Asian Journal of Economics and Finance. **2022**, 4, 4 : 411-424
ISSN: 2582-340X
https://DOI: 10.47509 /AJEF.2022.v04i04.04

ARF INDIA
Academic Open Access Publishing
www.arfjournals.com

Public Expenditure for Agricultural Development & the Economic Growth of Bihar (1981- 2019)

Jitendra Kumar Sinha

Ex. Sr. Joint Director & Head, Des Bihar. E-mail: jksinha2007@rediffmail.com

ARTICLEINFO

Received: 14 September 2022
Revised: 11 October 2022
Accepted: 13 October 2022
Online: 10 November 2022

To cite this paper:

Jitendra Kumar Sinha (2022). Public Expenditure for Agricultural Development & the Economic Growth of Bihar (1981-2019). *Asian Journal of Economics and Finance*. 4(4), 411-424. https://DOI: 10.47509/AJEF.2022.v04i04.04

Abstract: This study explores the relationship between public expenditure on the agricultural sector and economic growth in the agriculturally underdeveloped states of Bihar over the period 1981-2019. In estimating the long-run model, first, the time series characteristic of the data is tested using ADF and the Phillips-Perron tests. Then, the Johansen cointegration test was conducted. Both The long-run and short-run estimate result shows that public spending on the agricultural sector has a significant effect on the per capita real GDP. This study revealed that government spending on the agricultural sector has an insignificant effect both in the long run and short-run periods. While agriculture is the dominant sector and the majority of rural society is engaged in this sector, hence it needs to reduce unproductive government consumption expenditure and give attention to redirecting to productive activities. This will stimulate activities in the economic sectors and, perhaps, converse the insignificant effect on economic growth. The gross fixed capital formation has a positive and significant impact on per capita real GDP in Bihar during the period under review. This result seems to imply that the government should have to build up capital stock by the accumulation of capital formation regularly to improve the per capita real GDP. The labor force has an insignificant effect on the growth of per capita real GDP. Hence, improving the productivity of the labor force through technical and vocational training should have to be a prominent task.

Keywords: Cointegration, Augmented Dickey-Fuller, Phillips Perron, Error Correction Model

1. Introduction

The agriculture & allied sector is one of the most vibrant sectors of the Indian economy that accounting for nearly one-sixth of the national income and employs half of the country's workforce. It remained a rare bright spot even in the ailing economy due to the Covid-19 pandemic. Significant growth in agriculture production in India led to national food security and helped in reducing poverty. But the rapid population growth coupled with the shift in consumer preference towards high-value products after rising urban income enforces the burden on shrinking natural resources and induces an increase in the cost of cultivation, which has wedged the profitability, and farming is not considered a fair option of livelihood.

Depletion of natural resources, tepid growth in income, and imperfection in input and output have enhanced the vulnerability of the Indian farm sector. Thus Indian agriculture faces the twin challenges of improving productivity to ensure profitability in farming on one hand and maintaining resource sustainability on the other.

Agriculture, Forestry, and Land-use play a key role in meeting the environmental, economic, and social dimensions of Sustainable Development Goals, providing livelihood support to about seventy percent rural population in low-developed countries like India and providing a key contribution to poverty reduction with GDP growth originating in agriculture being two times more effective in reducing poverty than GDP growth outside agriculture (World Bank, 2008). So it can play a key role to ensure food security while contributing to tackling climate change. Thus, agriculture is considered the key driver of mass poverty reduction and rural development in most of the developing world (Akroyd and Smith, 2007; Jhingan, 2008; Alain and Elisabeth, 2010; World Bank, 2008). Furthermore, past studies have shown sufficient evidence that the agricultural revolution is more pro-poor than the industrial sector and an important pre-condition for economic growth, particularly in developing countries (Diao *et al.*, 2010, DFID, 2004). Hence, improving the agricultural sector in developing countries must be a top priority and competent government policy instruments must be in place to drive cost-effective public spending in this sector (Apata *et al.*, 2016).

