

## Economic Assessment of Onion Dehydration in Gujarat State: Can It be a Means for Stabilizing Onion Prices?

N.J. Ardeshna<sup>1</sup>, S.B. Vekariya<sup>2</sup>, R. L. Shiyani<sup>3</sup>, and V. L. Gondaliya<sup>2</sup>

Department of Agricultural Economics, Junagadh Agricultural University, Junagadh, Gujarat, INDIA

Corresponding author: nardeshna@yahoo.com

Paper no: 131 Received: 10 January, 2014 Revised: 26 March, 2014 Accepted: 29 May, 2014

### Abstract

Onion is extremely important vegetable for earning foreign exchange grown in an area of 1.04 million hectares with a production of 15.74 million tonnes in the country during the year 2011-12. The world's largest exporter India exported 15.53 lakh tonnes in the year 2011-12. Dehydration of onion has the potential to reduce the storage losses as well as in price stabilization. Gujarat state with 6 % share in area and 10 % share in production occupied third rank in area and production and first rank in productivity of the onion in 2011-12. The onion dehydration industry of the state is the biggest in the country and it comprises 80 % of the total dehydration units. This study explores processing cost, marketing cost and margin and employment generation in onion dehydration industry of Gujarat as well as growth of export of onion from India. The study based on primary data on processing and marketing cost collected from Junagadh and Bhavnagar district of Gujarat state and time series data on export of onion. It was found that the cultivation of onion is concentrated in the Saurashtra region of Gujarat. The area, production and productivity of onion crop increased at the rate of 9.53, 8.74 and 0.52 % annum, respectively during the period from 2001-02 to 2011-12. The cost of raw material in onion processing was found to be the major cost in total cost of processing. The net profit of ₹ 1931.64 per tonne of onion processing was realized by the processors. The processors got ₹1.15 per investment of one rupee while they recovered their total investment in 5.08 years. The processors preferred round shaped white onion having average diameter of 58 mm in order to obtain better quality of processed products. The export of dried onion and fresh onion from India increased at the rate 17.46 and 6.86 % per annum during 2001-02 to 2012-13, respectively. An appropriate export policy along with policy on fixing Minimum Export Price during glut season and efforts to minimize the variation in prices of onion in order to stabilize the area of the crop are the suggestions emerges from the study.

**Keywords:** Economic, assessment, onion, dehydration, gujarat, price stabilization

Onion (*Allium cepa L.*) is extremely important vegetable crop not only for internal consumption but also for the highest foreign exchange earner among the fruits and vegetables. Consumption of onions may prevent gastric ulcers, combat heart disease, inhibit strokes, lower blood pressure and cholesterol and stimulate the immune system. According to Food and Agriculture Organization (FAO), there are 6.7 million acres of land under onion in the world, producing 105 billion pounds of onion each year.

Approximately 8 % of the global onion production is traded internationally. Leading onion production countries are China, India, United States, Turkey and Pakistan. India is the second largest producer of onion in the world next to China. According to 2011 FAO estimates, India contributes nearly 19.25 % of world onion production. During the agricultural year 2011-12, onion was grown in an area of 1.04 million hectares with a production of 15.74 million tonnes in the country. The onion yield in country has improved from 9961 kg per hectare in the year 1980-81 to 14898 kg per hectare in the 2011-12.

The onion export from India has increased drastically in last sixty years and gone upto 15.53 lakh tonnes in the year 2011-12. India is the world's largest exporter of onion (Surabhi Mittal, 2007, Anonymous, 2012a). The total value of the export has also gone up from ₹ 1.06 crores to ₹ 2141.43 crores in the same period (Anonymous, 2012<sub>b</sub>). The mission of NHRDF is to utilize the available scientific and natural resources strength and provide technological empowerment to farmers through capacity building, for sustainable production and to promote export of onion. Unit value of onion export is increasing drastically due to excess demand for Indian onion in the international markets. Exports of onion from India are regulated and permitted only through certain designated canalizing agencies. One of the prime agencies is the National Agricultural Cooperative Marketing Federation (NAFED), which is the sole agency for exports of onion from India.

Although there has been an increasing trend in the quantum and value of exports of onion from the country, the exports are subject to wide fluctuations from year to year. This may be attributed to the fact that the exports of onion have not been free but are canalized through NAFED and now through some other agencies. Such agencies are protecting the domestic consumer and probably the producer from unduly high prices and gluts as well. The exports of onion have fetched the country valuable foreign exchange and at the same time, have given high price to the producer. The export potential of onion is quite high and a large number of dehydration plants are already in operation in many parts of the country. Drying of onion flakes has the potential not only to reduce the storage losses but it also helps in stabilizing the price. These dehydration plants use tray dryers for drying the onion flakes. The drying is done using hot air at 55 to 70°C. It is widely used in canned soups, salads, burgers, pizzas, dry soup mixes and other fast food preparations. Popularity of dehydrated onion is increasing now-a-days. Advantages of dehydrated onion are storage stability and ease of preparation. Commercial processing plants prescribes a shrinkage ratio of 7:1 to 15:1 with a moisture content of 4 % in final product. Dehydrated onions are sold in many forms as slices, chopped, minced, granulated and powdered.

