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ABSTRACT

Jharkhand, the 28th State of the Indian Union is best known for its rich mineral resources. However, 78% of the total population of 2.69 crore live in rural areas, largely dependent only on agriculture and allied activities. The average annual growth rate (AAGR) for the last three years (2016-17 to 2018-19) has been 8.2 per cent. Last year it grew at the rate of 6.7 per cent and in the current financial year, it is estimated to grow at the rate of 6.8 per cent. The state has made a commendable progress so far as other indicators of development are also concerned.

Keywords: Production, Growth Rate, Trends Line, AAGR, GSDP, NSDP

INTRODUCTION

The state of Jharkhand is one of the normal economically advanced states in India. In 2019-20, Jharkhand rank 19th after Bihar, Odissa, Assam, and Chhattisgarh in terms of Gross State Domestic Product (GSDP) at factor cost (at constant prices with base year 2011-12). The economy of Jharkhand will grow at 7.2 per cent in the current financial year 2019-20. According to the report, the state in the last five years has witnessed a high level of instability while it achieved double digit growth in some of the years. It also experienced negative growth in some other years. The average annual growth rate CAGR of the economy for the last four years (2014-15 and 2018-19) has been only 5.7 per cent. The Gross State Domestic Product (GSDP) at constant (2011-12) prices of Jharkhand was Rs 1,86,534 crores in the year 2014-15, while it has been estimated to be Rs 2,49,554 crores in the current financial year. The GSDP at current prices was Rs 2,18,525 crore in the year 2014-15 while it is estimated to be Rs 3,43,126 crore in the current fiscal. The per capita income (per capita NSDP) is estimated to be Rs 83,592 at current prices and Rs 60,339 at constant prices for the year 2019-20. The per capita income at constant prices was Rs 47,781 in the year 2014-15 and even after two years in the year 2016-17 there was only an increase of Rs 45. It recovered to some extent in later years and grew at an average annual rate of 4 per cent only between 2014-15 and 2018-19. This year it is estimated to grow by 5.6 per cent. The Economic Survey says with the unemployment rate at 7.7 per cent, Jharkhand ranks 25th (with Manipur, Bihar and Uttar Pradesh in the last three) on the index of per capita income nationally. The survey says that the unemployment rate in the state was at 7.7 per cent which was higher than the national average of 6.1 per cent. The survey further says that the per capita income of Jharkhand was one of the lowest in the country, as out of the 28 states it was ranked at 26th in the year 2015-16. Bihar and Uttar Pradesh were the only two states who were below Jharkhand in per capita income. This research paper is an attempt to analyse the trends related to food grains production in Jharkhand since 2000. Firstly, the overall current scenario of agriculture in Jharkhand is observed based on selected attributes. It is followed by the observations related to total area under food grains production, production and yield in Jharkhand with regards to the different periods since 2000. For all round agricultural development, technology must be supplemented by institutional mechanisms to ensure the provision of the essential facilities and services that the farmers need to improve agronomic practices and obtain higher productivity. Only the development of a healthy agricultural marketing system can guarantee remunerative prices to the farmers and motivate the adoption of scientific cultivation for raising agricultural productivity.

OVERALL SCENARIO OF AGRICULTURE IN JHARKHAND

The total geographical area of Jharkhand is 79.71 lakh hectares of which almost 29 percent is under forest coverage. The net shown area of the state is 28.36 lakh hectares which is almost 36 per cent of the total geographical land of the state. Around 7 per cent of the area accounts for barren land. 9 per cent of the land comes under non-agricultural use, 2 per cent of the land is under permanent pastures and other grazing lands, and 3 per cent of the land is under cultivable wasteland. About 21 percent of the total area is fallow about 11 per cent is current fallow and 10 per cent is other fallow. The total cultivable land of Jharkhand is 38 lakh hectares which constitutes 48% of the total

