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Agricultural Production in India: An Anlysis of Food Grains and Non-Food Grains Production

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I. Introduction

Agriculture is the science and art of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated spices created food surpluses that enabled people to live in cities.

India is predominantly an agricultural economy. Agriculture, and its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. It also contributes a significant figure to the Gross Domestic Product (GDP). Generation of surplus from agricultural production will ultimately depend on increasing the agriculture production. Various studies have been conducted related to agriculture production.

II. The Indian Scenario

Agriculture has always been the backbone of the Indian economy and despite concerned industrialization in the last decades agriculture still occupies a place of pride. It provides employment to around 60 percent of the total work force in the country. Agriculture development is central to economic development of the country. India is known as land of villages about 67% of India's population lives in villages. The main occupation of them is agriculture and other activities related to agriculture. Agriculture is the largest and dominant sector of our economy providing livelihood to about 70% of the population of India. Agriculture is the backbone of the Indian economy. Agriculture produce has been the principal source of raw material. This shows the relative importance and dominance of agriculture in Indian economy.

Agriculture sector plays a strategic role in the process of economic development of a country. It has a strategic role in the economic development as well as under – development has helped to a greater extent in the process of their industrialiasation especially in developed nations. Similarly, various under-developed countries of the world now engaged in the process of economic development with the help of agriculture sector. It means that agriculture output and production contribute to an overall economic development of the predominantly agricultural countries. Moreover, agricultural production can be raised more rapidly with lesser amount of capital investment in it. Productivity can be increased even without additional capital. The increasing agricultural productivity will make substantial contributions to the general economic development of the country. The significance of agriculture in India arises after the independence by knowing the fact that the development in agriculture is an essential condition for the development of the national economy. So, first 5 year plan of the India was to develop the agriculture sector. Various initiatives taken were by government of India to improve the agriculture production and their result shown as food grains production increased from 51 million tons in 1950-51 to 176.22 million tons in 1990-91. Since the 1960s government provide support to farmers in the form of subsidies, seed, fertilizer and water, as well as through gain market support prices to shape by heavily invested in specific commodities and is highly regionalized. Indian farmers appears to be diversifying production to meet these new growth opportunities, the share of area planted to primary food grains declining in each decade since the 1980s (Singh and paul,2010). Singh and Paul examine the changing pattern and source of agricultural growth in India. It was seen that there was an increasing trend towards commercialization and diversification of agriculture. It was observed that most of the output growth in recent years was realized through productivity growth. They also suggested that continued government support for agriculture, research and development and higher public investment in infrastructure are welcome step in increasing agricultural productivity.

India's agriculture is composed of many crops, with the foremost food staples being rice and wheat. Indian farmers also grow pulses, potatoes, sugarcane, oilseeds, and such non-food items as cotton, tea, coffee, rubber, and jute(a glossy fiber used to make burlap and twine).India is a fisheries giant as well. A total catch of about 3 million metric tons annually ranks India among the world's top 10 fishing nations. Despite the overwhelming size of the agricultural sector, however, yields per hectare of crops in India are generally low compared to international standards. Improper water management is another problem affecting India's

agriculture. At a time of increasing water shortages and environmental crisis, for example, the rice crop in India is allocated disproportionately high amounts of water.one result of the inefficient use of water is that water tables in regions of rice cultivation ,such as Punjab, are on the rise ,while soil fertility is on the decline. Aggravating the agriculture situation is an ongoing Asian drought 2000-01 a monsoon with average rainfall had been expected, prospects of agriculture production during that period were not considered bright. This has partially been due to relatively unfavorable distribution of rainfall, leading to floods in certain parts of the country and droughts in some others.

Despite the fact that agriculture accounts for as much as a quarter of the Indian economy and employs an estimated 60 percent of the labor force, it is considered highly inefficient, wasteful, and incapable of solving the hunger and malnutrition problems. Despite progress in this area, these problems have continued to frustrate India for decades.it is estimated that as much as one-fifth of the total agricultural output is lost due to inefficiencies in harvesting, transport, and storage of government-subsidized crops.

III. Objectives of the Study

- To analyze the trend and pattern of agricultural production of main food crops in India.
- Major determinants of agricultural production.

IV. Research Methodology

The study is based on secondary data for the period 2000 to 2018. Therefore, data were mainly taken from Reserve Bank of India (RBI) repots, Ministry of agriculture reports, books, articles, economic survey of India, websites, research papers etc. The data analyzed with the help of various statistical tools and techniques. The correlation method used in this study. The collected data were analyzed on the basis of statistical tools like tables and charts. The simple correlation method is used to find the relationship between two variables like food grains and yields, non-food grains and yields, and major crops and land use in Indian agriculture.