The government's economic development strategy calls for Agriculture Development and Industrialization in the coming years; promoting economic transformation in Bihar will depend largely on stimulating the agricultural sector. The intention of the Agriculture Development Led Industrialization (ADLI) strategy is to improve the productivity of peasant agriculture by initially improving existing crop husbandry practices and techniques, developing irrigation and provision of fertilizers and agro-chemicals and increasing farm sizes, and making it more suitable for mechanization and hence to attain fast and broad-based development (Diao *et al.*, 2010; Tewodaj *et al.*, 2008). Public expenditure policy is at the heart of the policy measures intended to translate ADLI into reality and gives subjective distinction to pro-poor and growth-enhancing sectors in resource allocation for the agriculturally underdeveloped states of Bihar, which are at the receiving end of the natural and social system made deprivation & apathy. This high concern of the government has been reflected in the past consecutive year's economic performance of the state. The per capita GDP in Bihar has been growing at about six percent on average per annum in real terms for the last 19 years despite being challenged by the worst

drought and flood. Similarly, the level of government spending as measured by absolute value and as a percentage of gross domestic product (GDP) has experienced an upward trend since 1981. In addition, it reached the maximum in the year2017.

However, in this regard, few empirical studies on public expenditure have focused on the impact of government spending on economic growth. In general, these studies are regarded in two broad categories. The first set explores how the size of overall public expenditure or public investment affects growth or rural welfare. The second set seeks to trace spending in one economic sector to the outcome in that sector, or broader welfare measure. Much of the literature that tries to explore the decline in national poverty has focused on agricultural growth and food price policies and has not given special consideration to spending on the agricultural sector (Dorosh and James, 2009; Diao *et al.* 2010; Valdés Foster 2007; Gebre-Selassie, 2004). However, little attention has been given to the role of government spending on the agricultural sector in improving the per capita GDP of the economy.

2. Literature Review

Peter and Lyndon (2015) investigated the effect of agriculture spending on economic growth in Nigeria over a period from 1977 to 2010 with a particular focus on sectional expenditure analysis. The study used an ex-post facto research design and employs some econometric techniques such as Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests, as well as Johansen Cointegration and followed by Error Correction Model (ECM) tests. The results revealed that real GDP was particularly influenced by changes in agriculture expenditure, inflation rate, interest rate, and exchange rate, these variables as they stand contribute to or promote economic growth in Nigeria.

Fan and Rao (2003) examined the impact of different types of government spending on overall GDP growth across 43 developing countries during the period from 1980 to 1998 using the OLS method and found mixed results. In Africa, public spending on agriculture and health was particularly strong in promoting economic growth. Among all types of government expenditures: agriculture, education, and defense contributed positively to economic growth in Asia. In Latin America, health expenditure had a positive growth-promoting effect. Structural adjustment programs had a positive growth-promoting effect in Asia and Latin America, but not in Africa. Structural adjustment programs hurt economic development in Africa.

Cletus and Sunday (2018) also carried out a study on government expenditure on agriculture and economic growth in Nigeria over the period

from 1985 to 2015 by employing multiple regression analysis and Johansen co-integration test. The multiple regression results of the study revealed that there exists a positive and significant relationship between government expenditure on agriculture and economic growth in Nigeria. The Johansen cointegration test result shows that the trace test statistics and the max-eigenvalue test indicates five co-integrating equations respectively at a 5% level, on the conclusion, there exists a long-run relationship among the variables.

Abdu and Melesse (2014) analyzed the relationship between real gross domestic product and various compositions of public expenditure like agriculture, education, health, transport and communication, urban development and housing, total capital expenditure, and total recurrent expenditure in Ethiopia. The aggregate, as well as disaggregate expenditure data for the period of 1975 to 2011, was used. They used a Co-integration error correction model. The results indicated that the various types of government spending had different impacts on economic growth. Expenditure on health and total capital expenditure are both positive and statistically significant in explaining growth. However, Expenditures on agriculture, education, health, transport and communication, urban development and housing, and total recurrent expenditure are statically insignificant. Yet, the main weakness of the study is the failure to address the problem of multicollinearity. Since each sector expenditure is the composition of recurrent and capital expenditure, two or more variables giving rise to the same piece of information may be included, that is, they may have redundant information or unnecessarily include related variables. The value of R^2 is good, meaning independent variables explain the variation in real GDP. Also, the F-statistic is significant at the 1% level of significance. Thus, the linear regression model is adequate. However, few of the estimated regression coefficients are insignificant at the conventional levels of significance.