geographical area of the state. The total cultivable land in the State compares well at 52% of the total geographical area with 55% in the country. But, unfortunately while 76% of the total cultivable area is under net sown area in the country, only 43% is cultivated in Jharkhand. The state suffers from several critical gaps in the agricultural and allied sectors. Agriculture is the main stay for the 80% of rural population of the state. Agriculture is their employment and primary income generating activity. The agricultural economy of the Jharkhand state is characterized by dependence on nature, low investment, low productivity, mono-cropping with paddy as the dominant crop, in inadequate irrigation facilities and small and marginal holdings. The dependence of agriculture on the Vagaries of the rain-god can be gauged from the fact that as much as 92% of the total cultivated area is un-irrigated.

Major Crops: Paddy, Wheat, Maize, Pulses, Oilseeds & Horticultural Crops

Minor Crops: Maize, Arhar, Urad, Moong, Wheat, Gram, Mustard

OBJECTIVES OF THE STUDY

- ❖ To study the trends of growth rate of vegetables and fruits of area, production and productivity in Jharkhand.
- ❖ To comparative study the growth rates of vegetables and fruits of area, production and productivity since 2000 in Jharkhand.

REVIEW OF LITERATURE

Kumar and Rosegrant (1994) attempt to assesses total factor productivity growth. The study revealed that increase in area production and productivity of crops was highly associated with their relative profitability. Rice area increased slowly since 1980 mainly through substitution from coarse cereals market infrastructure, research, canal irrigation, balanced sources of TFP, and Future productivity gains in Rice production would have to be achieved from the eastern and southern region of India.

Panigrahi and Ramakrishna (1995) analyzed the growth pattern and indentified factor affecting productivity levels across state and examined the role of population in land productivity growth for the period 1967- 68 to 1991-92 in India during the post green revolution period for principal crops and non food crops. Secondly time series data was used and multiple regression method was applied.

Bhalla and Singh (1997) examined the contribution of Indian agriculture in the productivity frame for the period 1980-83 to 1992-95 for the states in India. The contribution of area to the output growth has drastically diminished the expansion of gross cropped area through double cropping has increased. Since low yield and low value coarse cereals were replaced by high value oilseeds as well as Rice and Wheat, without and adversely affecting food grain output.

Shobana Nelasco (2008) in his paper, "Structural changes urgent for Indian Agriculture", in the Ahmedabad Science Conference, Manmohan Singh (Manmohan Singh, "Agriculture for Food",

"International conference in New Delhi, May 27th, 2007 published by Ministry of Information and Broadcasting) presented a seven points program, which included,

- > Increasing land fertility in physical, chemical, and microbial ways.
- > Saving water, conserving water, and balanced use of water.
- > Crop loans and Insurance reforms.
- > Proper technology and increasing the marketability of products.
- > Improving infrastructure, Improving seeds through science and microbiology.
- > Advanced scientific methods of Dairy farming and Poultry.

Sivanappan R.K. (2000) in his study stated that with modernization of existing post-harvest processing, establishment of suitable infrastructural facilities, huge amount of countries exchequer can be saved and further helps in feeding the teeming population in the country .

Hotaet al. (2002) in their study viewed that cooperatives occupy an important part in India's economy in terms of their coverage of rural producers, business turnover and contribution to economic welfare of their members as well as to rural economy of India.

Reardon et al. (2003) in their study documented that private firms now play a dominant role in countries such as China, India, South Africa in developing of improved seed varieties producing and distributing inputs, post harvest operations and retailing through super markets.

Royce F. (2004) reported, even though State agencies continue to be the main buyers of output and suppliers of input limiting cooperatives management authority within. There is much greater member participation and on-farm decision making.

Ramkishen Y. (2004) in his research paper argued that because of the lack of food processing and storage, the grower is deprived of a good price for his produce during the peak marketing season while the consumer needlessly pay a higher price during lean season.

Godara R. (2006) in his study described that the positive trend of economic liberalization and associated opening up of Indian economy have significantly reduced the structural rigidities in the system, this trend should be premise of India's future agricultural reform. Agricultural business has come under strong and direct influence of international market. Indian farmers have to produce quality goods to meet the international standards.

