

An Empirical Study on the Determinants of Agricultural Exports in Karnataka

Dr.T.P.Shashikumar¹ and Dr.Radhamma C²

Abstract

The globalization of agriculture and India's integration into the world economy have substantially reshaped the opportunities and challenges of the agricultural sector in the post-WTO period, with agriculture continuing to play a pivotal role in the Indian economy through employment generation, contribution to GDP, and foreign exchange earnings. Against this background, the present study analyzes the trends, causal relationships, and determinants of agricultural exports in Karnataka, with particular emphasis on their linkage with Gross State Domestic Product (GSDP), using time-series data. The Granger causality analysis reveals a unidirectional causal relationship running from agricultural exports to GSDP, indicating that expansion in agricultural exports significantly contributes to state economic growth, while GSDP does not exert a corresponding influence on exports; moreover, variables such as state gross capital formation, irrigation, and development expenditure do not show statistically significant causal relationships with GSDP. The results of the multivariate regression analysis further demonstrate that GSDP, the wholesale price index of agricultural commodities, and irrigation have a positive and statistically significant impact on agricultural exports, underscoring the importance of economic growth, favorable price incentives, and infrastructural support in enhancing export performance. Although agricultural production exhibits a positive relationship with exports, it is not statistically significant, whereas the real effective exchange rate negatively affects agricultural exports, suggesting that exchange rate appreciation reduces export competitiveness.

Key words: Agricultural Exports, Economic Growth, GSDP, Globalization, WTO, Granger Causality, Real Effective Exchange Rate.

Introduction

The globalization of agriculture has facilitated the free flow of agricultural goods and services across national boundaries. In this context, the Government of India has formally committed itself to the globalization of the Indian economy. While the globalization of Indian agriculture offers opportunities to access international markets, it also exposes domestic producers to increased competition from foreign suppliers in the domestic market, thereby compelling them to adopt more efficient production techniques. India is expected to benefit from the globalization of its agricultural sector, and it is generally assumed that agricultural exports will increase significantly if appropriate globalization-oriented policies are effectively implemented.

Agriculture occupies a dominant position in the Indian economy by providing employment to nearly 55 percent of the total population. The agriculture and allied sectors contribute about 14.2 percent to the country's Gross Domestic Product (GDP). Agriculture is also an important source of foreign exchange, as agricultural exports account for approximately 10.5 percent of India's total exports. Export of agricultural commodities not only earns foreign exchange but also enhances competitiveness in terms of production, productivity, and quality when compared with competing countries in global markets. Moreover, agricultural exports help in realizing economies of scale, which ultimately benefit domestic consumers. Sustained growth in agricultural exports encourages modernization in production, post-harvest processing, and marketing systems.

Agriculture plays a pivotal role in the overall development of the Indian economy, and agricultural exports form an integral component of India's sustainable agricultural development strategy. They also strengthen broader economic development strategies and trade policies. The trade policy reforms initiated in 1991 created a conducive environment for Indian agriculture to integrate with global markets. Several policy measures were introduced to enhance the viability of agricultural exports, including the abolition of the minimum export price for all varieties of rice, adoption of market-determined interest rates, reduction in

¹ Associate Professor, Department of Studies and Research in Economics, Karnataka State Open University, Mukthagangothri, Mysuru, Email Id: shashiksou85@gmail.com

² Associate Professor, Department of Economics, Government College for Women, Kolar, Email Id: rdhcdhc20@gmail.com

items under restricted and negative lists, simplification of licensing procedures, improved availability of export credit, and reduction of import duties on capital goods—particularly agricultural implements, plant, and machinery required for food processing industries.

In the contemporary period, the globalization of agriculture is widely regarded as a powerful instrument for generating employment opportunities and earning foreign exchange. Infrastructure support combined with a favorable policy environment has provided impetus for accelerated growth in agricultural exports. Although many earlier export promotion measures were withdrawn, new policy initiatives were introduced to enhance export competitiveness. The introduction of a market-determined exchange rate policy has strengthened the competitiveness of Indian agricultural exports. In addition, reductions in import duties especially on greenhouse equipment essential for food processing industries and improved access to export credit have contributed significantly to the growth of agricultural exports.

