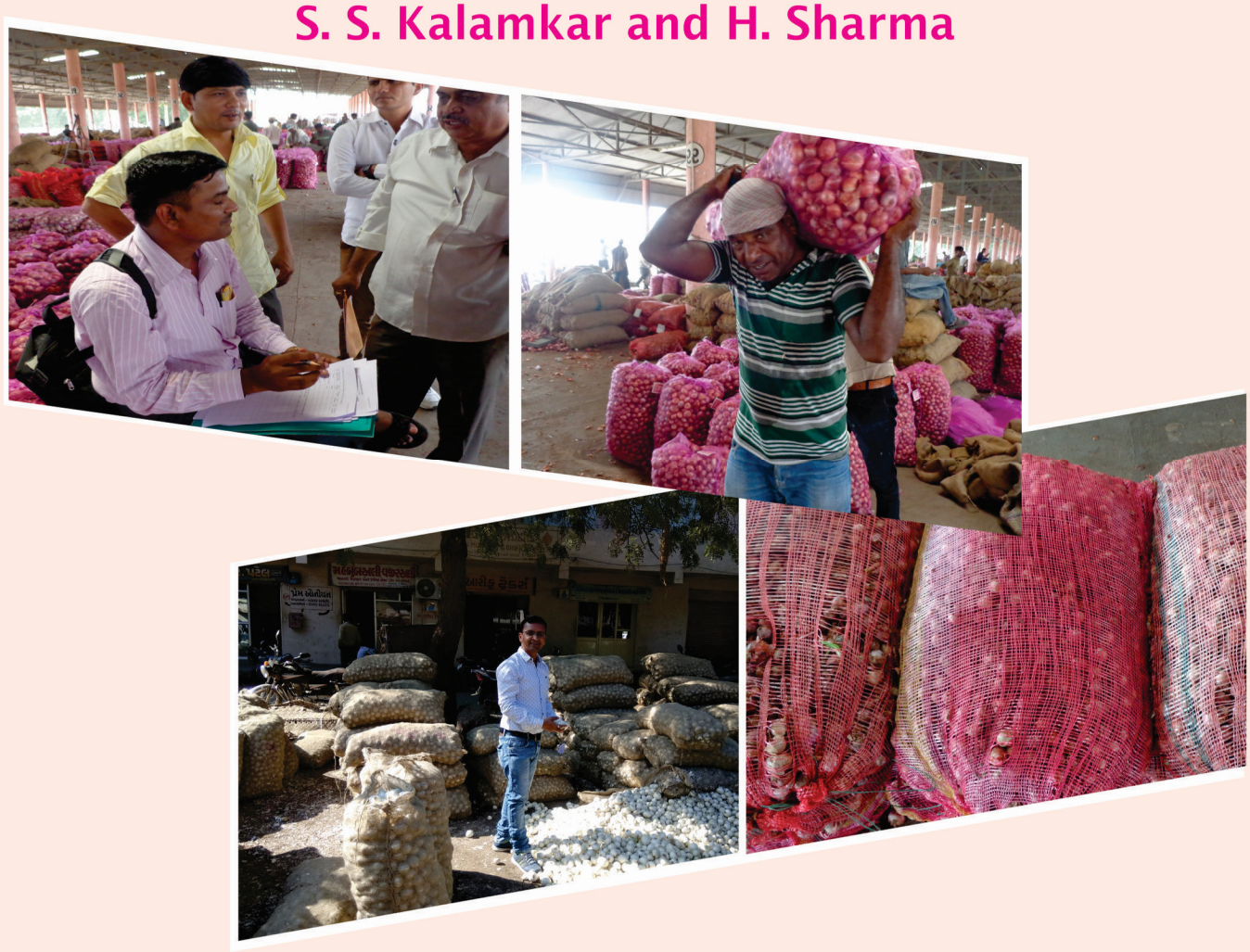
AERC REPORT 175

# Price Volatility and Major Issues in Demand and Supply Management of Onion in Gujarat

S. S. Kalamkar and H. Sharma



*Study Coordinated by*

**Agricultural Development and Rural Transformation Centre**
**Institute for Social and Economic Change, Bengaluru**

**Agro-Economic Research Centre**
**For the states of Gujarat and Rajasthan**
***(Ministry of Agriculture and Farmers Welfare, Govt. of India)***
**Sardar Patel University,**
**Vallabh Vidyanagar, Dist. Anand, Gujarat**

