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Trends and export competitiveness of major horticulture crops in India

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ABSTRACT : The present paper is an attempt to analyze the trends in performance of major horticulture crops in India, state wise performance of horticulture development and to measure the export competitiveness of fruits and vegetables. For the purpose the revealed comparative advantage method has been used in the study. The study finds that Fruits and vegetables are prominent in the horticulture. Further the study reveals that India is not having any revealed comparative advantage in exports of fruits of vegetables except the mosambi, grapes, mango in fruits and onions in vegetables. The study suggest that there is an immediate need to integrate the production, marketing and processing processes of the produce to get maximum benefits from horticulture crops cultivation.

KEY WORDS : Horticulture, Export competitiveness, Crop diversification, Fruits, Vegetables

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Now the days, there has been a great deal of interest among both policymakers and trade analysts in the role of horticultural products as a principal means of agricultural diversification and foreign exchange earnings in developing countries. India with diverse soil and climate comprising several agro-ecological regions provides ample opportunity to grow a variety of horticulture crops. These crops form a significant part of total agricultural produce in the country comprising of fruits, vegetables, root and tuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushrooms. It is estimated that all the horticulture crops put together cover nearly 11-6 million hectares area with an annual production of more than 91 million tonnes. Though these crops occupy hardly 7 per cent of the cropped area they contribute over 18 per cent to the gross agricultural output in the country. Horticultural crops play a unique role in India's economy by improving the income of the rural people. Cultivation of these crops is labour intensive and

as such they generate lot of employment opportunities for the rural population. Fruits and vegetables are also rich source of vitamins, minerals, proteins, carbohydrates etc. which are essential in human nutrition. Hence, these are referred to as protective foods and assumed great importance as nutritional security of the people.

Fruits and vegetables form the single largest sub-sector of horticultural crops in India, accounting for 63.8 per cent of the area and more than 80 per cent of the total production (National Horticulture Board, 2010). India is the world's second largest producer of fruits and vegetables contributing to 10 per cent and 14.4 per cent, respectively of the total world production. India is the largest producer of banana, mango, sapotas and acid limes and enjoys reputation for highest productivity in grapes, sapota and banana. In vegetables, India occupies prime position in the production of cauliflower and pea; second in onion; cabbage, tomato and brinjal and third in cabbage in the world (Singh *et al.*, 2003). Over the last five decades, there has been a three-fold increase in

area under fruits and four-fold increase in its production. It is estimated that since 1961, area, production and productivity of fruits increased by 3, 6.2 and 2 times, respectively. Vegetable production has tripled in the last 50 years. The value output from fruits and vegetables demonstrated a growth rate of 5.76 per cent per annum in real terms. Historically, there was virtually no export of fruits and vegetables. The exports of these crops have picked up remarkably after 1980s. Exports of fruits and vegetables more than doubled during the last two decades. It is important to note that although India is ranked second in the world production of fruits and vegetables, per capita availability of fruits and vegetables in India still continues to be much below dietary requirements (Singh *et al.*, 2004 and Gulati *et al.*, 1994).

Keeping the importance of horticulture sector in mind, the present paper is an attempt to analysis the performance of horticulture sector in India focusing on different related aspects.

Objectives of the study :

The main objectives of the study are as follow:

- To asses and analyze the recent performance trends in horticulture crops (Mainly Fruits and Vegetables) in India.
- To investigate the export performance of major horticulture crops from India.
- To access the export competitiveness of major horticulture crops from India.

RESEARCH METHODS

In the present study data on area, production and yield of horticulture crops is taken from various report

of the Indian Horticulture Database, published by the National Horticulture Board (NHB); The Wholesale prices and arrivals information is referred from report of the Indian Horticulture Database, published by NHB, and publication of the Directorate of Economics and Statistics on prices. Data regarding the quantity and value of export of fruits and vegetables has been collected from database, published by the National Horticulture Board (NHB), the India trade database of CMIE, database of Agricultural and processed food products export development authority (APEDA) and directorate general of foreign trade (DGFT).

RESEARCH FINDINGS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads :

Trends in horticulture development in India :

On account of prevalence of divers agro-climatic conditions and rich variability available in genetic resources, India can become the largest producer and exporter of horticultural crops. India leads the world in the production of mango, banana, sapota and acid lime. The country has recorded 120.52 per cent increase in the area and 149.79 per cent in production of fruits during the period of 1991-2010 (Table 1). Table 2 reveals that the area and production under vegetables has been increased 42.77 and 128.49 per cent during the study period. In the reported period under major spices, the increase in area and production was recorded to be 22.89 and 111.37 per cent, respectively (Table 3). The overall picture of area and production under horticulture crops has been shown in Table 4, table shows that area and

