



PRODUCTION OF MAJOR AGRICULTURE INSURANCE SELECT CROPS IN KADAPA DISTRICT

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ABSTRACT

Agriculture Production plays an inevitable role for any nation because it feeds the growing population of the nation, improves the GDP of the primary sector and in turn it also improves livelihood of the farmers and agriculture dependent labourers. However, agricultural production in India has been challenged by many natural and manmade disasters resulting in loss of crop yield. The loss of crop yield leads to productivity decline which in turn taken in to the loss of the food security of the nation. In this context the present paper assesses the growth and patterns of area, production and yields of selected major agriculture insurance crops in Kadapa district by comparing with Andhra Pradesh State. The present study was totally depended on secondary sources only. The main objective of the study was to analyze the growth and patterns of area, production and yields of selected major agriculture insurance crops in Kadapa District. Percentage shares, Linear Growth Rate (LGR) and Compound Annual Growth Rate (CAGR) were employed to analyze the growth and patterns of area, production and yields of selected major agriculture insurance crops during from 1997-98 to 2019-20.

Keywords: Area, Production, Yield, CAGR, LGR

INTRODUCTION

Any emerging economy that is largely based on agriculture must go through the process of agricultural development in order to accelerate economic growth. The progress of the agriculture sector is a key factor in how quickly a nation's economy develops. Thus, the performance of the agricultural sector is essential to a country's economic development. Agriculture sector seems to be significant position in the Indian economy. According to the Fiscal Policy statements 2023-24, the Nominal gross domestic product (GDP) of India in agriculture sector is projected to rise at 15.4 per cent year-on-year (Y-o-Y) for the fiscal year 2022-23

as against 19.5 per cent in 2021-22. The real GDP in agriculture sector is expected to increase by 7 per cent (Y-o-Y) as opposed to 8.7 per cent in 2021-22.

Agriculture Production plays an inevitable role for any nation because it feeds the growing population of the nation, improves the GDP of the primary sector and in turn it also improves livelihood of the farmers and agriculture dependent labourers. However, agricultural production in India has been challenged by many diseases, weeds, and insect pests and also frequently affected by natural and manmade disasters such as droughts, floods, cyclones, fire, storms, landslides, earth quakes and price crashes resulting in loss of crop yield. The loss of crop yield leads to productivity decline which in turn taken in to the loss of the food security of the nation. All of these disasters have a major detrimental effect on farmers and are beyond of their control due to the loss of agricultural production and income of the farmers. With the growing commercialization of agriculture, the magnitude of loss due to unfavorable eventualities is increasing. The question is how to protect farmers by minimizing such losses.

The minimum support prices for some crops give a segment of the farming population some degree of income security. However MSP is not used for the majority of crops or in the majority of States. Contract farming and futures trading are two contemporary strategies that are supposed to offer some protection against price changes either directly or indirectly. Nonetheless, agriculture insurance is seen as a crucial tool for dealing with the risk to income and output brought on by numerous natural and man-made disasters. Farmers can use agricultural insurance as one strategy to maintain farm income and investment and protect themselves from the catastrophic effects of losses caused by natural disasters or low market prices. In addition to stabilising farm revenue, crop insurance enables farmers to recommence production after a bad agricultural year. By offering farmers a minimal level of protection, it lessens the impact of crop losses. It helps farmers spend more in agriculture and spreads out crop losses over time and area.

Agriculture insurance is a comprehensive, yield-based policy designed to cover losses incurred by farmers as a result of low level of production. It covers losses caused by cyclonic rains and a lack of precipitation both before and after harvest. The agricultural output is decreased as a result of these losses, which has an impact on farmers' revenue. In India, agriculture insurance is offered to the certain selected major crops by the government in the form of Pradhan Mantri Fasal Bima Yojna (PMFBY).

The State of Andhra Pradesh is consisting of 13 districts spread seventh largest state by area covering an area of 162967 Sq.KMs and it ranking 10th most populous State consisting of 4.96 Crores of population. The major crop of Andhra Pradesh State is Paddy. It needs a large amount of water. The other major crops are jowar, bajra, ragi, pulses, tobacco, cotton, small millets, maize and sugarcane. The State of Andhra Pradesh is divided mainly into two distinct regions, namely Rayalaseema and Coastal Andhra basing on its geographical and economic composition.