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# Foreword

India has made impressive strides on the agricultural front during the last six decades or so. Food grains production has increased more than five times from 50.82 million tons (mt) in 1950-51 to about 284.83 mt in 2017-18. After self sufficiency in food grains was met, the policy makers realized the need for diversification of agriculture to achieve higher growth rates as well as to adjust to the changing consumption pattern of the population which was experiencing due to urbanization and rising per capita incomes. India now ranks first in the world in milk production, second in fruits and vegetables and third in production of eggs. This increased production has brought in its wake new challenges to handle in terms of huge marketable surplus. Among the agricultural products, prices of onions are more volatile than those of the non-farm commodities due to low price and income elasticity and inherently unstable production. Additionally, market inefficiencies, weak supply chains and traders cartels in the market aggravate the problem. The spurt in food inflation in the recent past has brought to forefront some critical issues of price volatility and market inefficiency.

Onion is a politically-sensitive commodity and one of the closely monitored agricultural commodities produced in India. Therefore, this commodity is always in focus of the government. India is the second largest producer of onion in the world after China with an annual production of 24.34 million metric tons from an area of 1.305 million hectare (2016-17), accounting 22.43 per cent share in total world onion production in 2017. The country is also the major consumer of onion with an annual demand of 16.50-18.0 million metric tons. Though there is always a surplus production, fluctuating domestic and export demand often creates demand supply mismatch leading to spiral effect on the prices of onion. The prices sometimes fall below cost of production making it uneconomical for the farmers. Its significant position in the diets across all income groups and an important ingredient in many Indian recipe causes wide ranging effects of any significant price change. It is equally important for the poor as also the middle class. Thus the changes in prices cause all embracing stir among farmers and consumers. High price variability in case of primary products affects both producers as well as consumers through a spillover effect to the other sectors, thereby leading to high inflation in the economy. Thus it is major concern for the politicians, policy makers and experts.

The price spikes of onion in many ways cannot be explained fully by the fundamentals of demand-supply. High inflation of food commodities cannot always be attributed to risks, exogenous shocks and mismatch of demand and supply –it can also be caused by market inefficiencies, weak supply chains and

monopolies in the market. Some of the factors that affect extent of seasonality in prices include- extent of seasonal concentration in production, degree of perishability of the commodity, the cost of storage (including direct cost, losses in storage, risk involved), degree of seasonality in consumption, facility of storage available to farmers or with public agencies, restrictions imposed on traders in terms of stock limits.

Onion is the important vegetable crop grown in the state. It is generally grown as late kharif or rabi crop. It accounts for about 8.38% of total area under vegetable crops and 10.70 per cent of total vegetable production in the state during 2017-18. Though, state has shared hardly 4 per cent area and 2.3 per cent production of Country, the highest productivity level (26 tones/ha) was recorded as compared to all India average of 21.5 tones kg/ha. The top five major onion growing districts are Bhavnagar, Rajkot, Junagarh, Amreli and Jamnagar. Against this backdrop and given that market structure, degree of competition and efficiency at the various levels of the supply chain has impact on the final prices paid by the end consumers with respect to agriculture products; the study proposes to price volatility and major issues in demand and supply management of onion in Gujarat. Irrational speculative driven bubbles and hoardings by trader lobbies have sometimes been blamed for episodes of high price volatility in India, but with no clear implications in terms of which possible policies could effectively prevent repetition of such crisis. This study aims to find major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure in Gujarat. The study came out with useful policy suggestions.

