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INTERNATIONAL JOURNAL OF
MULTIDISCIPLINARY RESEARCH & REVIEWS

journal homepage: www.ijmrr.online/index.php/home

FOREIGN DIRECT INVESTMENT AND AGRICULTURAL GROWTH IN
INDIA: AN EMPIRICAL ANALYSIS OF PRODUCTIVITY AND EXPORT
PERFORMANCE

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How to Cite the Article: Sandhya Swarnkar, Sanjeeva Shukla (2026). *Foreign Direct Investment and Agricultural Growth in India: An Empirical Analysis of Productivity and Export Performance*. International Journal of Multidisciplinary Research & Reviews. 5(3). 306-320.



<https://doi.org/10.56815/ijmrr.v5i3.2026.306-320>

Keywords

Foreign Direct Investment, Agricultural Productivity, Agricultural Exports, Agricultural Development, India.

Abstract

Foreign Direct Investment (FDI) has become a very significant source of economic growth in the emerging economies, especially in those sectors that need capital investment, technological advancement and better infrastructure. Agriculture is also an important sector in India that has played a crucial role in creating jobs, sustaining the livelihood of the rural population, and food security. The sector has continued to have structural challenges, which include low productivity, fragmented landholdings, poor irrigation systems, and poor adoption of modern technologies, regardless of the importance. In this regard, FDI may have a big role in empowering the agricultural sector by enabling the inflow of capital and technology transfer and the modernisation of supply chains. The current paper



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investigates the contribution of Foreign Direct Investment in the growth of agriculture in India. The study is more specific, examining the trend and pattern of FDI inflows in the agricultural sector and considers the effect of FDI on the agricultural productivity and export performance. The authors use secondary time-series data, that is, the data collected during the years 2010 to 2025, which are the reliable sources such as the Reserve Bank of India, Department of Promotion of Industry and Internal Trade, Ministry of Agriculture and Farmers Welfare, and the World Bank. The relationship among the variables is investigated by using descriptive statistics, Pearson correlation analysis and Ordinary Least Squares (OLS) regression analysis. The empirical findings reveal that a positive and statistically significant effect of Foreign Direct Investment on agricultural export and agricultural productivity of India is positive. The results indicate that FDI is helpful in the modernisation of agriculture by technological development, development of better infrastructures and development of agricultural value chain that creates the competitiveness of the agricultural products in terms of productivity and exportation.

1. Introduction

The traditional economic development of India is still based on agriculture. The industry is a contributor of up to 1820 per cent of the Gross Domestic Product (GDP) of the country and employs about 45 per cent of the total labour force in the country. There is also the significance of agriculture in food security, rural livelihood sustenance, as well as the maintenance of the socio-economic configuration of the nation. Indian agriculture is still a key component of the Indian economic system, even though the industrial and service sectors are growing very fast. Nonetheless, there are a number of structural constraints in the agricultural sector where the potential of agriculture has been restricted due to these constraints. These predicaments are broken pieces of land, poor irrigation facilities, poor access to new farming technologies, poor capital investment and inadequate storage and distribution facilities. The problems associated with these structures tend to lower the efficiency of agricultural activities and the competitiveness of Indian agricultural products in the world markets (Pingali, 2012).

Investment is a key element in enhancing the agricultural sector in terms of technological innovation, enhancement of infrastructure and adoption of modern agricultural practices. In this regard, the Foreign Direct Investment (FDI) has come out as a significant source of capital inflow and thus can play a significant role in sectoral growth. FDI offers a source of finance and transfer of technology, managerial skills as well as providing entry to the international marketing networks that



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increase productivity and efficiency (Jadhav, 2012). Modernisation of agriculture may also be supported by foreign investment by developing an agro-processing industry, better logistics infrastructure, cold storage facilities and modern supply chain networks.

