

Research Paper

A Study on Export Scenario of Vegetables from India: An Economic Analysis

Govind Pal*, Shubhadeep Roy, Neeraj Singh, P.M. Singh, S.N.S. Chaurasia and T.K. Behera

ICAR-Indian Institute of Vegetable Research, Varanasi, Uttar Pradesh, India

*Corresponding author: drpal1975@gmail.com (ORCID ID: 0000-0001-8491-0148)

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ABSTRACT

India is the second largest producer of vegetables, next to China. India's share is 11.95 per cent of total global production with 204.61 million tonnes from area of 11.28 million hectares. The share of vegetables export in India's agriculture and related products is 3.30 per cent and share in export of horticultural products is 16.21 per cent respectively during 2021-22. The present study was carried out with a view to analyze the export scenario of vegetables in India. The data were collected and analyzed for a period of twenty years (2001-02 to 2020-21). The compound annual growth rate in export of vegetables was worked out by fitting the exponential function. During the overall period of twenty years, both exported quantity and value of vegetables from India registered a positive trend and the compound annual growth rate was 6.66 and 14.40 per cent for exported quantity and value respectively. Under different component of vegetables highest compound annual growth rate in exported quantity was registered in other fresh vegetables category (10.83 per cent per annum) and in exported value it was vegetable seeds (18.85 per cent per annum). The largest quantity is exported in the form of onions (56.86 per cent) followed by other fresh vegetables (25.14 per cent), processed vegetables (10.47 per cent), cucumber and gherkins (7.24 per cent) and vegetable seeds (0.28 per cent). The share of vegetable exports in total vegetable production was ranging from 1.25 to 2.14 per cent during last one decade. In terms of value Bangladesh was the major importing country for Indian onions, UAE for other fresh vegetables, USA for cucumber & gherkins and processed vegetables and Netherlands for vegetable seeds. Awareness to farmers regarding export specifications and quality vegetable production, increase in infrastructural facilities related to export of vegetables, improved post-harvest technologies, promotion of need based processed products for export, identification of potential and new emerging markets, strict quality control and proper policies related to export of vegetables may contribute to increased foreign trade of India.

HIGHLIGHTS

- ① The exported quantity and value of vegetables shows increasing trend with minor fluctuations during the study period (2001-02 to 2020-21).
- ② The compound annual growth rate in export of vegetables was 6.66 and 14.40 per cent for exported quantity and value respectively during the study period.
- ③ The maximum exported quantity of vegetables was in the year 2016-17 (38.06 lakh tons) and maximum exported value of vegetables was in the year 2020-21 (₹ 10947.24 Crores).
- ④ The share of vegetable exports in total vegetable production was ranging from 1.25 to 2.14 per cent during last one decade.
- ⑤ Processed vegetables registered highest growth rate in exported quantity and value (15.16 and 12.75 per cent per annum respectively during the year 2016-17 to 2020-21 under different component of vegetables).

Keywords: Vegetables, export, market, compound annual growth rate

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India is the second largest producer of vegetables, next to China. India's share is 11.95 per cent in total global production of vegetables (FAO, 2023). The production of vegetables in India is 204.61 million tonnes from area of 11.28 million hectares (Anonymous, 2022). In the world, India occupies first position in the production of okra second in potatoes, tomatoes, eggplants, green peas, cauliflowers & broccoli, cabbages, green garlic and third in lettuce & chicory (FAO, 2023). Share of vegetables export in India's total export is only 0.37 per cent, share in export of agriculture and related products is 3.30 per cent and share in export of horticultural products is 16.21 per cent respectively during 2021-22 though vegetable production is more important in terms of social, nutritional, livelihood security, income and employment generation for the majority of small of marginal farmers.