I am thankful to authors and their research team for putting in a lot of efforts to complete this excellent piece of work. I also thank the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India for the unstinted cooperation and support. I hope this report will be useful for those who are interested in understanding the marketing and relationship between different prices of onion in Gujarat.

February 28, 2019

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The study would not have reached to this stage without the active co-operation of the sample farmer households, wholesalers, commission agents, processor, warehouse owner and others who provided all the required data for the study without any hesitation and expectation. We thank each one of them for their invaluable support. We would like to record our sincere thanks to all other staff other APMCs of all these organizations for their invaluable help and support.

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February 28, 2019

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**S. S. Kalamkar**
**Team Leader**

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# List of Abbreviations

| | |
|---|---|
| ADF | Augmented Dickey-Fuller test |
| APEDA | Agricultural and Processed Food Products Export Development Authority |
| APMC | Agricultural Produce Marketing Committee |
| Approx. | Approximately |
| Av. | Average |
| C.I. | Cropping Intensity |
| CACP | Commission for Agricultural Costs and Prices |
| CoC | Cost of Cultivation |
| ECA | Essential Commodities Act |
| EP | Export Price |
| FAO | Food and Agriculture Organization |
| FAQ | Fair Average Quality |
| FCI | Food Corporation of India |
| FGD | Focus Group Discussion |
| FPO | Farmers Producer Organization |
| GCA | Gross Cropped Area |
| GIA | Gross Irrigated Area |
| GOG | Government of Gujarat |
| GOI | Government of India |
| GUJCOMASOL | Gujarat State Cooperative Marketing Federation Ltd. |
| ha | hectare |
| HH/hh | Household |
| I.I. | Irrigation Intensity |
| INR | Indian Rupees |
| JCI | Jute Corporation of India |
| kg | kilograms |
| L | Large land size holder |

| | |
|---|---|
| M | Medium land size holder |
| MEP | Minimum Export Price |
| mha | Million hectares |
| MIS | Market Intervention Scheme |
| MOA | Ministry of Agriculture |
| MOA & FW | Ministry of Agriculture & Farmers Welfare |
| MoFPI | Ministry of Food Processing Industries |
| MPCE | Monthly Per Capita Expenditure |
| MSP | Minimum Support Price |
| mt | Metric Tones |
| NABARD | National Bank for Agriculture and Rural Development, India |
| NAFED | National Agricultural Cooperative Marketing Federation of India Ltd. |
| NCA | Net Cropped Area |
| NGO | Non Government Organization |
| NHRDF | National Horticultural Research and Development Foundation |
| NIA | Net Irrigated Area |
| NIA | Net Irrigated Area |
| NIAM | National Institute on Agricultural Marketing |
| NSA | Net Sown Area |
| NSA | Net Sown Area |
| NSSO | National Sample Survey Organization |
| OBC | Other Backward Classes |
| PDS | Public Distribution System |
| PLW | Physiological Loss in Weight |
| PSS | Price Support Scheme |
| RKVY | Rashtriya Krishi Vikas Yojana |
| RP | Retail Price |
| S | Small land size holder |

| | |
|---|---|
| TE | Triennium Endings |
| TOP | Tomato, Onion and Potato |
| VPO | Value of Output |
| WP | Wholesale Price |
| Y | Yield |

# Price Volatility and Major Issues in Demand and Supply Management of Onion in Gujarat

S. S. Kalamkar and H. Sharma

## 1. Introduction

Onion is a crop of mass consumption round the year all over the world. Globally, 97.86 million tonnes of onions are produced (2017), while the vegetable ranks as first by harvested area (25.29 per cent). China, India, and the US are the world's leading onion producing countries, while around two third of global onion output comes from the ten top onion producing countries which includes. China, India, United States of America, Iran, Egypt, Russian Federation, Turkey, Bangladesh, Pakistan, Netherlands. About 5.2 million hectares of onions are harvested each year on a global scale and it is estimated that around 8 per cent of this harvest is internationally traded. Onions are used as spice, condiment and vegetable almost daily. Because of special pungency, onions have more value for seasoning a wide variety of dishes. Dehydrated flakes or powder are in great demand both in the domestic and export markets. In fact onion is third most eaten vegetable in the US, right after tomato and potato.

