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Analysis of Growth Trends in Indian Agriculture Sector

Abstract

In India about 65% population depends directly on the agriculture. In recent years agriculture sector in India has witnessed spectacular advantages in the production and productivity of food grains. The present paper is intended to examine the growth of agriculture in pre and post reforms period. For this purpose time series secondary data from 1970 to 2014-15 have been used to analyze the regression equations with the Ordinary Least Square method. The study observed that the production in agriculture has been increased over the year and no structural changes have been found between the pre and post reforms period.

Keywords: Agriculture, Output, Growth, Trends.

Introduction

It is known that agriculture is most primitive and traditional sector of our Indian economy and plays crucial role in its economic development. It is still dependent primarily on the monsoons. Agriculture is the largest employment providing sector and contributes to capital formation. It is also provides raw material to industries and works as market for industrial products. In India about 65% population depends directly on the agriculture. About 52% of the total workforce is still employed by the farm sector which makes more than half of the Indian population dependent on agriculture for subsistence. The total food grain production in 1970-71 was noticed about 108.42 million tonnes which slowly increased during the 1980-81 and in the year 2011-12 it became 259.29 million tonnes. The productivity of food grain and the growth performance of the agriculture sector has been fluctuating across the plan periods. It witnessed growth rate 4.8 percent during the eight plan period (1992-97). However the agrarian situation saw a downturn towards the beginning of the ninth plan period (1997-2002) and the tenth plan period (2002-2007), When the agriculture growth rate came down to 2.5 percent and 2.4 percent respectively. The trend of rate of growth during the period 1992-93 to 2010-11 is 2.8 percent while the average annual rate of growth in agriculture are allied sectors GDP during the average growth in agriculture during the eleventh plan period was 3.3 percent. We see that the overall performance of the agriculture sector in India largely depends on what occurs at the state level because agriculture is a state subject. During 2000-01 to 2008-09 the growth performance of agriculture in Rajasthan noticed 8.2% while in nearby state Gujarat it was 7.7% growth in production of agriculture crops depends upon acreage yield. Given the limitations in the expansion of acreage the main source of long term output growth is improvement in yields. On the case of wheat, the growths in area and yield have been marginal during 2000-01 to 2010-11.

Objective of the Study

1. To examine the trends in agriculture growth.
2. To examine the structural changes in agriculture direction.

Review of the Literature

Many empirical researches have been conducted to prove the agricultural productivity growth. Higher growth in agriculture assumes great importance and is a matter of concern for the research scholars and policy planners in recent times. (Chand et al., 2007, Balakrishnan et al., 2008, Bhalla and Singh, 2009, Reddy and Mishra, 2009, Vaidyanathan, 2010) study found that the agricultural growth, which is facilitated through constant policy of institutional support provides positive results towards the agricultural productivity. Systematic efforts were made to analyse growth in crop output and its elements through decomposition analyses by the (Minhas and Vaidyanathan, 1965, Sagar, 1977, Sagar 1980, Majumdar and

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Basu, 2005, Joshi et. al. 2006). Impact of farmers income on agricultural growth have been studied by several scholars like Sawant and Achuttan (1995), Rao(1998), Bhalla and Singh (2001) and Vaidyanathan (2010) effect of technology on agricultural growth. The present study contributes to the existing knowledge based on Indian agriculture in a way that it estimates the trends in agricultural growth models through econometric method. It is hypothesized that there is structural changes in agriculture .Thus; study also discusses the structural changes in agriculture population in pre and post reforms period.

Data and Methodology

Data applied in this study are time-series secondary data from the time period 1970-71 to 2014-15. The ordinary least squares method has been used to analyse the regression equation. The data have been collected from Ministry of Agriculture & Farmers welfare, Government of India.

Estimates of Trends

Considering the various functional forms of the trend equations, following three trend equations have been estimated-

Model I: $Y = a + bt$

Model II: $Y = a + bt + ct^2$

Model III : $\ln Y = a + bt$

Where Y- the considered indicates of the agriculture growth, t- time considered in the study and a, b and c are the constants to be estimated.

Analysis of Results

Model-I is the linear specification of the relationship between y and t. Here b is the slope coefficient,while a is the autonomous quantity. Coefficient b measures the changes in Y as the result of one unit change in time. The increase in production of agriculture is the result of improving farmers' techniques. The investment policy of agriculture is also responsible of the agricultural production. Proper investment in agriculture leads the production high and inadequate investment brings the production at low level.