The Kadapa District is one among the four districts (now 4 districts restructured as 8 districts but data available for combined Kadapa district only) of drought-prone Rayalaseema region. Kadapa district is endowed

mainly with red and black soils ranging from poor to fertile soils. The soil of the district has been classified into red ferruginous soil and black soil. These two classes can be sub divided into clay, loam sand with finer distinctions. Red soils occupy 53 per cent of the cultivated area and are mostly situated in L. R. Palli, Rayachoty, Rajampet, Pulivendula and Kodur Mandals. These soils have a low nutrient status. Black cotton soil lands are 24 per cent, black soil 19 per cent, sandy soil lands 4 per cent and red soil lands 25 per cent. Paddy is the major crop in the kadapa for the season of kharif and bengalgram crop is the major crop for rabi season and both crops are selected as village insurance units in the district.

In this context the present paper assesses the growth and trends of area, production and yields of Paddy and Bengalgram crops in Kadapa district by comparing with Andhra Pradesh State.

OBJECTIVES

1. To know the area, production and yield of Paddy and Bengalgram crops in Kadapa District;
2. To analyse growth and pattern of area, production and yield of Paddy and Bengalgram crops in Kadapa District.

DATA AND METHODOLOGY

Secondary data have been used for the present study. The main sources of data for the study of area, production and yield have been collected from Ministry of Agriculture and Farmers Welfare Website. Various Books, Periodicals, Journals and Other Publications have been extensively used to cull out data and information. With the objectives of analyzing the growth and patterns of area, production and yield of selected major agriculture insurance crops in Kadapa District the present study has been taken up from 1997-98 to 2019-20. The main reason for choosing this period is that the data is available between the years only in the Ministry of Agriculture and Farmers Welfare Website. Percentage Shares, Linear Growth Rate (LGR), Compound Annual Growth Rate (CAGR) were employed to examine the growth of patterns of area, production and yields of Paddy and Bengalgram crops in Kadapa District.

Compound Annual Growth Rate

Compound growth rate has been computed for over a period based on the data for all the years. Semi-log trend function was used in the present study. The function form is $Y = ab^t$. After taking logarithms on both sides, the function becomes: $\log Y = \log a + t \log b$

Ordinary Least Squares (OLS) method was used to estimate the values of 'a' and 'b', from the estimated 'b' value, the Compound Growth Rate was computed by using the formula: $C.A.G.R = (\text{anti-log } \hat{b} - 1) \times 100$

Linear Growth Rate

The Linear functional form is $Y = a + bX$. Ordinary Least Squares (OLS) method have been used for computing Linear Growth Rate to estimate the values of 'a' and 'b'.

The LGR is computed by using the formula: $L.G.R = \frac{\hat{b}}{\bar{X}}$

Table- 1
Area, Production and Yields of Paddy Crop in Andhra Pradesh State during from 1997-98 to 2019-20

Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
1997-98	2565400.00	6436200.00	2.51
1998-99	2780100.00	7687800.00	2.77
1999-00	2634246.00	7362441.00	2.79
2000-01	2694741.00	8040667.00	2.98
2001-02	2515353.00	7823692.00	3.11
2002-03	1867142.00	5315408.00	2.85
2003-04	1957323.00	6054099.00	3.09
2004-05	2227682.00	7392678.00	3.32
2005-06	2520723.00	7288721.00	2.89
2006-07	2488883.00	7616392.00	3.06
2007-08	2576000.00	8880000.00	3.45
2008-09	2695725.00	8880586.00	3.29
2009-10	2325729.00	7569071.00	3.25
2010-11	2772377.00	7883078.00	2.84
2011-12	2346300.00	7744175.00	3.30
2012-13	2210000.00	6863000.00	3.11
2013-14	2583440.00	7993425.00	3.09
2014-15	2393955.00	8455584.00	3.53
2015-16	2160795.00	7518271.00	3.48
2016-17	2105019.00	8002337.00	3.80
2017-18	2218186.00	8461342.00	3.81
2018-19	2208304.00	8234539.00	3.73
2019-20	2355982.00	9140091.00	3.88
Mean	2400148.04	7680156.39	3.22
CAGR	-0.50	0.94	1.45
LGR	-0.53	0.90	1.44