V. Review of Literature

Sudhanarayana (2015) conducted a study with the objective to examine" The relationship between formal agriculture credit and agricultural output in India", especially the role of formal agriculture credit in supporting agriculture using the state level panel data covering the period 1995-96 to 2011-12. It was found that over this period all the inputs are highly responsive to an increase institutional agricultural credit, but study suggests that success of credit in enabling the increase use of purchased inputs and also changing the face of agriculture in India has not fully translate into agricultural growth.

K P kannan, K pushpangadan (1988), their study "agriculture stagnation in Kerala: an explanatory analysis", this paper attempts to explain the agricultural stagnation that set in Kerala since the mid-seventies. The phenomenon is attributed to oil conceived development of critical factors such as water management and land development which has been exacerbated by increasing environmental degradation.

Edison dayal (1984), their study "agricultural productivity in India: a spatial analysis", this paper indicates 3 index of agricultural productivity – land productivity, labour productivity and measure and map productivity pattern in India. There are large regional inequalities in the levels of productivity. Regression analysis reveals that the spatial variation of land productivity is positively related to fertilizer use and negatively with the density of agricultural workers on net sown area. Aggregate productivity is positively associated with fertilizer and irrigation use and negatively with densities of population and agricultural workers. The significant explanatory variables in the regressions explain 61 percent of labor productivity, and 42 percent of aggregate productivity.

Maitreeshghatak, Sancahari Roy (2007), their study "land reforms and agricultural productivity in India: a review of the evidence." In this paper we review as well as contribute to the empirical literature on the impact of land reform on agricultural productivity in India.

Lopamudra (2015) studied the "linkage between the structural technological and institutional policy reforms and sustainable agricultural development. Although India has achieved a significant growth rate but still suffers from agricultural distress, in this paper it was tried to assess the present trend of agricultural productivity and its future aspects.

Singh and Paul, examine the changing pattern and sources of agricultural growth in India. It was seen that there was an increasing trend towards commercialization and diversification of agriculture. It was observed that most of the output growth in recent years was realized through productivity growth. They also suggested that continued government support for agriculture, research.

Anjani Kumar, Rajini Jain (2013), their study "growth and instability in agricultural productivity: a district level analysis "this study has examined the trends in growth and instability in Indian agriculture at the district level and has identified distinctive features and drivers of productivity growth across districts.

Kappadathparaemeswarakannan, kesavanpushpangadan (1990), study "dissecting agriculture stagnation in Kerala: an analysis across crops, season and regions", the authors analysis across indicates that the yield stagnation in agriculture in Kerala is all pervasive, including in paddy. The observed increase in yield of paddy is not due to any technical change, but to marginal land going out of cultivation.

C H hanumantharao (1965), their study "agricultural growth and stagnation in India", in this analysis the net value of agricultural output per acre in these states is invariably higher than the all India average. In fact, in the case of Kerala and west Bengal it is nearly twice the all-India average. Therefore, in a vast country like India where there are extreme regional variations in the soil-climate crop complex, farm size is not a sufficient indication of income level. Moreover, madras and Bihar where the average farm size is lower the national average record satisfactory progress.

N Kaunakaran (2014), I this study "paddy cultivation in Kerala trends, determinants and effects on food security ", the stastical profile of Kerala agriculture since 1960, clearly established the decrease in the area under paddy cultivation in the state. Time series analysis of acreage, production and productivity data of rice in Kerala during the five decades from 1960-61 to 2009-10 reveled the performance of this crop in terms of growth of area, production and productivity. The production of major food crop, rice, reached negative growth rates due to the declining trend of their area.

A V Jose (1974), studied in "trends in real wage rates of agricultural labors". This paper makes a comparative study of wage rates of agricultural labors in the different states over the period 1956-57 to 1971-72.while according to earlier studies wage rates improved significantly in real terms only in Punjab, our extension of the series to 1971-72 shows that improvement in real wages took place also in tamilnadu, Uttar Pradesh and Gujarat. However, these states still account for less than 30 percent of the agricultural labor force in the country. This study also brings out those inter-state disparities in money wage rates have tended to widen since 1964-65.

B A prakash (1987), his study working paper no.220, agricultural development of Kerala from 1800 AD to 1980 AD .this survey covers both academic studies as well as government publications. The purpose of the study is to highlight nature and trends in literature and to identify areas which warrant and other research. Agricultural development may be viewed from various reaches. We may see it in terms of structure of production relations in terms of productive forces, i.e., in terms of output, cropping pattern, techniques, trends in productivity etc.