India is the second largest producer of onion in the world after China with an annual production of 24.34 million metric tonne from an area of 1.305 million hectare (2016-17), accounting 22.43 per cent share in total world onion production in 2017. The country is also the major consumer of onion with an annual demand of 16.50-18.0 million mt. Though, India holds premier positions in area and production, the productivity of onion (16.00 tons/ha) is very low compared to other countries. The inherent lower productivity in sub-tropical countries vis-à-vis European counties, shortage and high prices of quality seeds, high incidence of pests and diseases typical under tropical conditions, moisture stress or excess rains during critical growth stages are factors constraining yield.

Onion is one of the most important commercial and important vegetable grown in India which is next to Potato, which is used either in raw or dehydrated form to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. Onion is consumed all over the country and is an important constituent of Indian daily diet. Onion is typically cultivated thrice a year and all three crops are available for export, with rabi having the longer shelf life. Out of total production of about 24 million tones of onion, two third of total production is rabi crop while 20 per cent is late kharif and rest is kharif crop. The diverse agro-climatic conditions enable to India to produce onion in one or the other part round the year. Onion is largely grown in the western, northern and southern parts both in rabi and kharif seasons. Its supply is available throughout the year albeit with different volumes. India produces all three varieties of onion, i.e. red, yellow and white. In the northern part of the

country, onion is usually grown in the winter (rabi) season. While in the southern and western states of Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat and Maharashtra, it is grown in winter (rabi) as well as in the rainy (kharif) seasons. Currently, onion cultivation in kharif is gaining ground in the northern part of the country. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Andhra Pradesh, Haryana, West Bengal, Gujarat and Uttar Pradesh in the country. These States account for almost 90 per cent of the total onion production of the country.

Table 1: Season-wise Onion Production in India

| Agriculture Year: July-June | | | Production in Lakh Tonnes | | |
|---|---|---|---|---|---|
| Season | Transplanting | Harvesting Period | 2013-14 to 2017-18 | 2017-18 | 2018-19* |
| Kharif | July - August | October-December | 32 (15.24) | 35 (15.09) | 36 (15.25) |
| Late Kharif | October - November | January- March | 42 (20.0) | 46 (19.93) | 47 (19.92) |
| Rabi | December - January | End of March to May | 136 (64.76) | 151 (65.09) | 153 (64.83) |
| Total | | | 210 | 232 | 236 |

Notes: *- first advance estimate; figures in parenthesis are percentage to total.
Source: GOI (2019).

The onions from India are famous for their strong flavor. India export its considerable quantity of onion to countries like Malaysia, Singapore, Sri Lanka, Bangladesh, Pakistan, Indonesia, UK, Gulf countries, etc. Our exports generally hover around 1.5-2.5 million tonnes per annum. As onions have no substitutes, demand for it is completely inelastic. It is also exported in the form of dehydrated onion, canned onion and onion pickle. Dehydrated onions are seen as a potential valued product in world trade and India is the second largest producer of dehydrated onions in the world.