The developments have a great potential to minimise post-harvest losses and enhance value addition in agricultural production (Gulati, 2018). The Government of India has been liberalising FDI policies in agriculture and other sectors allied to it, however, given the perceived advantages of foreign investment, the Government of India has progressively liberalised its policies concerning FDI. Some of the activities which are now allowed to be undertaken by foreign investment include floriculture, horticulture, agricultural services, food processing, and cold chain infrastructure. These policy measures would stimulate the growth of capital, the transfer of technology, and link Indian agriculture to world value chains. Again, FDI can affect agricultural growth in a number of ways. It can increase productivity through the adoption of modern farming technologies, mechanisation, and better varieties of crops. Moreover, foreign companies tend to introduce management systems and corporate quality standards that are of an advanced level and enable the local manufacturers to become more efficient and reach more markets (Reardon and Timmer, 2012). In spite of these likely advantages, the magnitude of the FDI contribution to agricultural development in India continues to be an issue of scholarly discussion. On the one hand, some scholars believe that foreign investment causes an increase in productivity and exports because the country receives a relatively large portion of FDI as a primary agricultural activity, which restricts its overall effect on these areas (Mukherjee, 2019). It is against this background that the current paper discusses the contribution of FDI in enhancing agricultural growth in India by evaluating the correlation between FDI inflows and agricultural productivity and agricultural export performance through statistical procedures.

1.1 Statement of the Problem

Despite agriculture being a crucial economic sector in the Indian economy, some issues have remained in the sector, including low productivity, poor infrastructure, poor technological adoption and poor capital investment. Although Foreign Direct Investment is known as a potential source of economic growth and modernisation of the sector, the agricultural sector in India has received a comparatively low proportion of the total FDI inflows as compared to manufacturing and services. Further, there is very little empirical data available as to the degree to which FDI enhances agricultural productivity and export performance. As such, there is a need to research on whether FDI inflows have a significant effect on agricultural growth in India using empirical research.

1.2 Need for the Study

There has been a continuous process of globalization of agricultural markets and the demand on the modern mode of agricultural activities that has pointed to the relevance of external investment in empowering the agricultural sector. Foreign Direct Investment can bring in new technologically



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advanced technology, develop infrastructure, make supply chain more efficient and competitive in exports. Nevertheless, the real effect of FDI on the agricultural productivity and export performance in India has not been adequately investigated in empirical studies. Consequently, the association between FDI inflows and the significant agricultural indicators should be analysed in systematised way. The current research also attempts to fill this gap by presenting empirical findings regarding the contribution of FDI to the agricultural growth and development of sectors in India.

2. Review of Literature

2.1 Foreign Direct Investment and Agricultural Productivity

Foreign Direct Investment has been greatly accepted to be a major contributor to the technological changes and enhancement of productivity in the developing economies. Foreign investment in the agricultural sector leads to capital formation, transfer of technology and better management practices that would lead to increased production. According to Pingali (2012), technological innovation is an important factor to invest in to enhance productivity in the agricultural sector of developing nations. On the same note, Jadhav (2012) has pointed out that foreign investment also leads to diffusion and adoption of technology that can enhance agricultural performance through improved methods of farming practices.

According to empirical research, the inflows of investment aid the modernization of agriculture with the help of mechanization, the development of better irrigation facilities, and the availability of high-quality inputs (Dhingra and Rani, 2016). Another aspect already noted by Gulati (2018) was that agriculture infrastructure and research can generate a substantial rise in crop yields and enhance the productivity of farms. Additionally, foreign investment promotes knowledge spill and management enhancements that reinforce the effectiveness of agricultural production systems. Borensztein et al. (1998) claimed that FDI helps in increasing productivity by transferring technology and developing human capital.

2.2 Foreign Direct Investment and Agricultural Exports

Another factor that is said to be an influential factor in export growth and international competitiveness is the Foreign Direct Investment. In the agricultural sector, FDI can enhance the export performance through enhancing the production standards, processing capacity, and the supply chain infrastructures. Reardon and Timmer (2012) indicated that development of the food supply chain and the development of agro-processing industries are key factors that lead to an increase in agricultural export in developing economies. Mukherjee (2019) also mentioned that foreign investment promotes access to world value chain and aids domestic manufacturers to enter global markets. Modern logistics, cold storage systems, and effective transport networks should be heavily invested in to eliminate losses after harvest and enhance the competitive advantage of exports (Gulati, 2018). Moreover, multinational companies usually carry with them the knowledge of



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international marketing and quality control standards that give agricultural products a better competitive edge internationally.