Although onion is cultivated almost all over the country, the major producing states are Maharashtra, Karnataka, Madhya Pradesh, Gujarat, Rajasthan, Andhra Pradesh, Uttar Pradesh, Orissa, and Tamil Nadu. Maharashtra is the leading producer of onion in the country with a contribution of 32.6 % of total onion production (Anonymous, 2012 b) followed by Karnataka (17.6 %), Gujarat (10 %), and Bihar (7 %). Comparing 2000-01 and 2011-12, the production increased from 131.2 thousand tonnes to 1562.2 thousand tonnes in Gujarat. The significant increase in the production in the past decade was attributed to increase in the area under the crop, improved technology and the government efforts under National Horticultural Mission (NHM). Gujarat is the major onion producing state with its share of 6 % in area (61300 ha) and 10 % in production of in India in 2011-12. The Gujarat state occupies third rank in terms of area and production while it occupies first in terms of productivity of the onion in 2011-12. The acreage under onion cultivation in Saurashtra region is 55000 ha. which produces

14.41 lakh tonnes of onion in 2011-12. The Saurashtra region alone accounts for 90 % of area and production of onion in the state and belongs to Agri Expor Zone for dehydrated onion and garlic. The district of Bhavnagar is the major onion growing district of the state with 30 % share in onion production in the state.

Onion dehydration industry of the state is the biggest in the country and it comprises 80 % of the total dehydration units which process nearly one lakh tonnes of onion (Directorate of Horticulture, Gujarat state, Gandhinagar). High initial investment in onion processing industry and high uncertainty in production enhanced the risk in this business. Hence, it is worthwhile to study the economic aspects of this business with a view; to workout the processing cost of different processed products of onion, to examine the marketing cost and margin, to estimate the employment generation from the industry, to workout the compound growth of export of onion from India and to identify the problems of the processing industry.

### Methodology

The Bhavnagar and Junagadh districts were purposively selected for the study because maximum numbers of onion processing units are located in these districts. The primary data on processing and marketing cost were collected for the year 2011-12 and 2012-13, respectively from 33 and 22 selected processing units (Table 1). The collected data were analyzed by using ratios and averages in order to achieve the objectives of the study. Time series data on area, production and productivity of onion were collected from Directorate of Agriculture, Gujarat State, Gandhinagar. Country wise time series data on export of onion were also collected and compiled from the Department of Commerce, Government of India, New Delhi for the period from 2001-02 to 2011-12.

The compound growth rates (CGRs) of area, production and productivity of onion in Gujarat as well as export of onion from India were computed by fitting the exponential function,  $Y = a b^t$ . Where,  $Y =$  area/ production/ productivity /quantity exported/ value of export,  $a =$  Constant,  $b =$  Regression Co-efficient and  $t =$  Time variable. The annual Compound Growth Rates (CGR) was worked out using following formula:  $CGR (\%) = (\text{Anti log of } b-1) \times 100$ . The Co-efficient of variation (CV) was used to measure the level of instability in export of onion.

**Table 1:** Details of selected onion processing units in South Saurashtra region of Gujarat

District	2011-12			2012-13	
	Taluka	No. of units	% to total units	No. of units	% to total units
Bhavnagar	Mahuva	28	84.85	22	100.00
Junagadh	Una	05	15.15	00	0.00
Total		33	100.00	22	100.00

### Results and Discussion

The details of districtwise area, production and productivity of onion cop in the year 2011-12 are given in Table 2. It is apparent from the table that about 90 % of the total area of the Gujarat state under onion cultivation was observed in the Saurashtra region which produced about 92 % of the total onion

production of the Gujarat state. The crop is cultivated in 11 districts of the state. The majority of onion growing districts belongs to Saurashtra region indicating highly concentration of the crop in the Saurashtra region. The highest area and production under onion crop was observed in Bhavnagar district, followed by Junagadh district.