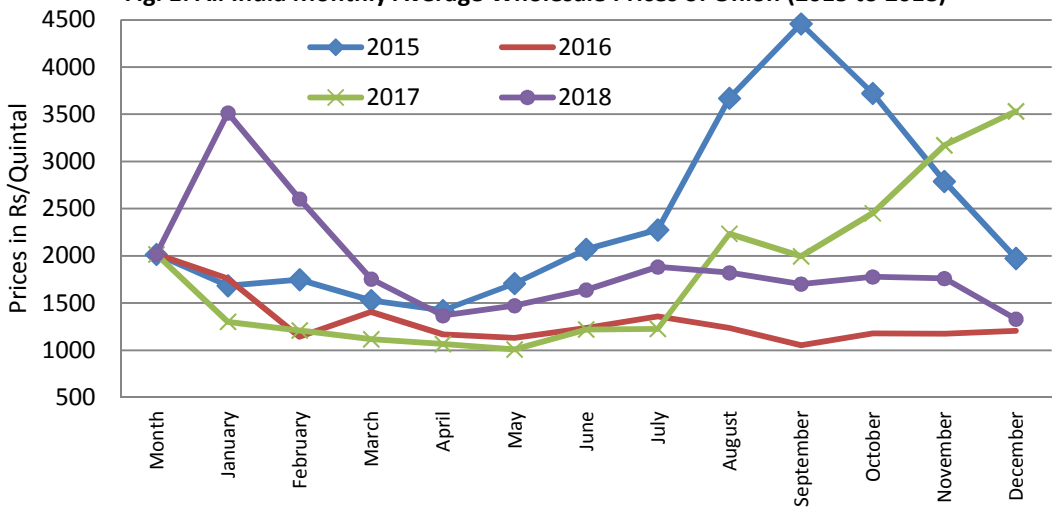
## 2. Onion Price Volatility

Onion is a politically-sensitive commodity which is one of the closely monitored agricultural commodities produced in India. Onion is the only vegetable that can bring down a government from power, as prices of onion have direct bearing on the common man's consumption basket. Therefore, this commodity is always in focus of the government. Though there is always a surplus production, fluctuating domestic and export demand often creates demand supply mismatch leading to spiral effect on the prices of onion. The prices sometimes fall below cost of production making it uneconomical for the farmers. Central Government uses Minimum Export Price (MEP) as a tool to ensure regulated exports so that there is an adequate supply of onion in the domestic market. State Governments with the support of Central Government also implement as and when require Market intervention Scheme (MIS) in view of possible glut in market. Month-wise arrival of onion during last five years indicates high fluctuation in arrival of onion in

markets across months that to year to year and monthwise arrival is not consistent.

Due to its highly volatile prices, during May 2014, Central Government brought onion under the Essential Commodities Act, 1955 imposing stock holding limits. Despite of same, wide variation in average wholesale prices of onion are recorded during last four years which is presented in Figure 1. The prices remained quite high in 2015, 2017 and 2018, especially during July to December. Average wholesale prices fell sharply in September 2016 below Rs. 1060/Qtl. After some improvement during remaining months of 2016 and beginning of 2017, the onion prices again crashed in May 2017 below Rs. 1010/-. The picture is more worrisome when we compare wholesale prices of onion across the states. During January 2018 prices were very high as compared to December 2018 and January 2019 and about 60 per cent deviation is recorded. This spiral effect of onion prices led to heavy losses to the farmers. While the middlemen take advantage of price movements, it affects farmers and consumers badly. The high fluctuation in prices of onion can be attributed to hoarding by traders with expectation of price rise, higher retailers' mark up, changes in MEP by Government and lack of proper forecasting system.

**Fig. 1: All India Monthly Average Wholesale Prices of Onion (2015 to 2018)**




The onion export brought under Canalization Scheme through National Agricultural Cooperative Marketing Federation of India Limited (NAFED) in 1974 by Government of India, which substantially increased export of quality produce and also the foreign exchange earnings. However, it was felt by NAFED and onion exporters that there is need to improve both production and quality of onion for export as well as to meet the domestic needs for which research and developmental programmes are to be undertaken. But spiralling price of onion is always a cause for concern. The prices rise sky high in years of deficit production and nose dip when there is glut. Wide price fluctuations make it a risky crop discouraging large scale adoption of input intensive production techniques and good management practices by farmers. Therefore, onion is generally referred as a high risk, high return crop for the farmers and traders. The high price variability

