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# An Economic analysis of Trends in Agriculture Growth and Production in India

KEYWORDS


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**ABSTRACT** *The present paper examines the performance of Trends of Agriculture growth and production in India. And also The paper has shown the growth and production has significantly increased from during the last three decades and also highlight the performance of the Indian agriculture growth is also increased over the period of time the present paper mainly focused on the secondary sources with help of the statistical tools such as mean, standard deviation, covariance, CGR, regression methods has been used for study purpose.*

**Introduction**

India has made impressive strides on the agricultural front during the past three decades. Much of the credit for this success should go to the several million small farming families that form the backbone of Indian agriculture and Indian economy. Policy support, production strategies, public investment in infrastructure, research and extension for crop, livestock and fisheries have significantly helped in increasing the agricultural productivity, food production and its availability. Notwithstanding these achievements, producing additional food with limited land, and providing economic access to food at the household level for ensuring food security would continue to be a major challenge for the nation. India has experienced considerable changes in the crop mix, yield and production since the inception of the Green Revolution. The Green Revolution phase displayed a high yield growth per unit of input. The first post-Green Revolution phase (from late-1960s to mid-1980s) was marked by the continued growth in returns from land through the intensification in use of chemical inputs and machine labour. The second post-Green Revolution phase (beginning the mid-1980s) was characterized by high input-use and decelerating productivity growth. It calls for an examination of the issues related to the trends in agricultural productivity, particularly with reference to individual crops in recent years. In the present paper, the temporal and spatial variations in the productivity status of major crops in India have been analyzed using the total factor productivity growth (TFPG) estimates. Some policy measures have also been suggested for sustaining TFP of the crops.

**Review of Literature**

A number of studies on the measurement of productivity have been carried out for India Evenson et al. (1999) have analysed the trends and sources of TFP growth in India's agriculture, and have shown that the gains in productivity had contributed about 1.1 per cent per annum since 1956. The TFP and conventional inputs contribute roughly 2.3 per cent growth rate per annum in total crop output. Fan et al. (1999) have computed TFP for the agriculture for India and different states of India for the period 1970 to 1995. Five major crops (rice, wheat, sorghum, pearl millet and maize), 14 minor crops (barley, cotton, groundnut, other grains, other pulses, potato, rapeseed, mustard, sesame, sugar, tobacco, soybeans, jute, and sunflower), and 3 major livestock products (milk, meat, and chicken) were included in the measurement of output index. Five inputs (labour, land, fertilizer, tractors, and buffalos) were included in the measurement of input index. TFP for India grew at an average annual rate of 1.8 per cent. During the 1970s, TFP growth rate was 1.6, but it grew fast during the 1980s, at 2.5 per cent per annum. Since 1990, TFP growth in Indian agriculture has continued to grow but at a little slower rate (2.3% per annum), but still it is at a high level. Modern inputs such as HYV seed, fertilizer and irrigation were major contributors to TFP growth in Indian agriculture. Rapid adoption of new technologies and improved rural infrastructure induced productivity growth. The government spending on productivity-enhancing investments (especially agricultural research and extension), rural infrastructure (especially roads and education), and rural development targeted directly to the rural poor, all contribute to the growth in agricultural productivity. Avila and Evenson (2004) have utilized FAO published data on cropland, pastureland, labour used in agriculture, fertilizer, seeds, tractors and combine harvesters and animal stocks for measuring the changes in TFP for crop production, livestock production and aggregate agricultural production for two periods, 1961-1980 and 1981-2001. Owing to the limitation of data on factor shares, the TFP growth rates seem to be on a higher side. Modern varieties of the Green Revolution increase in the education level of labour force, and increases in dietary energy have been reported as sources of TFP growth in the paper. Modern varieties contributed maximum (64%) to TFP growth, followed by