The compound growth rates of area, production and productivity of the crop during 2001-02 to 2011-12 were worked out separately for Gujarat state and Saurashtra region and presented in Table 3. It can be observed from the results that the growth of the area, production and productivity of the crop was significant in Gujarat state as well as in the Saurashtra region. The area under the crop increased at the rate of 9.53 % per annum in Gujarat which was slightly lower than that of the Saurashtra region (9.86 %/annum). Similarly, the growth of production was also lower in Gujarat state (8.74 %/annum) as compared to Saurashtra region (10.16 %/annum). Anonymous (2013) also reported many fold increase in area and production of onion in Gujarat during 2002-2012. The lower productivity growth in the state as well as in the Saurashtra region were respectively 0.52 and 0.28 % per annum which indicated the plateau of productivity of the crop. These results are in conformity with the findings of Ardehna and Shiyani (2014) and Malik *et al.*(2004). Ardehna and Shiyani (2014) reported that the area, production

**Table 2:** District wise area, production and productivity of onion in Gujarat in the year 2011-12

Sr. No.	Name of District	Area (ha.)	Production(tones)	Productivity(₹ tone/ha.)
1.	Amreli	4600	138000	30.00
2.	Bhavnagar	21000	462000	22.00
3.	Jamnagar	5100	119850	23.50
4.	Junagadh	9800	294000	30.00
5.	Porbandar	2000	79600	39.80
6.	Kutch	3900	83031	21.29
7.	Anand	500	6750	13.50
8.	Mehsana	200	3880	19.40
9.	Dahod	1700	26860	15.80
10.	Rajkot	11400	325128	28.52
11.	Surendranagar	1100	23100	21.00
	Total	61300	1562199	25.48
	Saurashtra total	55000	1441678	26.21
	Share of Saurashtra (%)	89.72	92.29	

**Table 3:** Growth of area, production and productivity in Gujarat during 2001-02 to 2011-12

Gujarat	Mean	CGR (%/annum)	C.V.(%)
Area (*00ha.)	495.36	9.53	36.72
Production (*00 tonnes)	17058.35	8.74	54.99
Productivity (Kg./ha.)	27658.15	0.52	6.65
Saurashtra			
Area (*00ha.)	450.18	9.86	38.71
Production (*00 tonnes)	12691.55	10.16	41.25
Productivity (Kg./ha.)	27996.91	0.28	6.58

*Note:* All CGRs were significant at 1 % level

and productivity of onion increased at the rate of 6.50, 9.96 and 0.68 % per annum during 1990-91 to 2007-08 in Gujarat. This implies the need of breakthrough technology in the crop which was not observed during the period. The percent of co-efficient of variation in the area and production was higher in Gujarat state as well as in Saurashtra region indicated less stability of the crop. It may be due to high fluctuation in prices of onion reflected through acreage response. The productivity of the crop remained more stable during the period.

The production capacity as well as the working days of selected onion processing units are presented in Table 4. The average production capacity of a processing unit was about 38 tonnes per day during 2011-12 and 2012-13. The utilization of the production capacity of processing unit depend on the working days in a year. The selected processing units remained working for 123.97 and 95.73 days, respectively in the year 2011-12 and 2012-13. These results are in line with the findings of Anonymous (2011). It depends on the parity price of fresh and dried onion as well as on the availability of raw material in the market.

The component wise investment pattern of the onion processing units is given in Table 5. It can be observed that processor invested ₹ 362.11 lacs and ₹ 360.76 lacs, respectively in the year 2011-12 and 2012-13 in establishment of the onion processing unit. The % share of individual component in total investment showed that the land remained to be the major component of investment with its share of 42.38 and 43.85 %, respectively in the year 2011-12 and 2012-13. The processing machinery remained the next major component of investment with its share of 39.17 and 34.44%, respectively during the same period. Thus, land and machinery constituted about 80 % of the total investment while remaining 20% of the investment includes construction of the office, godown, processing units, staff quarters *etc.*

**Table 4:** Production capacity of onion processing unit

Year	Production capacity tonnes/day/unit	No. of units	Working days/Year/unit	Capacity utilized(%)
2011-12	38.30	33	126.97	70.54
2012-13	38.43	22	95.73	53.18

**Table 5:** Investment pattern of onion processing units

(₹ in lakh/unit)

Year / particular	2011-12			2012-13		
	Area	₹	% to total	Area	₹	% to total
Land (ha.)	1.4825	153.46	42.38	1.6092	158.2	43.85
Office (ft.)	763	4.86	1.34	833	5.52	1.53
Godown/ Warehouse (ft.)	4380	18.77	5.18	4841	22.42	6.21
Processing unit (ft.)	7249	35.63	9.84	8459	44.47	12.33
Staff quarter (ft.)	990	4.27	1.18	721	3.52	0.98
Machinery		141.85	39.17		124.23	34.44
Other		3.27	0.9		2.4	0.67
Total Investment		362.11	100		360.76	100

The cost of fresh onion which was used as raw material in onion processing as well as expenses incurred towards handling of the raw material are presented in Table 6. It is observed from the table that the processors purchased onion at the rate of ₹ 4881.17 and ₹7355.36 per tonne, respectively in the year 2011-12 and 2012-13. They also incurred ₹ 316.78 and ₹ 404.32 per tonne, respectively in the year 2011-12 and 2012-13 towards handling of the raw material which includes the charges of weighing, transportation, bag and other market charges which constitutes 6.09 % (2011-12) and 5.21 % (2012-13) of the total cost of raw material. The lower share of other expenses in the year 2012-13 was due to higher prices of onion as compared to in the year 2011-12.

