectares)

Type of Crop	Year			
	1970-73	1987-90	2004-07	2009-11
Rice	3.1(24.76)	3.9(30.65)	3.6(28.54)	4.3(31.15)
Maize	0.2(2.12)	0.3(2.33)	0.7(5.33)	0.8(6.16)
Pulses	1.3(10.79)	1.5(11.85)	1.8(14.39)	1.7(12.3)
Total food grains	8.9(70.42)	7.8(61.31)	6.9(53.52)	7.4(53.6)
Cotton	0.3(2.47)	0.6(4.8)	1.0(8.23)	1.1(8.2)
Oilseeds	2.2(17.51)	3.8(24.74)	2.6(20.91)	2.7(19.5)
Total non-Food grains	3.7(29.57)	4.9(38.69)	5.9(46.94)	4.7(34.05)
Gross Cropped Area	12.7(100.00)	12.8(100.00)	12.8(100.00)	13.8(100.00)

Source: Department of Economics and Statistics, Government of Andhra Pradesh.



While food crops in general lost area to non-food crops; within food crops the area under rice increased from 24.8 per cent to 31.2 per cent. The area under coarse cereals declined during the same period. However, due to the increase in productivity, the food grain output has not been adversely affected; instead it experienced a long term rate of growth of 2.1 per cent. There is only a marginal addition to the area under pulses. The area withdrawn from under coarse cereals, mainly from jowar, has gone to rice, maize, cotton, oilseeds and other miscellaneous crops. Rice is now the dominant cereal in the State and this is best illustrated by the fact that it accounted for nearly 95 per cent of the total area under non-maize cereals by 2009-10. Though this shift has enabled a faster growth of food grain output given the higher productivity of rice, on the flip side the State has lost the diversity in production and consumption in this virtual mono-cropping.

The long term compound growth rate of production of food grains between 1973 and 2011 is 2.1 per cent, which is below the national average of 2.7 per cent. The last four decades can be divided into four sub-periods: the Green Revolution period during 1973-83; the post-green revolution period between 1983-91, early reforms period of 1991-2001; and the latest-reforms decade (2001-11) to understand

the temporal dimension of growth in the production of food grains. In these sub-periods, the compound growth rate of food grain output was placed at 2.86 per cent, 0.53 per cent, 3.55 per cent and 3.08 per cent, respectively. In the two sub-periods in post-reform decades, food grains recorded impressive rates of growth of above 3 per cent.

The regional pattern of the growth suggests that coastal Andhra and Telangana experienced a higher growth in food grain output. Rice cultivation in Rayalaseema remained stagnant. In terms of production, Coastal Andhra registered high growth during the green revolution period whereas Telangana witnessed higher growth during the last two decades.

An analysis of the sources of this growth reveals that during 1973-83 and 1983-91, the area under food grains declined. There was a shift in area under food grains to non-food grains. However, during the last one decade, *i.e.*, 2001-11, there has been an increase in area under food grains. The major driving force behind the output growth has been yield during the first three decades, *i.e.*, 1973-2001. In the last one decade, it decelerated marginally. Notably, in Telangana the yield has shown remarkable increase. This is largely due to rapid expansion of High Yielding Varieties (HYV) area under borewells.



Table-3: CAGRs of Area, Production and Yield of Food Grains in Andhra Pradesh

CAGRs of Area, Production and Yield of Food Grains in Andhra Pradesh				
Time period	AREA			
	Coastal Andhra	Rayalaseema	Telangana	Andhra Pradesh
1973-74 to 1982-83	0.14	-2.68	-0.76	-0.77
1983-84 to 1990-91	-0.44	-7.18	-2.86	-2.43
1991-92 to 2000-01	0.39	0.23	0.35	0.36
2001-02 to 2010-11	0.38	1.53	1.12	1.13
1973-74 to 2010-11	0.07	-1.95	-0.88	-0.67
Time Period	PRODUCTION			
	Coastal Andhra	Rayalaseema	Telangana	Andhra Pradesh
1973-74 to 1982-83	3.78	-1.12	3.22	2.86
1983-84 to 1990-91	0.33	-4.15	2.29	0.53
1991-92 to 2000-01	3.22	1.18	4.58	3.55
2001-02 to 2010-11	3.99	3.50	5.87	3.08
1973-74 to 2010-11	2.81	0.52	2.68	2.11
Time Period	YIELD			
	Coastal Andhra	Rayalaseema	Telangana	Andhra Pradesh
1973-74 to 1982-83	3.63	1.60	4.01	3.66
1983-84 to 1990-91	0.77	3.26	5.30	3.04
1991-92 to 2000-01	2.83	0.95	4.21	3.19
2001-02 to 2010-11	3.59	1.94	4.84	1.93
1973-74 to 2010-11	2.74	2.52	3.59	2.73

Source: Estimated from Department of Economics and Statistics data.

Technology and Change in Cropping Pattern:

The choice of cropping pattern is dictated by the technology, irrigation and market support that are available to the farmer. In the State, the seed-fertilizer-water packaged technology along with the presence of market support for rice led to its rapid growth. Thereby, the area under HYV technology (under rice) has grown from 5.4 per cent in 1970-71 to 39.0 per cent of total area by 2010-11. Along with the HYV seeds, the use of chemical fertilizers also increased from 29.3 million tonnes in 1970-71 to 255.3 million tonnes in 2005-06. The fertilizer consumption in the State has reached levels almost equal to those of Punjab and Haryana, and consumption is 100 per

cent more than it's neighboring States like Tamil Nadu and Karnataka.

Quality seeds and planting materials are the key agricultural inputs, which determine the productivity of the crops. The efficacy of other agricultural inputs such as fertilizers, pesticides and irrigation is largely determined by the quality of the seed used. It is estimated that quality of seed accounts for 20-25% of productivity. Hence timely availability of quality seeds at affordable prices to farmers is necessary for achieving higher agricultural productivity and production. The varied agro climatic conditions of the country are suitable for cultivation of large number of crops and varieties. This necessitates production of quality seeds and planting materials for a



treatment for enhancing agricultural production in the country.

Conclusion:

In Indian conditions selective mechanization for utilization of abundant human and animal power sources with supplementary mechanical and electrical power will be beneficial. As irrigation is available to less than 50% cultivable area, improved technology for upland and lowland rice will surely increase rice production and productivity. Mechanization of small holding will play an important role in increasing rice production. Vigorous efforts should be made by scientists, extension workers and government machinery along with strong political will to achieve this goal. Massive programmes are required to extend the improved production technology to the farmers and to provide irrigation which is key to agricultural development. Steps have to be taken for availability of high yielding variety seeds, fertilizers, pesticides and agricultural implements at block and panchayat level. Adequate farm power is needed for increasing rice production by timely completion of farm operations. Custom hiring of costly farm implements and easy availability of credit are required for small and marginal farmers to accept the improved production technology. Proper procurement policy, value addition by processing and improved marketing infrastructure will improve the economic conditions of the rice farmers.

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