Schooling (22 %) and nutrition (14 %). Birthal et al. (1999) have analyzed the trend in TFP for the livestock sector in India. The livestock output grew at the rate of 2.6 per cent per year over the period 1950-51 to 1995-96. The input index increased by 1.8 per cent per year and the TFP grew at about 0.8 per cent, implying that technical change contributed about 30 per cent to the overall growth over the past 45 years. Period-wise results were more revealing. There was no TFP growth during the first period (1950-51 to 1970-71), implying no progress in productivity. The real swing started during the 1980s when the sector's output touched nearly 4 per cent and the TFP growth jumped to nearly 1.8 per cent, contributing 45 per cent to the total output growth. Avila and Evenson (2004) have also reported the accelerating growth in the livestock TFP, growing at the rate of 2.7 per cent per year during 1981-2001 period, contributing 69 per cent to the total livestock output growth. Kumar et al. (2004b) have analysed the trend in TFP for the aquaculture and marine sector of India. The TFP indices for aquaculture have revealed that the TFP indices grew by 4.4 per cent annually and accounted for two thirds of the output growth. The growth in aquaculture was mainly technology driven. The TFP growth of fish in the marine sector moved with 2.0 per cent annual growth and accounted for half of the output growth in the marine fisheries. Most studies have focused on the estimates of the effect of technological change for agriculture as a whole or total crop production. Owing to non-availability

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of input allocation data on individual crops, this may over- or under-estimate the TFP for the crop sector to the extent that rates of technical change differ across crops. Thus, the assessment of TFP change which is one of the most important factors influencing crop production ought to be studied for individual crops. With the availability of micro-level farm data3 in India, few crop-specific TFP studies have emerged since 1992 (Pinstrup et al., 1991; Sindhu and Byerlee, 1992; Kumar and Mruthyunjaya, 1992; Kumar and Rosegrant, 1994; Jha and Kumar, 1998; Kumar et al. 1998; Kumar, 2001; Joshi et al., 2003). The present analysis covered all the major crops grown in various states of India.

**Objectives and Methodology**

In this background, the present study is **t**o analyze the trends and pattern of agriculture growth and Production in India. The Present Study is based on secondary sources. Secondary data is collected from various Government of India Reports, RBI reports, Ministry of Agriculture reports, books, articles, and Economic Survey of India.

**Indian Agriculture: Performance and Challenges**

India is the second largest producer of food in the world: more than 200 million tonnes of foodgrains, 150 million tonnes of fruits and vegetables, 91 million tonnes of milk, 1.6 million tonnes of poultry meat, 417 million livestock, and 6.05 million tonnes of fish and fish products. The Indian agriculture has made great strides over the years. The foodgrain production has increased more than fourfold - from 51 million tonnes in 1950-51 to 212 million tonnes during 2003-04 growing at an annual average rate of more than 2.4 percent per annum. The recent trends in performance of Indian agricultural production however present a dismal picture.

India accounts for only about 2.4 % of the world's geographical area and 4 % of its water resources, but has to support about 17 % of the world's human population and 15 % of the livestock. Agriculture is an important sector of the Indian economy, accounting for 14% of the nation's GDP, about 11% of its exports, about half of the population still relies on agriculture as its principal source of income and it is a source of raw material for a large number of industries. Accelerating the growth of agriculture production is therefore necessary not only to achieve an overall GDP target of 8 per cent during the 12th Plan and meet the rising demand for food, but also to increase incomes of those dependent on agriculture to ensure inclusiveness.