Models Variables	Linear Model	Quadratic Model	Exponential Growth Model
Constant	91.77* (28.11)	94.58* (18.67)	4.62* (216.9)
t	3.59* (29.08)	3.23* (6.37)	0.021* (26.58)
t ²	-	0.007 (0.01)	-
R ²	0.951*	0.952*	0.942*
\bar{R}^2	0.950*	0.941*	0.941*
F	845.70	418.48	706.48
Chow-test	0.015		

Note : Values in Parentheses are Absolute t-ratios.

: * -Significant at 1% level.

: ** - Significant at 5% level.

Model-II specifies the relationship between agriculture growth indicated by Y and t in the quadric forms. In this equation a, b and c are the regression parameters, b measures the change in Y as a result of change in t, while c measures the change in Y as

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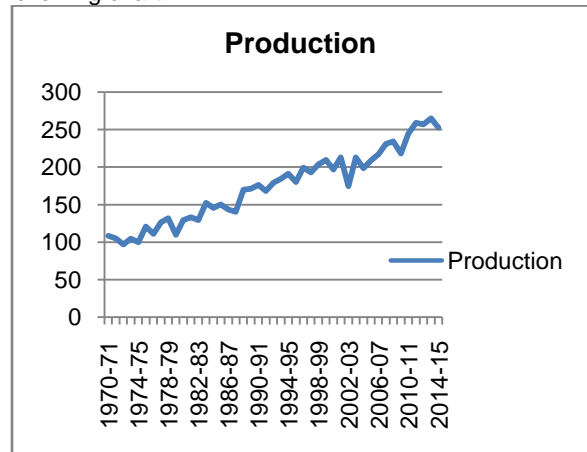
the result of change in the square of t. Model-III is the exponential form, also known as constant growth model, measuring the growth in Y variable constantly during the period considered in the study. In this model b is the measure of the constant growth rate while a is the constant term. Here b measures the relative change in Y as the result of the absolute change in t.

Table -1 reports the estimated trends of the agriculture output in linear, quadratic and constant growth models. The results of the linear model show that the agriculture output has shown the statistically significant increasing trend over the period of study. Thus the agriculture output increases by 3.51 units of the measurement annually on the average basis. The linear model significantly explains the 95.1% variation in the agriculture output. The quadratic model also explains the variation in agriculture output significantly by 95.2% in the period of study. The constant growth model shows that the agriculture output constantly significantly increases by about 2% annually in the period of study by explaining about 94.2% variation in agriculture output.

Regarding the power of test of goodness of fit the quadratic model is the best fitted model among the three models. All the three models show the significant attitude towards the goodness of fit.

In case of second objective of the study chow-test has been performed to test the structural changes. The result of test shows that the null hypotheses i.e. there is no structural changes in agriculture direction has been accepted.

Simply graphically presentation of the increasing trends in agriculture can be seen by the following chart.



Suggestions and Policy Implications

The cropping pattern in India has undergone significant changes with a significant shift from the cultivations of food grains to commercial crops. The use of modern varieties, irrigation and fertilisers were important aspects of higher growth in crop production in the country. The increase in production of food grain was possible as a result of adoption of quality seeds, higher dose of fertilizer and plant protection chemicals, coupled with assured irrigation. India has emerged as the second largest producer of fruits and vegetables in the world in addition to being the largest

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overseas exporter of cashews and spices. The proper investment and planning can be helpful to bring production growth. Many flagship programmes in India under the banner of National Food Security Mission, Rashtriya Krishi Vikas Yojana, National Horticulture Mission, Animal Husbandary and Fisheries, Women friendly Improved tools and Equipment for Agriculture are responsible for the higher growth in production of agriculture. Agriculture is the backbone of the development so that policies related with agriculture should be properly implemented.

India has Monsoon climate in which a year has been divided into two distinct seasons of summer and winter. Rainfall occurs mainly in summer. India has a strong weather forecasting system developed and maintained by Indian Meteorological Department (IMD). Apart from weather forecasting and severe weather warning, it also gives agro meteorological services to farmers in India. The agriculture resources like land and water are shrinking thus; there is gap between demand and supply side. It is big challenges for the society to meet the agriculture resources. So land should be fully utilised by increasing its productivity and control over wastage of water must be required. Water saving techniques are required to save water.

We know it very well that small holdings are not economical, the only solution for it is to increase the productivity of land by developing Research and Development activities. Some NGOs and private sector should come forward to invest in Research and Development activity of agriculture sector.

Drivers of agricultural growth in India are investment, farm mechanization, irrigation facilities, seeds, price policy, flagship programmes that should

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be handled carefully so that desired result in positive direction can be achieved.

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