Table 1 : Area and production of fruit crops 1991-2010

Year	Area ('000 Ha)	Production ('000 MT)	Increase over 1991-92 (in percentage)	
			Area	Production
1991-92	2870	28630	-	-
2001-02	4010	43001	39.72	50.20
2009-10	6329	71516	120.52	149.79

Source: Data base of National Horticulture Board (Various issues)

Table 2: Area and production of vegetable crops 1991-2010

Year	Area ('000 Ha)	Production ('000 MT)	Increase over 1991-92 (in percentage)	
			Area	Production
1991-92	5593	58532	-	-
2001-02	6156	88622	10.07	51.41
2009-10	7985	133738	42.77	128.49

Source: Data base of National Horticulture Board (Various issues)

production increased by 63.43 and 126.34 per cent, respectively.

Further trends related to yield from the major fruits and vegetables have been shown in Table 5 and 6, respectively. The Table 5 divulge that yield from major fruits is low and declining over the period of 1993 to 2010. The value of yield from total fruits has been declined to 11.30 in 2010 from 11.70 in 1993. Papaya and banana remains able to maintain the major yield gain, citrus, litchi and guava reported marginal increase in their yield gain while remaining fruits have faced the yield lose over the period. Mango has the highest share in our exports and with its low yield the horticulture sector would to be hit. Also the area under mango plantation remained static because of land constraint. The existing mango plantation requires rejuvenation or replanting,

transformation, a short-term measure, has helped to retain or increase the productivity by a few years but the orchard owners feel that the need to replant the orchard. As per the existing forest rules, cutting of trees is not allowed and hence, replanting the orchard can't take place, which is why increasing the productivity of mango is facing several obstacles.

The Table 6 expose that yield from major vegetables is increasing over the period of 1993 to 2010. The value of yield from total vegetables has been declined to 16.75 in 2010 from 13.50 in 1993. For vegetables the decline in yield has only been seen for peas, although the gains in the yield are almost negligible for sweet potato, pumpkin, lettuce and beans. On the other hand, in cassava production, India has the highest yield in the world. For all the fresh fruits and vegetables, the potential yield

Table 3 : Area and production of spices 1991-2010

Year	Area ('000 Ha)	Production ('000 MT)	Increase over 1991-92 (in percentage)	
			Area	Production
1991-92	2005	1900	-	-
2001-02	3220	3765	60.60	98.16
2009-10	2464	4016	22.89	111.37

Source: Data base of National Horticulture Board (Various issues)

Table 4 : Area and production of overall horticulture 1991-2010

Year	Area ('000 Ha)	Production ('000 MT)	Increase over 1991-92 (in percentage)	
			Area	Production
1991-92	12770	98562	-	-
2001-02	16592	145785	29.93	47.91
2009-10	20870	223089	63.43	126.34

Source: Data base of National Horticulture Board (Various issues)

Table 5: Trends in yield for major fruits in India (Unit: tonnes/hectares)

Commodity	1993	2003	2010	Gains in yield over 1993 to 2003	Gains in yield over 2003 to 2010	Gains in yield over 1993 to 2010
Apple	6.3	7.6	6.28	1.30	-1.32	-0.02
Banana	27.6	27.8	34.36	0.20	6.56	6.76
Citrus	9	8.5	9.76	-0.50	1.26	0.76
Orange	8.9	6.8	7.30	-2.10	0.50	-1.60
Grapes	18.1	25.5	8.28	7.40	-17.22	-9.82
Guava	10.8	11.1	11.71	0.30	0.61	0.91
Litchi	5.6	8.9	6.50	3.30	-2.40	0.90
Mango	8.3	6	6.50	-2.30	0.50	-1.80
Papaya	22.7	29.1	40.90	6.40	11.80	18.20
Pineapple	16.2	15.3	15.09	-0.90	-0.21	-1.11
Sapota	13.8	7.6	8.47	-6.20	0.87	-5.33
Total fruits	11.7	9.8	11.30	-1.90	1.50	-0.40

Source: Data base of National Horticulture Board (Various issues), Mittal (2007)

possible is higher than the existing yields. For cassava, the higher yields can be explained by the fact that the domestic consumption of cassava is almost negligible and mostly cassava is cultivated under contract farming on commercial scale for exports. If the information about the production undertaken on commercial and non-commercial basis is looked into, then it is quite possible that the average yield level may appear far satisfactory. This further implies that if the farming is taken up in an organized manner with the use of inputs, their application, and harvesting techniques imparted to the producers then the yield level can be raised (Mittal, 2006).

