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## **AN EVALUATION OF AGRICULTURAL TRADE IN INDIA: A SPECIAL STUDY OF SELECTED AGRICULTURAL COMMODITIES**

### **Abstract:**

India since ages has been known to be an agrarian country. Indian agriculture and allied activities consist of 54.6% of the population (census 2011) and contributes 17.4% to the country's Gross Value Added for the year 2016-17 (Current prices). India's agricultural export amounts to \$33.87 billion as of 2017, and it is 10.5% of total exports of the country.

□The paper is classified in the various parts like introduction, objectives, review of literature, research methodology, growth rates in agricultural commodity trade, India's agriculture trade, foreign trade policy by the government on agriculture, conclusion and suggestions.

□The growth in trade for agricultural commodity of India was analyzed by employing an exponential model of the form  $Y_t = abteu$ . In the present research paper agricultural trade, the data has been collected from the secondary sources from the economic survey, annual reports from the agricultural ministry and so on at the same time has been analyzed and evaluated by using Carl Pearson's co relation co efficient test.

□After the systematic analysis of the data there has been suggestions made by the researcher to improve agricultural trade to strengthen Indian economy

### **Keywords:**

Agricultural trade, Indian Economy, Export and import, exponential model, trade policy

**JEL Classification:** Q10, Q17, C00

## 1. INTRODUCTION

India since ages has been known to be an agrarian country. Indian agriculture and allied activities consist of 54.6% of the population (Census 2011) and contributes 17.4% to the country's <sup>1</sup> Gross Value Added for the year 2016-17 (Current prices).

During the mid-1960s, India witnessed a shortage of agricultural products that later on led to the green revolution that revolutionized the agricultural sector. India not only was able to fulfill the demands of population but exported many agricultural goods for profits to other countries of the world. India's agricultural export amounts to \$33.87 billion <sup>2</sup> as of 2017, and it is 10.5% of total exports of the country.

The Indian government has taken many steps since the last 7 decades to improve agriculture and agricultural exports so; agriculture sector had a growth rate of around 2.7% in the last 50 years. According to Economic Survey 2018, agriculture is set to grow at 2.1%. The Prime Minister of India recently announced that the government is making policies to ensure by the year 2022, the income of farmers to be doubled. And important measure to do so is an increase in agriculture exports.

## 2. OBJECTIVES OF THE STUDY

Agriculture is backbone of Indian economy. An economic growth is depends upon the performance of agricultural sector. The research paper on agricultural trade in India has following objectives;

- 1) To study agricultural trade in India.
- 2) To evaluate various trends in agricultural trade.
- 3) To study growth rates in agricultural commodity trade.
- 4) To evaluate export and import of agricultural trade in India.
- 5) To suggest various measures to improve agricultural trade in India.

## 3. HYPOTHESES

The present research on agricultural trade in India has following hypotheses;

- 1) Indian economy is an agricultural economy
- 2) The role of agricultural export is significant to its economic growth.
- 3) Agricultural trade is depends upon the strategic government plans and policies
- 4) Indian agricultural sector has potential to increase its export to the rest of world.

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<sup>1</sup> Economic Survey, Government of India, 2017-18

<sup>2</sup> Annual Report, Ministry of agriculture, Government of India, 2017-18

## 4. REVIEW OF LITERATURE

The present research paper on 'An evaluation of agricultural trade in India: A special study of selected agricultural commodities' has explored various reviews of literature on the various past studies on agricultural trade in India. In any kind of research, it is necessary to study meticulous studies done previously, it helps the researcher to know the present status of research in the area and identify the gaps if any in these studies. At the same time these studies would in turn help the researcher to give an appropriate direction to the study.

An agricultural trade in India has limited studies but still the researcher has identified the following review of literature for the present study.

**Kabra (1983)**<sup>3</sup> in his studies agricultural export from India suggested that, nonexistence of foreign aid, limited competitive ability of semi manufactured and manufactured items in international markets and limited flow of foreign funds from non-resident national working abroad, export earnings from agriculture become important. His study also made the point to the policy makers that if these exports items were relied upon for long time, it may bring about changes in cropping pattern which would in turn lead to growing of commercial crops instead of staple food crops. Thus he stated the need to develop a balance between production for export market and domestic market

**Sen and Mukhopadhyay (1993)** studied an impact of liberalization on the Indian Economy based on the specification of the structural linkages among GDP, exports and imports for the period 1985-86 to 1989-90 and 1973-74 to 1984-85 by appropriate linear trend equation. The outcome shows that the quantity of India's exports was positively accelerating during the liberalization period.