Another study undertaken by Chandio *et al*., (2016) also investigated the impact of government expenditure on the agricultural sector and economic growth in Pakistan over the period 1983-2011 with time-series data by taking on unit root test, Johansen Co-integration test, and Ordinary Least Square (OLS) technique as analytical tools to analyze the data. They found that there exists a long-run relationship between government expenditure on agriculture, agricultural output, and economic growth in Pakistan. On the other hand, the empirical results of the regression analysis revealed that agricultural output and government expenditure have a significant influence on the economic growth of Pakistan. Moreover, the agriculture sector is still confronting some challenges like inadequate

funding, underdeveloped infrastructure, poor agriculture marketing, and a shortage of irrigation in the Pakistan context.

Apata *et al.*, (2016) made a comparative analysis of Nigerian and Malaysian to explore public spending and agricultural growth over the period 1970-2010. Does the study answer two precise questions: a policy setting under which public spending contributes to agricultural growth? Secondly, public spending mechanisms that have a clearer and longer-lasting influence on agricultural growth? By using the fixed-effects model they found that government expenditures as a percentage of GDP in Nigeria witnessed massive public funding in agriculture from 1960-1980 but declined from 1990-2010, while Malaysian experienced consistency, both in public funding in agriculture and growth. Malaysia has a better management system in terms of the components of growth than Nigeria. They also showed that Malaysia reflects a clear predominance of productive spending, which is sustained through the decades of analysis, while Nigeria's predominance of unproductive spending.

3. Research Design

This study employed annual time-series data for the period 1981 to 2019 to examine the relationship between government spending on the agricultural sector and per capita real GDP in the Indian context. The variables under consideration are per capita GDP, government expenditure on the agricultural sector, gross fixed capital formation, and labor force. The theoretical model for this study is as follows:-

The production function takes the form:

$$Y_t = F(K_t, A_tL_t) \tag{1}$$

The most commonly used form of the Solow growth model with a constant return to scale is the Cobb-Douglas production function (Charles, 1998) and it is the good first approximation to the actual production function (Romer, 2006). Therefore the production function is given by

$$Y = K^{\alpha}(AL)^{1-\alpha}, \quad 0 < \alpha < 1 \tag{2}$$

The standard aggregate production function can be modified to include the total government expenditure on the agricultural sector (GEA) as an independent input and economic growth proxies by per capita real GDP). Hence the production function is rewritten as:

$$PCRGDP_t = f(GEA_t, GFKF_t, LF_t) \tag{3}$$

Where: $PCRGDP_t$ is per capita real Gross Domestic Product.

$GFKF_t$ is Gross fixed capital formation at period t.

GEA_t is Government Expenditure in the Agricultural sector.

LF_t is the Labor force.

Since a typical neoclassical growth model assumes Cobb-Douglas production function with exponential form

$$PCRGDP_t = GEA_t^{\beta_1} GFKF_t^{\beta_2} LF_t^{\beta_3} \quad (4)$$

The equation above is transformed into to log model to make the equation linear and rewritten as;

$$\ln PCRGDP_t = \alpha + \beta_1 \ln GEA_t + \beta_2 \ln GFKF_t + \beta_3 \ln LF_t + \mu_t \quad (5)$$

Where *ln* refers to the natural logarithm of the variables, α implies intercept parameter, β_1, β_2...the elasticity's of the respective variables and μ_t entails error term which is independent of all other explanatory variables and indicates the influence of all other factors which are not included in the model.

3. Data

Data on Gross Domestic Product; Government Expenditure in Agriculture sector; and Labour Force were sourced from various concerned State government Departments. However, as the gross fixed capital formation series were not available for Bihar, the corresponding series for GFCF were worked out following the approach by Sinha & Sinha (2020) for the period1981-2019. Table 1 shows the variables that were used in the study.

Table 1: Description of variables

Acronym of variable	*Variable*	*Measurement of variable*
GEA		The annual government expenditure on agriculture is a percentage of the total expenditure of the government.
PCRGDP	Real GDP	The annual percentage growth rate of PCGDP at market prices is based on constant prices.
GFKF	Gross Fixed Capital Formation in agriculture	The annual gross fixed capital formation is a percentage of gross value added from agriculture.
LF	Labor force	Percentage of the labor force engaged in agriculture to the total labor force

Source: Researchers' compilation (Various Departments of the Government of Bihar).

