

Research Paper

Growth and Export Potential of Horticultural Crops from India: An Overview

Lohita Rabha^{*1} and Ramen Kumar Sarma²

¹PhD. Scholar, Department of Extension Education, College of Agriculture, Assam Agricultural University, Jorhat, India

²Professor, Department of Agricultural Economics & Farm Management, College of Agriculture, Assam Agricultural University, Jorhat, India

*Corresponding author: lohitarabha111@gmail.com (ORCID ID: 0000-0003-4409-9981)

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ABSTRACT

Cultivation of horticultural crops is the best alternative for Indian agriculture as a farmer can achieve a higher return by exporting the produce. So the topic has been selected to analyze the trend in export performance of horticultural crops of India and to identify the major destinations of India for exporting fruits and vegetables. Data was entirely based on secondary sources, and the major analytical techniques like CAGR and CV were used to achieve the study's objective. The trend in export of fresh fruit and vegetables both by quantity and value shows that walnuts have negative growth rate. Fresh mangoes have shown a negative growth rate (-4.50%) in terms of quantity. In the case of export of processed fruits and vegetables by quantity, Cucumber and Gherkins (Prepared & Preserved) have shown a negative growth rate (-2.21%) along with mango pulp (-5.48%). India's primary market for fresh fruit and vegetables is United Arab Emirates. For processed fruit and vegetables, the major market are USA, Netherland, Saudi Arabia, and China. To emerge as a major exporting nation, India needs to produce surplus by cultivating high-value horticultural crops, improving cultivation practices, pre and post harvest management, storage, etc.

Highlights

- ① The growth in export of horticultural crop during the period 2009-18 shows fluctuating trend over the years.

Keywords: Export, horticultural crop, crop diversification, fruits, vegetables

India is an agricultural-based country which provides a forum for economic development and offers livelihood opportunity to about 70 percent of its rural populations (India at a glance, FAO). India produces a considerable amount of rice, wheat, pulses, fruits, vegetables, milk, and other commodities. Cultivation of horticultural crop is the best alternative for Indian agriculture as it improves the productivity of land, generates employment, and improves farmers' economic condition as they can achieve a higher return by exporting the produce and, most importantly, providing nutritional security to the people (Dahatreyulu, 1997). Moreover, the climatic condition of India is

conducive for the cultivation of the horticultural crop. India ranked second in producing fruits, vegetables, spices, and plantation crops such as tea and coffee in the world. The demand for fruits and vegetables, both fresh and processed, has been increasing in the international market. During 2004-05, the productivity of horticultural crops was 8.4 tons per hectare. After implementing the National Horticulture Mission, both area and production of

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fruits and vegetables have increased to 11.72 million hectares and 150.73 million tons, respectively (Choudhary, 2013). As a result, horticultural exports in India have increased after the implementation of NHM scheme. In 2019, the total fruit production of India is approximately about 98 million metric tons, and the principal exports include mango pulp, fresh mangoes, dried walnuts, and fresh grapes. In the case of vegetables, total production in the fiscal year 2019 is about 185 million metric tons, and it includes potatoes, tomatoes, onions, eggplants, and cabbage, among others (Statista). With increased incomes, urbanization, changing lifestyles, and international market integration, consumer preferences have shifted away from cereals to high-value agricultural produce (Mittal, 2007). As a result, farmers can benefit from crop diversification by cultivating horticultural crops to meet the growing demand. In India horticultural sector contributes about 54 percent of total agricultural export and 28 percent of GDP in agriculture (Dastagiri, 2017). India exports its horticultural crop mainly to Bangladesh, Nepal, UAE, U.K., Malaysia, Saudi Arabia, Bahrain, and Kuwait. The two major countries that import most of India's horticultural crops are UAE and Saudi Arabia (G.B. et al. 2017).

The study has been conducted with the following specific objectives:

1. To analyze the trend in export performance of horticultural crops of India.
2. To identify the major destinations of India for exporting fruits and vegetables.