**Bhattacharyya (2004)** studied on 'India's External Trade in Agriculture'. His studies revealed India's experience in agricultural trade since 1950s, with a view to identifying the structural shifts that have taken place. He also made a complete evaluation of the development of agricultural trade policies. **Swaminathan (2006)**<sup>4</sup> Chairman, National Commission on Farmers (NCF) has recommended establishing an Indian Trade Organization (ITO) and its own boxes for domestic agricultural support on the model of WTO's Blue, Green and Amber Boxes. According to him the Indian Trade Organization (ITO) can be a virtual organization, specializing in WTO affairs. It can serve as a brain and information bank for enabling Government to take informed and proactive decisions as well as to provide timely advice on potential, surplus and shortages in major Agricultural Commodities, by maintaining a trade watch.

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<sup>3</sup> Kabra, K.N., (1983), 'Agricultural exports: For whose benefit?', *Commerce*, 146 (1): 939- 941.

<sup>4</sup> Swaminathan, M.S., (2005), 'Global food security for tomorrow', *Indian Agriculture - Issues and Perspectives* The ICFAI University Press, Hyderabad.

**Kumar and Dadhich (2010)** studied and evaluated the growth performance of India's agricultural exports from 1991-92 to 2010-11, and their contribution of percentage share in total export of India and Gross Domestic Product (GDP) by using secondary sources of data collection. This study also examines the changing behavior of the contribution of individual group of commodities in the basket of total agricultural export. It includes the major agriculture product/crops that contributes to the maximum share in the total agriculture export in different periods (2000-2011)

**Harwinder and Bimal (2013)** in their research paper on review of empirical results of studies on agricultural commodity futures for the 2001-2013 periods. The studies have been classified in three sections: Growth and performance of the commodity futures market, relationship between agricultural commodity futures market and spot market and price risk management through agricultural commodity futures. The paper reveals the growth in commodity future market along with identification of problems that are affecting the performance of agricultural commodity future in India.

## 5. RESEARCH METHODOLOGY

The present research on the topic 'An evaluation of agricultural trade in India: A special study of selected agricultural commodities' is based on the secondary data collected from various sources like Ministry of Agriculture and Cooperation, Ministry of Finance, ministry of finance etc.

The secondary data of trade (Export and Import) of various 10 selected commodities has been analyzed by using the statistical tools like average, Pearson's correlation coefficient and so on.

## 6. GROWTH RATES IN AGRICULTURAL COMMODITY TRADE

The growth in trade for agricultural commodity of India was analyzed by employing an exponential model of the form  $Y^t = ab^te^u$

The exponential trend is preferred to other models on the ground that governments tend to plan on the basis of growth rates other than absolute changes;

$$Y^t = ab^te^u$$

**Where;**

$Y^t$  = Dependent variable for which growth rate is to be estimated (trade value)

**a** = Intercept

**b** = Regression coefficient

**t** = Time variable

**u** = Disturbance term

**e** = Napierian base

The linearly transformed estimating form of the above equation is

$$\text{Ln } Y_t = \text{Ln } a + t \text{ Ln } b + u$$

**Then,**

An estimate of the average annual percentage rate of growth of trade series for the t-years period is computed from the regression coefficient

The Ln-inverse (e raised to the power) of the regression coefficient (Ln b) for the time period (t), minus one (1), multiplied by 100 constitutes the growth rate for each commodity considered and each dependent variable.

$$\text{Growth rate (G)} = (e^{\text{Ln}b} - 1) \times 100$$

The growth rates were computed for two periods independently and for the whole period. The first period is the period, which included the years from 1987-88 to 2003-04, the pre-WTO period (Period 1). The second period was from 2004-05 to 2012-13, the post-WTO (Period 2) in which different policies enhancing the Agricultural commodity trade sector of the country are implemented.