Source: <https://aps.dac.gov.in/APY/Index.htm>

Table 1 describes area, production and yields of Paddy crop in Andhra Pradesh State during from 1997-98 to 2019-20. It could be seen from the table that the area of paddy crop was declined by nearly 8 per cent from 2565400 hectares in 1997-98 to 2355982 hectares in 2019-20. The production of the paddy crop in the State have been increased nearly by 40 per cent significantly from 6436200 tonnes to 9140091 tonnes during from 1997-98 to 2019-20. The yield of paddy crop was also increased significantly from 2.51 tonnes/ hectare to 3.88 tonnes/ hectare during the same period. Whereas, the mean area of paddy crop was registered 2400148.04 hectares with a negative compound annual growth rate (CAGR) and linear growth rate (LGR) of -0.50 per cent and -0.53 per cent respectively during the period from 1997-98 to 2019-20. The mean production of paddy crop was registered 7680156.39 tonnes with a positive CAGR of 0.94 per cent and LGR of 0.90 per cent. The mean yield of paddy crop was registered 3.22 tonnes/hectare with the highest positive CAGR and LGR of 1.45 per cent and 1.44 per cent respectively during from 1997-98 to 2019-20.

Area, production and yields of Bengalgram crop in Andhra Pradesh State during from 1997-98 to 2019-20 have been presented in table 2. It could be observed from the table that the area of bengalgram crop have been registered 108900 hectares in 1997-98 and increased more than 5 folds to 569000 hectares in 2012-13 later decreased to 458579 hectares in 2019-20. The mean area of bengalgram crop was registered to 378552.65 hectares over 23 years with a positive CAGR and LGR of 4.46 per cent and 4.39 per cent respectively during from 1997-98 to 2019-20. The production of the bengalgram crop have been increased more than 10 times from 53700 tonnes in 1997-98 to 558745 tonnes in 2019-20. The mean production of bengalgram crop was registered 424959.26 tonnes with a positive CAGR of 4.67 per cent and LGR of 3.98 per cent during the same period. The yield of bengalgram crop was registered 0.49 tonnes/ hectare in 1997-98 and increased to 1.44 tonnes/ hectare in 2019-20. The mean yield of bengalgram crop was registered 1.10 tonnes/hectare, the CAGR and LGR were recorded 0.37 per cent and 0.59 per cent respectively during from 1997-98 to 2019-20.

Table– 2

Area, Production and Yields of Bengalgram Crop in Andhra Pradesh State during from 1997-98 to 2019-20

Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)
1997-98	108900.00	53700.00	0.49
1998-99	112800.00	125900.00	1.12
1999-00	129106.00	72743.00	0.56
2000-01	166202.00	203844.00	1.23
2001-02	245322.00	319094.00	1.30
2002-03	332212.00	310136.00	0.93
2003-04	334529.00	351980.00	1.05
2004-05	268455.00	281344.00	1.05
2005-06	320852.00	522470.00	1.63
2006-07	500633.00	514235.00	1.03
2007-08	512000.00	750000.00	1.46

2008-09	487355.00	670033.00	1.37
2009-10	525416.00	671246.00	1.28
2010-11	474826.00	571143.00	1.20
2011-12	479896.00	447859.00	0.93
2012-13	569000.00	598000.00	1.05
2013-14	472380.00	648031.00	1.37
2014-15	341766.00	390967.00	1.14
2015-16	471131.00	499786.00	1.06
2016-17	397088.00	381037.00	0.96
2017-18	520381.00	589124.00	1.13
2018-19	477882.00	242646.00	0.51
2019-20	458579.00	558745.00	1.44
Mean	378552.65	424959.26	1.10
CGR	4.46	4.67	0.37
LGR	4.39	3.98	0.59

Source: <https://aps.dac.gov.in/APY/Index.htm>

Table- 3
Area, Production and Yields of Paddy Crop in Kadapa District during from 1997-98 to 2019-20

Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)	Percentage Share to Andhra Pradesh State (%)	
				Area (Hectare)	Production (Tonnes)
1997-98	60700.00	105200.00	1.73	2.37	1.63
1998-99	76200.00	211400.00	2.77	2.74	2.75
1999-00	61611.00	147405.00	2.39	2.34	2.00
2000-01	67838.00	176254.00	2.60	2.52	2.19
2001-02	75768.00	195114.00	2.58	3.01	2.49
2002-03	36660.00	72870.00	1.99	1.96	1.37
2003-04	34123.00	84057.00	2.46	1.74	1.39
2004-05	52621.00	161043.00	3.06	2.36	2.18
2005-06	66753.00	141619.00	2.12	2.65	1.94
2006-07	46905.00	125456.00	2.67	1.88	1.65
2007-08	62000.00	184000.00	2.97	2.41	2.07
2008-09	65066.00	128439.00	1.97	2.41	1.45
2009-10	65317.00	187926.00	2.88	2.81	2.48
2010-11	70382.00	129553.00	1.84	2.54	1.64
2011-12	53896.00	158660.00	2.94	2.30	2.05

2012-13	31000.00	81000.00	2.61	1.40	1.18
2013-14	62712.00	178289.00	2.84	2.43	2.23
2014-15	45885.00	165837.00	3.61	1.92	1.96
2015-16	40263.00	123127.00	3.06	1.86	1.64
2016-17	50329.00	165640.00	3.29	2.39	2.07
2017-18	54979.00	139764.00	2.54	2.48	1.65
2018-19	45840.00	147711.00	3.22	2.08	1.79
2019-20	41809.00	129564.00	3.10	1.77	1.42
Mean	55159.00	145214.26	2.66	-	-
CGR	-1.43	0.09	1.53	-	-
LGR	-1.50	-0.17	1.50	-	-

Source: <https://aps.dac.gov.in/APY/Index.htm>

Table 3 elucidates area, production and yields of Paddy crop in Kadapa district and also its percentage share to Andhra Pradesh State during from 1997-98 to 2019-20. It could be noted from the table that the area of paddy in Kadapa district was decreased from 60700 hectares to 41809 hectares. The share of paddy cropped area was also declined from 2.37 per cent to 1.77 per cent during from 1997-98 to 2019-20. The production of paddy crop has been increased slightly from 105200 tonnes in 1997-98 to 129564 tonnes in 2019-20. But its share to Andhra Pradesh has declined from 1.63 per cent to 1.42 per cent during the same period. The yield of paddy crop in Kadapa district has increased significantly to 3.10 tonnes/ hectare in 2019-20 from 1.73 tonnes/ hectare in 1997-98. Whereas, the mean area of paddy crop was registered 55159.00 hectares with a negative CAGR of -1.43 per cent and LGR of -1.50 per cent respectively during the period from 1997-98 to 2019-20. The mean production of paddy crop was registered 145214.26 tonnes with CAGR of 0.09 per cent and LGR of -0.17 per cent over the study period. The mean yield of paddy crop was registered 2.66 tonnes/hectare with the CAGR and LGR of 1.53 per cent and 1.50 per cent respectively during from 1997-98 to 2019-20.

Table 4 represents area, production and yields of Bengalgram crop in Kadapa district and also its share of Kadapa district to Andhra Pradesh State during from 1997-98 to 2019-20. It could be seen from the table that bengalgram crop area in Kadapa district have been increased more than 6 times from 14200 hectares to 90675 hectares and the share of bengalgram cropped area to the Andhra Pradesh State also increased from 13.04 per cent to 19.77 per cent during from 1997-98 to 2019-20. The production of bengalgram crop increased from 7000 tonnes in 1997-98 to 115883 tonnes in 2019-20 and its share to the Andhra Pradesh State also increased from 13.04 per cent to 20.74 per cent during from 1997-98 to 2019-20. The yield of bengalgram crop in Kadapa district has recorded from 0.49 tonnes/ hectare in 1997-98 to 1.28 tonnes/ hectare in 2019-20. Whereas, the mean area of bengalgram crop occupied 63930.61 hectares and the CAGR and LGR of bengalgram crop recorded 7.84 per cent and 5.95 per cent respectively during the study period. The mean production and yield of bengalgram crop registered 52492.96 tonnes and 0.89 tonnes/ hectare respectively. The production growth rates of bengalgram crop registered 5.44 per cent of CAGR and 4.57 per cent of LGR during the study period and

The yield growth rates of bengalgram registered negative rate of -2.22 per cent of CAGR and -1.61 per cent of LGR during the period from 1997-98 to 2019-20.