METHODOLOGY

Secondary time series data on the export of horticultural crops for 2009-2018 was collected from the database of APEDA. Data collected to analyzing export performance based on their contribution to total agricultural export. Data was analyzed statistically to achieve the objectives of the study by using primary analytical techniques like:

Compound Annual Growth Rate

The compound growth rate has been carried out to identify the growth rate in the export of horticultural crops of India during the period 2009-18.

The Compound Annual Growth Rates (CAGR) was computed by using the formula:

$$Y = ab^t e$$

Where,

Y = Dependent variable; a = Intercept; b = Regression Coefficient; t = Time variable; e = Stochastic term

The above equation can be transformed into logarithmic form as follows:

$$\ln Y = \ln a + t \ln b + e$$

The compound growth rates were worked out as follows:

$$CGR = [\text{Anti } \ln \text{ of } \ln(b) - 1] \times 100$$

Coefficient of variation (CV)

Coefficient of Variation (CV) has been worked out to study the variability in the growth of export of horticultural crops over the period from 2009-18.

Coefficient of variation (CV) was calculated using the formula:

$$CV = (\text{Standard deviation}/\text{Mean}) * 100$$

RESULTS AND DISCUSSION

Growth in the export of fresh fruits & vegetables from India in terms of quantity and value

The growth in export of fresh fruit and vegetables in terms of quantity and value has been presented in table 1 & 2, respectively. The export growth rates of fruits such as fresh grapes, other fresh fruits, fresh onions, and other fresh vegetables are positive with a value of 9.26%, 5.15%, 4.22%, and 6.56%, respectively. However, the export growth is not uniform and is fluctuating over the years. For example, walnuts and fresh mangoes show a negative growth rate with -13.93% and -4.50%, respectively. As stated by Mishra (2018), the reason for a negative growth rate of walnut is that during 2018-19 yield of walnut was lower than anticipated at 34,000 MT (in-shell basis) due to untimely rains in Kashmir Valley during the flowering months because Indian walnut production is primarily confined to the hill states of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand.

Table 1: Growth in export of fresh fruits & vegetables from India in terms of quantity (in '000' MT)

Year	Walnuts	Fresh Mangoes	Fresh Grapes	Other fresh fruits	Fresh Onions	Other Fresh vegetables
2009-10	9.071	74.46	117.33	256.07	1664.92	398.53
2010-11	5.753	58.86	92.43	250.69	1182.32	452.67
2011-12	5.828	63.44	94.86	262.48	1309.92	665.41
2012-13	5.295	55.58	140.96	256.24	1666.87	724.23
2013-14	6.724	41.27	160.25	232.10	1482.49	881.59
2014-15	2.663	42.99	94.37	261.21	1238.10	798.60
2015-16	3.289	36.77	132.64	362.95	1382.95	707.51
2016-17	2.188	52.76	198.47	394.31	2415.73	980.97
2017-18	3.59	49.18	188.22	321.15	1588.98	735.19
2018-19	1.87	46.51	246.13	372.21	2183.76	720.55
Mean	4.62	52.18	146.56	296.94	1611.60	706.52
CGR (%)	-13.93	-4.50	9.26	5.15	4.22	6.56
CV (%)	49.68	21.77	35.18	20.15	25.02	24.82

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/genReport_combined.aspx.