To test whether the estimated growth rates of two periods differ significantly, in which case we conclude that the relationship is changing from one sample to the other, **Chow test** (1960) was adopted here. The test is F\* test given by the formula,

The formula is as follows;

$$F^* = \frac{(\sum e_{p2} - (\sum e_1^2 + \sum e_2^2)) / K}{(\sum e_1^2 + \sum e_2^2) / (n_1 + n_2 - 2K)}$$

The above formulae can be compared with F table value at  $(K, (n_1 + n_2 - 2K))$  degrees of freedom.

**Where:**

$\Sigma e_{p,2}$  = Residual sum of square for whole sample (Whole period)

$\Sigma e_1^2$  = Residual sum of square for the first data set (Period 1)

$\Sigma e_2^2$  = Residual sum of square for the second data set (Period 2)

**K** = Number of parameters estimated (including the constant term)

**n<sub>1</sub>** = Number of observations of the first period

**n<sub>2</sub>** = Number of observation of the second period

## 7. INDIA'S AGRICULTURE TRADE

India has emerged as important global agro-exporter in some crops viz. rice, cotton, sugarcane, cashew nut, castor seed and groundnut. As per WTO's Trade Statistics, the share of India's agricultural exports and imports in the world agriculture trade in 2015 were 2.26% and 1.74%, respectively. Agricultural exports as a percentage of agricultural GDP has come down from 13.56% in 2012-13 to 9.90 % in 2015-16. During the same period, Agricultural imports as a percentage of agricultural GDP has also increased from 5.71% to 6.45%.

### Agricultural Exports and Imports:

Export of agricultural commodities has helped producers to take advantage of wider international market which in turn has incentivized their domestic production. Crops exported in large quantities viz. rice, cotton, and maize has witnessed significant increase in area coverage and growth rate of production.

Agricultural exports <sup>5</sup> increased from Rs. 2,27,193 crore in 2012-13 to Rs. 2,27,554 crore in financial year 2016-17 registering a growth of nearly 0.15%. Increase in the value of agricultural exports during 2016-17 was primarily on account of higher exports of rice basmati, spices, rice (non-basmati), raw cotton, sugar etc.

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Ministry of Agriculture & Farmers Welfare Government of India, Krishi Bhawan, New Delhi-110 001

The share of agricultural exports in India's total exports decreased from 13.90% in 2012-13 to 12.27% in 2016-17. India's top 10 agricultural export commodities in terms of quantity and value for the year 2012-13 to 2016-17 are given in the table 1 below:

**Table 1:**

**Exports of India's top 10 agricultural commodities 2012-13 to 2016-17 (Value in Rs. Crores)**

Sr. No.	Commodity	2012-13	2014-15	2015-16	2016-17
1)	Rice- basmati	19409	27599	22719	21604
2)	Spices	15177	14842	16630	19442
3)	Rice(other than basmati)	14449	20336	15483	17145
4)	Cotton raw	20277	11643	12821	10982
5)	Sugar	8576	5327	9825	8678
6)	Fresh vegetables	3407	4612	5237	5772
7)	Coffee	4711	4973	5125	5668
8)	Groundnut	4065	4675	4075	5454
9)	Oil meals	16519	8128	3599	5371
10)	Cashew nut	4067	5566	5028	5303
<b>Total agro &amp; allied exports</b>		<b>227193</b>	<b>239471</b>	<b>215396</b>	<b>227554</b>

Source: Central Statistics Office, Govt. of India

India's agricultural imports increased from Rs. 95,719 crore in 2012-13 to Rs1,64,680 crore in 2016-17 registering a growth of nearly 72%. Increase in value of agricultural imports during this period was primarily on account of imports of vegetable oils, pulses, fresh fruits, cashew nuts, spices, sugar etc. Share of agricultural imports in the total imports increased from 3.59 % in 2012-13 to 6.42 % in 2016-17.