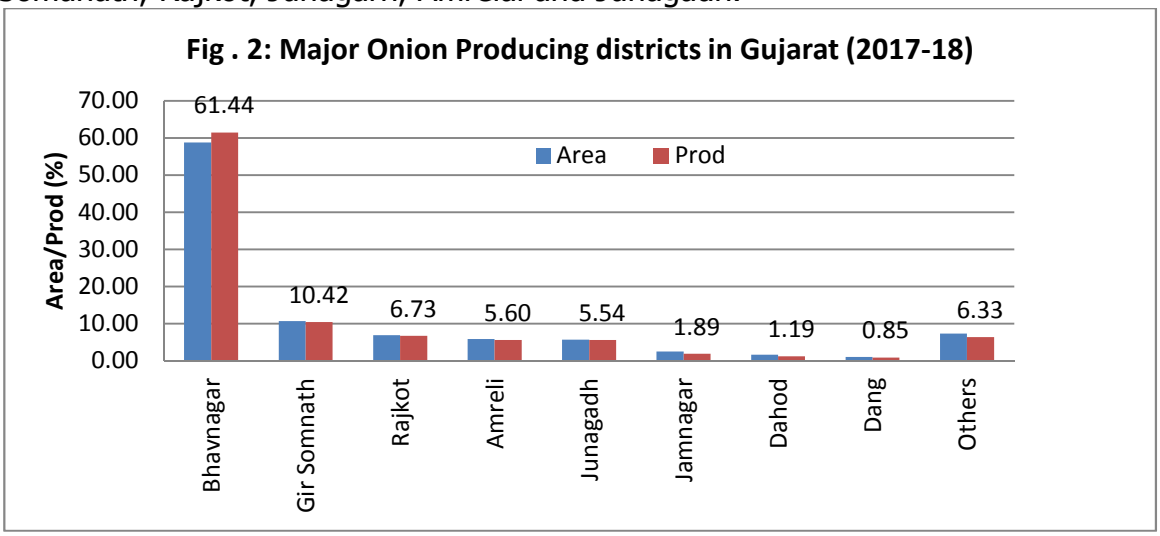
affects both producers and consumers through a spillover effect to the other sectors thereby leading to high inflation in the economy.

The Government of India has approved Operation Greens, the Central sector scheme aimed at the integrated development of value chain for three commodities, viz. tomato, onion and potato (TOP). It aimed at the stabilisation of the prices of these commodities, which have seen serious volatility in the past and reduction in post-harvest losses by way of farmgate infrastructure. TOP scheme also aim on value addition to increase the shelf life of the product, as well as enhance the value addition. Besides, emphasis would be on creation of a market intelligence network to collate real-time data on demand and supply in order to check the localised gluts of TOP crops. The government wants it to be implemented in a two-pronged strategy, the first being a short-term strategy focussed on price stabilisation and the second being a long-term one focussing on the development of integrated value chain development. The National Agricultural Cooperative Marketing Federation of India (NAFED) will be the nodal agency for the price stabilisation measures, which will create an e-platform for demand and supply management of TOP crops based on market intelligence inputs. Under the scheme, the clusters for onions includes Nashik in Maharashtra; Gadag and Dharwad in Karnataka, Bhavnagar and Amreli in Gujarat and Nalanda in Bihar.

## 3. Onion Production in Gujarat:

Gujarat has achieved considerable growth rate in horticulture during last five years because of serious efforts made by the State Government. The area and production of horticulture crop was 4.80 lakh ha and 43.03 lakh tons in 1994-95 which increased up to 16.87 lakh ha and 234.35 lakh tons respectively in 2017-18. It accounts for about 11.76 per cent of total area under vegetable crops and 11.84 per cent of total vegetable production in the state. The state of Gujarat is the eighth largest onion producing states in India, which accounts for about 2.3 percent of production of the country from area share around 4.0 percent. It was estimated that during the year 2017-18, total onion production in the state was 14.16 lakh tones and major onion producing district were Bhavnagar, Gir Somanath, Rajkot, Junagarh, Amrelai and Junagadh.

