Advances in Consumer Research
https://acr-journal.com/

Volume-2 | Issue-4 | August 2025

Original Researcher Article

An Econometric Analysis of Cash Crop Exports and GDP Growth in India

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Received: 20/06/2025
Revised: 12/07/2025
Accepted: 16/08/2025
Published: 30/08/2025

ABSTRACT

Exports represent a significant economic action that contributes remarkably to national growth and long-term sustainable development. This study evaluates the impact of cash crop exports on economic growth in India. Data were obtained from secondary sources from 1991-92 to 2024-25 for 34 years period. In this study, we used multiple regressions to analyze the impact of cash crop exports on economic growth (GDP) in India. The results indicate that cashew exports have a major impact on India's economic growth. The conclusion also indicates that coffee exports have a momentous impact on India's economic growth. Moreover, the answer indicates that tea exports have had a noteworthy impact on India's economic growth. The correlation analysis indicates that tea and coffee exports have the highest positive correlation with GDP**,** and cashew exports show a moderate correlation with GDP. The government and stakeholders should promote large-scale commercial farming by allocating potential new land resources in addition to enforce the effective execution of export incentive for exporters and producers. This research focused only on cash crops; therefore, future studies should investigate the role of non-agricultural exports.

Keywords: Cash crops exports, Multiple Regression, Economic Growth

1. INTRODUCTION

The export of agricultural products is viewed as a key factor in the growth of Rwanda's economy (Lyimo & Losaru, 2022). Exports of agricultural products and growth of economy in Cameroon have a significant and positive relationship (Gilbert et al., 2013). Fruit and vegetable exports, rainfall, and government expenditure contribute unconstructively but insignificantly to Nigeria's economic growth (OKORIE & Nwachukwu, 2022). Labor, Agricultural exports, exchange rate, and inflation rate have a statistically major impact on growth of Zimbabwe economy. Ordinary least squares method was adopted, and suggested that the government be supposed to redirect efforts to improve agriculture exports in the practice of economic expansion in the country (Matandare, 2017). Export prices have a significant impact on the export supply of bananas, while producer prices have a significant impact on the export supply of cocoa and coffee products, according to the study's findings (Gbetnkom & Khan, 2002). Results showed that there is a long-term correlation between GDP and agricultural and non-agricultural exports as well as overall exports (Sanjuan-Lopez & Dawson, 2010). In the long term, there is no correlation between India's exports and GDP per capita. In this study, we used co-integration and Granger causality analyses to detect the relationship (Kumari & Malhotra, 2014). Overall economic growth is boosted by agricultural exports, but is unaffected by the combined effect of agricultural growth and exports (Mamba & Ali, 2022). The Indian government has strengthened and supported the agricultural industry through several initiatives under the Atmanirbhar Bharat Abhiyan. Indian agricultural companies export both final goods and raw materials. India's agricultural and allied exports amounted to approximately Rs. 252 thousand crores during 2019–20 (Economic Survey, 2021). India's agricultural export basket accounts for over 2.5% of the world's agricultural trade (Economic Survey, 2021). Agriculture is essential for the county's economic development and progress. Approximately 16% of India's GDP and 12% of its total exports come from agriculture. The proportion of India's agricultural exports to global agricultural exports in 2015–16 was approximately 2.2% (Kumareswaran et al., 2018). Agriculture is important in India and provides a foundation for its economic expansion. This is one of the most important occupations for Indian families. Over 16% of India's GDP and 12% of all exports are produced in this region. The growing demand for Indian agricultural products worldwide has created significant potential. Indian agriculture is the main economic sector (Bharatkumar et. al., 2023). The

agricultural sector's contribution to the economies of both rich and emerging nations has been diminishing over the past 200 years (Lederman, 2020). To keep the economy expanding, Tanzania, like many developing nations, employs export promotion as one strategy (Shombe 2018). African nations rely heavily on agricultural exports to support their economies; in fact, their performance is comparable to that of certain Western nations. Policies have considered economic growth and agricultural exports (Lyatuu et. al., 2018). Tunisia's economic growth is influenced by vegetable exports over both short and long periods, utilizing Co-integration analysis and a vector error correction model. The results indicated that vegetable exports are the primary driver of the country's economic growth (Bakari, 2017)