Kashyap P. and Raut S. (2006) in their paper suggested that, marketers need to design creative solutions like emarketing to overcome challenges typical of the rural environment such as physical distribution, channel management promotion and communication. The "anytime-anywhere" advantage of e-marketing leads to efficient price discovery, offers economy of transaction for trading and more transparent and competitive setting.

Tripathi A. and Prasad A.R. (2009) in their paper reported that Indian agriculture has progressed not only in output and yield terms but the structural changes have also contributed

Pathak N. (2009) in his research paper stated that the contribution of agriculture in growth of a nation is constituted by the growth of the products within the sector itself as well as the agricultural development permits the other sectors to develop by the goods produced in the domestic and international market.

Berabih and Herdra (2007) examined the utilization of low level agricultural technologies, risks related to natural occurrences such as streams and diseases outbreak to be the major sources of the decline in productivity. As a result development in order to maximize land productivity. Horticulture production provider on opportunity for intensive production and increase small holders farmers participation in the market.

Singh H.P. (2009) study mainly concentrated on the marketing of Agriculture crops is a major constraint in the production and disposal system and has a major role to play in making the industry viable. Fruits and vegetables are mostly marketed through commission agents. A very small portion is handled by Co-operative Marketing Societies. Storage due to over ripening and under ripening, Processing and packing due to inefficiency and contamination and Marketing due to loss of weight and quality with mutli-level handling. Not complete? Are these problems? The Horticulture marketing practices lack systems approach. The trading and marketing structure is very traditional and consists of a long chain of intermediaries. The farm gate price available to farmers is only 25% of the retail price under Indian conditions, whereas the same is 70 percent in the case of Dutch and US farmers, where more efficient marketing system is in place. Trade and market distortions are many and some of these are: high and unjust trading and marketing charges levied on producer sellers, delayed payment, pooling by traders and lack of open bid systems. Malpractices are rampant and the national market operates in a highly segmented manner.

The role of government is creation of market access in the rural areas and to work for the improvement in the economic conditions of the farmers. The crux of the problems of the farmers of Jharkhand is thus, only of development but also distributive justice which can be achieved only through those institutions, which can strengthen linkages between production and marketing. Different aspects of vegetable marketing has been studied by economists like **S.S. Acharya (1990), A.J. Singh and I. Singh (1992) G.C. Srivastava (1993), Jugdish Prasad (1997). D.S. Thakur et. al (1994), Singh and Chandda (1990)**. These include marketing pattern, marketing systems, marketing channels, marketing efficiency and even the factors affecting the marketed surplus in vegetable / horticultural marketing.

It has been observed that production and marketing of vegetables for the small farmers is a profitable enterprise. Different studies such as Acharya (1994), Cummings (1976), Lele (1972), Rao (1989), Thakur (1974), Prasad (1996), Vineeta Ekka and Deogharia P.C. (2005) and Deogharia (2006) have also highlighted the problems of marketing like high commission charges transport and packing cost.

There were papers from Bihar on the aspects of price spread and price variability (Srivastava 1989). Problems related to market finance (Ghosh, 1990, Jagdish Prasad 1990) and the functions of different intermediaries involved in marketing of cauliflower in Ranchi district and identified the channels followed (Singh, et. al 1990)

DATA COLLECTION AND METHODOLOGY

Agricultural production largely comprises of cereals (like rice, wheat, maize), pulses, oilseeds, horticulture (like fruits and vegetables) and various cash crops (sugarcane). Pulses are collectively termed as food grains. The agricultural output performance is measured basically through three indicators namely area covered under agricultural production (in thousand hectares), production (in thousand tons) and yield (in kg/ha). The research paper uses the sum nomenclature and categorisation as discussed above. Largely the production of food grains cover the maximum area and produces maximum output amongst various agricultural outputs like oilseeds, cash crops, or horticulture in India as well as in Jharkhand. Hence the current research paper exclusively focuses on the production related aspects of selected food grains in Jharkhand since 2000.