**Fig . 2: Major Onion Producing districts in Gujarat (2017-18)**



## 4. Need of the Study:

Against this backdrop and given that market structure, degree of competition and efficiency at the various levels of the supply chain has impact on the final prices paid by the end consumers with respect to agriculture products; the study proposes to price volatility and major issues in demand and supply management of onion in Gujarat. Irrational speculative driven bubbles and hoardings by trader lobbies have sometimes been blamed for episodes of high price volatility in India, but with no clear implications in terms of which possible policies could effectively prevent repetition of such crisis. This study aims to find major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure in Gujarat.

## 5. Data and Methodology:

The study has been carried out by utilizing both secondary as well as field survey data collected in Gujarat. The secondary level data has been collected from the various published sources and websites. The primary data survey were carried out from the one of the largest onion producing districts of Gujarat, i.e. Bhavnagar (Producer market, Map 1.1). Primary survey was carried out with a structured questionnaire for farmers and market intermediaries for the year 2017-18. Data were collected from 10 sample farmer households; 2 Trader, 2 Commission Agent, 2 warehouse owner and 1 Onion Processor. Besides data were also collected from 2 commission agent from Sevana APMC of Ahmadabad and 2 APMC Mahuva (Bhavnagar) and Sevana ( Ahmadabad) this makes a total of 21 households (Table 1.4). A focus group discussion with the committee members of APMC and with market functionaries was also held in order to get a clear picture of market charges, market practices, etc. The co-integration analysis were carried out using monthly wholesale prices of five onion dominated markets i.e. Ahmadabad, Gondal, Rajkot, Mahuwa and Surat markets of Gujarat for the period from 2005 to 2017.

## 6. Evidences from Literature

The review of literature on price volatility, supply chain issue and state interventions indicate that onion prices prevailed in the markets is greatly influenced by production in the previous year, exported quantity in the previous year and export price in the current year, while pattern of harvesting and market arrivals have direct bearing on price behavior and its movements. Besides factors likes huge post-harvest losses, non-availability of proper storage structures and mall practices in trading were highly responsible for onion price fluctuation. It was observed that Farmers Market helped in increased farmer's share in consumer's rupee and providing fresh vegetables to consumers at relatively low prices. While share of the farmer in retail price was less than half the retail prices in traditional market, the balance being accounted by marketing costs and margins. The reduction in the length of the marketing channel and also encouragement of cooperative marketing is needed so that farmers can benefit from scale economies. As far as traditional chain is concerned, strengthening and

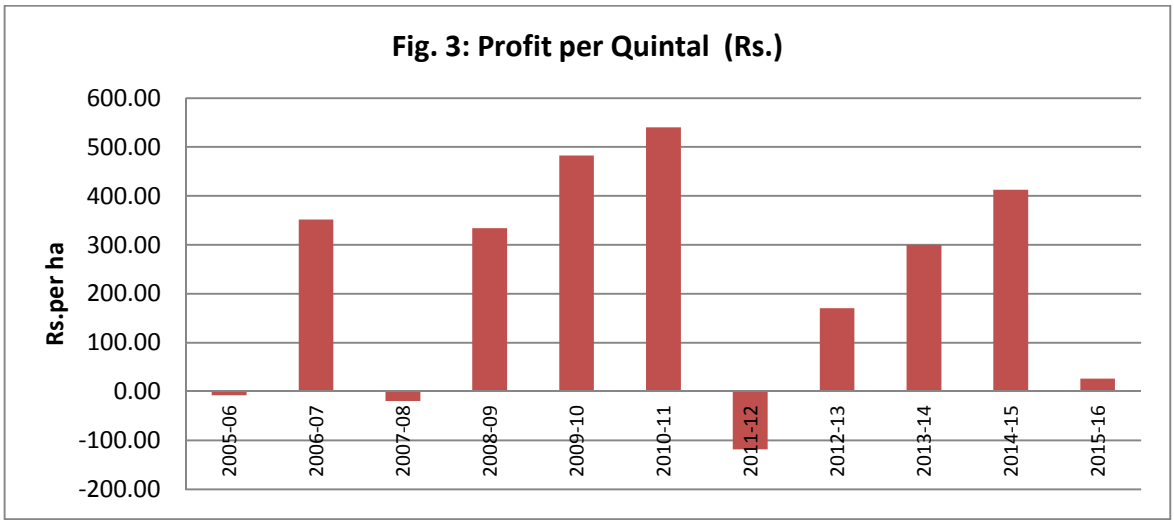
upgradation of infrastructure in regulated markets is necessary so as to reduce post harvest losses and benefit the producer and consumer. As part of market reforms, implementing market intelligence systems can help in discovering the right prices for producers as well as consumers. Proper planning for production, post-harvest management and marketing may help growers to get better prices for good quality produce.