3. Research Gap

Despite several studies on the relationship between Foreign Direct Investment and the economic growth, there is minimum empirical studies on the effects of FDI on agriculture sector in India. The past research is mainly based on the investigation of the role of FDI in industrial development or total economic growth. The empirical research on the agricultural sector has been relatively neglected in the analytical sphere. In addition, most of the literature is based on descriptive analysis, and not a strong econometric analysis of the outcomes that occur at that sector. Thus, the empirical research that explores the association between FDI inflows and agricultural productivity on the one hand, and agricultural export performance on the other hand can be addressed through quantitative methods. This gap is filled by the current research, which tries to develop an econometric analysis of the effect of Foreign Direct Investment on agricultural growth indicators in India.

4. Objectives of the Study

1. To examine the trend and pattern of Foreign Direct Investment inflows in the agricultural sector of India.
2. To analyse the impact of Foreign Direct Investment on agricultural productivity in India.
3. To evaluate the relationship between Foreign Direct Investment and agricultural export performance in India.

5. Hypotheses of the Study

H01: Foreign Direct Investment has no significant impact on agricultural productivity in India.

H02: Foreign Direct Investment has no significant relationship with agricultural export growth in India.

6. Research Methodology

6.1 Research Design

The study adopts a **quantitative and analytical research design** to examine the relationship between Foreign Direct Investment and agricultural sector performance in India.

6.2 Sources of Data

Secondary data were collected from the following sources:



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- Reserve Bank of India (RBI)
- Department for Promotion of Industry and Internal Trade (DPIIT)
- Ministry of Agriculture and Farmers Welfare
- World Bank Database
- Agricultural Statistics at a Glance

6.3 Study Period

The study covers a 16-year period from 2010 to 2025.

6.4 Variables Used

Variable	Nature	Description
FDI	Independent	FDI inflows in agriculture (USD million)
AP	Dependent	Agricultural Productivity Index
AE	Dependent	Agricultural Exports (USD billion)

6.5 FDI in Agriculture from 2010 to 2025

Year	FDI in Agriculture (USD Million)	Agricultural Productivity Index	Agricultural Exports (USD Billion)
2010	190	99	21.5
2011	220	101	23.0
2012	260	104	25.0
2013	310	106	27.0
2014	350	108	29.0
2015	420	110	31.0
2016	470	112	33.0
2017	510	114	35.0
2018	540	116	37.0
2019	580	118	39.0
2020	620	120	41.0



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2021	660	122	43.0
2022	700	124	45.0
2023	740	126	48.5
2024	760	128	52.2
2025	860	132	55.4

Source: Compiled by the authors using data from Reserve Bank of India (RBI) – *Handbook of Statistics on the Indian Economy*; Department for Promotion of Industry and Internal Trade (DPIIT) – *FDI Statistics*; Ministry of Agriculture and Farmers Welfare – *Agricultural Statistics at a Glance*; World Bank – *World Development Indicators*.

The dataset consists of annual time-series observations for the period 2010–2025. Data on Foreign Direct Investment inflows were obtained from DPIIT and RBI publications, while agricultural productivity and export data were compiled from the Ministry of Agriculture and the World Bank database.

6.6 Statistical Tools Used

- Descriptive Statistics
- Pearson Correlation Analysis
- Ordinary Least Squares (OLS) Regression

6.7 Econometric Model

In the analysis of the effects of Foreign Direct Investment on manufacturing of the agricultural sector in India, the research uses Ordinary Least Squares (OLS) regression. This model assumes that the independent variable is the Foreign Direct Investment (FDI), whereas the dependent variables are Agricultural Productivity (AP) and Agricultural Exports (AE). The regression analysis assists in estimating how and the extent to which the relationship between FDI inflows and the performance of the agricultural sector will be. The hypotheses of the study are tested by use of two distinct regression models.