The current research largely used the secondary data available from Ministry of Agriculture and Farmers Welfare, Government of India and Directorate of Agriculture, Agriculture Farmers welfare and Co-operation Department, Government of Jharkhand. Besides, various research papers, books and websites were referred. Line charts and the graphical linear trend lines were used for the analysis. Trend lines were used for the analysis of area under production, production and productivity for selected food grains, cereals and pulses in total and separately for major food grains and pulses. Separate graphs for food grains and cereals and pulses as aggregate and separately for major cereals and pulses are displayed, but the graphs for comparative analysis for the area under production, production and productivity for selected food grains and pulses have been used for analysis but not displayed here. For the sake of laser complex display, the linear trend lines have not been shown in the graphs. Growth rates for area and production, production and productivity have been calculated for different periods since 2000. Growth rates have been calculated for food grains, pulses and oilseeds separately.

PRODUCTION OF VEGETABLES AND FRUITS IN JHARKHAND

Major cereals cultivated in Jharkhand included rice, wheat, maize. Similarly, major pulses cultivated in Jharkhand included gram, masur and pea. The area under production, production and productivity for total food grains in Jharkhand since 2000. The area under the food grain production in Jharkhand reduced from 3531 thousand hectares in 2014-15 to 3184 thousand hectare in 2015-16. The food grain production in Jharkhand was 4734.9 thousand tons in 2015-16 that reduced to 4263 thousand tons in 2015-16. The area under production for food grains and its productivity during the study period fluctuated in Jharkhand.

Table 01: Area, Production and Productivity across various periods for Selected Vegetables and Fruits in Jharkhand since 2000

Year	Vegetables			Fruits		
	Area (in 000 ha)	Production (in 000 tons)	Yield (in kg/ha)	Area (in 000 ha)	Production (in 000 tons)	Yield (in kg/ha)
2000-01	149.8	2109.5	14	29.9	265.1	8.87
2001-02	158.5	1736.3	10.95	31.5	321.1	10.19
2002-03	118.2	1300.1	11	32.7	321.2	9.82
2003-04	110.6	1197.2	10.82	31.8	296.3	9.31
2004-05	223.6	3394.9	15.18	33.2	403.4	12.15
2005-06	224.2	3401.3	15.17	33.3	388.6	11.67
2006-07	223.6	3394.9	15.18	32.9	382	11.61
2007-08	238.9	3639.7	15.24	37.6	382.6	10.17
2008-09	232.59	3698.51	15.94	43.25	512.8	11.97
2009-10	229.63	3727.01	16.23	43.95	519.81	11.82
2010-11	259.5	4112.4	15.8	72	779.6	10.8
2011-12	261.2	3902.6	14.9	83.8	850.2	10.1
2012-13	321.5	4325.4	13.5	93.01	889.74	9.57
2013-14	313.6	4238.1	13.51	94.03	890.04	9.47
2014-15	316.7	4279.3	13.51	94.14	898.08	9.54
2015-16	264.21	3373	12.77	96.53	961.19	9.96
2016-17	293.53	3370	11.48	100.78	1047.96	10.4
2017-18	289.2	3475.2	12.02	104.3	1081.69	10.37

Source: Jharkhand Economic Survey, GOJ

Table 02: Growth Rates in Area, Production and Productivity across various periods for Selected Vegetables and Fruits in Jharkhand since 2000