The World Trade Organization (WTO), established on January 1, 1995, aims to promote a cooperative global trading environment, raise income levels, and generate employment through fair and open trade. The establishment of the WTO has added new dimensions to India's foreign trade sector. India, a founding member of both the General Agreement on Tariffs and Trade (GATT) in 1947 and the WTO in 1995, has consistently supported a multilateral approach to international trade. Since the last quarter of the twentieth century, the world economy has witnessed increasing international economic integration. After seven years of extensive negotiations under the Uruguay Round, the WTO emerged as a powerful global trade-regulating institution, incorporating new areas such as agriculture, textiles, technology, intellectual property rights (IPRs), and trade-related investment measures. Over time, the scope of WTO negotiations has expanded considerably.

The changing global economic environment and evolving trade agreements are expected to influence the economic conditions of developing countries, including India, particularly in the agricultural and allied sectors. However, with a modest share of about 1.5 percent in global trade, India remains limited in its ability to influence international trade policies. Consequently, structural adjustment has become a key policy concern for the government, leading to paradigm shifts across various sectors of the economy. The implications of these changes are being felt across different sections of society, and addressing these challenges requires well-prepared and proactive policy responses.

The WTO framework recognizes a free and market-oriented trading system in agriculture. During the WTO base period (1986–88), international prices of most agricultural commodities were higher than domestic prices in India. It was anticipated that reductions in agricultural subsidies by developed countries under WTO agreements would stabilize international prices. However, this expectation was not realized, and the share of agricultural products in India's total exports has not increased significantly since 1995. In this context, the present study seeks to analyze the emerging trends in Indian agricultural exports during the post-WTO period, with a specific focus on examining the trends and performance of agricultural exports in Karnataka.

Objectives of the Study

The Major objectives of the study are as follows

- To analyze the causal relationship between agricultural exports and Gross State Domestic Product (GSDP) in Karnataka.
- To assess the direction of causality between agricultural exports and selected macroeconomic variables such as state gross capital formation, irrigation, and development expenditure.
- To identify and evaluate the key determinants of agricultural exports in Karnataka.

Hypotheses of the Study

The major Hypothesis of the study are,

- Agricultural exports do not have a causal relationship with Gross State Domestic Product (GSDP) in Karnataka.
- There is no causal relationship between agricultural exports and selected macroeconomic variables such as state gross capital formation, irrigation, and development expenditure in Karnataka.
- Selected economic variables such as GSDP, agricultural production, wholesale price index of agricultural commodities, irrigation, and real effective exchange rate do not significantly influence agricultural exports in Karnataka.

Methodology and Data Base

The study is based on secondary time-series data covering the post-WTO period (2006-2024), collected from reliable published sources such as the Directorate of Economics and Statistics, Government of Karnataka, Reserve Bank of India, APEDA, Economic Survey reports, and other official publications. To examine the causal relationship between agricultural exports and Gross State Domestic Product (GSDP), the Granger causality test is employed, as it helps in identifying the direction of causality among the selected variables. Further, to analyze the determinants of agricultural exports in Karnataka, a multivariate regression model is estimated by considering key explanatory variables such as GSDP, agricultural production, wholesale price index of agricultural commodities, irrigation, and real effective exchange rate. Descriptive statistics are used to summarize the basic characteristics of the data, while econometric techniques are applied to ensure robust and meaningful interpretation of results. The outcomes of these analyses are used to draw conclusions and policy implications regarding agricultural export performance in Karnataka during the post-WTO period.

Results and Discussion

Granger Causality Test:

Since the Co integration test investigates only long run relationship between selected variables, it never traces out the cause and effect relationship between the variables. Therefore, Granger causality test has been employed in order to find out the direction of causality. It is a statistical hypothesis test for determining whether one time series is useful in forecasting another. In the Granger sense x is a cause of y if it is useful in forecasting y. In this framework useful means that x is able to increase the accuracy of the prediction of y with respect to a forecast, considering only past values of y. Results of Granger causality test are presented in the table no.1.