Table – 4
Area, Production and Yields of Bengalgram Crop in Kadapa District during from 1997-98 to 2019-20

Year	Area (Hectare)	Production (Tonnes)	Yield (Tonnes/Hectare)	Percentage Share to Andhra Pradesh State (%)	
				Area (Hectare)	Production (Tonnes)
1997-98	14200.00	7000.00	0.49	13.04	13.04
1998-99	17500.00	26700.00	1.53	15.51	21.21
1999-00	22263.00	15651.00	0.70	17.24	21.52
2000-01	30637.00	38541.00	1.26	18.43	18.91
2001-02	42872.00	54061.00	1.26	17.48	16.94
2002-03	54058.00	28110.00	0.52	16.27	9.06
2003-04	44584.00	49221.00	1.10	13.33	13.98
2004-05	35568.00	28988.00	0.82	13.25	10.30
2005-06	33462.00	55513.00	1.66	10.43	10.63
2006-07	71786.00	32663.00	0.46	14.34	6.35
2007-08	67000.00	87000.00	1.30	13.09	11.60
2008-09	71451.00	67450.00	0.94	14.66	10.07
2009-10	77338.00	38128.00	0.49	14.72	5.68
2010-11	69518.00	76817.00	1.10	14.64	13.45
2011-12	90366.00	74913.00	0.83	18.83	16.73
2012-13	112000.00	19000.00	0.17	19.68	3.18
2013-14	97046.00	131594.00	1.36	20.54	20.31
2014-15	68169.00	43083.00	0.63	19.95	11.02
2015-16	79214.00	89512.00	1.13	16.81	17.91
2016-17	82037.00	33061.00	0.40	20.66	8.68
2017-18	97135.00	68966.00	0.71	18.67	11.71
2018-19	101525.00	25483.00	0.25	21.24	10.50
2019-20	90675.00	115883.00	1.28	19.77	20.74
Mean	63930.61	52492.96	0.89	-	-
CAGR	7.84	5.44	-2.22	-	-
LGR	5.95	4.57	-1.61	-	-

Source: <https://aps.dac.gov.in/APY/Index.htm>

CONCLUSION

An attempt has been made to analyse the growth and patterns of paddy and bengalgram crops in terms of area, production and yields. It could be seen that the area of paddy crop was declined by nearly 8 per cent but the production and yields of the paddy crop in Andhra Pradesh State have been increased significantly during from 1997-98 to 2019-20. Similarly, The CAGR and LGR of area, Production and yields of Paddy crop were recorded negative growth rate, positive growth rate and positive growth rate respectively during the study period. Area, production and yields of Bengalgram crop in Andhra Pradesh State has been observed that all the three variables has increased in terms of numbers and also recorded positive CAGR and LGR for the above said variables over the study period.

The area of paddy crop in Kadapa district was declined in terms of numbers and its share to Andhra Pradesh also declined during from 1997-98 to 2019-20. The production of paddy crop has been increased in numbers but its share to Andhra Pradesh has declined during the same period. The yields of paddy crop in Kadapa district has also increased significantly to 3.10 tonnes/ hectare in 2019-20 from 1.73 tonnes/ hectare in 1997-98. The area of paddy crop was registered negative CAGR and LGR during the period from 1997-98 to 2019-20. The production of paddy crop was registered positive but nearer to zero per cent of CAGR of 0.09 per cent and recorded negative LGR of -0.17 per cent over the study period. However, the yield of paddy crop was registered positive CAGR and LGR during the study period. It could be seen that area and production of Bengalgram crop in Kadapa district have been increased in terms of both numbers and shares during from 1997-98 to 2019-20. The yield of bengalgram crop in Kadapa district has recorded from 0.49 tonnes/ hectare in 1997-98 to 1.28 tonnes/ hectare in 2019-20. Whereas, the area and production of CAGR and LGR of bengalgram crop was recorded positive growth rate but the yield growth rates of bengalgram registered negative rate of CAGR and LGR for the same period.

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