Year	Vegetables			Fruits		
	GR of Area	GR of Pdx	GR of Yield	GR of Area	GR of Pdx	GR of Yield
2000-01						
2001-02	5.8%	-17.7%	-21.8%	5.4%	21.1%	14.9%
2002-03	-25.4%	-25.1%	0.5%	3.8%	0.0%	-3.6%
2003-04	-6.4%	-7.9%	-1.6%	-2.8%	-7.8%	-5.2%
2004-05	102.2%	183.6%	40.3%	4.4%	36.1%	30.5%
2005-06	0.3%	0.2%	-0.1%	0.3%	-3.7%	-4.0%
2006-07	-0.3%	-0.2%	0.1%	-1.2%	-1.7%	-0.5%
2007-08	6.8%	7.2%	0.4%	14.3%	0.2%	-12.4%
2008-09	-2.6%	1.6%	4.6%	15.0%	34.0%	17.7%
2009-10	-1.3%	0.8%	1.8%	1.6%	1.4%	-1.3%
2010-11	13.0%	10.3%	-2.6%	63.8%	50.0%	-8.6%
2011-12	0.7%	-5.1%	-5.7%	16.4%	9.1%	-6.5%
2012-13	23.1%	10.8%	-9.4%	11.0%	4.7%	-5.2%
2013-14	-2.5%	-2.0%	0.1%	1.1%	0.0%	-1.0%
2014-15	1.0%	1.0%	0.0%	0.1%	0.9%	0.7%
2015-16	-16.6%	-21.2%	-5.5%	2.5%	7.0%	4.4%
2016-17	11.1%	-0.1%	-10.1%	4.4%	9.0%	4.4%
2017-18	-1.5%	3.1%	4.7%	3.5%	3.2%	-0.3%

Source: Growth rate calculated by author on the data from Jharkhand Economic Survey, GOJ

It can also be observed from Table 01 that the growth rates for area under food grains fluctuated like positive and negative from 2001-02 to 2018-19. As can be observed in table, the growth rate of production of food grains was high in 2006-07 (77.1%) and was negative in 2002-03,2005-06,2009-10(lowest -49.4%), 2013-14,2015-16 and 2018-19(4th AE). Nevertheless, a dramatic rise in the growth rate of production of food grains was observed in 2016-17(57.9%). The growth rates in the area under food grains observe the maximum negative growth rates was 35% in 2009-10 and therefore the maximum growth rate of productivity were are observed to be 58.8% in the year of 2015-16. However, as can be observed in figure 01, a rising trend in the overall production of food grains was observed since 2000, even though the trend in the area under the production of food grains depicted. Trend in the yield in Jharkhand food grains production as measured by quantity of production in kg/ha fluctuated since 2000.