Vegetables are rich source of vitamins, minerals and plant fibres which provide food and nutritional security to human health. Majority of the vegetables have a short crop-cycle and therefore provide returns round the year. India is bestowed with varied agro-climatic conditions, which allow growing of several types of vegetables in the country. There is a change in the dietary pattern of people with rise in income and living standard and increase in awareness about quality of food. The demand for vegetables has been constantly increasing due to health consciousness. Growing demand for vegetables is considered to have a favourable economic effect on small and marginal farmers who dominate the Indian agriculture. Marginal and small farmers comprising 86.07 per cent of the total holdings with an area share of 46.49 per cent, contributes majority of the vegetables production in the country (Anonymous, 2019). Smallholders have a distinct advantage in vegetable production as vegetable cultivation is labour intensive and smallholders have abundant labour availability.

The increasing trend of agricultural trade at international level benefits promotion of rural development, agricultural exports and economic growth. India being an agricultural base country has a large potential for foreign trade through vegetables. India has huge production base of vegetables provides excellent export opportunities. Despite this advantage, India's share in

the global market is very less and accounts for only 3.15 per cent in terms of quantity and 1.39 per cent in terms of value of the global trade in vegetables (FAO, 2023). Very few studies have been conducted on different aspects of vegetable export (Vanitha *et al.* 2014; Pal *et al.* 2015; Mohandas *et al.* 2018; Vasavada and Shiyani, 2021). Considering the importance of vegetables as export, the present study was taken up with the objectives to analyze the export status of vegetables in India in terms of quantity and value of export, forms of export, major destination of exports and constraints in export.

Methodology

The study is based on the secondary data which were obtained from online data base of Agricultural and Processed Food Export Development Authority, Ministry of Commerce and Industry, Government of India (APEDA, <https://apeda.gov.in/apedawebiste/>). Export data of vegetables and its different component from India in terms of quantity and value have been obtained for 20 years (2001-02 to 2020-21), total vegetable production in the country have been obtained for 10 years (2011-12 to 2020-21) and data on export market of different component of vegetables from India have been obtained for the year 2020-21.

Statistical tools like growth rate and percentages were used for analysis. The Compound Annual Growth Rate (CAGR) in export of vegetables and its different component was worked out by fitting the exponential function given below:

$$Y_t = ab^t$$

Y = The dependent variable (export); a = Constant term; b = Regression coefficient; t = Time variable in years

The equation can be re-written in the logarithmic form (base 10) as follows:

$$\log Y_t = \log a + t \log b$$

where, Y_t = export of vegetables in t^{th} year.

We can, thus, calculate the compound annual growth rates (r) as under:

$$CGR \text{ in per cent } (r) = (Antilog \text{ of } \log b - 1) \times 100$$

Where, r = Compound annual growth rate per annum (per cent).

RESULTS AND DISCUSSION

Average export of vegetables from India during different durations has been presented in Table 1.

Table 1: Average export of vegetables from India

Period	Exported quantity (Lakh tons)	Exported value (₹ Crores)
Five years duration		
2001-02 to 2005-06	11.03	1315.57
2006-07 to 2010-11	21.62	3602.88
2011-12 to 2015-16	26.09	7043.89
2016-17 to 2020-21	30.46	9672.56
Ten years duration		
2001-02 to 2010-11	16.32	2459.23
2011-12 to 2020-21	28.27	8358.22
Twenty years duration		
2001-02 to 2020-21	22.30	5408.72

Average exported quantity of vegetables during decade I (2001-02 to 2010-11) was 16.32 Lakh tons and the same has been increased to 28.27 Lakh tons during decade II (2011-12 to 2020-21). During the same period average exported value of vegetables has increased from ₹ 2459.23 Crores to ₹ 8358.22 Crores. Average exported quantity and value of vegetables from India during five yearly durations has increasing trend over period of time and it was maximum during 2016-17 to 2020-21.

The Compound Annual Growth Rate (CAGR) and trend in export of vegetables from India in terms of quantity and value during the period 2001-02 to 2020-21 has shown in Table 2 and Fig. 1.