Table 2: Growth in export of fresh fruits & vegetables from India in terms of value (₹ in crore)

Year	Walnuts	Fresh Mangoes	Fresh Grapes	Other fresh fruits	Fresh Onions	Other Fresh vegetables
2009-10	197.8	200.54	431.07	513.55	2319.43	673.31
2010-11	166.1	164.84	391.01	486.1	1779.29	804.38
2011-12	230.99	209.74	516.76	716.31	1723	1152.98
2012-13	199.82	264.72	982.04	726.88	1966.63	1368.51
2013-14	324.42	285.43	1437.07	924.37	3169.61	2027.99
2014-15	136.39	302.54	972.77	1084.06	2300.54	2158.67
2015-16	117.89	320.64	1362.26	1567.29	3097.21	2008.44
2016-17	55.18	443.66	1781.71	1629.64	3106.06	2589.51
2017-18	127.21	382.34	1899.95	1443.76	3088.82	1848.78
2018-19	66.77	406.5	2335.25	1834.57	3468.87	1950.97
Mean	162.25	298.09	1210.98	1092.65	2601.94	1658.35
CGR (%)	-12.08	10.60	22.17	16.82	7.20	13.33
CV (%)	49.54	31.01	55.12	45.19	25.08	37.80

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/genReport_combined.aspx.

Moreover, Indian walnut consumption has grown steadily from 2014-15 to 2017-18, at 67 percent growth, and in 2018-19 the consumption level was expected to be 50,000 MT, the same consumption levels as in 2017-18 (Mishra, 2018) but it was higher than expected due to strong domestic demand as the awareness about the health benefit of almond has increased among the consumer. In the case of fresh mangoes, one of the primary reasons for the decline in export since 2011-12 was the pesticide residue and fruit fly infestation, which has resulted in the ban of Indian mangoes in the United States, Europe, and Japanese markets. Another reason is the low demand for Alphonso mangoes due to color and appearance, which do not compare well with Israel and Latin America (Madhuri, 2019). The coefficient

of variation of walnuts, fresh mangoes, fresh grapes, other fresh fruits, fresh onions, and other fresh vegetables in terms of quantity is 49.68%, 21.77%, 35.18%, 20.15%, 25.02%, and 24.82%, respectively. Walnut has shown the highest CV value indicating the highest variability among others. The reason is the same as discussed above: the demand for walnut has been increasing for domestic consumption due to increasing awareness about their health benefit. The consumption has grown steadily from 2014-15 to 2017-18 and lower production during 2018-19, leading to high instability in the export of walnut from India.

As shown in table 2, export in terms of the value of fresh mangoes, fresh grapes, other fresh fruits,

fresh onions, and other fresh vegetables are positive with values 10.60%, 22.17%, 16.82%, 7.20%, and 13.33%, respectively. However, it has been showing a negative growth rate with a value -12.08% in case of walnut. Here coefficient of variation for walnuts, fresh mangoes, fresh grapes, other fresh fruits, fresh onions, and other fresh vegetables are 49.54%, 31.01%, 55.12%, 45.19%, 25.08% and 37.80%, respectively. Overall, the growth rate in the export of fresh fruits & vegetables by value term is higher than the growth rate in quantity. Among the fresh fruit & vegetables, fresh grapes have earned maximum foreign exchange value.

Trend in exports of processed fruits & vegetables from India in terms of quantity and value

Table 3 indicates that the quantity of export of processed fruits & vegetables such as Processed Fruits, Juices & Nuts, processed vegetables, pulses has shown positive growth rate with 10.29%, 3.67%, and 4.69% respectively. However, Cucumber and Gherkins (Prepared & Preserved) have shown a negative growth rate of -2.21% and mango pulp is -5.48%. : The negative growth rate of Cucumber and Gherkins (Prepared & Preserved) may be due to better quality of products in other countries, which fetch higher prices in the international markets (Kumar *et al.* 2008). The value for the coefficient of variation of Cucumber and Gherkins (Prepared & Preserved), Processed Fruits, Juices & Nuts, mango pulp, processed vegetables, and pulses are 11.87%,

28.33%, 18.39%, 15.43%, and 33.94%, respectively. On the other hand, the export of pulses has shown the highest variability with a high CV value (33.94%). The reason might be because the demand for pulses in the domestic market is increasing every year. Less area under cultivation, poor yield, seasonal failure, lack of irrigation facility, lack of processing and marketing facilities, why India has and price instability is why India has to depend upon the import of pulses for satisfying the domestic needs. During 2007-08 to 2013-14 imports of pulses have been increased from 2.83 MT (₹ 5375 crore) to 3.05 MT (₹ 10551 crores) (Dastagiri and Vajrala).