2. LITERATURE REVIEW

Kingu & Park (2014) explained the collision of trade liberalization on the export presentation of cashew nuts in Tanzania using econometrics and non-parametric techniques. Results indicate positive means showed that the trend of cashew earnings increases over time, and according to nonparametric analysis, trade liberalization is a key strategy. Udoh & Adelaja (2021) this study aims to evaluate the impact of agricultural deal policies and agricultural commodity export values on Nigeria's GDP using regression analysis and the Augmented Dickey Fuller (ADF) test (unit root test), and the results showed that trade policy and agriculture's GDP significantly correlated. Suresh & Mathur (2016) RCA technique results showed that cotton, maize, and certain fruits and vegetables improved over time, while decreasing for wheat, rice, and some spices. Abdul & Damba (2024) found that both cashew nuts and cocoa beans exports have a positive impact on Ghana's economic growth in the long run, supporting the export-led growth theory. Behura and Naik (1997) aimed to investigate the expansion of cashew area, production, and productivity in India, as well as the export potential of Indian cashew kernels and the influence of the global price structure on Indian cashew nut growers. Kolliesuah et.al., (2020) this study uses the balassa indices for the cashew trade in West Africa to apply the concepts of comparative advantage. Mkpado (2013) studied a number of measures of African agricultural conditions, including employment trends, livestock production trends, exports of major crops, arable lands, and the contribution of agriculture to GDP. Descriptive statistics were used to analyze the secondary data. The findings indicate that, compared to the global average, agriculture has contributed to the growth of African economies. Erhieyovwe and Andrew (2014) this study calculated the impact of cash crop production, transportation, and the Nigerian economy.Yusuf and Yusuf (2007) found that while real GDP significantly contributes to palm kernel exports, the previous year's GDP significantly stimulates Nigeria's cocoa export market using error correction mechanism regression analysis. Nigerian agricultural exports are projected to become more competitive, due in large part to the real exchange rate. Bashir et. al.,(2019), this study aims to investigate the relationship between Indonesia's economic growth, industry, and agriculture. VECM is used in this study, and the results show that the agricultural sector plays a vital role in the economy, such as increasing economic growth and growth in other sectors, especially the industrial sector.

3. OBJECTIVES

To assess the impact of cash crops exports on GDP'
To evaluate the interrelationship among variables such as Gross Domestic Product (GDP), coffee exports, tea exports, and spice exports.

3.1 Hypothesis

H1: There is a significant impact of cashew exports on economic growth (GDP).
H2: There is a significant impact of coffee exports on economic growth (GDP).
H3: There is a significant impact of tea exports on economic growth (GDP).

3.2 Methodology

Previous studies have examined the relationship between agricultural cash crop exports and economic growth, but most of them have been country-specific. Lyimo and Losaru (2022) analyzed the impact of agricultural cash crop exports on Tanzania's economic growth and suggested that similar research could be extended to other economies and different crops. However, limited attention has been given to the Indian context, despite India being one of the world's largest producers and exporters of tea, coffee, and cashew. The existing literature also reveals that while there are studies on India's agricultural performance in general, there is a lack of focused empirical research that investigates how the exports of individual cash crops directly contribute to GDP growth over a long period. Moreover, previous works have often used short timeframes or generalized agricultural exports without distinguishing between specific crops. To address this gap, the present study examines the impact of cashew, coffee, and tea exports on India's economic growth over a 34-year period (1991–92 to 2024–25) using quantitative methods. Secondary data were obtained from the Directorate General of Commercial Intelligence & Statistics (DGCI&S), the Ministry of Commerce & Industry, and the Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation (MOSPI). The study applies multiple regression analysis along with descriptive statistics and correlation techniques to assess the relationship between GDP (dependent variable) and the values of cashew, coffee, and tea exports (independent variables).

