



GROWTH OF PADDY IN LAST TWO DECADES IN INDIA WITH SPECIAL REFERENCE TO JHARKHAND

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Jharkhand is the 28th state of India carved-out from its neighbor state Bihar on 15 Nov, 2000. It has huge potential to develop agriculture and allied sectors that is why agriculture is important for the Jharkhand economy. Majority of the population (59%) for their livelihood depend on agriculture related activities, it contributes only 15% to the Gross State Domestic Product. Paddy is one of the most important staple food-grains and it is a lucrative business to various farmers in Jharkhand and this is an important crop which helps to increase the economic condition of the farmers. The present study is to analysed the growth in production, area and productivity of paddy under different phases and stability or instability of paddy production in Jharkhand as well as India.

Keyword: *Growth, CAGR, Production, Area and Productivity*

JEL Classification: C10, Q10

INTRODUCTION

Jharkhand is the 28th state of India carved-out from its neighbor state Bihar on 15 Nov, 2000. It has huge potential to develop agriculture and allied sectors that is why agriculture is important for the Jharkhand economy. Majority of the population (59%) for their livelihood depend on agriculture related activities, it contributes only 15% to the Gross State Domestic Product (Jharkhand Economics Survey 2018-19). Though it has a total cultivated area of 1735 thousand hectares, crop productivity is low and stagnant while the cost of cultivation has been increasing in recent years.

Paddy is one of the most important staple food-grains and it is a lucrative business to various farmers in Jharkhand and this is an important crop which helps to increase the economic condition of the farmers. The cultivation of paddy is generally depending on fertility of land, climate condition, high yielding varieties of seeds and irrigational potentials. Therefore the production of paddy varies between region to region and even district to district. Climatic condition in Jharkhand is conducive for production of rice cultivation.

Rice (*Oryza sativa*) is the most important food crop in the world, because it is the staple food of over half the world's population (Ribbes and Toan 1999; Khan et al. 2007). Rice has always been relevant to global food security and socio-economic stability (Zeigier and Barclay 2008). This crop has been the most traditional land use and the main economic variable that has historically shaped social relations (Narayanan 2006). The found that production of major food crop, rice, reached negative growth rates due to the declining trend of their area. The diversification of crops in terms of variation in acreage allocation has taken

place due to price and non-price factors like agro-climatic conditions, labour availability, irrigation facilities, soil fertility, cost of cultivation, price levels, profitability, mechanization etc. The change has taken place largely in favour of non-food crops and recently it is towards rubber. The study also examines food security aspects of the state and found that rice security is the vital issue for Kerala today. The data revealed that during 1960-61 Kerala had a shortage of rice of about 40.12 percent, which increased to 83.45 percent in 2009-10 (Karunakaran N. 2014). A Theoretical Analysis" considers that Kerala has a long history of food grain deficit, especially in rice. For instance, deficit in rice has increased steadily in the state from 45 percent to 85 percent between 1957 and 2008 (Manikandan A.D. 2011). Sustained agricultural growth, which is facilitated by constant policy and institutional support, could augur growth in the rural economy. In fact, the growth performance of agriculture at the national level was remarkable during the 1980s. Its deceleration during the 1990s was attributed to the reduction in /or stagnation of public expenditure on agricultural infrastructure, defunct extension services, and biased economic reforms (Thamarajakshi 1999; Balakrishnan 2000; Hirashima 2000; Mahendradev 1987; Vyas 2001; Rao 2003). Recent studies include those of Bhalla and Singh (2001), Radhakrishna (2002), Bhalla and Singh (2009), and Vaidyanathan (2010). The changing land use pattern of Kerala. The study reveals that agricultural land-use changes in Kerala record an initial increase in total cropped area, followed by dramatic shifts in the coverage of individual crops (Kumar B.M 2005). Some social scientists have also analysed production and productivity of paddy in the state of Jharkhand. (Deogharia 2013) has discussed paddy cultivation under alternative institution of tenurial contracts. Deogharia (2009) has also examined the paddy cultivation in Jharkhand farms. Under paddy being the major crop in Jharkhand, impact of share cropping has been examined by Deogharia (2010).

OBJECTIVE OF THE STUDY

The objective of the study is to assess the growth in production, area and productivity of paddy under different phases. The study is also to analyse the stability or instability of paddy production in Jharkhand as well as India.