Table 2: Compound annual growth rate (CAGR) in export of vegetables from India (per cent / annum)

Period	Exported quantity	Exported value
Five years duration		
2001-02 to 2005-06	20.94	20.67
2006-07 to 2010-11	4.08	15.01
2011-12 to 2015-16	-1.22	14.59
2016-17 to 2020-21	-6.90	3.12

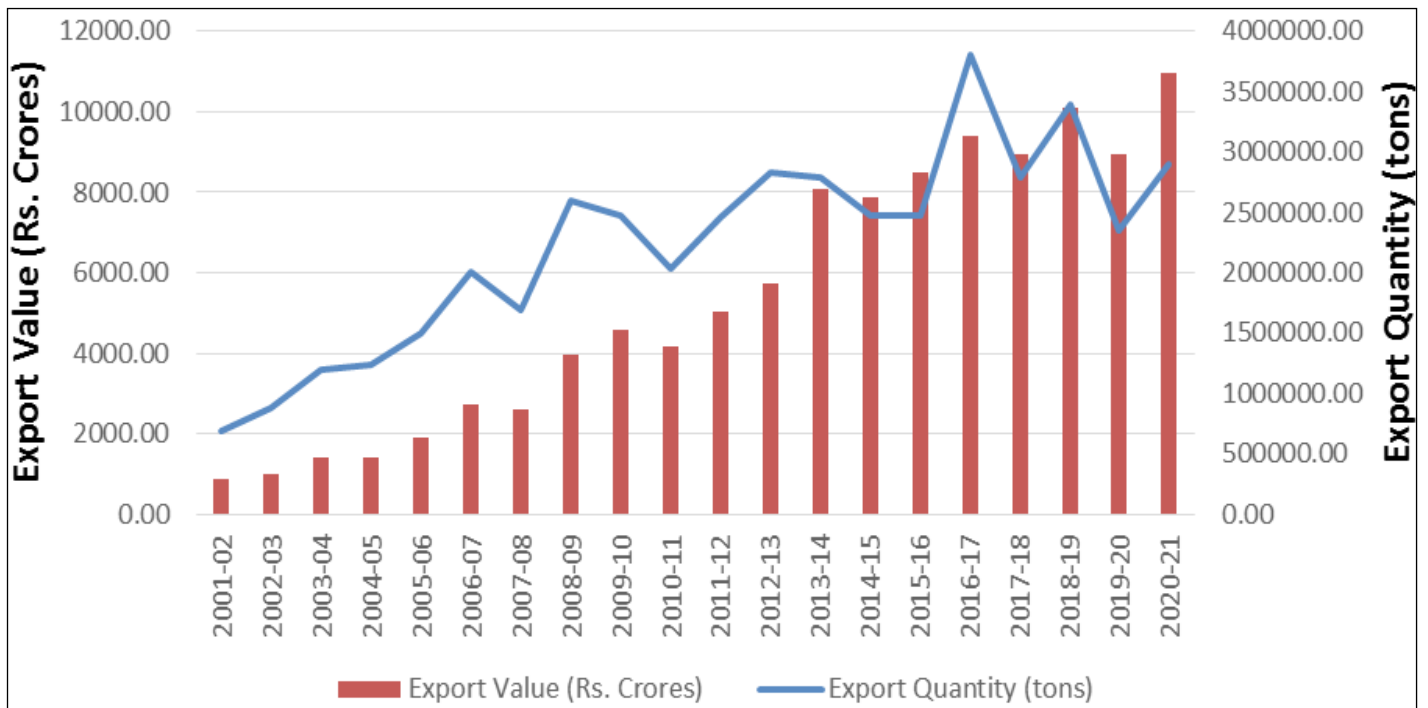


Fig. 1: Trend in export quantity and value of vegetables from India during 2001-02 to 2020-21

Ten years duration		
2001-02 to 2010-11	14.29	21.42
2011-12 to 2020-21	1.16	7.36
Twenty years duration		
2001-02 to 2020-21	6.66	14.40

The exported quantity and value of vegetables shows increasing trend with minor fluctuations during the study period. During the overall period (2001-02 to 2020-21), both exported quantity and value of vegetables from India registered a positive trend and the compound annual growth rate in export of vegetables was 6.66 and 14.40 per cent for exported quantity and value respectively. Compound annual growth rate in exported quantity and value of vegetables from India during five yearly durations was maximum during 2001-02 to 2005-06 and it was 20.94 and 20.67 respectively. Compound annual growth rate in exported quantity and value of vegetables from India during decade I (2001-02 to 2010-11) was 14.29 and 21.42 per cent per annum respectively which was much higher than the decade II (2011-12 to 2020-21).