4. Results

5.1. Descriptive Statistics

Mean, Median, Minimum, Maximum, and Standard Deviations were worked out for the variables used in the study. Descriptive statistics of

variables are reported in Table 2. The average per capita real GDP of Bihar from 1981 to 2019 was 7763.139 and the standard deviation was approximately 3110.905. This value oscillates between Rs 4817.616 million as a minimum and Rs16189.36 as a maximum value. The mean of government expenditure on agriculture was Rs76406.5 Crore and varies from 2352.921 to Rs 5946612 million with a standard deviation of 1523042 million. Concerning gross fixed capital formation, the government spent Rs 423122.3 million on average in the considered years and the standard deviation was 173407.8. This spending lies in the range of Rs 678801.5 to 160668.2 million. The mean value of the labor force is about 34.85191 million people with a standard deviation was 11.70323 people. This group of people ranged between about 18.9 as a minimum and approximately 53.6 million as the maximum number of people. Trade openness index which is defined as the ratio of total trade to GDP averages 32.6% in the span of 19982 to 2017. This index increased from 12.2 percent to 51.08 percent through the stated period.

Table 2: Descriptive statistics in real terms (1981-2019)

	PCRGDP (Rs)	*GEA (Rs Million)*	*GFKF (Rs Million)*	*EL (Million)*
Mean	7763.139	764065.1	423122.3	34.85191
Median	6340.753	40095.86	444708.9	33.03421
Maximum	16189.36	5946612.	678801.5	58.69233
Minimum	4817.616	2352.921	160668.2	18.98986
Std. Dev.	3110.905	1523042.	173407.8	11.70323

Source: Author computation.

Tables 3 and 4 show that ADF and the PP test statistics for the first difference for all variables are less than the critical values at 1%, 5%, and 10% significance levels (that is, we reject the null hypothesis of the presence of a unit root). This tells us that the first-differenced series are stationary, meaning that both series are integrated into order one.

The results of the cointegration analysis using the Johansen maximum likelihood procedure are summarized in Table 5. The existence of a cointegration vector is pointed out by a trace test and max- Eigenvalue since the t-test value exceeds the critical value at a 5% level of significance. The trace statistic value in the table below implies that we can reject the null hypothesis of no cointegration vector at the 5 percent significant level. The maximum Eigenvalue test makes the confirmation of this result. The trace statistics and maximum eigenvalue explain two different cointegrating vectors at the 5% critical value in the system. Infrequently, if the trace and the maximum eigenvalue test statistics yield an inconsistent result, the trace

Table 3: Augmented Dickey-Fuller Unit root test results at a Level and First difference

Variables	*At Levels*		*First Difference*	
	t-Statistics	*Critical values*	*t-Statistics*	*Critical values*
lnPCRGDP	-0.683672	1% -4.243644	-5.448571**	1% -4.252879
	(0.9666)	5% -3.544284	(0.0005)	5% -3.548490
		10% -3.204699		10% -3.207094
lnGEA	-1.425254	1% -4.243644	-6.098055*	1% -4.252879
	(0.8356)	5% -3.544284	(0.0001)	5% -3.548490
		10%-3.20469		10%-3.207094
lnLF	-1.821101	1% -4.252879	-3.810028**	1% -4.309824
	(0.6723)	5% -3.548490	(0.0305)	5% -3.574244
		10%-3.207094		10%-3.221728
lnGFKF	-1.286261	1% -4.243644	-7.253547*	1% -4.252879
	(0.8749)	5% -3.544284	(0.0000)	5% -3.548490
		10%-3.20469		10%-3.207094

Source: Author computation.
Note: * and ** indicates the level of significance at 1 and 5%, respectively.