As shown in Table 4, in the case of processed fruits & vegetables, the export value of Cucumber and Gherkins (Prepd. & Preserved) is 8.98%, Processed Fruits, Juices & Nuts (19.07%), Processed Vegetables (13.49%), and Pulses (11.83%). However, in the case of Mango Pulp, the export growth rate in terms of value is negative *i.e.*-0.02%. Therefore, overall growth rate in the value term is positive and high except for mango pulp. Therefore, processed Fruits, Juices & Nuts have earned maximum foreign exchange value from among the category of export of processed fruits & vegetables.

Major countries and share percentage of exports of fresh as well as processed fruits and vegetables from India, 2019-20

The Major countries where India exports maximum fresh fruits and vegetables are presented in Table 5. One of the major trading partners for exports of

Table 3: Trend in exports of processed fruits & vegetables from India in terms of quantity (in '000' MT)

Year	Cucumber and Gherkins (Prepared & Preserved)	Processed Fruits, Juices & Nuts	Mango Pulp	Processed Vegetables	Pulses
2009-10	263.30	157.34	186.19	142.15	100.13
2010-11	209.23	123.20	170.21	179.06	209.01
2011-12	258.60	203.02	150.49	224.50	174.62
2012-13	238.62	223.07	147.81	193.09	202.75
2013-14	218.74	246.13	174.86	204.66	345.27
2014-15	251.18	253.34	154.82	180.38	222.26
2015-16	202.95	275.58	128.86	177.33	256.05
2016-17	179.66	300.00	130.88	210.58	136.96
2017-18	220.93	317.35	110.92	226.48	180.19
2018-19	212.81	339.60	105.87	248.12	289.61
Mean	225.60	243.86	146.09	198.63	211.68
CGR (%)	-2.21	10.29	-5.48	3.67	4.69
CV (%)	11.87	28.33	18.39	15.43	33.94

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/genReport_combined.aspx.

Table 4: Trend in exports of processed fruits & vegetables from India in terms of value (₹ in crore)

Year	Cucumber and Gherkins (Prepared & Preserved)	Processed Fruits, Juices & Nuts	Mango Pulp	Processed Vegetables	Pulses
2009-10	741.34	669.98	744.61	759.46	408.32
2010-11	515.26	591.76	818.93	941.23	870.04
2011-12	745.03	1116.16	620.83	1249.98	1067.93
2012-13	856.59	1452.59	608.56	1357.58	1285
2013-14	955.2	1823.52	772.95	1707.39	1747.63
2014-15	1202.42	1899.75	841.39	1913.4	1219.08
2015-16	999.17	2297.3	796.18	1994.56	1658.09
2016-17	936.19	2492.7	846.02	2280.04	1278.79
2017-18	1285.22	2647.84	673.92	2211.59	1473.26
2018-19	1437.13	2804.97	657.67	2474	1822.58
Mean	967.35	1779.65	738.10	1688.92	1283.07
CGR (%)	8.98	19.07	-0.02	13.49	11.83
CV (%)	28.75	45.05	12.33	34.79	33.57

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/genReport_combined.aspx.