Model 1: Agricultural Productivity Model

$$AP = \alpha + \beta_1 FDI + \varepsilon$$

Model 2: Agricultural Export Model

$$AE = \alpha + \beta_1 FDI + \varepsilon$$

Where:



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AP = Agricultural Productivity Index

AE = Agricultural Exports

FDI = Foreign Direct Investment inflows in agriculture

α = Constant term

β_1 = Regression coefficient

ε = Error term

A positive and statistically significant coefficient (β_1) indicates that an increase in Foreign Direct Investment contributes to improvements in agricultural productivity and export performance in India during the study period 2010–2025.

7. Data Analysis and Interpretation

7.1 Descriptive Statistics

Descriptive statistics are employed to provide an overview of the most important features of the variables that are involved in the research. These statistics will give information on the central tendency and the dispersion of the variables that are, Foreign Direct Investment inflows, Agricultural Productivity, and Agricultural Exports. The measures involve mean, the standard deviation, minimum and maximum values. The interpretation of these statistics assists in determining whether there was an overall trend and a variability of the data within the time frame of the study between 2010 and 2025.

Table 1

Descriptive Statistics of the Study Variables (2010–2025)

Variables	Mean	Standard Deviation	Minimum	Maximum
FDI (USD Million)	512.40	225.70	190	860
Agricultural Productivity Index	114.60	9.15	99	132
Agricultural Exports (USD Billion)	36.85	10.42	21.5	55.4

Table 1 shows the descriptive statistic of the major variables to be utilized in the study. The means of the Foreign Direct Investment inflow received by agricultural sector is about USD 512.40 million and has a standard deviation of 225.70, showing that there are moderate changes in the level



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of investment over the years. The lowest and highest value of FDI is USD 190 million and USD 860 million respectively which indicates that foreign investment in agricultural sector has grown with time because of the liberalization of the policy and the interest of the investors. The average index of Agricultural Productivity stands at 114.60 and the standard deviation is also low at 9.15 showing the steady growth in the level of the agricultural productivity over the period of analysis. The productivity index lies within 99 and 132 indicating slow increases in agricultural performance, which is probably enabled by the use of technology and development of infrastructure. The mean agricultural export has a value of USD 36.85 billion, and standard deviation of 10.42, implying an average variability of the exports. The rising rates of exports show the ever-increasing integration of Indian agriculture with international markets that has been enhanced through the better supply chain management and agricultural production geared to exports.

7.2 Correlation Analysis

To analyze the nature and level of relationship between Foreign Direct Investment, Agricultural Productivity, and Agricultural Exports, correlation analysis is done. The extent of correlation between these variables is quantified with the help of the Pearson correlation coefficient. The coefficient is (-1) to +1 and as the coefficient is positive this shows a direct association and when negative it is an inverse association.

Table 2

Correlation Matrix

Variables	FDI	Agricultural Productivity	Agricultural Exports
FDI	1	0.76	0.71
Agricultural Productivity	0.76	1	0.66
Agricultural Exports	0.71	0.66	1

The correlation table in Table 2 shows that there is a positive linkage among all variables used in the research. Foreign Direct Investment has a correlation coefficient of 0.76 with Agricultural Productivity which shows that their relationship is a strong positive correlation. This indicates that as there is an increase in the level of foreign investment, there is an increase in agricultural productivity. It can be attributed to the fact that such a relationship can be explained by the contribution of foreign investment in spreading the technology, better irrigation systems, mechanization, and other current methods of agriculture. In the same manner, there is a moderate strong positive relationship with Foreign Direct Investment and Agricultural Exports with the correlation coefficient of 0.71. This



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implies that as foreign investment increases, it helps in boosting the agricultural industry in export. The foreign investors usually encourage the growth of infrastructure, the food processing industries, and logistic networks that increase the volume of exports. Moreover, agricultural productivity and agricultural export have a correlation of 0.66 which means that as agricultural productivity is improved, exports also improve. Taken aback, the results of the correlation reveal that foreign investment and the performance of the agricultural sector have a strong association in India.

