

Impact of Fertilizer Consumption on Performance of Foodgrains in India

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ABSTRACT: The development in area, production and productivity of foodgrains are the subjected to the efforts are contribution of many factors. Amongst all inputs, fertilizer is one of the major share in the improvement and development of area, production and productivity of foodgrains in India. The foodgrains production increased from 33 million tonnes since independence to 285 million tonnes today i.e. over the period of 72 years. In paper, the attempt is made to find the impact of fertilizer consumption of the growth of foodgrains' area, production and productivity with the help of Cobb douglas function. The data is collected from website of Department of Agriculture Cooperation and Farmers, Government of India from 1950-1 to 2016-17. Cobb Douglas function is fitted find impact of fertilizer consumption on Foodgrains production. From the results of the analysis of the Impact of Fertilizers on Area, Production and Productivity of Foodgrains in India. It found that the growth in Nitrogenous, phosphoric and potassium fertilizers are positive and significant. The growth in Area, Production and Productivity of Foodgrains in India is also positive and significant. The impact of fertilizers shows that the fertilizers consumption significantly increased the foodgains' area, production and productivity.

KEYWORDS: Impact, Fertilizer, FoodgrainsArea, Productions

I. INTRODUCTION

Green revolution brought a great uplift in foodgrains' production. Many factors and package of practices contributed as the booster for green revolution like government policies, varietal development, scientists and farmers' efforts, inputs etc. The development in area, production and productivity of foodgrains are the subjected to the efforts are contribution of many factors and it will be like a major national study. Amongst all inputs, fertilizer is one of the major share in the improvement and development of area, production and productivity of foodgrains in India. The foodgrains production increased from 33 million tonnes since independence to 285 million tonnes today i.e. over the period of 72 years. Here, the small attempt is made to find the impact of fertilizer consumption of the growth of foodgrains' area, production and productivity with the help of Cobb douglas function.

II. OBJECTIVES

The objectives of the study are as follows

- a) To study the growth in Fertilizers and Foodgrians in India.
- b) To find the impact of major fertilizers on foodgrains' area, production and productivity.

III. METHODOLOGY

This methodology will throw light on the source of data, period of the data, crop included, methods considered to achieve the objectives.

a. Source of the data

The data is collected from the website of Department of Agriculture Cooperation and Farmers, Government of India.

b. Period of the data

The annual data is collected from the year 1950-51 to 2017-18 on the variables viz; the Nitrogenous, Phosphorus and Potassium fertilizers as well as on area, production and productivity of Foodgrains.



c. Analytical Tools:

The analytical tools are used to find the growth and effect of fertilizer on area, production and productivity of Foodgrains of India are as follows;

i. Estimation of Growth in Fertilizers and Foodgrains in India

In the present research paper, the Compound Growth Rates in Fertilizers and Area, Production and Productivity of Foodgrains are estimated as per the following formula

The exponential function of the following type was used.

$$Y=ab^t$$

Where,

Y = Fertilizers and APY of Foodgrains

t = time period in the years

b = trend value (coefficient)

a = intercept.

Compound Growth Rate= (Antilog b-1) x 100. (Chand and et al. 2012)

The significance of the growth in the selected variables is tested with the help of ‘t’ test.

For getting normal base year, the triennial averages are taken as base year.

ii. Estimation of Impact of Fertilizers on Area, Production and Productivity of Foodgrains

To find the impact of fertilizers on Area, Production and Productivity of Foodgrains of India Cobb Douglas model is fitted.

$$F = a * N^{b1} * P^{b2} * K^{b3}$$

F = Area(M.hect)/ Production(m.tons)/ Productivity(kg) of Foodgrains

a = Intercept

NPK = Fertilizers (Thousand tonnes)

b_i (1 to 3)= Coefficients of respective variables

Other factors are assumed constant.

IV. RESULTS AND DISCUSSIONS

This section will focus of the extracts of the data analysis regarding the growth and impact of fertilizers and area, production and productivity of foodgrains in India are presented and discussed in this section on the line of objectives mentioned.