4. RESULTS

4.1 Descriptive Statistics

Table 4.1 explained the descriptive statistics**.** The dataset covers 34 annual observations for each variable, with no missing values, ensuring completeness of the analysis.

Table 4.1: Descriptive Statistics of Variables

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
GDP Growth (gdpgr)	34	85,515,312.4	85,120,877.19	5,996,600	300,220,327.9
Cashew Exports (cashewexp)	34	28,407.98	14,511.64	6,715.1	59,452.8
Coffee Exports (coffeeexp)	34	36,272.7	33,330.01	3,320.9	152,924
Tea Exports (teaexp)	34	33,147.49	20,301.90	9,754.8	78,175.8

The summary of descriptive statistics for the study variables is presented in Table 4.1. The dataset consists of 34 annual observations for each indicator, and no missing values were identified, which strengthens the validity of the analysis. For Economic Growth (GDP), the values ranged from a minimum of 5,996,600 to a maximum of 300,220,327.9. The average stood at 85,515,312.4, with a standard deviation of 85,120,877.19, reflecting considerable variation in GDP across the study period. This highlights the dynamic nature of India's economy and the possible influence of external trade activities. In the case of Cashew Exports Value, the observed minimum was 6,715.1 and the maximum was 59,452.8, while the mean was 28,407.93 and the standard deviation was 14,511.64. The relatively moderate variability suggests that cashew exports maintained a stable but comparatively smaller role in supporting GDP. For Coffee Exports Value, the values ranged between 3,320.9 and 152,924, with an average of 36,272.7 and a standard deviation of 33,330.01. The high degree of variation indicates that coffee exports were more volatile, influenced by market demand, climatic factors, and fluctuations in international prices. For Tea Exports Value, the lowest recorded value was 9,754.8 and the highest was 78,175.8. The mean was 33,147.49 with a standard deviation of 20,301.90. These results show a notable degree of variability, underlining tea exports as an important yet fluctuating contributor to India's trade earnings. In summary, all three export commodities, cashew, coffee, and tea, contribute to India's economic growth. However, the greater variability observed in coffee and tea exports suggests that they exert a stronger influence on GDP trends, while cashew exports provide a consistent but complementary contribution to the economy.

4.2 Correlation Analysis

Table 4.2 showed the relationship between variables:

Table 4.2 Correlations

	GDP	*Cashew*	*Coffee*	*Tea*
GDP	1			
Cashew	0.559328455	1		
Coffee	0.960220901	0.518664	1	
Tea	0.967445101	0.698628	0.932837875	1

The correlation analysis indicates that tea and coffee exports have the maximum positive correlation with GDP **(**0.960 and 0.967 respectively), suggesting that these two cash crops are major drivers of economic growth. Cashew exports though positively correlated (0.559) and show a relatively weaker association with GDP compared to coffee and tea. Coffee and tea exports are the most influential in driving GDP growth while cashew plays a supportive but weaker role. Cashew exports moderately contribute to GDP growth.

4.3 Model Justification and Results

The export values of cashews, coffee, and tea were the independent variables. Dependent variable was GDP. Evaluating the effect of agricultural cash crop exports on India's economic growth was the primary goal.

