Available online @ www.iaraindia.com
RESEARCH EXPLORER-A Blind Review & Refereed Quarterly International Journal
ISSN: 2250-1940 (P) 2349-1647 (O)
Impact Factor: 3.655 (CIF), 2.78 (IRJIF), 2.62 (NAAS)
Volume V, Issue 22
January - March 2019
Formally UGC Approved Journal (63185), © Author

THE IMPACT OF INFRASTRUCTURE ON AGRICULTURAL PRODUCTIVITY IN INDIA

Dr.G. RAMESH PANDI
Assistant Professor, Department of Commerce
Kalasalingam University, Krishnankoil, Virudhunagar District

Dr.G.RENGARAJAN
Associate Professor, Department of Commerce
CMS College of Commerce and Science, Coimbatore

Dr.A.SARAVANAN
Assistant Professor, Department of Economics,
J.K.K.Nataraja College of Arts & Science, Komarapalayam

Abstract

The main aim of the paper is to analysis the impact of infrastructure on agricultural productivity in India. The data collected for the study is secondary one. The required data for the study were collected and compiled from the RBI Website, Census of India Website and India Meteorological Department Website and the study covers a period of 17 years from 2001-02 to 2017-2018. The collected data have been used for analysis with the help of statistical tools, namely Mean, Standard Deviation (SD), Coefficient of Variance (CV), Compound Annual Growth Rate (CAGR) and Cobb-Douglas Production Function Model. The study concluded that overall empirical results point to a significant relationship between infrastructure and agricultural productivity. Electricity is an important factor determining the productivity of agriculture.

Keywords: Infrastructure, Food grains, Productivity, Cobb-Douglas Production Function.

Introduction

Recent literature points to the significant role of rural infrastructure in improving agricultural productivity in developing countries. While the availability and quality of rural infrastructure never replace effective macroeconomic and agricultural policies and the effective implementation of such policies, inadequate infrastructure can become a significant constraint on growth and productivity. Studies show that increasing agricultural productivity, which is an effective stimulus to economic growth and poverty reduction, depends on good rural infrastructure, well-functioning domestic markets, relevant institutions and access to appropriate technologies (Andersen and Shimokawa 2007).The relatively low productivity of Philippine agriculture tests the leadership qualities of the country's politicians and the potential of bureaucrats who must effectively use the billions of pesos that are allocated and appropriated annually to the agricultural sector. The inadequacy of rural infrastructure was identified as the main reason for low agricultural productivity. But how important is the rural infrastructure for increasing the productivity of agriculture?

This paper provides an empirical basis for the perceived link between rural infrastructure and agricultural productivity. It confirms the hypothesis that the shortcomings in rural infrastructure, for example transport, energy and related infrastructure, have a negative impact on agricultural productivity. Rural infrastructure, like other public investments, increases the productivity of agriculture, which in turn contributes to growth in rural areas, which leads to higher wages in agriculture and improved opportunities for non-farm labor. Growth in agricultural productivity, which reduces food prices, benefits both urban and rural residents who are net buyers of food. Thus, in addition to the benefits of growth, agricultural productivity has significant implications for poverty reduction.

Review of Literature

Andersen and Shimokawa (2007) the lack of transport, energy and telecommunications infrastructure related shifting and domestic markets and a minimum of space and time, poorly functioning integration and low low price of international competitiveness. The failure to invest in rural infrastructure will be critical bottleneck for future agricultural production and economic growth and the fight against poverty in developing countries. Indeed, rural infrastructure undermines the serious flaw in the immense agricultural potential of the region in the developing countries to reduce poverty and not a moment grow. To enhance the powers of the infrastructure to enhance the rustic poverty, sorrowful and improving agricultural productivity, not your lead-in agriculture; by means of reward for my labors. Significant benefits for the poor (Fan, Hazell and Thorat2000). Agricultural productivity is a significant amount of elasticity and poverty reduction, higher than elasticity is positive, and in some other products, especially in the early stages of development (Ravallion and Datt 1996; Thirstle, C., L. Lin, and J. Piesse2003). Mamatzakis (2003) points out that the state infrastructure reduces the total cost of Greek agriculture; in particular, it was found that an increase in investment in public infrastructure by 1% reduces the total cost of livestock and plant growing by 0.38%. Thus, the decline in investment in public infrastructure in the 1970s and 1980s adversely affected agricultural productivity in Greece.

Objectives

The main objectives of the paper is to analysis the impact of infrastructure on agricultural productivity in India

Research Design

Sources of Data: The data collected for the study is secondary one. The required data for the study were collected and compiled from the RBI Website, Census of India Website and India Meteorological Department Website and the study covers a period of 17 years from 2001-02 to 2017-2018. In addition, the other required data were collected from various journals and magazines.

Framework of Analysis: The collected data have been used for analysis with the help of statistical tools, namely Mean, Standard Deviation (SD), Coefficient of Variance (CV), Compound Annual Growth Rate (CAGR) and Cobb-Douglas Production Function Model.

Findings

The study made an attempt to assess the efficiency of the productivity of food grain productivity for changing inputs in the existing state of the area, energy and rainfall.