Export trends of fruits and vegetables in India :

Export of fresh mango had commenced as early as 1925. Among vegetables onion has been the major crop exported from India. The APEDA has initiated a programme for an integrated training of horticulture producers for some identified fruits such as grape, mango, litchi, Kinnow in the selected regions. APEDA is also making efforts to enhance the shelf life of fruits such as mango, grape, litchi through use of controlled/modified atmosphere storage and use of refrigerator containers so that they could be transported by sea freight and achieve higher competitive advantage. In order to

Table 6 : Trends in yield for major vegetables in India (Unit: tonnes/hectares)

Commodity	1993	2003	2010	Gains in yield over 1993 to 2003	Gains in yield over 2003 to 2010	Gains in yield over 1993 to 2010
Brinjal	15.3	16.4	17.25	1.10	0.85	1.95
Cabbage	15.5	21.7	22.00	6.20	0.30	6.50
Cauliflower	15.2	18.5	18.88	3.30	0.38	3.68
Okra	10.3	10.3	10.62	0.00	0.32	0.32
Onion	10.9	11.3	16.08	0.40	4.78	5.18
Peas	8.4	6.7	8.30	-1.70	1.60	-0.10
Tomato	14.3	16.2	19.60	1.90	3.40	5.30
Patato	16.6	18.8	19.93	2.20	1.13	3.33
Sweet potato	8.5	8.9	9.21	0.40	0.31	0.71
Tapioca	24.5	27	34.76	2.50	7.76	10.26
Total vegetables	13.5	14.8	16.75	1.30	1.95	3.25

Source: Data base of National Horticulture Board (Various issues), Mittal (2007)

Table 7: Exports of fresh fruits and vegetables from India to the world

Commodity	Quantity (in tn)			Value (Rs. Lakh)		
	1991	2001	2010	1991	2001	2010
Apple	3075.2	5476.6	26880.30	183.5	884.3	3210.32
Banana	290.2	6289.7	54319.20	6.3	1280.8	13025.47
Orange	6611.2	24019.2	25060.10	239.1	2375.5	2539.26
Grapes	5347.7	14005.6	117677.40	854.6	5513.8	43364.74
Guava	237.3	2101.5	516.30	21.2	272.1	113.38
Litchi	NA	299.2	545.40	NA	73.8	88.92
Mango	19378.3	34631.2	74460.60	3121.6	7154.9	20053.96
Papaya	272.5	12660	17925.00	28.5	2076.1	1748.76
Pineapple	197.2	137.5	2462.30	13.8	38	402.69
Sapota	1299.4	1572.1	4197.70	102.3	243.1	504.51
Cabbage	NA	18	847.9	NA	2.1	74.78
Cauliflower	NA	21.1	1674.1	NA	3.1	90.84
Onion	240042.2	260475.3	1664922.4	9084.3	20461.9	231942.97
Peas	NA	1128.1	1270.7	NA	68.2	353.69
Tomato	117.1	1232.7	105861.6	7.1	62.9	10324.98
Patato	1530.4	28200.2	96398.5	48.9	669.3	7901.85

Source: Mittal (2007) and Data base of National Horticulture Board 2010

improve quality of fruits and vegetables, pre-harvest manuals for certain fruits and vegetables have been prepared for dissemination to farmers and producers. (Kumar and Mittal, 2003).

Mango occupies a premier position among fruits export. Other fruits, which have attained significant position in export, are grape, walnut, citrus (Kinnow), banana and apple. Small quantities of a number of other fruits e.g. litchi, guava, custard apple, pineapple papaya and tamarind have also demanded in the export market. Fresh vegetable export has been on the rise. The major vegetable exported is onion, with a share of 83.66 per cent in vegetable exports. Other crops with significant export include tomato, peas and cucumber (Gherkin). (Singh *et al.*, 2004). The National horticulture board (Table 7) provides the quantity and value of exports of fresh fruits from India to the world. The export quantity increased by more than four times in the last 20 years and the value of exports by 10 times. The major fruits exported in terms of quantity are mango (74.46 thousand tonnes), grapes (117.67 thousand tonnes), orange (25.06 thousand tonnes), apple (26.88 thousand tonnes), banana (54.31 thousand tonnes), other citrus fruits (11.4 thousand tonnes) and lemon (10.5 thousand tonnes). In value terms grapes and mango exports earn the maximum foreign exchange for India. In fresh vegetables, the Table 7

shows that onion and potato are the most important ones among the fresh vegetables, both in terms of quantity exported and value.

Export competitiveness :

To measure the export competitiveness of horticultural export from India revealed comparative advantage (RCA) has been applied, discussed as follow:

Revealed comparative advantage (RCA) :

Revealed comparative advantage ratio has been used to study the export comparative advantage of the products. The ratio is defined as:

$$R_{ih} = (X_{ih}/X_{it}) / (X_{wh}/X_{wt})$$

where,

R_{ih} = Revealed comparative advantage ratio for India in product of horticulture

X_{ih} = India's exports of product of horticulture

X_{it} = Total exports of India

X_{wh} = World exports of product of horticulture

X_{wt} = Total world exports.