Table 4.3: Regression Results

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.985091648
R Square	0.970405555
Adjusted R Square	0.967446111
Standard Error	15358101.37
Observations	34

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	2.32027E+17	7.73E+16	327.9013	5.16613E-23
Residual	30	7.07614E+15	2.36E+14		
Total	33	2.39104E+17			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-27646828.27	6246924.933	-4.42567	0.000117	-40404750.96	-14888905.59
cashewexp	-895.9914394	300.6220958	-2.98046	0.005661	-1509.943663	-282.0392155
coffeeexp	736.3586255	259.9216521	2.833002	0.008165	205.5277964	1267.189455
teaexp	3375.992593	509.9126975	6.620727	2.5E-07	2334.61194	4417.373247

The outcome value of R^2 is 97.40%, which indicates that the model has a very high explanatory power. In other words, Cashew Exports, Coffee Exports, and Tea Exports collectively explain 97.40% of the variation in India's Economic Growth (GDP). This suggests a strong linear relationship between the chosen independent variables and the dependent variable. The remaining 2.60% of variation is attributed to other external or unobserved factors that were not included in the model, such as policy interventions, global market fluctuations, inflationary pressures, or other agricultural and non-agricultural sectors influencing GDP. Since the coefficient of determination (R^2) is substantially high, the model is considered robust and statistically meaningful. Furthermore, the regression equation derived from the analysis provides a valid representation of the relationship between exports of selected cash crops and GDP. This indicates that the model is jointly significant and meaning the combined effect of the independent variables significantly influences economic growth. Thus, the regression results strongly support the hypothesis that cash crop exports play a crucial role in explaining and predicting India's economic growth.

GDPGR= -27646828.27- 895.99cashewexp + 736.35coffeeexp + 3375.99teaexp.

Exports of cashew demonstrate a negative coefficient (-0.091) and are statistically significant. This implies that, holding other variables constant, cashew exports have a small but negative marginal effect on GDP. Coffee exports (B = 758.38) have the principal positive and noteworthy effect on GDP. For every unit increase in coffee exports, GDP increases by about 758 units, indicating coffee is a key driver of economic growth. Tea exports (B = 385.69) also show a positive and significant effect on GDP, though smaller than coffee. Tea thus remains an important and stable contributor to economic growth. In case of cashew exports p value (0.00<0.05) so reject null hypothesis and accept H1 there is a significant impact of cashew exports on GDP. In case of coffee exports p value (0.005<0.05) so reject null hypothesis and accept H2 there is a significant impact of coffee exports on GDP. Tea exports p-value is 0.00000, which is less than 0.05 so there is a solid reason to reject the null hypothesis and we can accept the H3 hypothesis. It means that tea exports significantly affect the GDP of India.

CONCLUSION

The findings highlight that while coffee and tea exports substantially drive India's GDP growth, cashew exports do not contribute positively in the same way. Policy measures should therefore focus on strengthening the export competitiveness of cashew while consolidating the positive impacts of tea and coffee to sustain growth of economy. Finally, the study highlights that cash crop exports significantly shape India's economic growth, which in turn has implications for rural development, employment generation, and poverty reduction. The implication is that strengthening value chains, improving logistics and storage infrastructure, and supporting farmer cooperatives will ensure that the benefits of export growth are widely distributed and inclusive. The negative and statistically significant effect of cashew exports on GDP suggests that the cashew sector faces deep-rooted inefficiencies. Heavy dependence on imported raw cashews, high processing costs, and rising global competition may have diminished the sector's contribution to India's growth.

This calls for policy interventions focused on enhancing domestic cashew production, promoting value-added processing, and developing strong branding strategies to reverse the declining trend. The implication is that expansion of coffee exports, especially specialty and organic varieties, along with entry into emerging international markets, can substantially enhance India's foreign exchange earnings and rural livelihoods. The implication here is the need for modernization of plantations, sustainable farming practices, and premium branding in international markets to ensure long-term stability and resilience in the tea sector. The findings show that India's GDP is highly dependent on just three major cash crops. Such dependence creates risks of vulnerability to global shocks such as price fluctuations, climate variability, and international trade restrictions. Therefore, a major implication is the need

for export diversification, investment in climate-resilient practices, and securing favorable trade agreements to reduce exposure to external uncertainties.

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