The variable and fixed costs of processing of onion are given in Table 7. It can be revealed from the results that total variable costs of processing of onion other than cost of raw material was ₹ 2803 and ₹ 3007 per tonne of onion, respectively in the year 2011-12 and 2012-13. The variable costs other than cost of raw material constitutes 32.95 and 26.20 % of the total processing cost, respectively in the year 2011-12 and 2012-13. The item wise cost components indicated that the cost of fuel ranked first (10.52 %), followed by labour charges (8.55 %), electricity(6.24 %),VAT (5.21 %) *etc.* in the year 2011-12.The similar pattern was also observed in the year 2012-13 with highest share of fuel cost (8.37 %), followed by labour charges (6.80 %), electricity (4.96 %), VAT (4.15 %) *etc.* with slight decrease in the respective shares due to higher prices of onion. The share of the cost of raw material was 61.07 % of the total cost which was less in 2011-12 as compared to share of the cost of raw material (67.61 %) in the year 2012-13. It was due to higher prices of onion in 2012-13. The total cost of processing of onion was ₹ 11477 per tonne in the year 2012-13 which was higher than that of in 2011-12 (8509 / ton).

**Table 6:** Cost of onion as raw material for processing

		(₹/ton)			
Sr. No.	Items	2011-12		2012-13	
		Cost	% to total cost	Cost	% to total cost
(A)	Purchase price of onion	4881.17	93.91	7355.36	94.79
(B)	Other expenses				
1.	Weighing	39.60	0.76	50.54	0.65
2.	Transport	39.60	0.76	50.54	0.65
3.	Market charge	47.52	0.91	60.65	0.78
4.	Other (Bag)	190.06	3.66	242.59	3.13
	Sub total	316.78	6.09	404.32	5.21
	Total	5197.95	100	7759.68	100

**Table 7:** Processing cost of onion

(₹/ton)

Particular	2011-12		2012-13	
	₹/ton	% to total cost	₹/ton	% to total cost
Processing cost				
Godown / Warehouse repairing	6.45	0.08	6.92	0.06
Machinery repairing	50.73	0.60	54.43	0.47
Fuel	895.56	10.52	960.73	8.37
Electricity charge	530.61	6.24	569.22	4.96
Employee's salary	137.07	1.60	147.04	1.28
Labour wages	727.10	8.55	780.01	6.80
Telephone bill	12.05	0.14	12.93	0.11
VAT	443.43	5.21	475.71	4.15
Sub total	2803.00	32.94	3006.99	26.20
Cost of raw materials	5197.95	61.09	7759.68	67.61
Fixed cost	508.10	5.97	710.92	6.19
Total cost	8509.05	100.00	11477.59	100.00

The proportion of different processed products obtained from onion processing is given Table 8. It can be revealed that 127.40 kg of dried onion was obtained from processing of one tonne of fresh onion which comprises of 90.83 kg Kibble (71.31 %) and 36.57 kg powder (28.70 %) in the year 2012-13. Similar results were also observed in the year 2011-12 with negligible variation. The Kibble can also be further graded in to the chopped, mince and granules by some exporters.

The cost of marketing of processed onion is given in Table 9. It is observed that processors incurred ₹ 318.34 and ₹ 283.27 towards the marketing of dried onion (Kibble + Powder) obtained from processing of one tonne of fresh onion, respectively in the year 2012-13 and 2011-12. The cost of packing was the highest in total marketing cost, followed by cost of storage, transportation, loading, commission, weighing, advertisement and telephone. The cost of marketing of Kibble (₹ 2.56/kg) was higher as compared to Powder (₹ 2.35/kg) in the year 2012-13.