DATA AND METHODOLOGY

The data has been collected from secondary sources. The secondary data on area, production and productivity was used for analysis. Time series data from 2000-01 to 2019-20 has been used to understand the trend in area, production and productivity of paddy in Jharkhand as well as India.

In addition to the usual statistical measures such as percentages, compound growth rates, and regression analysis are applied. The model may be extended by assuming that the dependant variable Y is a linear function of a series of independent variables. The simple regression model may be specified as :

$$Y = a + bx + u$$

Where, Y is the dependent variable,
X is the independent variables,
u is error term
a and b = parameter to be estimated.

RESULT AND DISCUSSION

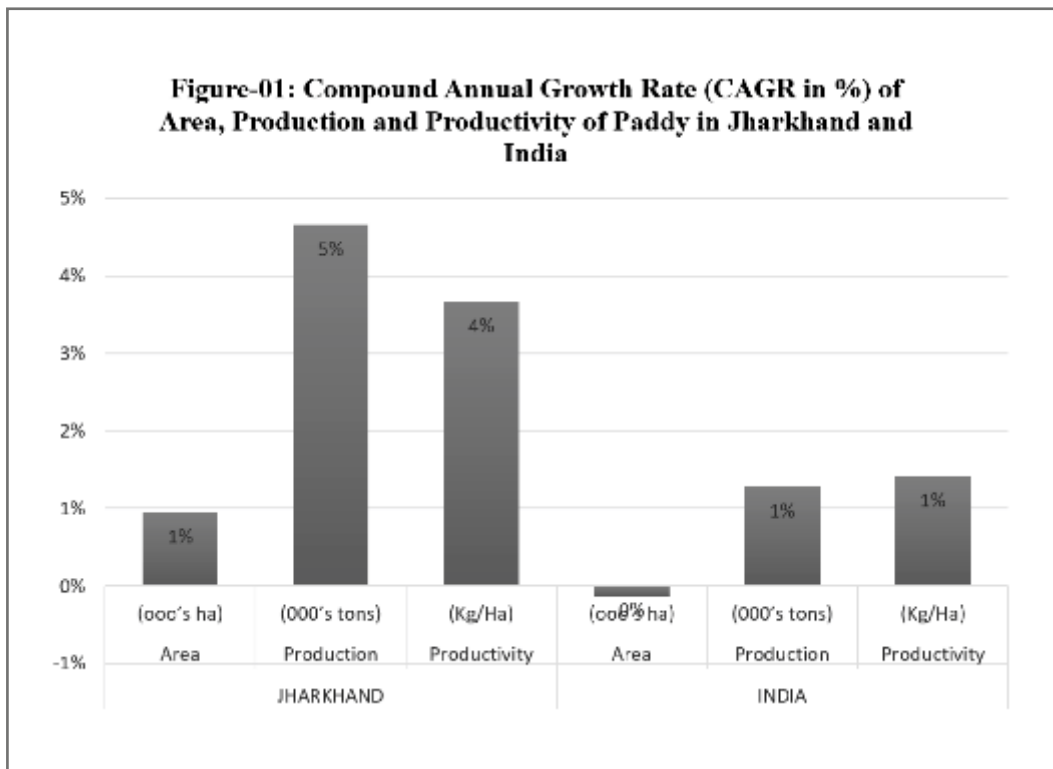
Table 01: Trend in Area, Production and Productivity of Paddy in Jharkhand and India

	JHARKHAND			INDIA		
YEAR	Area (000's ha)	Production (000's tons)	Productivity (Kg/Ha)	Area (000's ha)	Production (000's tons)	Productivity (Kg/Ha)
2000-01	1325	1446	1090	4490	9334	2079
2001-02	1466	2279	1550	4118	7182	1744
2002-03	1383	2071	1510	4259	8853	2077
2003-04	1364	2143	1590	4191	8313	1984
2004-05	1276	1908	1490	4366	9179	2102
2005-06	1355	1558	1150	4381	9336	2131
2006-07	1604	2938	1832	4391	9669	2202
2007-08	1634	3616	2213	4554	9918	2178
2008-09	1670	3400	2055	4185	8913	2129
2009-10	982	1518	1546	3695	8041	2177
2010-11	720	1176	1557	4286	9598	2239
2011-12	1469	4696	3197	4397	10531	2372
2012-13	1414	3991	2833	4275	10180	2462
2013-14	1255	3637	2896	4413	10654	2416
2014-15	1502	4324	2870	4411	10548	2391
2015-16	1588	2569	1617	4338	10441	2404
2016-17	1678	4988	2971	4319	11015	2550
2017-18	1735	5109	2944	4378	11291	2578
2018-19	1527	2894	1895	4379	11642	2659
2019-20	1584	3435	2159	4378	11887	2715
CAGR(%)	1%	5%	4%	0%	1%	1%