The RCA ratio is the share of a given product in a country's exports to its share in world exports. A country is said to have the revealed comparative advantage in the product if the ratio is greater than one. The RCA ratio less than one imply a disadvantage. The ratio is

Table 8: Revealed comparative advantage of exports of fresh fruits and vegetables								
Commodity	1999	2000	2001	2002	2003	2004	2005	2009
Fruits								
Apple	0.12	0.05	0.15	0.13	0.09	0.16	0.21	0.28
Banana	0.09	0.14	0.12	0.08	0.07	0.07	0.10	0.13
Lemon	0.15	0.25	0.29	0.15	0.23	0.16	0.20	0.22
Mosambi	0.54	0.09	0.08	0.40	7.00	9.37	2.97	1.71
Orange	0.51	0.54	0.52	0.35	0.59	0.30	0.31	0.29
Grapes	0.87	1.06	0.69	1.09	0.86	0.81	1.17	1.22
Guava and mango	7.22	5.78	6.07	6.16	17.92	18.37	18.83	19.77
Papaya	8.01	4.85	0.71	1.00	0.75	0.68	0.89	0.93
Pineapple	0.04	0.12	0.11	0.07	0.08	0.06	0.11	0.09
Vegetables								
Brinjal	0.00	0.000	0.00	0.00	0.22	0.27	0.07	0.11
Cabbage	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00
Onion	7.48	9.59	9.48	8.15	12.41	10.57	10.63	11.35
Peas	1.08	0.69	0.61	2.32	2.04	0.93	0.45	0.51
Tomato	0.01	0.01	0.01	0.08	0.04	0.03	0.05	0.04
Potato	0.35	0.35	0.08	0.23	0.46	0.42	0.60	0.55
Sweet potato	0.03	0.19	0.10	0.06	0.07	0.03	0.16	0.13
Beans	0.01	0.06	0.00	0.01	0.11	0.13	0.11	0.17

Source: Mittal (2007) and author's calculations

influenced by the individual countries' internal and external trade policies like government interventions, import restrictions, subsidies and high tariffs, etc. Thus, a disadvantage may not be a true picture of the comparative status, but it may also indicate that the trade policies are not in favour of the exports of the produce (Mittal, 2007).

The results of the RCA ratio for major fruits and vegetables are presented in Table 8. The results are presented for the years 1999 to 2009. Among all the major fruits and vegetables that we produce and export the ratio is above one for mango and guava in the fruits group and onion in the vegetables group for all the years. The ratio for these two produce have been increasing since 1999 and the magnitude of the ratio is huge (Mittal, 2007). This implies that the comparative advantage of these produce has increased over time, India has very high comparative advantage. For peas RCA ratio has been above one for years 2002 and 2003 but in 2004, 2005 and 2009 again the RCA is less than one. Mosambi had the RCA ratio less than one from 1999 till 2002, after which its ratio was 7 in 2003 which increased to 9.37 in 2004 but has come down to 2.97 in 2005 and further declined to 1.71 in 2009. For papaya, India had the comparative advantage in 1999, 2000 and 2002; the ratio has now declined to 0.93. Regarding the comparative advantage in vegetables, India has comparative advantage only in producing the onion as RCA value for onions has been increasing (increased from 7.48 to 11.35). For all other fruits and vegetables India is not having any revealed comparative advantage in exports.

If a commodity has a comparative advantage then it means that the share of this country exports is increasing in the world total share, but this commodity might not be export competitive in price terms. Thus it means that the high delivery cost impacts the competitive of our fresh fruits and vegetables, due to this commodities in which we might have comparative advantage lose in the world market due to high costs of delivery (transportation cost). The best examples for this are onion and mango. Mattoo *et al.* (2007) confirms that apart from quality problems and policy barriers Indian exporters have to face an important impediment which significantly erodes the production cost advantage enjoyed by Indian farmers. Domestic and international transportation cost is the single largest contributor to the retail price, accounting

for nearly 25-40 per cent of the price (Mittal, 2007).

Conclusion :

This paper was an attempt to analyze the trends in major horticulture crops development in India, state wise performance of horticulture development and to measure the export competitiveness. The study finds that fruits and vegetables are prominent in the horticulture. Further the study reveals that India is not having any revealed comparative advantage in exports of fruits of vegetables except the mosambi, grapes, mango in fruits and onions in vegetables. This can not be regret as happy situation. The study suggest that there is an immediate need to integrate the production, marketing and processing processes of the produce to get maximum benefits from horticulture crops cultivation.

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