**Table 8:** Proportion of different processed products obtained from onion processing

(kg per ton)

Sr.No.	Particular	2011-12	2012-13
1.	Kibble	90.33(71.93 %)	90.83(71.30 %)
2.	Powder	35.25(28.07 %)	36.57(29.70 %)
	Total	125.58	127.40

(Note: Figures in parentheses indicate % to total)

**Table 9:** Marketing cost of processed onion products from one ton of raw onion

(₹/ton)

Particular	2011-12		2012-13	
	Kibble	Powder	Kibble	Powder
Packing	72.09	26.68	81.03	29.97
Storage	34.76	12.86	39.06	14.47
Transport	26.07	9.65	29.30	10.84
Weighing	8.69	3.21	9.76	3.61
Loading	26.07	9.65	29.30	10.84
Commission	21.71	8.03	24.40	9.02
Advertisement	8.69	3.21	9.76	3.61
Telephone	8.69	3.21	9.76	3.61
<b>Total</b>	<b>206.77</b>	<b>76.50</b>	<b>232.37</b>	<b>85.97</b>

Cost and returns of processed onion products given in Table 10 revealed that processers got net profit of ₹ 869.23 and ₹1931.64 per ton of onion processing, respectively in the year 2011-12 and 2012-13 which showed an increase of 122 % over previous year. It was due to more increase in return obtained in the year 2012-13 (₹ 14725.22/ton) as compared to 2011-12 (₹ 10407.13/ton). The total cost of processing of one tonne of onion was ₹ 9537.90 and ₹ 12793.58, respectively in the year 2011-12 and 2012-13. The pattern of selling of processed onion (Table 11) revealed that 84 % of total processed products was exported while 16 % was sold in the local market in the year 2012-13. While in the year 2011-12, 82 % of processed products were exported and 18 % was sold in the local market.

The sensitivity analysis of economic feasibility of onion processing unit is presented in Table 12. It revealed the sensitivity of processing units to change in cost and returns. It is observed that the processing units got ₹ 1.09 and ₹ 1.15 per investment of one rupee while the total investment was recovered in 8.59 and 5.08 years, respectively in the year 2011-12 and 2012-13. If return increased by 10 % , the benefit cost ratio increased to 1.20 and 1.26 while the pay back period reduced to 3.90 and 2.88 years, respectively in the year 2012.

**Table 10:** Cost and returns of onion processed product

(₹/ tone)

Sr.No.	Particular	2011-12	2012-13	% increase over previous year
<b>(A) Costs</b>				
1.	Raw material	5197.95	7759.68	49.28
2.	Processing	2803.00	3006.99	7.27
3.	Marketing	283.27	318.34	12.38
4.	Interest on working capital	745.58	997.65	33.81
4.	Interest on capital investment (Fixed Cost)	508.10	710.92	39.92
	<b>Total</b>	<b>9537.90</b>	<b>12793.58</b>	<b>34.13</b>

*Contd.*

Sr.No.	Particular	2011-12	2012-13	% increase over previous year
<b>(B) Income</b>				
1.	Kibble	8050.25	11188.10	38.98
2.	Powder	2356.88	3537.12	50.08
	Total	10407.13	14725.22	41.49
	Net profit	869.23	1931.64	22.22

**Table 11:** Selling of processed onion produce

(In per cent)

Particular	2011-12(N=33)	2012-13(N=22)
Local	18.00	16.00
Export	82.00	84.00

**Table 12:** Sensitivity analysis of economic feasibility of onion processing unit

Sr. No.	Combination	2011-12		2012-13	
		BCR (Rs.)	PBP (Years)	BCR (Rs.)	PBP (Years)
1.	With normal cost and returns	1.09	8.57	1.15	5.08
2.	10 % increase in cost	0.99	Loss	1.05	15.03
3.	10 % decrease in return	0.98	Loss	1.04	21.36
4.	10 % increase in cost and 10 % decrease in return	0.89	Loss	0.94	Loss
5.	10 % increase in return	1.20	3.90	1.26	2.88
6.	10 % increase in return and 10 % increase in cost	1.09	7.79	1.15	4.61

12 and 2012-13. The processors were in loss if there was 10 % increase in cost and 10 % decrease in return in the year 2012-13.

The preference of onion processors for quality traits of onion suitable for processing given in Table 13 indicated that white onion having average diameter of 57.88 mm along with round shape are the most preferable for obtaining more quantity and good quality processed products of onion. The white onion is preferred because of the whiteness of the processed products which was preferred by the consumers. On the contrary, the processed products of red onion have dark colour which is less preferred by the consumers. Therefore, the processed products of white onion fetch higher prices as compared to the products of red onion.

The capacity of employment generation by onion processing industry is given Table 14. It was observed that 6236 and 4057 man days of labour was employed in a unit, respectively in the year 2011-12 and 2012-13. The industry also provided employment to managers, administrators, technocrats and agricultural engineers, respectively to the tune of about 597, 208, 150 and 13 man days/unit in the year 2011-12. Thus, one unit provided an employment of 7204 and 4780 man days, respectively in the year 2011-12 and 2012-13. The fluctuation in employment generation capacity of the industry was due to the fluctuation in working days which in turn depends on the availability of raw material.

