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Does Agriculture Production Matter For Economic Growth?Empirical Evidence From India

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ABSTRACT

The main purpose of this study is to answer the question "Does Agriculture Production Matter For Economic Growth?"To fulfil this purpose we had toinvestigate the relationship between Agriculture Production and Economic Growth in India during the period 1961 to 2016. Vector Error Correction Method and Co-integration techniques are used for analysing the relationship between Agriculture Production and Economic Growth in this study. The Johnson Cointegration test result indicates that there is long-run equilibrium relationship between Agriculture Production and Economic Growth in India.The Vector Error Correction test reveals that there is Uni directional causality running fromEconomic Growthto Agriculture Production in the long run. It means Economic Growthleads to Agriculture Production but Agriculture Production does not lead toEconomic Growth in the long run. But in the short run Bidirectional causality exist betweenEconomic Growthand Agriculture Production. It means in short run Economic Growth leads to Agriculture Production and Agriculture Production leads to Economic Growth.

Key Words: Agriculture Production, Economic Growth, Co-integration, VECM.

1. INTRODUCTION

Agriculture is the most important sector of Indian Economy. Indian agriculture sector accounts for 17 per cent of India's gross domestic product (GDP) and provides employment to 53% of the countries workforce. India is the world's largest producer of pulses, rice, wheat, spices and spice products. India has many areas to choose for business such as dairy, meat, poultry, fisheries and food grains etc. India has emerged as the second largest producer of fruits and vegetables in the world. Though, the share of Indian agriculture in the GDP has steadily declined but it plays a vital role in the overall socio-economic development of India. One of the biggest success stories of independent India is the rapid steps made in the field of agriculture. From a nation dependent on food imports to feed its population, India today not only is self-dependent in grain production but also has substantial reserves. Under the green revaluation involved bringing additional area under cultivation, extension of irrigation facilities, the use of high yielding variety of seeds, new agricultural technology evolved though agricultural research, water management and plant protection though sensible use of fertiliser, pesticides and cropping practices. All these measures had a salutary effect of

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Vol-68-Issue-1-January-2020

agricultural production. Government has also taken initiative to encourage private investment in the field of agriculture food processing industry. Still the agriculture sector has had low production. There are a number of factors behind low production such as, low literacyrate, insufficient finance and inadequate marketing of agricultural product, further the reasons for the decline in Agriculture Growth Rate in India GDP are that in the sector the average size of the farm is very small which in turn has resulted in low productivity. Also, the Growth Rate of the Agriculture Sector in India GDP has declined due to the fact that the sector has not adoptedmodern technology and agricultural practices. Agriculture Growth Rate in India GDP has also decreased due to the fact that the sector has insufficient irrigationfacilities. As a result of this, the farmers are dependent on rainfall, which is however very unpredictable.

2. REVIEW OF LITERATURE

Salih TuranKatircioglu (2006) suggests that agricultural output growth and economic growth as measured by real gross domestic product growth are stationaryat their levels.Thus, they are naturally co-integrated. They are in long run equilibrium relationship. And secondly, there is feedback relationship between thesevariables that indicates bidirectional causation among them in the long run period.

Salih katircioglu (2006)examines possible co-integration and causal relationship between economic growth and sectoral growth in North Cyprus mainly including agriculture, industry and services sector. Results of this study reveal that agriculture is still the backbone of the North Cyprus economy. It is in a long run equilibrium relationship with growth and gives direction to industry as it provides raw materials to that sector. However, it does not give any direction to the economic growth as measured by real Gross Domestic Product (GDP) growth rate.

Titus O. Awokuse (2009) by taking advantage of recent developments in time series econometric methods re-examines the question of whetheragriculture could serve as an engine of growth. Results from the empirical analysis provide strong evidence indicating that agriculture is an engine of economicgrowth. Furthermore, the authors find that trade openness has a positive effect on GDP growth.