Decade-wise maximum and minimum annual export of vegetables from India in terms of quantity and value have been presented in Table 3. The maximum exported

quantity of vegetables was in the year 2016-17 (38.06 lakh tons) and the minimum exported quantity was in the year 2001-02 (6.88 lakh tons) during the study period. Similarly, maximum exported value of vegetables was in the year 2020-21 (₹ 10947.24 Crores) and the minimum exported value was in the year 2001-02 (₹ 866.07 Crores).

The technological innovations in vegetable production have enhanced their export potential. The export of vegetable products has the capacity to earn twenty to thirty times more foreign exchange per unit area than cereals (Adhiguru *et al.* 2004). The quantity and value of the vegetables exported from India along-with total vegetable production in the country have been reported in Table 4. It is clear from the Table that only a small portion of the total vegetable production was being exported. It was found that export of vegetables was growing at an annual rate of 1.16 per cent in quantity and 7.36 per cent in value terms during the year 2011-12 to 2020-21. The share of vegetable exports in total vegetable production was ranging from 1.25 to 2.14 per cent during last one decade. There is a large demand for some high-value vegetables in the international markets. India can harness this opportunity by reaching foreign markets with good quality products.

Table 3: Decade-wise maximum and minimum annual export of vegetables from India in terms of quantity and value

Decade / Period	Maximum annual exported quantity (₹ lakh tons)	Maximum annual exported value (₹ Crores)	Minimum annual exported Quantity (₹ lakh tons)	Minimum annual exported value (₹ Crores)
I (2001-02 to 2010-11)	26.02 (2008-09)	4584.90 (2009-10)	6.88 (2001-02)	866.07 (2001-02)
II (2011-12 to 2020-21)	38.06 (2016-17)	10947.24 (2020-21)	23.54 (2019-20)	5029.32 (2010-11)

Table 4: Export of vegetables from India during 2011-12 to -2020-21

Year	Export		Total Vegetable production (mt)	Export share in production (%)
	Quantity (mt)	Value (₹ Crores)		
2011-12	2.46	5029.32	156.33	1.58
2012-13	2.83	5748.09	162.19	1.75
2013-14	2.79	8088.38	162.88	1.72
2014-15	2.47	7855.76	169.48	1.46
2015-16	2.48	8497.91	169.48	1.46
2016-17	3.81	9384.23	178.17	2.14
2017-18	2.78	8959.70	184.39	1.51
2018-19	3.39	10120.29	183.17	1.85
2019-20	2.35	8951.32	188.28	1.25
2020-21	2.89	10947.24	200.45	1.44
CAGR (%)	1.16	7.36	2.56	-

Share of different component in export of vegetables from India during TE 2020-21 for exported quantity and value have been presented in Fig. 1 and 2. The data for TE 2020-21 shows that the largest quantity is exported in the form of onions (56.86 per cent) followed by other fresh vegetables (25.14 per cent), processed vegetables (10.47 per cent), cucumber and gherkins (7.24 per cent) and vegetable seeds (0.28 per cent). In terms of value of export, it is largest for processed vegetables (29.82 per cent) followed by onions (28.70 per cent), other fresh vegetables (20.91 per cent), cucumber and gherkins (14.42 per cent) and vegetable seeds (6.14 per cent).