P Indira Devi, Radhakrishnan, EK Thomas (1991), their studies "fertilizer consumption and agricultural productivity in Kerala", in this study among the various inputs to increase crop productivity fertilizer plays a prominent role, analysis have shown that the initial enthusiasm in the consumption of plant nutrients in India has faded.

Jenifer et al, evaluated research led technological change in agriculture generate sufficient productivity growth to give high rate of return in Africa and Asia and has substantial impact on poverty.

S ASaseendran, K K Singh, L S Rathore, S V Singh, SK Sinha (2000), studied the "effects of climate change on rice production in the tropical humid climate of Kerala, India".

VI. Indian Agriculture: An Overview

Agriculture continues to be the mainstay of the Indian economy. Agriculture is described as the backbone of the Indian economy. The history of agriculture in India dates back to Indus valley civilization and even before that in some places of southern India. As per 2016, agriculture employed 49.9% of the Indian work force and contributed 16.9-17.9% to country's GDP.

In 2016, agriculture and allied sectors like animal husbandry, forestry and fisheries accounted for 15.4% of the GDP (Gross Domestic Product) with about 31% of the workforce in 2014. India ranks first in the world with highest net cropped area followed by US and China. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India.

India exported $38 billion worth of agricultural products in 2013, making it the seventh largest agricultural exporter worldwide and the sixth largest net exporter. Most of its agriculture exports serve developing and least developed nations. Indian agricultural / horticultural and processed foods are exported to more than 120 countries, primarily to the Japan, Southeast Asia, SAARC countries, the European Union and the United States.

This chapter gives an overview of the agricultural sector in India. It also reviews policies and initiatives in agricultural sector in the light of the New Economic Policy and etc.

National income statistics provide a wide view of the country's entire economy, as well as of the various groups of the population who participate as producers and income receivers, and that, if available over a substantial period, they reveal the basic changes in the country's economy in the past and suggest, if not fully

reveal, trends for the future. Agriculture has always been the backbone of the Indian economy and despite concerted industrialization in the last six decades; agriculture still occupies a place of pride employment to around 60 perc

ent of the total work force in the country. The significance of agriculture in the national economy can be best explained by considering the role of agriculture under different heads.

VII. Data Analysis and Interpretation

The study is trying to find out the relationship between production and yield of food grains in India, production and yield of nonfood grains in India and production of major crops and land use in India. It is based on secondary data for the period of 2000 to 2018. This chapter deals with production of food grains and nonfood grains, yield of food grains and nonfood grains and land use in India from 2000 to 2018. By using correlation method, trying to find out the relation between these.

VIII. Production and Yield of Food Grains in India

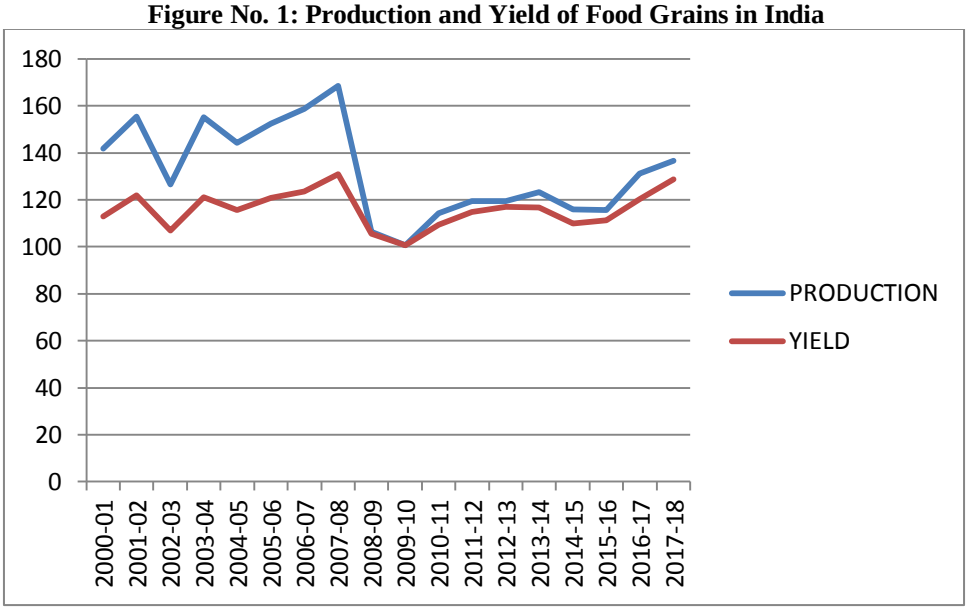
Table No. 1

Index Number of Production and Yield of Food Grains in India

YEAR	PRODUCTION	YIELD
2000-01	141.9	112.9
2001-02	155.3	121.8
2002-03	126.6	107
2003-04	155.1	121
2004-05	144.2	115.6
2005-06	152.5	120.8
2006-07	158.8	123.6
2007-08	168.6	130.9
2008-09	106.5	105.5
2009-10	100.6	100.6
2010-11	114.3	109.5
2011-12	119.5	114.9
2012-13	119.4	117.1
2013-14	123.3	116.8
2014-15	115.9	110
2015-16	115.7	111.3
2016-17	131.1	120.3
2017-18	136.6	128.6