Figure 01: Trends of Area, Production and Yield for Vegetables in Jharkhand

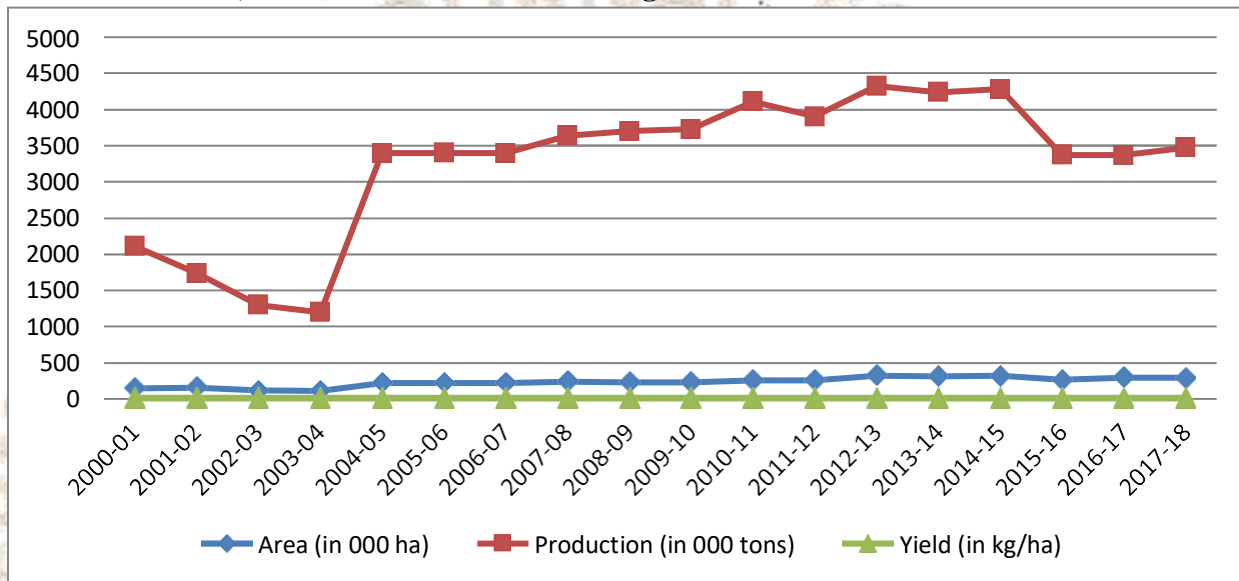
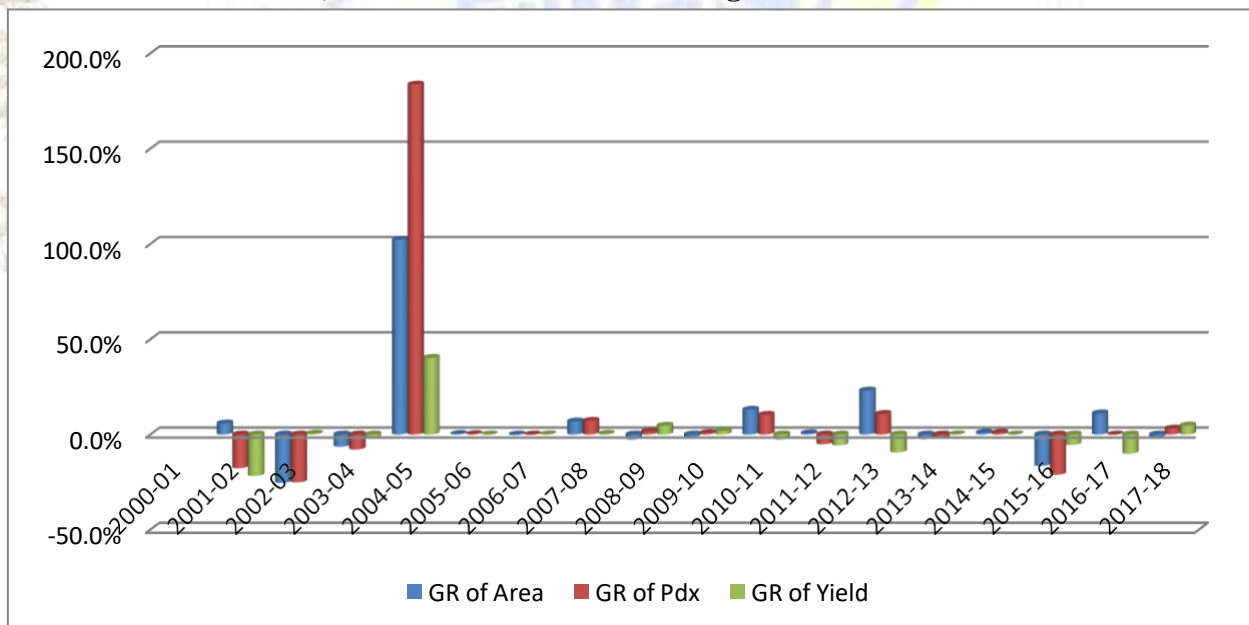


Figure 02: Growth Rate of Area, Production and Yield for Vegetables in Jharkhand



From the figure maximum area covered of food grains is 3231 thousand hectare in the year of 2014-15 and minimum area covered in 1552.23 thousand hectare in the year of 2009-10. The maximum area growth rate of food grains is 44.1% and minimum is -35.0% in the year of 2014-15 and 2009-10. The maximum production of paddy is 7071 thousand tons and minimum is 2044.17 thousand tons in the year of 2017-18 and 2005-06. The maximum growth rate of food grains is 77.1% and minimum is -49.4% in the year of 2006-07 and 2009-10. The maximum yield of food grains is 2327 kg/ha and minimum is 1077 kg/ha in the year of 2015-16 and 2005-06. The maximum yield growth rate of food grains is 58.8% and minimum is -29.4% in the year of 2015-16 and 2018-19 (4th AE). In the year of