3. OBJECTIVES OF THE STUDY:

1. To examine long run co integration relationship between Agriculture Production and Economic Growth in India.

2. To examine long run causality between Agriculture Production andEconomic Growth in India.

3. To examine short run causality between Agriculture Production andEconomic Growth inIndia.

4. HYPOTHESES OF THE STUDY-:

Hypothesis -1

Null hypothesis- H0: Agriculture Production does not Granger Cause Economic Growth.

ISSN: 0474-9030

Vol-68-Issue-1-January-2020

Alternative hypothesis- H1: Agriculture Production does Granger Cause Economic Growth.

Hypothesis-2

Null hypothesis-H0: Economic Growth does not Granger Cause Agriculture Production

Alternative hypothesis-H1: Economic Growth does Granger Cause Agriculture Production

5. EMPIRICAL STUDY-:

5.1 Data and Variables-:

The current study is analyzing relationship between Agriculture Production and Economic Growth in India. In this study two variables are used Agriculture Production and Economic Growth of India. All series of data are based on the annual data and the sample period of annul observation so from 1961 to 2016. All the data were collected from HAND BOOK OF INDIA (RBI) 2018.

5.2 Methodology-:

In this study, annual data is used from 1961 to 2016. All the data were collected from Hand Book of India (RBI) 2018. In this study two variables are used Agriculture Production and Economic Growth of Indiathe data is analyzed to determine the causality between Agriculture Production and Economic Growth of India. Before analyzing the causal relationship between Agriculture Production and Economic Growthdata has been transformed in to natural logarithms, and then possible existence of unit roots in the data is examined. The stationarity of each series is investigated by employing Augmented Dickey-Fuller unit root test. The number of lagged differences included is determined by the Schwarz Information Criterion and Akaike Information criteria. Further proceed with the VAR lag order selection criteria to choose the best lag length for the VAR time series model to examine the Granger Causality test for all the series is performed. Johansen co-integration test is also applied to test for co-integration. The basic empirical investigation has two purposes. The first one is to examine the long-run relationship between Agriculture Production andEconomic Growthwhile the second is to examine the short-run dynamic causal relationship between Agriculture Production andEconomic Growth. The basic testing procedure requires three steps. The first step is to test whether the variables contain a unit root to confirm the stationarity of each variable. This is done by using the Augmented Dickey–Fuller tests (ADF). In the second step we test for the existence of a long-run cointegrating relationship between the variables. This is done by the use of the Johansen co-integration test. Finally, the last step, if all variables are integrated of same order and co-integrated then short run and long run causality test can be computed using the Vector Error Correction Model (VECM) method suggested by Engle and Granger (1987).

6. EMPIRICAL RESULTS-:

6.1 Result of Stationarity Test:

One of the most important attributes of a time series variable is its order of integration. Hence, first perform unit root tests in levels and first differences in order to

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Vol-68-Issue-1-January-2020

determine the order of integration of the series. To test the order of integration, there is need of applying the conventional Augmented Dickey-Fuller (ADF) test.

Table: 1 Result of Unit Root Test Using Augmented Dickey Fuller Test

Variable	At Level		At First Difference		Conclusion
	ADF	Prob.	ADF	Prob.	
Agriculture Production	1.780912	0.9808	-7.1785	0.0000	I (1)
Economic Growth	4.605190	1.0000	-5.3721	0.0000	I (1)

It is evident from the above table that the calculated ADF statistics for level variables are less than the critical values in both cases, suggesting that the variables are not level stationary. Table 1 also shows that the ADF statistics for both the variables imply first-difference stationary.

6.2 Result of Lag Order Selection Criteria for AP and GDP

For getting optimal lag Length for co integration analysis, we have used five criteria namely, LR test statistic, Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. All the criteria have suggested a leg length of 4 as an optimal leg length.