**Table 13:** Traits of onion preferred by industry

Average size	Colour	Shape
57.88 mm	White	Round

**Table 14:** Employment generation in onion processing industry (Man days/Unit/year)

Sr.No.	Particular	2011-12	2012-13
1.	Managerial	596.76	439.40
2.	Administrative	208.23	178.06
3.	Technical	149.82	100.52
4.	Agri. Engineer	12.70	4.79
5.	Labour	6236.36	4057.05
	Total	7203.87	4779.82

There exists a positive effect of growth of export of dried onion and negative effect of growth of export of fresh onion on onion processing industry because export of fresh onion reduces the availability of raw material for the industry at a given price. Considering this relationship, compound growth rates of export of dried onion as well as export of fresh onion from India were worked out separately. Country wise growth performance of exported dried onion from India during 2001-02 to 2012-13 are presented in Table 15. The results revealed that total quantity of exported dried onion increased at the rate of 17.46 % per annum while the value of exported quantity increased at the rate of 25.90 % per annum. It implies that the export price of dried onion increased at a faster rate than exported quantity of dried onion. These results are in conformity with the findings of (Anonymous, 2012c). On an average, India exported 30272.77 tonnes of dried onion which valued to ₹ 18360.69 lacs. The coefficient of variation of exported quantity was less (57.82 %) as compared to value of export indicating more stability. The cause of fluctuations in the exports may be due to the occasional restriction put on exports (Sudhir 2004; NCAER, 2012). So far as the country wise exports are concerned, Germany stood first in terms of quantity as well as value of export, followed by Russia in terms of quantity, and U.S.A. in terms of value of export. The highest growth of export was observed in case of Lithuania in which exported quantity and value increased, respectively at the rate of 162.24 and 103.23 % per annum. The growth rates of exported quantity of dried onion were negative in case of Romania and Sri Lanka but those of the value were positive in both the countries due to increase in prices. Thus Germany, Bangladesh, U.S.A., Russia, U.K., Malaysia, Sri Lanka, Nepal and U.A.E. were found to remain important destinations where more than 1000 tonnes of dried onion were exported. Verma and Singh(2004) also reported that Egypt, Sri Lanka, Sudan, the USA, the UAE and Bangladesh together have accounted for a predominant share of 70% of the total export of dried and preserved vegetables in recent years.

The compound growth rates of export of fresh onion from India to various countries during 2002-03 to 2012-13 are presented in Table 16. It is observed from the results that about 12.6 lakh tonnes of fresh onion were exported from India in a year which fetched the value of ₹ 1388.3 crores. Anonymous (2013) also reported that during recent decades, there was a tremendous growth in export of onion

which touched a peak of 18.73 and 11.70 lakh tones, respectively during 2009-10 and 2012-13. The total exported quantity of fresh onion increased at the rate of 6.86 % per annum while its value has increased at the rate of 15.12 % per annum. These Results are in conformity with findings of Goyal, 2008.

**Table 15:** Growth and instability of export of dried onion from India during 2001-02 to 2012-13

Name of Country	Quantity in tonnes			Values in ₹ Lacs		
	Mean	CGR (%/annum)	C.V.(%)	Mean	CGR (%/annum)	C.V.(%)
Australia	574.03	8.61	38.18	398.88	20.29	59.63
Bangladesh	2643.33	69.33	255.82	587.58	67.54	221.15
Belgium	631.62	27.05	101.17	530.23	34.43	119.88
Brazil	963.72	26.91	82.00	774.46	33.78	101.38
Canada	469.49	21.60	62.41	371.93	27.83	77.12
Finland	248.63	11.66	77.27	236.30	15.48	76.42
France	244.90	55.95	89.27	235.22	63.92	101.13
Germany	4499.41	11.57	92.67	2913.46	18.43	72.48
Israel	208.76	30.28	96.28	168.25	36.83	117.08
Italy	374.25	43.29	116.04	261.04	44.94	117.91
Lithuania	850.74	162.24	273.44	135.73	141.94	128.50
Malaysia	1722.35	8.01	177.42	532.91	15.96	143.19
Nepal	1124.78	100.63	194.07	260.58	103.23	195.01
Netherland	882.13	6.27	45.37	684.85	13.28	61.37
New Zealand	218.60	27.88	79.20	206.28	35.81	104.23
Nigeria	208.11	138.23	108.16	244.40	56.66	114.85
Poland	803.74	22.12	95.76	641.49	28.48	108.93
Romania	366.90	-6.34	242.72	157.92	3.71	134.50
Russia	1993.53	49.66	107.97	1700.65	55.01	110.48
South Africa	812.80	25.98	77.68	706.21	36.23	95.19
Spain	566.17	16.26	82.86	440.80	24.15	102.30
Sri Lanka	1632.16	-5.04	183.09	309.42	7.27	168.76
U. A. E.	1079.10	5.37	260.68	173.82	12.30	120.67
U. K.	1985.80	25.13	70.82	1638.25	33.26	86.79
U.S. .A	2167.31	16.70	59.05	1705.31	21.41	68.03
Other Countries	3329.64	23.24	64.46	2442.96	31.63	83.15
Total	30272.77	17.46	57.82	18360.69	25.90	76.06