Table 5: Major countries and share (%) of exports of fresh fruits and vegetables from India, 2019-20

Commodity	Country 1	Country 2	Country 3	Country 4	Country 5
Walnuts	France (22.82%)	UK (19.20%)	Germany (18.23%)	United Arab Emirates (17.08%)	Netherland (8.38%)
Fresh Mangoes	United Arab Emirates (35.70%)	UK (16.89%)	USA (7.64%)	Oman (6.89%)	Qatar (6.85%)
Fresh Grapes	Netherland (36.14%)	Russia (12.20%)	UK (9.44%)	Bangladesh Pr (6.33%)	Germany (6.28%)
Other fresh fruits	United Arab Emirates (21.81%)	Bangladesh Pr (19.42%)	Iran (10.97%)	Nepal (10.49%)	Oman (6.04%)
Fresh Onions	Bangladesh Pr (23.71%)	Malaysia (18.71%)	United Arab Emirates (12.80%)	Sri Lanka Dsr (12.64%)	Nepal (4.07%)
Other Fresh vegetables	United Arab Emirates (20.94%)	Nepal (18.32%)	UK (9.15%)	Qatar (8.80%)	Bangladesh Pr (5.02%)

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/topfive_destination.aspx.

Table 6: Major countries and share (%) of exports of processed fruits and vegetables from India, 2019-20

Commodity	Country 1	Country 2	Country 3	Country 4	Country 5
Cucumber and Gherkins (Prepared & Preserved)	USA (25.12%)	France (8.65%)	Russia (8.61%)	Spain (7.68%)	Germany (7.12%)
Processed Fruits, Juices & Nuts	Netherland (13.17%)	USA (11.32%)	Saudi Arabia (10.16%)	United Arab Emirates (5.53%)	Russia (3.67%)
Mango Pulp	Saudi Arabia (21.51%)	Yemen Republic (10.61%)	Netherland (10.47%)	Kuwait (7.94%)	USA (6.70%)
Processed Vegetables	USA (20.98%)	UK (10.38%)	Germany (7.15%)	Thailand (6.36%)	Russia (4.61%)
Pulses	China P Rp (16.27%)	USA (13.32%)	Algeria (10.68%)	Bangladesh Pr (10.57%)	Sri Lanka Dsr (7.14%)

Source: APEDA, https://agriexchange.apeda.gov.in/indexp/topfive_destination.aspx

fresh fruits and vegetables is United Arab Emirates. The maximum share of exports of fresh mangoes, other fresh fruits, and Other Fresh vegetables go to the United Arab Emirates. However, walnut, fresh

grapes, and fresh onions have found their market in France, the Netherlands, and Bangladesh.

In the case of processed fruits & vegetables, as shown in table 6, the maximum share of cucumber

and Gherkins (Prepared & Preserved) and Processed Vegetables goes to the USA. Moreover, India exports its Processed Fruits, Juices & Nuts, mango pulp, and pulses to the Netherlands, Saudi Arabia, and China.

CONCLUSION

Though India is world's largest producer of fruits and vegetabless, its overall performance is not good and does not have many of export volumes instead shown fluctuating trend over the years. Moreover, during the period 2009-10 to 2018-19 the export of some commodities like walnut, fresh mangoes, Cucumber, and Gherkins (Prepared & Preserved) and mango pulp has shown a negative growth rate mainly due to huge domestic demand. Besides, there are other constraints such as quality issues, lack of infrastructure like cold storage, markets, roads, transportation facilities, etc., huge post-harvest losses leading to lower productivity per unit area. However, 'India's major markets for fresh fruit and vegetables are France, United Arab Emirates, Netherland, and Bangladesh. In processed fruit and vegetables USA, Netherland, Saudi Arabia, and China are the primary market. So in order to emerge as a major exporting nation, India needs to produce surplus through the cultivation of high-value horticultural crops, effective supply chain management through collaboration among various stakeholders, emphasis should be given on pre and -post-harvest handling, storage. India is the homeland of small and marginal farmers, they need to be mobilized and help them to diversify the crop to meet the increasing demand of horticultural products by linking them with export markets through proper marketing strategy. Moreover, the government needs to take practical steps regarding the development of credit structure, infrastructure development, strengthening research for sustainable production technology, and improved pest-resistant variety. It is also necessary from the government to strengthen the role of Agri Export Zones (AEZ), encouraging extension activities to improve farmers' knowledge and awareness regarding improved cultivation practices.

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