**Crop Production**

During 2011-12, there was record production of foodgrains at 259.32 million tonnes, of which 131.27 million tonnes was during Kharif season and 128.05 million tonnes during the Rabi season. Of the total foodgrains production, production of cereals was 242.23 million tonnes and pulses 17.09 million tonnes. As per 2nd advance estimates for 2012-13, total foodgrains production is estimated at 250.14 million tonnes (124.68 million tones during Kharif and 125.47 million tonnes during Rabi seasons). The 6.59 million tonnes (about 5.02 per cent) decline in kharif production has been on account of late onset of monsoon and deficient rainfall in several states affecting kharif production in Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Maharashtra, Rajasthan, Tamil Nadu and West Bengal. The production of rice (both kharif and rabi) is estimated at 101.8 million tonnes, pulses at 17.58 million tonnes, oilseeds at 29.46 million tonnes, sugarcane at 334.54 million tonnes and cotton at 33.80 million bales (of 170 kg. each). Though, production of rice, sugarcane and cotton during kharif 2012-13 has been lower than that of the last year, these are better than the average production during the last five years. Production of coarse cereals has been severely affected by the deficient monsoon in Gujarat, Haryana, Karnataka, Maharashtra and Rajasthan, with the result that the overall production of Coarse Cereals has been lower by 3.95 million tonnes as compared to kharif 2011-12. Production of jute is estimated at 10.56 million bales (of 180 kg each) which is marginally lower than that of last year (10.74 million bales). Production of the major crops since 2007-08 till 2012-13 (second estimates) is given in Table 1.

**Table-1: Production of major crops during 2003-12(million tonnes/bales)**

| Year | Rice | Wheat | Coarse Cereals | Pulses | Food grains | Oilseeds | Sugar-cane | Cotton | Jute and Mesta |
|---|---|---|---|---|---|---|---|---|---|
| 2003-04 | 88.5 | 72.2 | 37.6 | 14.9 | 213.2 | 25.2 | 233.9 | 13.7 | 11.2 |
| 2004-05 | 83.1 | 68.6 | 33.5 | 13.1 | 198.4 | 24.4 | 237.1 | 16.4 | 10.3 |
| 2005-06 | 91.8 | 69.4 | 34.1 | 13.4 | 208.6 | 28 | 281.2 | 18.5 | 10.8 |
| 2006-07 | 93.4 | 75.8 | 33.9 | 14.2 | 217.3 | 24.3 | 355.5 | 22.6 | 11.3 |
| 2007-08 | 96.69 | 78.57 | 40.75 | 14.76 | 230.78 | 29.75 | 348.19 | 25.88 | 11.21 |
| 2008-09 | 99.18 | 80.68 | 40.03 | 14.57 | 234.47 | 27.72 | 285.03 | 22.28 | 10.37 |
| 2009-10 | 89.1 | 80.8 | 33.55 | 14.66 | 218.1 | 24.88 | 292.3 | 24.02 | 11.82 |
| 2010-11 | 95.98 | 86.87 | 43.4 | 18.24 | 244.49 | 32.48 | 342.38 | 33 | 10.62 |
| 2011-12 | 105.31 | 94.88 | 42.04 | 17.09 | 259.32 | 29.8 | 361.04 | 35.2 | 11.4 |
| 2012-13 | 101.8 | 92.3 | 38.47 | 17.57 | 250.15 | 29.46 | 334.54 | 33.8 | 11.13 |
| Mean | 94.49 | 80.01 | 37.73 | 15.25 | 227.48 | 27.60 | 307.12 | 24.54 | 11.02 |
| SD | 6.35 | 8.62 | 3.59 | 1.67 | 18.64 | 2.67 | 45.36 | 7.09 | 0.46 |
| CV | 6.72 | 10.78 | 9.52 | 10.98 | 8.19 | 9.67 | 14.77 | 28.88 | 4.15 |
| CGR | 1.85 | 3.59 | 1.81 | 3.06 | 2.54 | 2.17 | 3.93 | 10.45 | 0.38 |

**Source: Reserve Bank of India: Annual Report 2012-13, GOI Ministry of Agriculture**

**Figure-1: Annual growth rate of coarse cereals and Rice during 2003 to 2012-13**

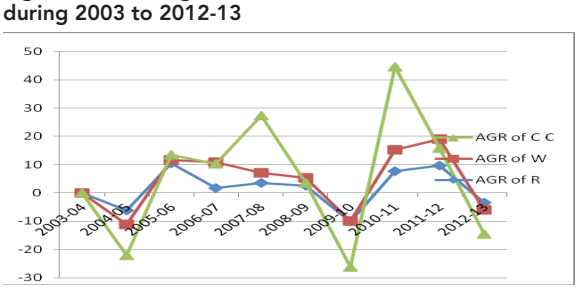



Figure-2: Annual growth rate of Pulses, Foodgrains and Oil seeds during 2003 to 2012