Table 4: Phillips-Perron Unit root test results at a Level and First difference

Variables	*At Levels*		*First Difference*	
	t-Statistics	*Critical values*	*t-Statistics*	*Critical values*
lnPCRGDP	-0.523788	1% -4.243644	-6.109656*	1% -4.252879
	(0.9775)	5%-3.544284	(0.0001)	5% -3.548490
		10% -3.20469		10% -3.207094
lnGEA	-1.399517	1% -4.243644	-6.164276*	1% -4.252879
	(0.8436)	5% -3.544284	(0.0001)	5% -3.548490
		10%-3.204699		10%-3.207094
lnTOP	-1.321981	1% -4.243644	-5.048878**	1% -4.252879
	(0.8657)	5% -3.544284	(0.0013)	5% -3.548490
		10% -3.204699		10% -3.207094
lnLF	-1.821101	1%-4.252879	-3.810028**	1% -4.309824
	(0.6723)	5% -3.548490	(0.0305)	5%-3.574244
		10% -3.207094		10%-3.221728
lnGFKF	-1.116847	1% -4.243644	-9.116611*	1% -4.252879
	(0.9116)	5% -3.544284	(0.0000)	5% -3.548490
		10% -3.204699		10% -3.207094

Source: Author computation.
Note: * and ** indicates the level of significance at 1 and 5%, respectively.

statistics are more robust than the maximum eigenvalue statistics in testing for co-integration (Luintel and Khan, 1999). Therefore, there are two cointegrating equations exist in the model having a meaningful long-run

or equilibrium relationship between the variables under consideration; consequentially, this necessitates the use of restricted VAR i.e. Vector Error Correction Model.

Table 5: Results of Johansen Cointegration Test

Null Hypothesis	*Alternative Hypothesis*	*Tests*	
		Trace Statistics	*5% Critical value*
r=0	r=1	84.29434*	69.81889
r=1	r=2	49.41249*	47.85613
		Max- Eigen value (λMax) Statistics	5% Critical value
r=0	r=1	34.88185*	33.87687

Source: Author computation.
* Rejection of the null hypothesis at a 5 % critical value

Table 6 below shows that fixed capital formation has a positive and significant impact on per capita real GDP. It implies that i.e. a 1 gross percent increase in real gross fixed capital formation leads to around a 0.22 percent increase in real GDP, all other things remain constant. This is in line with the findings of Ewubare and Eyitope (2015) in Nigeria; Dritsakis (2006); Yasin (2000) in Sub-Saharan Africa; and Alexiou (2009) in South-Eastern Europe who concluded that the existence of a long-run positive relationship between gross fixed capital formation and per capita real GDP. This result is also supported by economic theories which say a higher level of capital accumulation will be associated with higher per capita output (Charles, 1998). On the other hand, the main explanatory variable; government expenditure on the agricultural sector has an insignificant effect on the per capita real GDP, which did not conform to the a priori expectation of a positive linkage between agricultural expenditure and economic growth. This hints that the real government consumption expenditure on the agricultural sector (mostly on wages and salaries for the development agents and recurrent expenditure in the sector) is very dominant. In such a circumstance, spending on the sector may not help the growth of the per capita GDP. This is consistent with the findings of Abdu and Melesse (2014) in Ethiopia, denoting that expenditure on agriculture is statically insignificant.

Another result of the estimation of the long-run model is the insignificant effect of the labor force, which is proxied by the population aged between 15 and 64, on the growth of per capita RGDP. This indicates that while the Ethiopian economy comprises pertinent labor for the production of goods and services under this specified period, most of them

are unskilled laborers which in turn depend on vagaries of nature (availability of rainfall). Thus, its productivity is not as much as expected. This result is in line with Lewis's (1954) two-sector development model, the marginal productivity of surplus labor in the agricultural sector has a minor effect on the long-run growth pattern.

Trade openness also has a trivial effect on the long-run per capita real GDP of the Ethiopian economy. This suggests that the displacement effect, which occurs as a result of external shocks, has not been a general cause of a change in per capita real GDP during the period under consideration. This is due to the country's export sector primarily depending on the same primary commodities as it did for many years while world price is on a declining trend. However, this does not necessarily mean that there is no long-run relationship between the insignificant variables and the dependent ones since as cited by Peters, Murthy (1993) states "the absence of cointegration and hence any cointegration vector might suggest the possibility that the test results are period-specific or sensitive to the implied lag structure and omitted variable bias."