Food Grains Area, Productivity and Energy And Rainfall

Year	Area Under Cultivation - Foodgrains (Million hectares)	Foodgrains Productivity (Kg / hectare)	Energy (GWh)	Actual Rainfall (millimetre)
2001-02	122.77	1734	507216	1168.10
2002-03	113.87	1535	522537	1435.20
2003-04	123.45	1727	545674	1323.50
2004-05	120.08	1652	559264	1431.70
2005-06	121.60	1715	591373	1364.90
2006-07	123.70	1756	631757	1465.30
2007-08	124.06	1860	690587	1347.40
2008-09	122.83	1909	739343	1191.00
2009-10	121.33	1798	777039	1485.60
2010-11	126.67	1930	830594	1387.10
2011-12	124.75	2078	861591	1272.60
2012-13	120.70	2129	937199	1486.70
2013-14	126.04	2101	998114	1248.70
2014-15	122.00	2070	998456	1368.71
2015-16	123.21	2056	1040078	1370.75
2016-17	129.23	2129	1081701	1372.78
2017-18	127.57	2233	1123323	1374.82
Sum	**2093.86**	**32412.00**	**13435845.38**	**23094.85**
Mean	**209.39**	**3241.20**	**1343584.54**	**2309.49**
SD	**3.44**	**203.18**	**211465.80**	**94.18**
CV	**1.65**	**6.27**	**15.74**	**4.08**
LGR t-value	**0.412* (2.934)**	**37.583* (10.132)**	**41622.395* (34.998)**	**2.037 (0.426)**
CAGR t-value	**0.30** (2.905)**	**2.020* (9.750)**	**5.55* (35.295)**	**0.20 (0.479)**

Source: 1. RBI, 2. Central Electricity Authority, Ministry of Power, 3. Directorate of Economics and Statistics, Department of Agriculture and Cooperation.

Figures in brackets are t-value;*Significant at 1% level, **Significant at 5% level.

The data relating food grains productivity show an increase trend during the study period from 1734kg/hectare in 2001-02 to 2233 kg/hectare in 2017-18. The area under cultivation of foodgrains was increased during the study period from 122.77 million hectare in 2001-02 to 127.57 million hectare in 2017-18. The energy and actual rainfall in India were increased trend during the study period from 507216 GWh and 1168.10 millimetre respectively in 2001-02 to 1123323 GWh and 1374.82 millimetre respectively in 2017-18.The mean area, productivity, energy and rainfall of the country were 209.39 million hectares, 3241.20 kg/hectares, 1343584.54 GWh and 2309.49 millimetres respectively.LGR and CAGR were calculated to assess the growth of area, productivity, energy and rainfall, LGR indicates 0.412, 37.583, 41622.395 and 2.037 respectively growth on average year by year during the study period.CAGR which measures the overall growth achieved during the study period show that there have been 0.30, 2.020, 5.550 and 0.200 growth in area, productivity, energy and rainfall.

The Cobb-Douglas production function, using the Ordinary Least Square (OLS) method, tried to evaluate the elasticity of food grains relative to key inputs, namely, area, energy, and precipitation. The output elasticities, based on the OLS estimates of the Cobb-Douglas production function for the productivity of food grains, are presented in Table 2.

Estimated Parameters of the Cobb-Douglas Production Function

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.160	1.952		1.107	.288
In_Area (Million hectares)	.495	.360	.130	1.374	.193
In_Energy (GWh)	.346*	.036	.880	9.696	.000
In_Rainfall (millimetre)	.234**	.116	.153	2.910	.046
R	.969				
R Square	.938				
Adjusted R Square	.924				
F	65.557*				.000

*Significant at 1% level, **Significant at 5% level.

The estimated food grains productivity elasticities with respect to area, energy and rainfallwere estimated to 0.495, 0.346 and 0.234 respectively. The productivity elasticity with respect to energy and rainfall have registered with a positive sign and statistically significant at 1 percent and 5 percent level. From the point of view as R^2 a significant proportion of variability in the yield of food grains was explained by these variables as measured by the R^2 of 0.938. Thus, it is observed from the estimates that the production function fitted based on the food grains productivity use of energy and rainfall showed the operation of increasing returns to scale.

Conclusion

The general empirical results point to a significant relationship between infrastructure and agricultural productivity. Electricity is anvital factor determining the productivity of agriculture. This is stable with the relevant conclusion about the limitations associated with the growth of inadequate infrastructure. Rural set-up provides an important link to growing markets adjacent to rural areas; they also reduce the costs of production and the transaction costs of rural producers and consumers. Access to electricity creates various income-generating opportunities for rural households. There is an imbalance in the availability and quality of infrastructure at the regional, provincial, municipal and city levels. Richer and more settled regions have better infrastructure, and cover regions face scarcestructure.

References

1. Andersen, P. and S. Shimokowa. 2007. Rural infrastructure and agricultural development. Paper presented at the Annual Bank Conference on Development Economics, Tokyo, Japan, May 29-30.
2. Fan, S., P. Hazell and S. Thorat. 2000. Government spending, growth and poverty in rural India. American Journal of Agricultural Economics 82 (4): 1038-1051.
3. Ravallion, M. and G. Datt. 1996. How important to India's poor is the sectoral composition of economic growth? World Bank Economic Review 10(1).
4. Thirstle, C., L. Lin, and J. Piesse. 2003. The impact of research-led agricultural productivity growth on poverty reduction in Africa, Asia and Latin America. 31 (12): 1959-1975.