4.1 Growth in Fertilizers consumption and Foodgrains in India

The table 1 shows the Decadal Changes in Fertilizers consumption and Foodgrains in India. It can seen from the table that the fertilizer consumption was less in first decade of Independent India i.e. 65.60 Thousand tones in 1950-51 which in increase to 25949 thousand tones in 2016-2017. Amongst the major fertilizers, potassium consumption was very less initially and slowly increased to 2508 thousand tones. The nitrogenous consumption increased from 58.70 thousand tones to 16735 thousand tons in 72 years. While phosphorus consumption also increased to 6705 thousand tons over 72 years.

Year	Nitrogenous Fertilizers in thousand tones	Phosphorus fertilizer in thousand tones	Potassium fertilizers in thousand tonnes	Total Fertilizers in thousand tones	Area of Foodgrains in million ha	Production of foodgrains in million tonnes	Productivity offoodgrains in Kg per ha
1951-52	58.70	6.90		65.60	96.96	51.99	536
1961-62	249.80	60.50	28.00	338.30	117.23	82.71	705
1971-72	1798.00	558.20	300.60	2656.80	122.62	105.17	858
1980-81	3678.10	1213.60	623.90	5515.60	126.67	129.59	1023
1991-92	8046.30	3321.20	1360.50	12728.00	121.87	168.38	1382
2001-02	11310.20	4382.40	1667.10	17359.70	121.91	212.03	1739
2011-12	17300.00	7914.00	2575.00	27790.00	124.75	259.29	2078
2016-17	16735.00	6705.00	2508.00	25949.00	129.23	275.11	2129



The area under foodgrains cultivation increased from 96.96 million hectares in 1950-51 to 129.23 million hectares, while the production shown increase from 51.99 million tones to 275.11 million tones. The foodgrains’ productivity changed from 536 kg to 2129 kg per hectare.

The table 2 depicts the Growth rates of Fertilizers consumption and Foograins’ production in India. The growth in nitrogenous fertilizer in 8.56 percent per annum in 72 years . while the growth in phosphorus fertilizer in highest amongst fertilizer i.e. 10.04 percent per annum. Overall, the total major fertilizers is grown by 8.89 percent tones per annum during period of 72 years.

The growth in area, production and productivity was 0.14 percent, 2.35 percent and 2.24 percent per annum over the period of 72 years and the growth in significant at 1 percent. It can be said the contribution in growth of production is due to productivity rather area.

S.N.	Variables	CGR
1	Nitrogenous fertilizer (thousand tonnes)	8.56***
2	Phosphorous fertilizer (thousand tonnes)	10.04***
3	Potassium fertilizer (thousand tonnes)	9.05***
4	Total NPK fertilizer (thousand tonnes)	8.89***
5	Area of Food grains (in million hectares)	0.14***
6	Production of Foodgrains(in million tones)	2.35***
7	Productivity of Foodgrains(in kg)	2.24***

Note: * = Significant at 10 percent (table T value is 1.67)

** = Significant at 5 percent (table T value is 2.00)

*** = Significant at 1 percent (table T value is 2.66)

4.2 Impact of Fertilizers consumption on Foodgrains in India

The table 3 shows the impact of Fertilizers on Foodgrains in India. The results shows that the production doest vary upto 1.06 million tones but beyond the 1.06 million tones the foodgrains production vary with fertilizers. Nitrogenous fertilizer has good and significant impact on area i.e. 0.87 percent, on production 3.94 percent, and on productivity it is 4.93 percent. The phosphorus fertilizer has positive and non significant impact on area, production and productivity. The potassium is showing positive and significant contribution in foodgrains production(0.63 percent) and productivity (0.58 percent).

Variables	Area	Production	Productivity
Intercept	112562485.40***	1062070.98***	8.11***
Nitrogenous fertilizers	0.87*	3.94***	4.93***
Phosphorus fertilizers	1.10NS	0.79NS	0.68NS
Potassium Fertilizers	1.07NS	0.63**	0.58**

Note: * = Significant at 10 percent (table T value is 1.67)

** = Significant at 5 percent (table T value is 2.00)

*** = Significant at 1 percent (table T value is 2.66)



V. CONCLUSIONS

From the results of the analysis of the Impact of Fertilizers on Area, Production and Productivity of Foodgrains in India. It found that the growth in Nitrogenous, phosphoric and potassium fertilizers are positive and significant . The growth in Area, Production and Productivity of Foodgrains in India is also positive and significant. The impact of fertilizers shows that the fertilizers consumption significantly increased the foodgains' area, production and productivity.

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