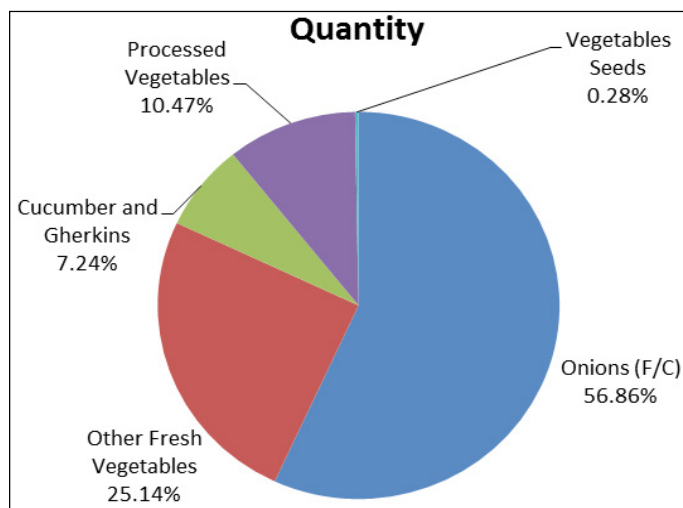


Fig. 2: Share of different component in export of vegetables from India during TE 2020-21 (quantity term)

Compound annual growth rate in export of different component of vegetables from India has been presented in Table 5. The different components of vegetables were onions, other fresh vegetables, cucumber & gherkins, processed vegetables and vegetable seeds. During the overall period (2001-02 to 2020-21), both exported quantity and value of all components of vegetables from India registered a positive trend. Highest compound annual growth rate in exported quantity was registered in other fresh vegetables category (10.83 per cent per annum) and in exported value it was vegetable seeds (18.85 per cent per annum).

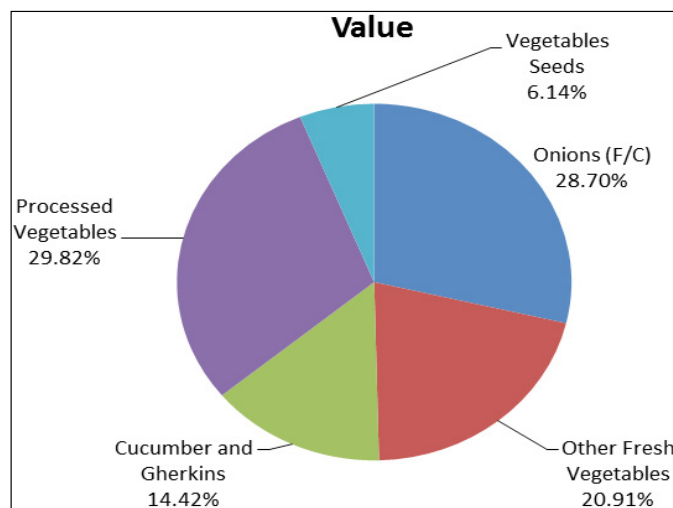


Fig. 3: Share of different component in export of vegetables from India during TE 2020-21 (value term)

Table 5: Compound annual growth rate in export of different component of vegetables from India (per cent / annum)

Period	Onions (F/C)		Other fresh vegetables		Cucumber and gherkins		Processed vegetables		Vegetable seeds	
	Exported quantity	Exported value	Exported quantity	Exported value	Exported quantity	Exported value	Exported quantity	Exported value	Exported quantity	Exported value
Five years duration										
2001-02 to 2005-06	21.46	23.24	6.00	-2.94	39.30	40.06	27.49	24.65	7.52	8.40
2006-07 to 2010-11	1.96	18.01	14.41	21.61	1.07	7.00	4.20	10.80	4.50	5.78
2011-12 to 2015-16	-1.87	14.22	2.37	17.54	-4.24	9.70	-5.26	13.63	-13.96	21.14
2016-17 to 2020-21	-11.09	-4.64	-7.05	-3.61	2.87	11.64	15.16	12.75	0.59	12.32
Ten years duration										
2001-02 to 2010-11	13.07	23.42	15.83	18.67	18.79	23.79	15.82	19.55	8.30	15.26
2011-12 to 2020-21	1.42	4.30	-0.18	5.24	-2.14	7.50	5.60	10.99	2.66	17.43
Twenty years duration										
2001-02 to 2020-21	5.29	11.87	10.83	17.14	4.64	13.40	8.44	16.13	5.73	18.85