Table 6: Long-run Estimate

Cointegration Equation(s):		*Log-likelihood*	*288.5532*	
Normalized cointegrating coefficients (standard error in parentheses)				
LNPCRGDP	*LNGEA*	*LNGFKF*	*LNEL*	*LNTOP*
1.000000	-0.248766	-0.223766	1.537385	-0.041337
	(0.03806)	(0.03844)	(0.20170)	(0.06290)

Source: Author computation.

Table 7 shows the short-run relationship between nonintegrated variables. Therefore, the table below shows that the model is a good fit for the data by the F taste (p-value = 0.000216 < 1%). This means that the explanatory variables as a group are significantly able to explain the variability in the dependent variable, which is indicated by the F-statistic. Likewise, the Error Correction Model (ECM) is not a spurious regression or model as the computed values of R^2 (0.546438) are lower than Durbin Watson Statistics (1.474698) which indicates that there is no evidence of first-order serial correlation. Similar to the long-run the short-run estimate indicates that government expenditure on the agricultural sector has an insignificant effect on the per capita real GDP. in gross fixed capital formation, per capita real GDP increases by 0.24 Birr in the short run Gross fixed capital formation has a substantial effect on the per capita real GDP. For a unit increase. The table also shows that the estimated error correction term is significant at a 1 percent level and carries a significant expected sign. The negative sign of the error correction term suggests that any shock

in the system will return to its long-run path. The speed of adjustment to restore long-run equilibrium is 33% percent per year. This means that 33 percent of the deviation of the per capita real GDP from its long-run equilibrium level is corrected each year. This speed of adjustment suggests that it will take almost three years (i.e., 1/0.33) to completely recover from a single shock and restore long-run equilibrium.

Table 7: Error Correction Model with ΔlnPCRGDP as a dependent variable

Variables	*Coefficients*	*Standard Errors*	*T-statistics*	*Probabilities*
C	0.007041	0.110514	0.063713	0.9496
D(LNEL)	-0.146930	3.446062	-0.042637	0.9663
D(LNGEA)	0.003682	0.039308	0.093658	0.9260
D(LNGFKF)	0.242708	0.046321	5.239654	0.0000*
D(LNTOP)	-0.127738	0.074519	-1.714174	0.0972***
ECT(-1)	-0.332325	0.132199	-2.513827	0.0177**

R-squared 0.546438, F-statistic 6.987676, Prob (F-statistic) 0.000216, Durbin-Watson stat 1.474698.
Source: Author computation.

Furthermore, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMQ) are applied to analyze the stability of the long-run coefficients together with the short-run dynamics. The results indicated the absence of any instability of the coefficients during the investigation period because the plots of the two statistics in figure (1) below are confined within the 5% critical bounds about the parameter stability.

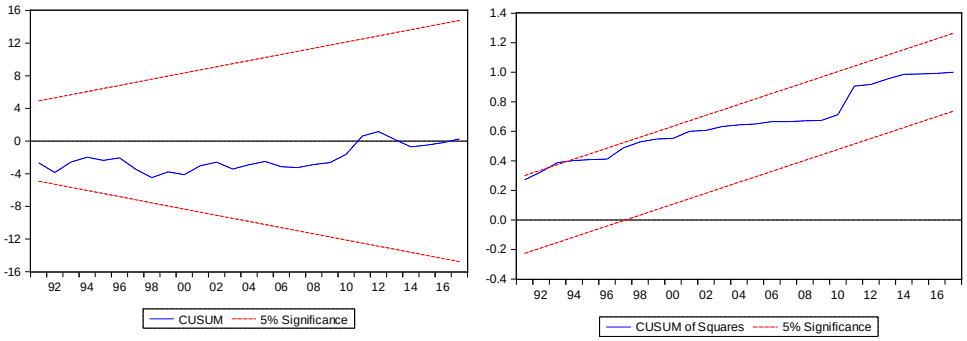

Figure 1: Plots of CUSUM and CUSUMQ statistics

Conclusion and Policy Implications

The main objective of this study is to investigate the relationship between government expenditure on the agricultural sector and economic growth in Bihar through recent econometrics techniques over the period 1982-2019. This study adopts the usual neoclassical production function used as the

basis for specifying the empirical model by incorporating additional exogenous variables, which affect per capita real GDP, such as gross government spending on the agricultural sector and trade openness.