**Pearson's co relation coefficient test:**

An analysis has been done by using **Pearson's co relation coefficient test** for exports of India's top 10 agricultural commodities from the years 2012-13 to 2016-17. The result of the test is as follows:

**Result Details & Calculation**

**X Values**

$$\sum = 110657$$

$$\text{Mean} = 11065.7$$

$$\sum(X - Mx)^2 = SSx = 415774796.1$$

**Y Values**

$$\Sigma = 105419$$

$$\text{Mean} = 10541.9$$

$$\Sigma(Y - My)^2 = SSy = 375428430.9$$

**X and Y Combined**

$$N = 10$$

$$\Sigma(X - Mx)(Y - My) = 271509400.7$$

**R Calculation**

$$r = \frac{\Sigma(X - Mx)(Y - My)}{\sqrt{(\Sigma(X - Mx)^2)(\Sigma(Y - My)^2)}}$$

$$r = \frac{271509400.7}{\sqrt{(415774796.1)(375428430.9)}} = 0.6872$$

$$r = 0.6872$$

**Inference:**

**The value of R is 0.6872. This is a moderate positive correlation, which means there is a tendency for high X variable scores go with high Y variable scores (and vice versa).**

**So, the trade (Export) of agricultural commodities like Rice- basmati, Spices, Rice (other than basmati), Cotton raw, Sugar, Fresh vegetables, coffee, Groundnut, cashew nuts, oil meals has been increasing from the year 2012-13 to 2016-17**

**Table 2:**

**Imports of India's agricultural commodities (Value in Rs crores)**

Sr. No.	Commodity	2012-13	2014-15	2015-16	2016-17
1)	Vegetable oils	53562	64894	68677	73047
2)	Pulses	13345	17063	25619	28523
3)	Fresh fruits	6180	9544	11072	11241
4)	Cashew nut	5434	6600	8701	9027
5)	Wheat	6	61	873	8509
6)	Sugar	3094	3668	4038	6868
7)	Cotton raw	2467	3101	2566	6337
8)	Spices	2716	4392	5400	5758
9)	Misc processed items	1268	1749	1811	2116
10)	Oil Meals	210	273	430	975
<b>India's total agro and allied imports</b>		<b>88282</b>	<b>111345</b>	<b>129187</b>	<b>152401</b>

Source: Central Statistics Office, Govt. of India



**Pearson's co relation coefficient test:**

An analysis has been done by using *Pearson's co relation coefficient test* for imports of India's top 10 agricultural commodities from the years 2012-13 to 2016-17.

The result of the test is as follows:

**Keys:****X: X Values****Y: Y Values****Mx: Mean of X Values****My: Mean of Y Values****X - Mx & Y - My: Deviation scores****(X - Mx)<sup>2</sup> & (Y - My)<sup>2</sup>: Deviation Squared****(X - Mx)(Y - My): Product of Deviation Scores****Result Details & Calculation****X Values**

$$\sum = 88282$$

$$\text{Mean} = 8828.2$$

$$\sum(X - Mx)^2 = SSx = 2360014013.6$$

**Y Values**

$$\sum = 152401$$

$$\text{Mean} = 15240.1$$

$$\sum(Y - My)^2 = SSy = 4232978786.9$$

**X and Y Combined**

$$N = 10$$

$$\sum(X - Mx)(Y - My) = 3121739029.8$$

**R Calculation**

$$r = \frac{\sum((X - Mx)(Y - My))}{\sqrt{(SSx)(SSy)}}$$

$$r = \frac{3121739029.8}{\sqrt{(2360014013.6)(4232978786.9)}} = 0.9877$$

$$r = 0.9877$$

**Inference:**

**The value of R is 0.9877. This is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa). So, the trade (Import) of agricultural commodities like Vegetable oils, Pulses, Fresh fruits, Cashew nut, Wheat, Sugar, Cotton raw, Spices, Misc processed items, Oil Meals has been increasing from the year 2012-13 to 2016-17**

## 8. FOREIGN TRADE POLICY BY THE GOVERNMENT ON AGRICULTURE

India is the world's leading producers of rice, wheat, sugarcane, castor seeds, groundnut, millet, sesame seed, fruits and vegetables. Therefore, changes in its balance sheets for key commodities will have a potentially large impact on global markets. Over the years, it has developed export competitiveness in certain specialized agriculture commodities viz. Basmati rice, guar gum and castor.

### Measures taken on Export & Import Policy (2017-18)

There has been various measures taken by the govt. through its policies; some of the measures are as follows.