Table-1: Results of Pairwise Granger Causality Tests

Sample: 2006-2024

No of Observation: 18

Lags: 1

SL NO.	Null Hypothesis	Obs	F-Statistic	Probability
1	LNEXPORT does not Granger Cause LNGSDP	18	3.51036	0.0806
2	LNGSDP does not Granger Cause LNEXPORTS		0.43524	0.5194
3	LNSGCF does not Granger Cause LNGSDP	17	1.47618	0.2672
4	LNGSDP does not Granger Cause LNSGCF		1.83912	0.2010
5	LNIRRIGT does not Granger Cause LNGSDP	17	1.36458	0.2924
6	LNGSDP does not Granger Cause LNIRRIGT		0.07940	0.9241
7	LNDEV.EXPD does not Granger Cause LNGSDP	17	0.70397	0.5139
8	LNGSDP does not Granger Cause LNDEVEXPD		0.55029	0.5907

For the null hypothesis 1, the above result rejects the null hypothesis that is agricultural export doesn't granger cause GSDP, therefore alternative hypothesis has been accepted which means agricultural export does granger cause GSDP. Whereas, the second null hypothesis that is GSDP doesn't granger cause agricultural export is accepted therefore alternative hypothesis GSDP does granger cause agricultural exports is rejected. The third null hypothesis is also accepted which means SGCF does not granger cause GSDP. As for as fourth null hypothesis is concerned it is accepted that null hypothesis which means GSDP does not granger cause SGCF. The fifth null hypothesis is also accepted which means irrigation does not granger cause GSDP and the sixth one is also accepted which says GSDP does not granger cause irrigation. Finally, The 7th and 8th null hypotheses are also accepted which means development does not granger cause GSDP, and GSDP does not granger cause development expenditure respectively.

From the above granger causality test, it can be concluded that only the agricultural exports Granger cause GSDP but the effects of other variables on GSDP and the reverse are not statistically significant. Therefore, only agricultural exports Granger cause GSDP. Hence, this proves that the above cause and effect relationship between agricultural exports and GSDP is unidirectional and not bidirectional.

Multivariate Regression Analysis:

Finally, in order to study the determinants of agricultural exports in Karnataka, multivariate regression analysis has been employed. Since there are several factors determining agricultural exports, the present study select five variables namely GSDP, Agricultural production, wholesale price index for agricultural commodities, irrigation and real effective exchange rate.

Table-2: Summary Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
Agri.exports	19	3666.379	2277.053	801.52	9103.2
GSDP	19	168197	92643.69	46167	321455
Agri.prod	19	11558.73	2074.908	7496.2	15204
WPI. Agri.com	19	564.0526	219.9721	369	1042
Irrigation	19	3439.744	2040.687	981.89	9086.06
REER	19	85.51	22.23299	59.44	114.47

The above table shows, the mean and standard deviation for the selected variables during the study period. The mean value of agricultural exports is Rs.3666.379 with the standard deviation of 2277.053. As far as GSDP is concerned, the mean value is Rs.168197 with the 92643.69 of standard deviation. The mean value of agricultural production is Rs. 11558.73 and the 2074.908 of the standard deviation. On the other hand, wholesale price index for agricultural commodities has a mean value of Rs.564.0526 with the standard deviation of Rs.219.9721. The mean value of irrigation is about Rs.3439.744 with the standard deviation value of Rs.2040.687. Finally, the mean value of real effective exchange rate is Rs 85.51 with the standard deviation of Rs.22.23299.