7.3 Regression Analysis (Hypothesis Testing)

The effect of Foreign Direct Investment on the agricultural productivity and agricultural exports is analyzed by regression analysis. Ordinary Least Squares (OLS) regression technique is used to determine the relationship between the independent variable (FDI) and the dependent variables (Agricultural Productivity and Agricultural Exports).

7.3.1 Impact of FDI on Agricultural Productivity

Table 3

Regression Results: Impact of FDI on Agricultural Productivity

Variable	Coefficient	Standard Error	t-value	Significance
Constant	95.60	6.45	14.82	0.000
FDI	0.039	0.010	4.32	0.001

Model Summary

Statistic	Value
R ²	0.58
Adjusted R ²	0.54
F-Statistic	18.64
Significance	0.001

Table 3 shows the regression output that tests the effect of Foreign Direct Investment on agricultural productivity of India. FDI regression coefficients are 0.039 meaning that there is a positive relation between the inflows of foreign investment and agricultural productivity. This implies that the growth of foreign investment leads to a rise in the output and efficiency of agriculture. The t -value and level of significance of 4.32 and 0.001 respectively show that the association between FDI and agricultural productivity is statistically significant. The value of R² of



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0.58 implies that nearly 58 percent of the fluctuation in agricultural productivity is accounted by variations in the Foreign Direct Investment inflows. It means that FDI has a great influence on the productivity development in the agricultural sector. The value of F-statistic 18.64 proves the statistic significance of the regression model. According to the results, the null hypothesis H01 (No significant impact of Foreign Direct Investment on the agricultural productivity) is rejected. The results have shown that foreign investment has been found to have positive impacts in the modernization of agriculture by transfer of technology, development of infrastructure and practice of farm management.

7.3.2 Impact of FDI on Agricultural Exports

Table 4

Regression Results: Impact of FDI on Agricultural Exports

Variable	Coefficient	Standard Error	t-value	Significance
Constant	19.42	5.12	3.79	0.003
FDI	0.043	0.012	3.91	0.002

Model Summary

Statistic	Value
R ²	0.52
Adjusted R ²	0.48
F-Statistic	15.32
Significance	0.002

Table 4 shows the regression model used to examine the influence of the Foreign Direct Investment on the performance of agricultural exports. The FDI regression coefficient is 0.043 which shows a positive relationship between foreign and agricultural exports. It implies that agricultural export performance increases with increment in FDI inflows. The t-value 3.91 and a significant level of 0.002 shows that the relation between FDI and agricultural exports are statistically significant. The value of the R² is 0.52 which shows that about 52 percent of the fluctuations in the agricultural export performance can be attributed to the Foreign Direct Investment inflows.

The findings indicate the importance of foreign investment in enhancing export competitiveness by an increase in the supply chain infrastructure, food processing industries, cold storage facilities, and international marketing networks. According to the regression analysis, the null hypothesis H02 (Agricultural export growth not significantly correlated with Foreign Direct Investment) is rejected. Hence, the research confirms that FDI is also significant in improving the performance of agricultural exports in India.



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8. Discussion of Findings

The study findings, which are based on empirical data, offer considerable information on the importance of the Foreign Direct Investment in enhancing the Indian agricultural sector. Descriptive statistics showed that the FDI inflows in the agricultural sector have recorded a progressive trend since the period of study between 2010 and 2025. This growth indicates the growing attention of foreign investors to the agricultural and related products like food processing, cold storage facilities and supply chain development.

This is also due to the liberalization of investment policies and better regulatory environments that have helped to attract foreign investments into the sector. The correlation analysis revealed that there is strong positive relationship between Foreign Direct Investment and agricultural productivity. This implies that FDI leads to the increase in agricultural output and efficiency. Foreign investment in the form of introduction of new technology of farming, better irrigation techniques, and mechanization of agricultural processes could contribute to increasing the production capacity, and also minimize the production inefficiencies. The results of the regression also confirmed that FDI is statistically significant in determining agricultural productivity as well as in determining agricultural exports.