Note: All CGRs were significant at 1 % level

The export of fresh onion was more stable in terms of quantity (26.42 %) as compared to the value of export (43.63 %) which implies more variation in export prices. Bangladesh, Malaysia, Sri Lanka and U.A. E. were the important destinations for export of fresh onion where more than one lakh tonnes of onion was exported in a year during 2002-03 to 2012-13. These results are in conformity with the findings of Anonymous (2013). The height increase in export of onion was observed in Pakistan both in terms of quantity (165.30 % /annum) and value (150.09 % /annum), followed by Indonesia and Qatar. The growth rate of onion export was negative in case of Nepal and Baharain in terms of quantity

but it was positive in term of value of export due to the fact that higher rate of increase in export prices. The Sri Lanka was found to remain more stable country in export of fresh onion in terms of quantity (13.07 %) as well as value (37.02 %). The Indonesia was found to remain instable in export of fresh onion.

Constraints faced by the onion processors are given in Table 17. It was observed that 93.94 % of respondents opined that they fetches the problem in selling of processed products while 84.85 % of respondents opined about the lack of availability of technical person in the industry. The onion processors also faced other constraints like problem of waste management (81.82 %), lack of availability of uniform bulbs of onion (63.64 %), level of TSS in onion (57.58 %), high rate of taxes (51.52 %) *etc.*

The suggestions made by the selected respondents regarding the onion processing are presented in Table 18. It was observed that highest numbers of respondents suggested (75.76 %) that there is need for separate pollution control rules for the industry, followed by development of variety having more uniform bulbs size (42.42 %). The onion processors opined that the waste of industry has biological nature, easily degradable and less harmful as compared to waste of other chemical industries. Therefore, they anticipated for separate rules for pollution control in onion processing industry. The processors (24.24 %) also suggested that there is need to improve the knowledge of the farmers regarding recommended technologies in order to improve the quality of the onion. Other suggestions made by the processors include establishment of cold storage facilities, laboratories for testing the quality of onion, declaration of MSP for onion in order to stabilize the area under onion cultivation and provision for incentives to exporters.

### **Conclusion**

The cultivation of onion is concentrated in the Saurashtra region of Gujarat. The area, production and productivity of onion crop increased at the rate of 9.53, 8.74 and 0.52 % per annum, respectively during the period from 2001-02 to 2011-12. The onion processors invested about ₹ 360 lacs per unit in the year 2012-13. The cost of onion used as a raw material in onion processing was found to be the major cost (67.61 %) in total cost of processing which was to the tune of ₹ 11477 per tonne in the year 2012-13. The processors incurred the cost of ₹ 318.34 towards marketing of processed products obtained from processing of one tonne of onion. The net profit of ₹ 1931.64 per tonne of onion processing was realized by the processors. The processors got ₹ 1.15 per investment of one rupee while they recovered their total investment in 5.08 years. The processors preferred round shaped white onion having average diameter of 58 mm in order to obtain better quality of processed products. The export of dried onion and fresh onion from India increased at the rate 17.46 and 6.86 % per annum during 2001-02 to 2012-13, respectively.

The tremendous increase in area and production of onion has been attributed to the rising exports in the recent decade. However, the spurt in export should not lead to price rise. Hence, an appropriate export policy along with policy on fixing Minimum Export Price during glut season should be in place. The efforts to minimize the variation in prices of onion in order to stabilize the area under cultivation of the crop as well as to improve the quality of onion are the suggestions emerges from the study.