Source: handbook of statistics on the Indian economy (RBI 2017-18)

Figure No. 1: Production and Yield of Food Grains in India



The figure shows that, there is a variation in the yield of food grains from 2000 to 2018. In 2007-08 production is high level indicate 168.6, at the same time yield is 130.9. In 2009-10 production is low level indicating 100.6 and yield also 100.6.

Table No.2
Correlation between Agriculture Production of Food Grains and Yield

	PRODUCTION	***YIELD***
PRODUCTION	1	
YIELD	0.816099361	1

This figure reveals that, the correlation between agriculture production and yield of food grains in India since 2000. In this figure, the 'r' value is .0816099361.that is positive correlation between agriculture production and yields of food grains in India.

IX. Production and Yield of Non Food Grains in India

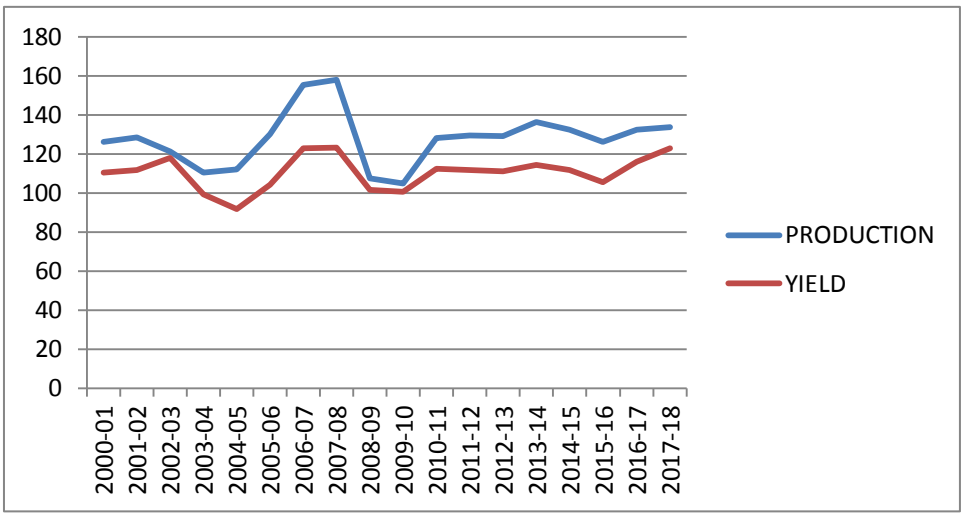
Here, we look at the production and yield of non-food grains in India from 2000-01 to 2017-18. There are having variations in the yield and production during these periods.

Table No. 3
Index Number of Production and Yield of Non-Food Grains in India

YEAR	PRODUCTION	YIELD
2000-01	126	110.3
2001-02	128.5	111.8
2002-03	121.2	117.9
2003-04	110.4	99.3
2004-05	112.1	91.8
2005-06	130.1	104.3
2006-07	155.4	122.8
2007-08	157.9	123.3
2008-09	107.6	101.5
2009-10	104.9	100.6
2010-11	128	112.2
2011-12	129.3	111.7
2012-13	129	111.2
2013-14	136.4	114.4
2014-15	132.3	111.6
2015-16	126.1	105.5
2016-17	132.5	116
2017-18	133.7	122.9

Source: Handbook of statistics on the Indian economy (RBI 2017-18)

Figure No. 2
Production and Yield of Non-Food Grains in India



In this figure reveals that, in 2013-14 production is very high. Which is 136.4 and yield is 114.4. And in 2009-10 production is very low .production value is 104.4 and yield value is 100.6.from the above data we can conclude that situation of production and yield sometimes increased or decreased .

Table No. 4
Correlation between Agriculture Production of Non-food Grains and Yield

	PRODUCTION	*YIELD*
PRODUCTION	1	
YIELD	0.819442	1

This table revels that, the correlation between agriculture production of nonfood grains and yield in India since 2000. In this figure, the 'r' is .819442. There is a positive correlation between production of food grains and yields in India.