Similarly, lowest growth rate in exported quantity was registered in cucumber & gherkins (4.64 per cent per annum) and in exported value it was onions (11.87 per cent per annum). Decade-wise analysis showed that decade I (2001-02 to 2010-11) has higher growth rate in both quantity and value in all components of vegetables compared to decade II (2011-12 to 2020-21). During decade II, other fresh vegetables and cucumber & gherkins registered negative growth rate in exported quantity while other exported quantity and value showed positive growth rate. During decade II, processed vegetables registered highest growth rate in exported quantity (5.60 per cent per annum) and in exported value it was vegetable seeds (17.43 per cent per annum). During the year 2016-17 to 2020-21, processed vegetables registered highest growth rate in exported quantity and value (15.16 and 12.75 per cent per annum respectively).

The major countries to which different forms of vegetables were exported from India during 2020-21 have been presented in Table 6. Bangladesh was the major importing country of Indian onions (in terms of value) accounting for nearly 26.73 per cent of total export. Malaysia comes next with 16.33 per cent share followed by UAE 11.69 per cent, Sri Lanka 11.08 per cent and Nepal 5.83 per cent of total export. Onions was exported to 61 countries of the world. UAE was the major importing country of Indian other fresh vegetables

accounting for nearly 20.66 per cent of total export. Nepal comes next with 19.38 per cent share followed by Bangladesh 11.59 per cent, U.K. 8.91 per cent and Qatar 8.74 per cent of total export. Other importers include more than 85 countries of the world including Oman, Kuwait, Saudi Arab Malaysia and Maldives. USA was the major importing country of Indian cucumber and gherkins accounting for nearly 25.30 per cent of total export. Russia comes next with 8.10 per cent share followed by France 7.83 per cent, Germany 7.36 per cent and Belgium 6.70 per cent of total export. Cucumber and gherkins was exported to 89 countries of the world. Again, USA was the major importing country of Indian processed vegetables accounting for nearly 20.36 per cent of total export. U.K. comes next with 9.40 per cent share followed by Germany 6.28 per cent, Thailand 5.33 per cent and Canada 4.41 per cent of total export. Other importers include 157 countries of the world including Nepal, UAE, Australia, Russia and Brazil. Netherlands was the major importing country of Indian vegetable seeds accounting for nearly 19.62 per cent of total export. USA comes next with 13.93 per cent share followed by Bangladesh 11.48 per cent, UAE 6.89 per cent and North Korea 4.16 per cent of total export. Vegetable seeds were exported to 96 countries of the world.

The major constraints faced by farmers related to export of vegetables were small and scattered quantity of produce, inability to meet quality requirements for

Table 6: Export market of different component of vegetables from India

Onions (F/C)		Other fresh vegetables		Cucumber and gherkins		Processed vegetables		Vegetable seeds	
Destination	%	Destination	%	Destination	%	Destination	%	Destination	%
Bangladesh	26.73	UAE	20.66	U S A	25.30	U S A	20.36	Netherlands	19.62
Malaysia	16.33	Nepal	19.38	Russia	8.10	U.K.	9.40	U S A	13.93
UAE	11.69	Bangladesh	11.59	France	7.83	Germany	6.28	Bangladesh	11.48
Sri Lanka	11.08	U.K.	8.91	Germany	7.36	Thailand	5.33	UAE	6.89
Nepal	5.83	Qatar	8.74	Belgium	6.70	Canada	4.41	North Korea	4.16
Indonesia	3.99	Oman	4.97	Spain	6.38	Nepal	4.21	Japan	4.12
Saudi Arab	3.55	Kuwait	3.95	Canada	6.34	UAE	3.99	Thailand	3.94
Qatar	3.30	Saudi Arab	3.02	Australia	4.84	Australia	3.92	Kenya	3.31
Kuwait	2.96	Malaysia	2.36	Netherland	3.79	Russia	3.72	Vietnam	2.56
Oman	2.87	Maldives	2.27	U K	3.23	Brazil	3.16	Italy	2.18
Others (51)	11.67	Others (83)	14.15	Others (79)	20.13	Others (152)	35.22	Others (86)	27.81