Sources: Compiled from Different Jharkhand Economic Survey

The performance of agriculture in Jharkhand as well as India from 2000-2020, production and productivity of several commodities increased tremendously, social economical, institutional and environmental reforms carried in away. Affirmative strategies were followed and policy makers and researchers were carried out through the establishment of research institutions, agricultural universities.

The table-01 shows that the trends in area, production and productivity of paddy in Jharkhand and India. The data indicates that the area under paddy cultivations is at increasing trend in Jharkhand but decreasing trend in India during the study period. In 2000-01, the area under paddy in Jharkhand was 1325 thousand hectare and it was increased to 1584 thousand hectare in the year 2019-20. Similarly, in India, the area under paddy is 4490 thousand hectare in 2000-01 decreased to 4378 thousand hectare in 2019-20. The annual compound growth rate in Jharkhand is about 1 percent over the 20 years and for India it was 0 percent over the period of time. Similarly, the production and productivity of paddy during the study period, shows tremendous increase both in Jharkhand and India and compound growth rate in Jharkhand is higher than national average and it was 5, 1 and 4 and 1 percent production and yield respectively.



The figure 01 shows the compound annual growth rate of area production and productivity of paddy in the state as well as the country. The compound annual growth rate of area, production and productivity are 1%, 5% and 4% of the state and 0% (Approx.), 1% and 1% of the country during 2000-01 to 2019-20. The CAGR of area, production and productivity in Jharkhand is larger than India.

PHASE WISE GROWTH RATE OF PADDY

The entire period has been divided into four sub periods for analytical convenience and to facilitate comparison namely, First Phase (2000-01 to 2004-05), Second Phase (2005-06 to 2009-10), Third Phase (2010-11 to 2014-15) and Fourth Phase (2015-16 to 2019-20).

Table: 02- Phase wise Compound Growth Rate of Area, Production and Productivity of Paddy in Jharkhand and India

	JHARKHAND	INDIA
	AREA	
2000-01 to 2004-05	-1%	-1%
2005-06 to 2009-10	-8%	-4%
2010-11 to 2014-15	20%	1%
2015-16 to 2019-20	0%	0%
	PRODUCTION	
2000-01 to 2004-05	7%	0%
2005-06 to 2009-10	-1%	-4%
2010-11 to 2014-15	38%	2%
2015-16 to 2019-20	8%	3%
	PRODUCTIVITY	
2000-01 to 2004-05	8%	0%
2005-06 to 2009-10	8%	1%
2010-11 to 2014-15	17%	2%
2015-16 to 2019-20	7%	3%

Sources: Author Calculation based on Jharkhand Economic Survey and Agriculture Annual Report (2000-01 to 2019-20)

First Phase (2000-01 to 2004-05)

The table 02 shows that the compound annual growth rates (CAGR) of area, production and productivity of paddy during the first phase, the area and production and productivity of

paddy in Jharkhand as well as in India increasing and decreasing and it was registered -1% in Jharkhand and -1% in India for area, 7% in Jharkhand and 0% in India for Production and 8% in Jharkhand and 0% in India for productivity in the first phase.

The Second Phase (2005-06 to 2009-10)

The table 02 shows that the compound annual growth rates (CAGR) of area, production and productivity of paddy during the second phase, the area and production and productivity of paddy in Jharkhand as well as in India increasing and decreasing and it was registered -8% in Jharkhand and -4% in India for area, -1% in Jharkhand and -4% in India for Production and 8% in Jharkhand and 1% in India for productivity in the second phase.

The Third Phase (2010-11 to 2014-15)

The table 02 shows that the compound annual growth rates (CAGR) of area, production and productivity of paddy during the third phase, the area and production and productivity of paddy in Jharkhand as well as in India increasing and decreasing and it was registered 20% in Jharkhand and 1% in India for area, 38% in Jharkhand and 2% in India for Production and 17% in Jharkhand and 2% in India for productivity in the third phase.