Table 2 VAR Lag Order Selection Criteria for AP and GDP

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-122.7490	NA	0.415735	4.798038	4.873086	4.826810
1	127.8697	472.3198	3.16e-05	-4.687294	-4.462151	-4.600980
2	132.4916	8.355024	3.09e-05	-4.711215	-4.335975	-4.567357
3	137.1020	7.979488	3.02e-05	-4.734690	-4.209356	-4.533289
4	146.2552	**15.13801***	**2.49e-05***	**-4.932891***	**-4.257461***	**-4.673947***
5	149.2965	4.795939	2.60e-05	-4.896019	-4.070493	-4.579532

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic HQ: Hannan-Quinn information criterion

FPE: Final prediction error AIC: Akaike information criterion

SC: Schwarz information criterion

6.3 Result of Co-Integration Test Based on Johnson Juselius Method:

Once we have the results of unit roots, the next step is to determine whether there exists co-integration, using the same order of integrated variables. To test for co-integration, the Johansen and Juselius (1990) procedure were used, which lead to two test statistics, trace test and maximum eigenvalue test, for cointegration.

Table: 3 Result of the Co-integration Test for AP and GDP

Johansen Test for Co-integration (Trace Test)

ISSN: 0474-9030

Vol-68-Issue-1-January-2020

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.	Conclusion
None r = 0	8.952112	5.49471	0.0098	Co-integrated
At most 1 r > 0	0.007827	3.841466	0.9290	
Johansen Test for Co-integration (Maximum Eigen value Test)				
Hypothesized No. of CE(s)	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.**	**Conclusion**
None r = 0	8.944285	4.26460	0.0008	Co-integrated
At most 1 r + 1	0.007827	3.841466	0.9290	

Tables 3 express the results of the co-integration test. The Trace-Statistic value is shown to be greater than the critical values 5% levels. Therefore, we reject the null hypothesis of no co-integrated equation between the variables. Thus, we conclude that there is co-integration between Agriculture Production and Economic Growth. The results of Maximum Eigen value test statistics also express same here. Finally, we can say that there is long run relationship between Agriculture Production and Economic Growth.

6.4 Long run Causality Test Based on VECM

The VECM long run causality result presented in Table 4 reveals the causal relationship between Agriculture Productionand Economic Growth. The result showed that the error correction term for co-integrating equation with Economic Growth as a dependent variable is negative but not significant at one percent, implying that there is no long run relationship existing from Agriculture Production to Economic Growth. The error correction term for co-integrating equation with Agriculture Production as a dependent variable is negative and significantimplying that there is long run relationship existing from Economic Growth to Agriculture Production in long run.

Table: 4Long run Causality Test Based on VECM:

Causality	ECM_{t-1}	T-Statistic	Prob.	Result
Long run causality from AP to GDP	-0.002973	-1.843803	0.0723	Uni directional Causality
Long run causality from GDP to AP	-0.123787	-2.457930	0.0182	

6.5Short run Causality Test Based on VECM/ Block Exogeneity Wald Tests

The Short run Causality Test between Agriculture Production and Economic Growth Based on VECM/Block Exogeneity Wald Tests present in Table 5. The result showed that the short run bidirectional causality betweenEconomic Growthand Agriculture Production. It means in short run Economic Growth leads to Agriculture Production andAgriculture Production leads to Economic Growth

ISSN: 0474-9030

Vol-68-Issue-1-January-2020

Table: 5 Short run Causality Test Based on VECM/ Block Exogeneity Wald Tests

Causality	Chi-Statistics	P-Value	Result
Short run causality from AP to GDP	919.0212	0.0000	Bi directional Causality
Short run causality from GDP to AP	20.98899	0.0127	

7. CONCLUSION:

In this paper, we have examined the relationship betweenAgriculture Production and Economic Growth in India during the period of 1961 to 2016. Vector Error Correction Method and Co-integration techniques are used for analysing the relationship between Agriculture Production and Economic Growth in this study. The Johnson Cointegration test result indicates that there is long-run equilibrium relationship between Agriculture Production and Economic Growth in India.The Vector Error Correction test reveals that there is Uni directional causality running from Economic Growth to Agriculture Production in the long run. It means Economic Growth leads to Agriculture Production but Agriculture Production does not leads to Economic Growth in long run. But in short run Bidirectional causality exist between Economic Growth and Agriculture Production. It means in short run Economic Growth leads to Agriculture Production and Agriculture Production leads to Economic Growth. Finally, we conclude that Agriculture production does not matter for Economic Growth.