**Table 16:** Growth and instability of export of fresh onion from India during 2003-04 to 2012-13

Name of Country	Quantity in tonnes			Values in ₹ Lacs		
	Mean	CGR (%/annum)	C.V.(%)	Mean	CGR (%/annum)	C.V.(%)
Baharain	19532.26	-3.71	36.46	1879.98	2.93	41.06
Bangladesh	442747.02	3.65	35.79	48435.96	8.71	55.70
Indonesia	17571.53	86.50	119.33	2868.73	103.23	133.18
Kuwait	15085.23	27.89	75.90	1517.48	34.20	86.34
Malaysia	265768.36	7.53	25.64	30999.24	16.76	45.62
Nepal	32740.78	-2.38	20.86	2537.74	14.19	41.42
Oman	13861.37	40.74	85.00	1550.59	50.76	90.48
Pakistan	54231.66	165.30	83.78	5980.67	150.09	90.45
Qatar	14231.04	39.61	79.16	1463.40	49.85	88.10
Re. Union	4440.89	2.72	16.85	540.15	11.99	37.79
Saudi Arab	13679.72	10.32	39.91	1356.85	17.10	51.65
Singapore	22834.86	7.69	27.06	2508.27	17.26	49.07
Sri Lanka	131626.12	3.29	13.07	13697.99	13.13	37.02
U. A. E.	157645.18	5.08	27.98	16121.43	13.16	39.10
U. K.	1919.84	23.76	64.31	250.65	35.18	86.61
Other Countries	56379.09	14.35	49.73	7121.79	26.41	72.91
Total	1258351.28	6.86	26.42	138830.92	15.12	43.63

Note: All CGRs were significant at 1 % level

**Table 17:** Constraints in onion processing industry

(N=33)

Sr.No.	Particular	Score	Rank
1.	Selling problem of processed product	31(93.94)	1
2.	Lack of availability of technical person	28(84.85)	2
3.	Problem of waste management	27(81.82)	3
4.	Lack of uniform size of onion bulb	21(63.64)	4
5.	Low level of TSS in onion	19(57.58)	5
6.	High rate of Government taxes	17(51.52)	6
7.	Lack of timely availability of good quality onion bulbs	13(39.39)	7
8.	Poor infrastructural facilities from Government	10(30.30)	8
9.	Lack of laboratory facilities for testing quality parameters necessary for export	10(30.30)	9
10.	Lack of scientific knowledge about processing technique	4(12.12)	10
11.	Constraints with respect to machinery	3(9.09)	11

(Note: Figures in parentheses indicate % to total)

**Table 18:** Suggestions for good processing and marketing of onion produce

(N=33)

Sr.No.	Suggestions	Score	Rank
1.	Need for separate pollution control rules for special onion processing industries	25(75.76)	1
2.	Development of good onion variety for uniform bulb production	14(42.41)	2
3.	Need for improving the knowledge of farmers regarding recommended technologies in order to improve the quality of onion	8(24.24)	3
4.	Establishment of enough cold storage facilities	8(24.24)	3
5.	Declaration of minimum support price for onion producer to avail regular supply of onion	7(21.21)	4
6.	Establishment of laboratory for testing different parameters for export of processed products of onion	6(18.18)	5
7.	Timely getting of subsidy	5(15.15)	6
8.	Need for providing incentives to exporters	2(6.06)	7

(Note: Figures in parentheses indicate per cent to total)

### References

- Anonymous 2011. Status Report of Onion Storage and Dehydration Industry in Gujarat, All Indian Coordinated Research Project on Post Harvest Technology, Junagadh Agricultural University, Junagadh.
- Anonymous 2012a. Vision 2030, National Horticultural Research and development Foundation, Nasik.
- Anonymous 2012b. Competitive Assessment of Onion Markets in India, Report Prepared for Competition Commission of India, Government of India.
- Anonymous 2012c. Onion and Potato Baseline Report, Small Farmers Agribusiness Consortium, New Delhi.
- Anonymous 2013. Research report on “ Trends in Marketing and Export of Onion in India”, National Institute of Agricultural Marketing, Jaipur.
- Ardehna, N.J. and Shiyani, R.L. 2014. Spatio-temporal growth of garlic and onion crops in Gujarat state, *Journal of Spices and Aromatic Crops* **23 (1)** : 120–121.
- Goyal, S.K. 2008. “Growth and Instability in Revised Export Marketing of Onion”, *Indian Journal of Agricultural Marketing* **22 (3)** :11-24.
- Malik, D.P., Kumar Sanjay and Hooda, B.K. 2004. An Economic Analysis of Production and Export of onion in India, *Agricultural Marketing* **48(1)**:12-20.
- NCAER 2012. Price and Competition Issues in Indian Onion Markets, New Delhi: National Council of Applied Economic Research.
- Sudhir, B. 2004: “Onion Prices and State Intervention”, *Economic and Political Weekly*, August 14, 2004; 3684-3686.
- Surabhi Mittal 2007. Can Horticulture Be a Success Story for India? Indian Council for Research on International Economic Relations, Working Paper No. 197
- Verma, Ajay and K. P. Singh 2004. Emerging Trends in Export of Processed Products, Proceeding on Impact of vegetable research in India, National Centre for Agricultural Economics and Policy Research, Proceeding No. 13, pp:243.