The Fourth Phase (2015-16 to 2019-20)

The table 02 shows that the compound annual growth rates (CAGR) of area, production and productivity of paddy during the fourth phase, the area and production and productivity of paddy in Jharkhand as well as in India increasing and decreasing and it was registered 0% in Jharkhand and 0% in India for area, 8% in Jharkhand and 3% in India for Production and 7% in Jharkhand and 3% in India for productivity in the fourth phase.

AREA AND PRODUCTIVITY EFFECT WITH PRODUCTION OF PADDY

To analyse the stability or instability of area, production and productivity of paddy in Jharkhand and India, the study try to assess the impact through using simple regression analysis. Production of paddy as a dependant variable, area and productivity as independent variables are used in order to obtain comparability. The study computed the growth rate with different phases and corresponding time period of dependant variable i.e. production.

Table: 3.1- Production and Area Effect among the Paddy

	JHARKHAND			INDIA		
	Constant	Coefficient	R²	Constant	Coefficient	R²
2000-01 to 2004-05	-2068.43	2.962892	0.424547	-14078.3	5.286244	0.793743
2005-06 to 2009-10	-1820.578	3.05492	0.771052	-79.5962	2.182165	0.965494
2010-11 to 2014-15	-1852.467	4.258858	0.975719	-12617.1	5.261063	0.719049
2015-16 to 2019-20	-17195.9	12.94048	0.824049	-53719	14.90782	0.552895

Sources: Author's Calculation based on Jharkhand Economic Survey

The Table 3.1 indicates that the estimation of regression between area and production of paddy in Jharkhand and India. It is evident from the table that in all the phases, paddy crop has registered positive association with dependent variable. The R^2 values of 0.424547, 0.771052, 0.975719 and 0.824049 clearly indicate that the effect of area on production. Similarly, in India, paddy crop has registered positive association with dependent variable. The R^2 values of 0.793743, 0.965494, 0.719049 and 0.552895 clearly indicate that the effect of area on production and the variations in production are explained by area as explanatory variable.

Table: 3.2- Production and Productivity Effect among the Paddy

	JHARKHAND			INDIA		
	Constant	Coefficient	R^2	Constant	Coefficient	R^2
2000-01 to 2004-05	-207.062	1.505161	0.899136	-2818.01	5.703091	0.949002
2005-06 to 2009-10	-1298.9	2.219701	0.871767	-425.934	4.438076	0.037294
2010-11 to 2014-15	-2142.84	2.137211	0.963222	1579.906	3.670999	0.504998
2015-16 to 2019-20	-638.887	1.915194	0.992611	235.0596	4.23656	0.899747

Sources: Author's Calculation based on Jharkhand Economic Survey

The Table 3.2 indicates that the estimation of regression between productivity and production of paddy in Jharkhand and India. It is evident from the table that in all the phases, paddy crop has registered positive association with dependent variable. The R^2 values of 0.899136, 0.871767, 0.963222 and 0.992611 clearly indicate that the effect of productivity on production. Similarly, in India, paddy crop has registered positive association with dependent variable. The R^2 values of 0.949002, 0.037294, 0.504998 and 0.899747 clearly indicate that the effect of productivity on production and the variations in production are explained by productivity as explanatory variable.

CONCLUSION

It is clear that compound growth rates of area in case of paddy is 1% and 0% , CAGR of production in case of paddy is 5% and 1% and CAGR of productivity in case of paddy is 4% and 1% are in Jharkhand and India respectively. The first two phases for area CAGR are negative both in Jharkhand and India and last two phase increases or decreases. In the second phase for production CAGR are negative both in Jharkhand and India and first and last two phase increases. All phases for Productivity of CAGR are increases or positive both in Jharkhand and India. The State as well as central government has to take an affirmative action to promote agricultural sector. To break the productivity plateau, the investment in technology, higher capital formation, opening of better market revenues, improved efficiency in processing sector, better cropping system, improved extension activities, pest and disease control, encouraging scientific methods and effective and efficient

implementation of all strategies shall go a long way in augmenting the growth of paddy and there will be no doubt to bring some long lasting results in newly created Jharkhand.

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