Figures are based on the exported value from India during 2020-21; Figures in parentheses are the number of countries.

export, lack of exportable varieties, insufficient storage and transport facilities, dependency on pesticide usage, lack of Institutional supports, heavy post-harvest losses and low utilization in processing sector. The major constraints faced by the exporters of vegetables were poor infrastructure facilities (pack houses, quality packing materials, cool chain, controlled / modified atmosphere containers), lack of standardization on post-harvest handling, tedious documentation procedures for export, unavailability of market information and strategies. The major constraints related to supply chain and market access were uneconomic scale of operation, lack of consistency in supply and quality, intermediation and wastages losses, export subsidies and domestic support, short product life cycle and lack of brand image (Gondalia *et al.* 2017; Thulasiram and Alagumani, 2018; Thulasiram, 2020).

Development of cost-effective production technologies, awareness to farmers regarding export specifications and quality vegetable production, increase in infrastructural facilities related to export of vegetables, improved post-harvest technologies, utilization of full capacity of the vegetable processing industry, promotion of need based processed products for export, identification of potential and new emerging markets, strict quality control and proper policies related to export of vegetables may contribute to increased foreign trade of India. Improved quality of produce and better competitiveness in the world market will certainly increase Indian vegetable market share.

To boost the agricultural exports from India, in March 2001, Government of India announced a policy of setting up of Agri Export Zones (AEZs) across the country. The Central Government has sanctioned 60 AEZs comprising about 40 agricultural commodities and these AEZs are spread across 20 states in the country. APEDA has been nominated as the Nodal Agency to coordinate the efforts on the part of Central Government. The AEZs is centered on a cluster approach of identifying the potential products, the geographical region in which these are grown and adopting an end to end approach of integrating the entire process, right from production to the market. The benefit for setting

up AEZs are strengthening of backward linkages with a market oriented approach, product acceptability and its competitiveness abroad as well as in the domestic market, value addition of agricultural produce, reduction in cost of production through economy of scale, better price for produce, improvement in product quality and packaging, promotion of trade related R&D and increased employment opportunities.

CONCLUSION

Average exported quantity of vegetables during decade I (2001-02 to 2010-11) was 16.32 Lakh tons and the same has been increased to 28.27 Lakh tons during decade II (2011-12 to 2020-21). During the same period average value of exported vegetables has increased from ₹ 2459.23 Crores to ₹ 8358.22 Crores. The exported quantity and value of vegetables shows increasing trend with minor fluctuations during the reporting period. Compound annual growth rate in exported quantity and value of vegetables from India during decade I was 14.29 and 21.42 per cent per annum respectively which was much higher than the decade II. The maximum exported quantity of vegetables was in the year 2016-17 (38.06 lakh tons) and the minimum exported quantity was in the year 2001-02 (6.88 lakh tons). The different components of vegetables were onions, other fresh vegetables, cucumber & gherkins, processed vegetables and vegetable seeds. During the overall period (2001-02 to 2020-21), both exported quantity and value of all components of vegetables from India registered a positive trend. The value of export for TE 2020-21 was largest for processed vegetables (29.82 per cent) followed by onions (28.70 per cent), other fresh vegetables (20.91 per cent), cucumber and gherkins (14.42 per cent) and vegetable seeds (6.14 per cent). Onions was exported to 61 countries of the world, other fresh vegetables to 93 countries, cucumber and gherkins to 89 countries, processed vegetable 162 countries and vegetable seeds to 96 countries. Improved quality of produce and better competitiveness in the world market will certainly increase Indian vegetable market share.

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