X. Agriculture Production and Land Use of Commercial Crops

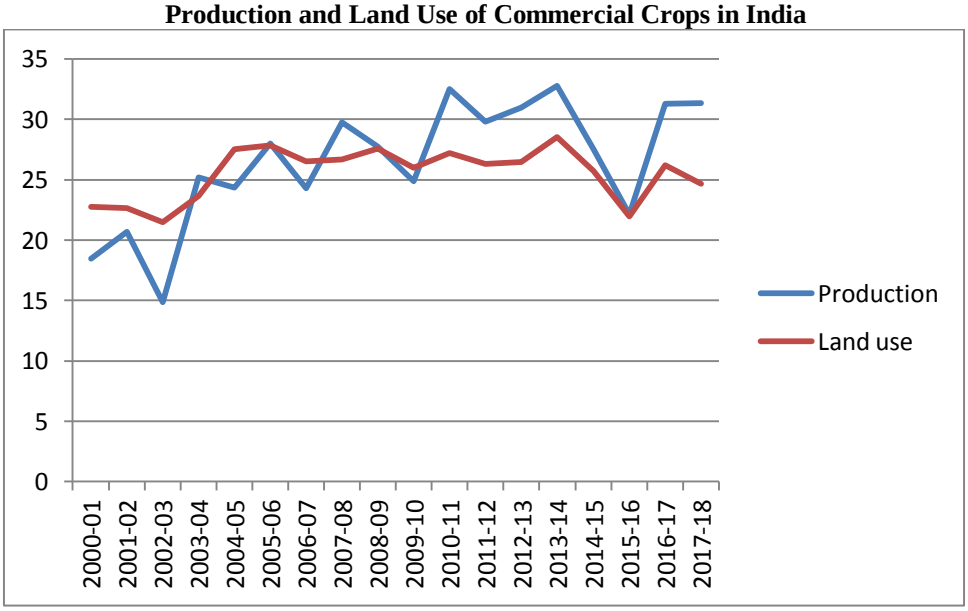
Table No. 5
Agriculture Production and Land Use of Commercial Crops

Production (Million tonnes)
Land (million hectares)

Year	Production	Land Use
2000-01	18.44	22.77
2001-02	20.66	22.64
2002-03	14.84	21.49
2003-04	25.19	23.66
2004-05	24.35	27.52
2005-06	27.98	27.86
2006-07	24.29	26.51
2007-08	29.76	26.69
2008-09	27.72	27.56
2009-10	24.88	25.96
2010-11	32.48	27.22
2011-12	29.80	26.31
2012-13	30.94	26.48
2013-14	32.75	28.53
2014-15	27.51	25.73
2015-16	22.09	21.93
2016-17	31.28	26.18
2017-18	31.31	24.65

Source: Ministry of Agriculture & Farmers welfare, government of India.

Figure No. 3
Production and Land Use of Commercial Crops in India



In this figure reveals that, in 2002-03 production and land use is very low. And in 2013-14 both are high.

Table No. 6
Correlation between Agriculture Production of Commercial Crops and Land Use

	PRODUCTION	LAND USE
PRODUCTION	1	
LAND USE	0.763479	1

This figure reveals that, the correlation between agriculture production of commercial crops and land use in India since 2000. In this figure, the 'r' value is 0.763479, which is positive correlation between agriculture production and land use of commercial crops, mainly in oilseeds.

XI. Conclusion

There is a positive relationship between agriculture production of food grains and yields. There is a positive relationship between agriculture production of grains and yield. The food grains rate was higher in 2007-2008, which indicate 168.6 compared to other years. In the same year, 2007-2008 the yield rate was 130.9, compared to other years. While the agriculture production rate was very low 2009-2010, and yield rate was very low in the same year. The agriculture production of non-food grains is 2007-2008 was higher the level indicates 157.9, and yield rate was 123.3 in the same year. While during 2003-2004 nonfood grain was lower level, at 110.4 and at the same yield was 91.8.

After assessing the secondary data related to trend of area under agriculture production of major food grains, nonfood grains and yields and land use of major crops during the year 2000 to 2018. The data was available in the estimates of output of reserve bank of India, publication, journals, book, etc. It has been observed that the data is showing a slow trend is increase in production, fall in area of land use under cultivation .These are the issues of Indian agriculture on these days most commonly low production of food grains and non-food grains.

There is need to be sort out with the support of government by taking new initiatives as well as investments from private sector , cooperation of farmers , awareness campaign and also provide education related to crops ,seed , fertilizers, irrigation, diversification etc.

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