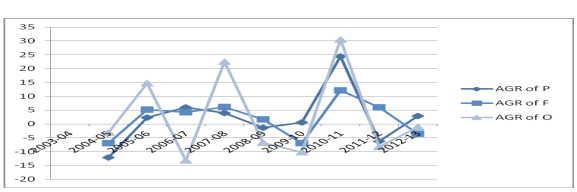
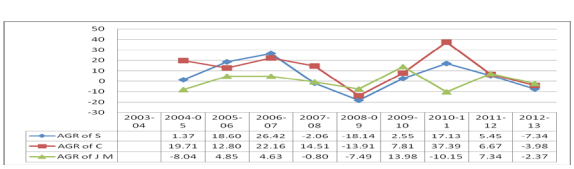



**Figure-3: Annual growth rate of Sugarcane, Cotton and Jute & mesta**



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**Result of Regression (exponential growth model)**

| Model Summary and Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dependent Variable: rice | | | | | | | |
| Equation | Model Summary | | | | | Parameter Estimates | |
| | R Square | F | df1 | df2 | Sig. | Constant | b1 |
| Linear | .614 | 12.732 | 1 | 8 | .007 | 84.964 | 1.731 |
| Growth | .608 | 12.422 | 1 | 8 | .008 | 4.445 | .018 |
| Exponential | .608 | 12.422 | 1 | 8 | .008 | 85.230 | .018 |

| Model Summary and Parameter Estimates | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dependent Variable: food grain | | | | | | | |
| Equation | Model Summary | | | | | Parameter Estimates | |
| | R Square | F | df1 | df2 | Sig. | Constant | b1 |
| Linear | .778 | 28.051 | 1 | 8 | .001 | 195.997 | 5.724 |
| Growth | .776 | 27.784 | 1 | 8 | .001 | 5.286 | .025 |
| Exponential | .776 | 27.784 | 1 | 8 | .001 | 197.540 | .025 |

An average of 94.49 million tonnes of rice is produced annully which is higher than production of wheat, coarse cereals and pulses taken individually. However, it is lessthan annually average production of all foodgrain(227.48 millon tonnes). Nonethanless, the variation in annual production of all food grains is signicant standrad Deviation value obtained of rice, cereals, wheat and pulses have increased comparatively over the last few years. Wheat, pulses and food grains have grown at CGR 3.59 percent, 3.06 percent and 2.54 percent respectively. However, rice and coarse cereals have grown at less compand growth rate 1.85 percent and 1.81 respectively, oil seeds production has progressed very little from 25.2 million tonnes (2003-04) to 29.46 million tonnes (2012-13).

In contrast, commercial crops- sugarcane and cotton have grown significantlywith CGR of 3.93 percent and 10.45 percent respectively. An average of 307.12 million tonnes is produced annualy. Cotton production has rose from 13.7 million tonnes (2003-04 ) to 33.8 million tonnes (2012-13). However, production of jute has remained same. It has grown as mere CGR 0.38 percent.

**Conclusion**

From the above evidence we can conclude that overall performance of the Indian agriculture growth and production has shown the significant change in the last three decades. It reveals that the agriculture major crops has increase over the period of time. An average of 94.49 million tonnes of rice is produced annully which is higher than production of wheat, coarse cereals and pulses taken individually. However, it is lessthan annually average production of all foodgrain(227.48 millon tonnes). Nonethanless, the variation in annual production of all food grains is signicant standrad Deviation value obtained of rice, cereals, wheat and pulses have increased comparatively over the last few years. This paper is mainly depends on the secondary sources of the different agriculture departments and plannin commision.

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