2017-18 area covered, production and yield of food grains are increased by 0.1%, 5.1% and 4.6% respectively, where production is lower increment but area covered and yield of food grains are increased than the previous year 2016-17°

Figure 03: Trends of Area, Production and Yield for Fruits in Jharkhand

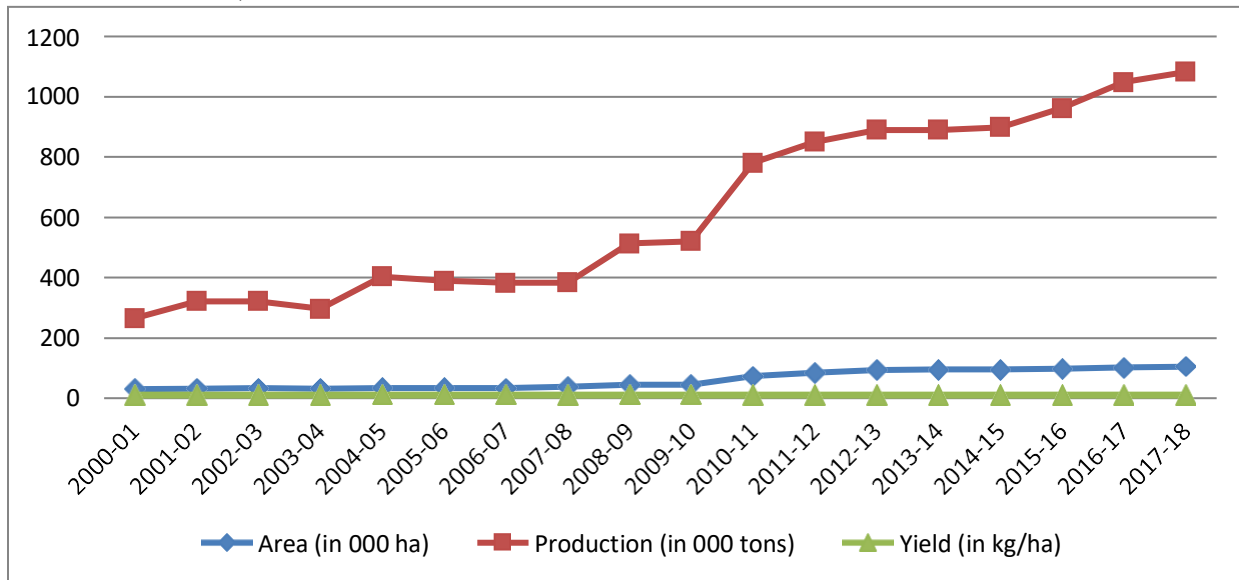
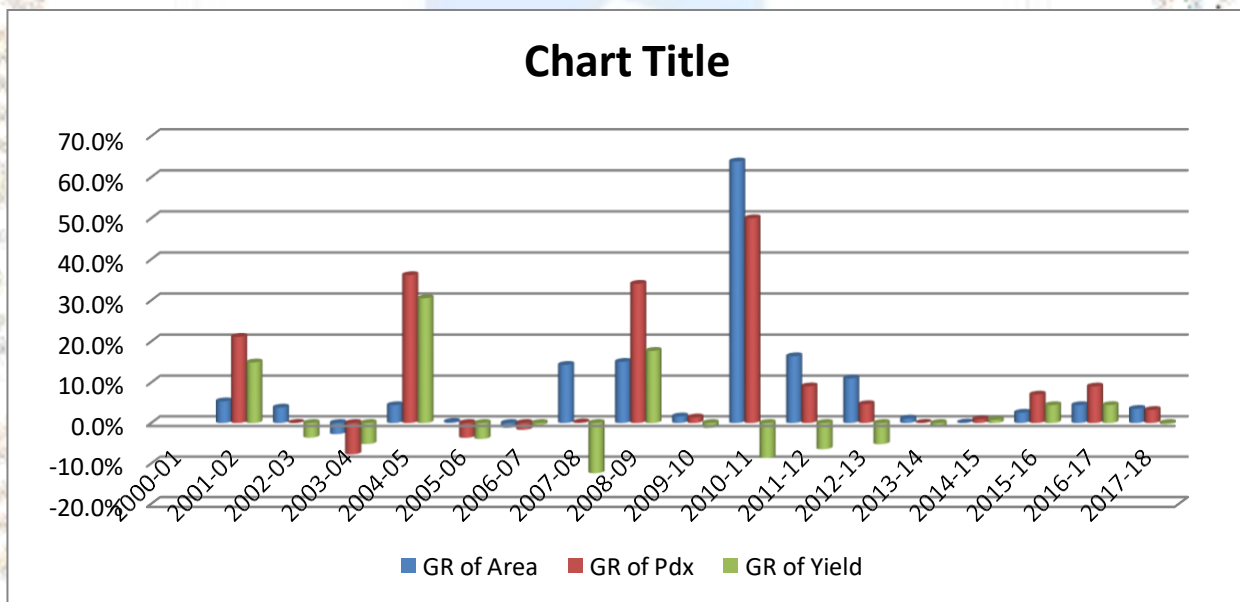