8. RECOMMENDATION:

1. Under the green revaluation involved bringing additional area under cultivation, extension of irrigation facilities.
2. The use of high yielding variety of seeds.
3. New agricultural technology use of fertilizer, pesticides and cropping practices had a salutary effect of agricultural production.
4. Government has also taken initiative to encourage private investment in the field of agriculture food processing industry.

BIBILIOGRAPHY: -

D.N., G. 2007. Basic Econometrics, 4rd Edition. New York: McGraw Hill International Editions.

Datta, K. and Kumar, C. 2011. Relationship between Inflation and Economic Growth in Malaysia. International Conference on Economics and Finance Research IPEDR, Vol. 4, No. 2, pp. 415-16.

Dev, S.Mahendra and C.Ravi 2003, “Macroeconomic Performance: Performance and Policies”

ISSN: 0474-9030

Vol-68-Issue-1-January-2020

DevandS.Mahendra. 2003, "AndhraPradesh Development: Economic Reforms and Challenges Ahead", Centre for Economic and Social Studies, Hyderabad.

Dickey, D. A. 179. "Distributions of the Estimators for Autoregressive Time Series with a Unit Root", Journal of the American Statistical Association, Vol. 74, Part I, 427-31.

Dickey, D. W. 1986. Unit Roots in Time Series Models: Tests and Implications. American Statistician, , vol. 40, pages 12-26.

Dougherty, C. 2007. Introduction to Econometrics 3rd Edition. New York: Oxford University Press.

Engle, R. A. 1987. Cointegration and Error Correction: Representation, Estimation and Testing", .Econometrica , 55.

Granger, C. 1969. Investigating Causal Relations by Economic Models andCross-Spectral Methods. Econometrica , Vol. 37, No. 3, 424-438.

Granger. 1988. Some Recent Developments in the Concept of Causality. Journal of Econometrics.

Humphries, H., Knowles, S., 1998. "Does agriculture contribute to economic growth? Some empirical evidence." Applied Economics 30(6): 775-781.

Hwa, E.C., 1988. "The contribution of agriculture to economic growth: some empirical evidence." World Development 16(11): 1329-1339.

Johansen, S. 1988. Statistical Analysis of Cointegrating Vectors. Journal of Economic Dynamics and Control,

Johansen, S. 1992. Determination of Co-Integration Rank in the Presence of a Linear Trend.". Oxford Bulletin of Economics and Statistics ,54(3): 383–97.

Paneerselvam, R. 2007. Research Methodology. New Delhi: Prentice–Hall of India Private Limited.

Paneerselvam, R. 2007. Research Methodology. New Delhi: Prentice–Hall Of India Private Limited.

Reddy, D.N. 2006, "Economic Reforms, Agrarian Crisis and Rural Distress",

Reserve Bank of India Handbook of Statistics on Indian Economy. (2013-14). New Delhi: Reserve Bank of India.

Salih Katircioglu 2005. "Co-Integration and Causality Between GDP, Agriculture, Industry and Services Growth in North Cyprus: Evidence from Time Series Data, 1977-2002" Review of Social, Economic & Business Studies, Vol.5/6, 173 – 187.

Salih TuranKatircioglu, 2006. "Causality between agriculture and economic growth in a small nation under political isolation: A case from North Cyprus", International Journal of Social Economics, Vol. 33 Iss: 4, pp.331 – 343.

Sen A. 1996. 'Economic Reforms, Employment and Poverty: Trends and Options', Economic and Political Weekly, Vol.31, No35, 36 and 37.

Titus O. Awokuse. 2009. "Does Agriculture Really Matter for Economic Growth in Developing Countries?" Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Milwaukee, WI,

Wooldridge, J. M. 2007. Introductory Econometrics A Modern Approtch 3rd Edition. South-Western: Thomson Corporation.

Zikmund, W. G. 2007. Business Research Methods. South- Western.: Thomson Corporation.