- 1) Import duty on sugar was increased from 40% to 50% on 10<sup>th</sup> July, 2017.
- 2) Import duty on wheat has been increased from 10% to 20% and on peas from 0% to 50% respectively on 8<sup>th</sup> November 2017.
- 3) Quantitative ceiling of 2 lakh tons/ year on arhar and 3 lakh tons/ year on Moong & Urad have been imposed on 5<sup>th</sup> August, 2017 and 21<sup>st</sup> August, 2017 respectively.
- 4) Import duty on soya bean seed has also been raised from 30% to 45% on 17<sup>th</sup> November 2017.
- 5) Export of all varieties of pulses including organic pulses has been "Free" without any quantitative restriction w.e.f. 22<sup>nd</sup> November 2017.
- 6) Minimum Import Price (MIP) of Rs. 500/kg on pepper has been imposed w.e.f. 6<sup>th</sup> December, 2017.
- 7) Import duty on lentil (Masur) and Chana (Chickpea) has been raised from zero to 30% w.e.f 21<sup>st</sup> December, 2017.

### Specialization in Agricultural Trade

The specialization in agricultural trade is assessed by following measure:

$$S_T = \frac{E-I}{E+I}$$

**Where,**

**S<sub>T</sub>** : Specialization in agricultural trade,

**E**: Value of agricultural exports,

**I**: Value of agricultural imports.

According to the table no.1 and table no.2 the value of agricultural export in the year 2016-17 is Rs. 227554, and import is Rs. 152401. There is possibility to have specialization in agricultural trade as the difference is Rs. 75153.

## 9. CONCLUSION AND SUGGESTIONS

The present research work has been carried out about the trade of selected agricultural commodities in India. Agriculture being one of the important sectors of Indian economy plays a significant role in economic growth and development of Indian economy. Agricultural trade is an engine of economic growth.

On the basis of data analysis and interpretations; researcher has drawn meaningful findings to meet requirements of the objectives set for this study;

- 1) Indian agricultural trade has tremendous potential to earn foreign currencies through export of various agro based commodities trade.
- 2) India's agricultural export amounts more than \$33.87 billion, and it is 10.5% of total exports of the country, these exports could lead to employment generation and reduce unemployment as well.
- 3) According to the specialization in agricultural trade, there is possibility to have specialization in agricultural trade as the difference between export and import is Rs. 75153.
- 4) As per Export & Import Policy (2017-18) of the government of India, there are various agricultural commodities on which trade subsidies are given, so more subsidies can be given for promoting agricultural trade.
- 5) The role of export duty and import duty is essential for promoting trade, i.e. wherever there is need to increase export duty the govt. has increased it and to prevent import of various agricultural goods it has also increased .
- 6) The growth in trade for agricultural commodity of India was analyzed by employing an exponential model of the form  $Y^t = ab^te^u$
- 7) It has been inferred from the above analysis that, the agricultural exports increased from Rs. 2,27,193 crore in 2012-13 to Rs. 2,27,554crore in financial year 2016-17.
- 8) An analysis has done by using *Pearson's co relation coefficient test* for exports of India's top 10 agricultural commodities from the years 2012-13 to 2016-17. **The value of R is 0.6872. This is a moderate positive correlation, which means there is a tendency for high X variable scores go with high Y variable scores (and vice versa). So, the trade (Export) of agricultural commodities like Rice- basmati, Spices, Rice (other than basmati), Cotton raw, Sugar, Fresh vegetables, coffee, Groundnut, cashew nuts, oil meals has been increasing from the year 2012-13 to 2016-17.**

9) An analysis has been done by using *Pearson's co relation coefficient test* for imports of India's top 10 agricultural commodities from the years 2012-13 to 2016-17. **The value of R is 0.9877. This is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa). So, the trade (Import) of agricultural commodities like** Vegetable oils, Pulses, Fresh fruits, Cashew nut, Wheat, Sugar, Cotton raw, Spices, Misc processed items, Oil Meals has been increasing from the year 2012-13 to 2016-17.

Thus, the above research paper on **'An evaluation of agricultural trade in India: A special study of selected agricultural commodities'** has brought various insights of the agricultural trade in India.

Indian agricultural trade has enough potential to earn foreign currency as well as dominate the global agricultural market, provided there is needed to have proper trade policy and incentives for the agricultural sector.

It is true that India lives in villages, but if villages are empowered then India can really show its power to the rest of the World in the form of domination of agricultural trade.

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