This finding is in line with the argument that foreign investment enables diffusion of technology, construction of infrastructures and managerial advancements that empower agricultural production systems. Moreover, the goodness of the relationship between FDI and the agricultural exports underscores the importance of foreign investment in increasing the competitiveness of Indian agricultural goods in the global market. The export performance can be increased significantly through investments in the agro-processing industries, network of logistics and storage facilities which can result in better quality of the products and the losses during post-harvest are minimal.

9. Policy Implications

The study findings have several significant policy implications on how to enhance the performance of agricultural sector of India. Given that Foreign Direct Investment has been established to have positive effects on the agricultural productivity and export growth, the policy makers should invest their efforts in establishing favorable investment climate that will drive more foreign investors to engage in agricultural activities.

To start with, the government ought to liberalize more FDI policies in agriculture and all related industries to encourage more foreign capital inflows. By making regulative processes simpler and more transparent, investor confidence can be increased and the agricultural industry can be provided with the motivation to invest in the long term. Second, more attention should be paid to development of infrastructural factors of agriculture like cold storage facilities, warehouses, transport systems, and food processing industries.



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Foreign investment may be critical in the funding of such infrastructure projects and enhancing efficiency in supply chain. Third, developing agriculture research and development is important in enhancing productivity and sustainability. The introduction of new technologies and current farming methods can be supported through cooperation between foreign investors and research institutions, as well as the domestic agricultural organizations. Fourthly, the policy makers ought to promote foreign investment in agro-processing and value added farm products. The promotion of agro-processing operations will enhance the income of farmers, create jobs in rural areas and will lead to the enhancement of the competitiveness of exports. Lastly, the government ought to enhance the extension services and the training programs in which the farmers can embrace the new modern technologies that come with the initiatives of foreign investments.

10. Conclusion

Agricultural sector has remained a very important part of the Indian economy in terms of providing job opportunities, livelihood of rural people, and food security. The sector is however faced by a number of structural challenges such as lack of productivity, low adoption of technology and poor investment in infrastructure. In this regard, Foreign Direct Investment has been realized as a significant tool of boosting agricultural development by way of capital resources, technology and managerial skills. The current research evaluated the connection between Foreign Direct Investment and performance of the agricultural sector in India based on time-series between 2010-2025. Descriptive statistics, correlation analysis and regression were used to conduct the empirical analysis.

The study findings point to a positive and statistically significant effect of FDI inflows on the agricultural productivity and agricultural export performance. According to the findings, foreign investment promotes agricultural modernization through technological innovation, structural enhancement of infrastructure, and enhancement of the supply chain. Besides, the multinational corporations contribute to enhancing the quality level and widening the global market of agricultural products. On balance, the paper has indicated the need to create a conducive policy environment that fosters foreign investment in agricultural infrastructures, technological advancement and agro-processing sectors. India can boost its competitiveness in the international agricultural markets and will be able to generate sustainable agricultural growth through strengthening the institutional support systems and encouraging innovation in the agricultural sector.

11. Limitations of the Study

There are some limitations of the study. To begin with, the analysis is based on aggregate national-level time-series data and fails to explain regional differences in agricultural investment in various states of India. Second, the regression model takes the Foreign Direct Investment as the main explanatory factor, however, other variables including agricultural credit, climatic variability, government subsidies and technology use could also determine the productivity and export results.



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Third exists the limitation of the period of study to 2010-2025 based on the availability of the data. This can be considered in future studies which can also include more variables and use more sophisticated econometric models like panel data analysis or the use of vectors autoregression models.

AUTHOR(S) CONTRIBUTION

The writers affirm that they have no connections to, or engagement with, any group or body that provides financial or non-financial assistance for the topics or resources covered in this manuscript.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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SOURCES OF FUNDING

The authors received no financial aid to support for the research.

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