Table-3: Results of Regression for Determinants of Agricultural exports in Karnataka

Agri.export	Coeffient	Std.Err	T	P> t
LnGSDP	.2611059	.0917252	2.85	0.015
Lnagri.prd	.0795848	.1253715	0.63	0.537
Lnwpiagrcd	.7654456	.2141465	3.57	0.004
Lnirrigation	.2524891	.0546095	4.62	0.001
Lnreer	-.0785934	.2153343	-0.36	0.721
Const	-.7256896	.8660051	-0.84	0.418

Durbin-Watson statistic (original) 1.501133

Durbin-Watson statistic (transformed) 2.084395

Table 3 reveals that the values of estimated co efficient of selected variables under the study period. It is clear from the above table, GSDP has a statistically significant and positive impact on agricultural export i.e one percent increase in GSDP can lead to 0.26 percent increase in agricultural export. The co efficient of agricultural production has positive impact on agricultural export, but not statistically significant i.e., one percent increase in agricultural exports, can lead to only 0.079 percent increase in agricultural exports. The wholesale price index for agricultural exports has positive sign and significant at 5 % level i.e., one percent increase in wholesale price index for agricultural commodities, can lead to 0.76 percent increase in agricultural exports.

The coefficient of irrigation has a positive sign and statistically significant i.e., one percent increase in irrigation, can lead to 0.25 percent increase in agricultural exports. Finally, real effective exchange rate is statistically significant and has negative impact on agricultural exports i.e., one percent increase in exchange rate can lead to 0.72 percent decrease in agricultural export.

Conclusion

The study shows that in the post-WTO period, agricultural exports have played a crucial role in supporting economic growth in Karnataka, with evidence of a unidirectional causal relationship from agricultural exports to GSDP. While GSDP does not significantly influence exports, factors such as wholesale price incentives and irrigation infrastructure positively and significantly enhance agricultural export performance. Agricultural production, though positively related, does not exert a statistically significant impact, and the real effective exchange rate adversely affects exports by reducing competitiveness. Overall, the findings highlight the importance of strengthening agricultural exports through supportive pricing policies, improved infrastructure, and prudent exchange rate management to sustain economic growth in Karnataka.

References

- Abhijit Sharma and Theodore Panagiotidis (2018), An Analysis of Exports, Growth, and Causality in India. Sheffield Economic Research Paper Series, SERP No. 2003004, pp. 01–31.
- Asghar, Zahid (2019), ELG Hypothesis is Valid for India: Evidence from Structural Causality. Munich Personal RePEc Archive (MPRA), pp. 01–19.
- Babar, S. N. and Bhise, V. B. (2021), Trends and Comparative Advantage of Principal Agricultural Commodity Exports of India under WTO Regime. Indian Development Review, Vol. 8, pp. 247–259.
- Betnkorn, D. G. and Khan, S. A. (2022), Determinants of Agricultural Exports: The Case of Cameroon. AERC Research Paper No. 120, African Economic Research Consortium, pp. 01–46
- Bulagi, M. B., Hlongwane, J. J. and Belete, A. (2019), Causality Relationship between Agricultural Exports and Agriculture's Share of GDP in South Africa. African Journal of Agricultural Research, Vol. 10(9), pp. 990–994.
- Deepika Kumari and Neena Malhotra (2024), Export-Led Growth in India: Cointegration and Causality Analysis. Journal of Economics and Development Studies, Vol. 2(2), pp. 297–310.
- Gupta, Shankar (2017), Impact of WTO on Indian Agricultural Exports. Economic and Political Weekly, Vol. 36(17), pp. 30–50.
- Kalirajan, K., Thangavelu, S. M. and Miankhel, A. K. (2019), FDI, Exports and Economic Growth in Selected Emerging Countries: Multivariate VAR Analysis. MPRA Series, pp. 23–32.
- Kumari, Anju (2015), India's Agricultural Exports in the Post-Globalisation Period. Abhijeeth Publications, pp. 198–216.
- Murugavelu (2016), Export Performance of Indian Agriculture in the Context of Globalisation: An Econometric Analysis. Serials Publications, Vol. 1, pp. 309–320.

Copyright & License:

© Authors retain the copyright of this article. This work is published under the Creative Commons Attribution 4.0 International License (CC BY 4.0), permitting unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.