ADF and PP unit root tests result show that the time series variables incorporated in this study display a consistent trend over the period, and they accept the null hypothesis of non-stationary levels. However, the null hypothesis at the first difference is rejected hence all the variables become stationary. The result indicates that all the variables are nonintegrated. It means that there is a valid long-run relationship between public expenditure on the agricultural sector and real per capita GDP in Bihar.

The long-run estimate result shows that government spending on the agricultural sector has an insignificant effect on the per capita real GDP. This unexpected result suggests that the real government consumption expenditure in the agricultural sector (mostly on wages and salaries for the development agents and recurrent expenditure in the sector) is very dominant. The long-run analysis also revealed that gross fixed capital formation has a positive and significant impact on real per capita GDP. This is related to the neoclassical growth theory which argues that capital formation is the prominent determinant for those countries far away from their steady-state.

The short-run estimates, on the other hand, the short-run dynamics of the error correction model (ECM) are a good fit to the data by the F taste. This means that the explanatory variables as a group are significantly able to explain the variability in the dependent variable. Likewise, in the long run, the main driving force behind short-run per capita real GDP is gross fixed capital formation. Here also government spending on the agricultural sector has statistically insignificant. In contrast to the long-run estimate, trade openness has a significant effect on the short-run change of per capita real GDP. The short-run dynamics of the error correction model (ECM) result show that the estimated error correction term is significant at a 1 percent level and carries a significant expected sign. It indicates that for any shock occurring in the economy, the per capita real GDP will converge to its long-run equilibrium.

This study revealed that government spending on the agricultural sector has an insignificant effect both in the long run and short-run periods. While agriculture is the dominant sector and the majority of rural society is engaged in this sector, hence it needs it is important to reduce unproductive government consumption spending habits. As such, the government should give attention to redirecting to productive activities. This will stimulate activities in the economic sectors and, perhaps, converse the insignificant effect on economic growth.

Economic theory, as well as empirical experience, confirm that the significant differences in the level of economic development and rates of economic growth to a great extent, interrelated with the differences that exist in the level and composition of the capital stock (Saleh, 1997). The gross fixed capital formation will impact positively and significantly on per capita real GDP in Bihar during the period under review as well. This result seems to imply that the government should have to build up capital stock by the accumulation of capital formation regularly to improve the per capita real GDP. The labor force which is proxied by a population aged between 15 and 59 has an insignificant effect on the growth of per capita real GDP. Hence, improving the productivity of the labor force through technical and vocational training or else via adult education should have to be a prominent task for the concerned bodies.

In the short run, the effect of the level of trade on economic growth turns out to be negative and significant. This implies that openness to international trade does not automatically lead to an increase in per capita real GDP. Hence, the government should take a policy measure that intensifies the diversification of exported items, and the productivity and quality of currently exported goods.

Reference

Abdu Muhammed and Melesse Asfaw. (2014). Government Spending for Economic Growth in Ethiopia. *Journal of Economics and Sustainable Development*. Vol. 5, No. 9.

Akroyd, S. and Smith, L. (2007). Review of public spending on agriculture. Main study and Country Case-Studies, A joint DFID/World Bank study.

Alain De, J. and Elisabeth S. (2010). Agricultural Growth and Poverty Reduction: Additional Evidence. *The World Bank Research Observer*, Vol. 25, No. 1 Oxford University Press.

Alexiou, C. (2009). Government spending and economic growth: Econometric evidence from South-Eastern Europe (SEE). *Journal of Economic and Social Research*, 11(1), p.1.

Apata, T.G., Sanusi, R.A., Obaisi, A. and Ajani, O. (2016). September. Exploration of public spending and agricultural growth.Comparative analysis of Nigerian and Malaysian agricultural growth (1970-2010).In 2016 AAAE Fifth International Conference, September 23-26, 2016, Addis Ababa, Ethiopia (No. 246922).African Association of Agricultural Economists (AAAE).

Chandio, A.A., Jiang, Y., Rehman, A. and Jingdong, L. (2016). Impact of government expenditure on the agricultural sector and economic growth in Pakistan. *International Journal of Advanced Biotechnology*. Vol. 7, pp. 1046-1053.