Figure 04: Growth Rate of Area, Production and Yield for Fruits in Jharkhand



From the figure maximum area covered of paddy is 3315 thousand hectare in the year of 2011-12 and minimum area covered in 1255.873 thousand hectare in the year of 2013-14. The maximum area growth rate of paddy is 115.1% and minimum is -24% in the year of 2011-12 and 2009-10. The maximum production of paddy is 5614.131 thousand tons and minimum is 1110.006 thousand tons in the year of 2011-12 and 2010-11. The maximum growth rate of paddy is 405.8% and minimum is -55.3% in the year of 2011-12 and 2009-10. The maximum yield of paddy is 3315 kg/ha and minimum is 1150 kg/ha in the year of 2011-12 and 2005-06. The maximum yield growth rate of paddy is 115.1% and minimum is -43.8% in the year of 2011-12 and 2015-16. In the year of 2017-18 area covered, production and yield of paddy are increased by 1.6%, 5.4% and 3.7% respectively, which are lower increment than the previous year 2016-17.

CONCLUSION

Horticulture production in Jharkhand undergone many changes since 2000. Many factors during my study period different crops observed different impact on area under production, total production and yield as well as growth rate. In the year of 2017-18 area covered, production and yield of food grains are increased by 0.1%, 5.1% and 4.6%

respectively, where production is lower increment but area covered and yield of food grains are increased, paddy are increased by 1.6%, 5.4% and 3.7% respectively, which are lower increment, wheat are no change, maize are increased by -0.7%, -0.7% and 0% respectively, where decreased in area covered and production but there is no change in yield of maize, pulses are increased by -1.5%, 4.7% and 6.2% respectively, where lower increment in production and yield but decreased in area covered of pulses and oilseeds are increased by 13.9%, 13.3% and -0.4% respectively, where lower increment in area covered and production but decreased in yield of oilseeds than the previous year 2016-17. This study reveals that there has been shifting in agriculture in respect to area, production and yield all food grains, pulses and oilseeds crops in the state. A significant changing is observed in case of high value crops i.e. food grains, pulses and oilseed as well as horticultural crops in the state. The farmers prefer high value crops through adoption of improved technology i.e. increase in fertilizer consumption per unit of area and also adopting hybrid paddy/ improved paddy and other varieties on their farm.

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