Charles Jones. (1998). *Introduction to economic growth* 2nd edn. Norton and Company, Inc.

Cletus UsmanIdoko and Sunday Mary Jatto. (2018). Government Expenditure on Agriculture and Economic Growth in Nigeria (1985-2015). *International Journal of Academic Research and Reflection*.Vol. 6, No. 4.

De Janvry, A. and Sadoulet, E. (2009). Agricultural growth and poverty reduction: Additional evidence. The World Bank Research Observer, 25(1), pp.1-20.

DFID. (2004). Agriculture, Growth and Poverty Reduction.

Diao, X., Taffesse, A.S., Yu, B. and Pratt, A.N. (2010), November. Economic importance of agriculture for sustainable development and poverty reduction: The case study of Ethiopia. In Global forum on agriculture (pp. 29-30).

Dorosh, Paul, and James Thurlow. (2009). Implications of Accelerated Agricultural Growth on Household Incomes and Poverty in Ethiopia: A General Equilibrium Analysis. International Food Policy Research Institute – Ethiopia Strategy Support Program, Addis Ababa. ESSP-2 Discussion Paper No. 2.

Dritsakis, N., Varelas, E. and Adamopoulos, A. (2006). The main determinants of economic growth: An empirical investigation with Granger causality analysis for Greece. *European Research Studies Journal*, *9*(3-4), pp.47-58.

Ewubare, D.B. and Eyitope, J.A. (2015). The effects of public expenditure on agricultural production output in Nigeria. *Journal of Research in Humanity and Social Science*, 11(3), pp. 07-23.

Fan, S., and Rao, N. (2003). Public Spending in Developing Countries: Trends, Determination, and Impact. EPTD Discussion Paper No. 99. IFPRI.

Jhingan, M.L. (2008). *The Economics of Development and Planning.39th ed*. VRINDA Publications P.LTD, Delhi.

Lewis, W. Arthur. (1954). Economic development with unlimited supplies of labor. *The Manchester School of Economics and Social Studies, 22(2), 139–191.*

Luintel, K.B. and Khan M. (1999). A quantitative reassessment of the finance growth nexus: evidence from a multivariate VAR. *Journal of Development Economics*. 60 (2): 381-405.

Murthy, N.R. (1993). Further evidence of Wagner's law for Mexico: An application of cointegration analysis. *Journal of Public finance*.48 (1), 92 -96.

Peter E. Ayunkul and Lyndon M. Etale. (2015). Effect of Agriculture Spending on Economic Growth in Nigeria: Empirical Evidence. *Research Journal of Finance and Accounting*. Vol. 6, No. 2.

Romer D. (2006). *Advanced Macro-Economics*. 3rded. McGraw-Hill Irwin: New York.

Saleh, K. (1997), March. The measurement of gross domestic fixed capital formation in Indonesia. In document présenté à l'occasion de la conférence de l'OCDEsur le stock de capital qui s' esttenue à Canberra du.Vol. 10.

Sinha, J.K., and Sinha, A.K. (2020). Trend and Growth of Capital Stock in Bihar during 1980-2017. *Journal of Humanities, Arts, and Social Science,* Vol. 4(1), pp. 57-66.

Sinha, J.K. and Sinha, A.K. (2020). Factors Influencing Sustainable Agricultural Development in Bihar, *Indian Development Policy Review,* Vol. 3(1), pp.47- 65.

Tewodaj, M., Gezahegn, A. and Zelekawork, P. (2008). Public Expenditures and Rural Welfare in Ethiopia.IFPRI.Research Report 160.

Valdés Alberto, and William Foster. (2007). Making the Labor Market a Way out of Rural Poverty. Rural and Agricultural Labor Markets in Latin America and the Caribbean. Background paper for the World Development Report 2008, The World Bank.

World Bank. (2008). The Growth Report: Strategies for Sustained Growth and Inclusive Development, Washington D.C., Commission on Growth and Development, World Bank.

Yasin, M. (2000). Public Spending and Economic Growth: Empirical Investigation of Sub-Saharan Africa. *Southwestern Economic Review*, 4(1), 59–68.