## 7. Consumption of Onion

Historically, onion consumption per capita in India reached an all time high of 13.5 kg in 2013. Consumption of onion in India is subject to fluctuation on account of religious considerations. The monthwise per capita onion consumption as per NSSO survey indicate that consumption of onion during 2011-12 in rural area was relatively lower of 0.84 kg while in urban area, same was 0.95 kg. India produced enough onion, leaving a record surplus of about 2.92 MMT. Surplus onion was exported to a number of other countries. Gupta, et al (2015) estimated that onion consumption in the rural area was estimated to be 48.10 g/person/day while same was 50.97 g/person/day in urban side.

## 8. Cost of Cultivation and Income from Onion

Cost of cultivation of onion in Gujarat is estimated to be 125082.69 per hectare as C2 cost during 2015-16 while per quintal cost of production is estimated to be Rs. 722.97. Among various components of operational costs, cost of labour accounted for the highest share of 37.5 per cent in total cost of cultivation followed by seed (27 per cent). The cost of cultivation and production varies considerable across the years and thus negative profit per hectare and quintal of onion was observed during the year 2005-06, 2007-08 and 2011-12.




## 9. External Trade Scenario

India is a traditional exporter of fresh onions. Although there has been an increasing trend in the quantum and value of exports of onions 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 onions have not been free but are canalised through National Agricultural Cooperative Marketing Federation (NAFED) and now through some other agencies. Indian onions are famous for their pungency and are available round the year. Indian onion has two crop cycles, first harvesting starts in November to January and the second harvesting from January to May. There is a lot of demand of Indian Onion in the world, the country has exported 1588985.72 MT of fresh onion to the world for the worth of Rs. 3088.82 crores / 479.32 USD Millions during the year 2017-18. Major export destinations (2017-18) are Bangladesh, Malaysia, Sri Lanka, United Arab Emeritus and Nepal, which is not stable since last one and half decade period.

India mainly exports fresh onions to foreign countries followed by dehydrated onion. During 2017 (Jan-Sept), fresh onion export from India recorded USD 216.95 million which represented 70.29% of the total onion exports while it was USD 72.49 million (23.49%) for dehydrated onion. The varieties of onion in India that exports are Podisu onion, Red Onion, White Onion, Krishnapuram rose onion, Bangalore rose onion etc. The major onion varieties found in India are Agrifound Dark Red, Agrifound Light Red, NHRDF Red, Agrifound White, Agrifound Rose and Agrifound Red, Pusa Ratnar, Pusa Red, Pusa White Round. There are certain varieties of yellow onion which are suitable for export in European countries namely Tana F1, Arad-H, Suprex, Granex 55, HA 60 and Granex 429.

There are 23 states of India which are exporting onion to other countries. The major onion exporting states are Maharashtra, Gujarat, Tamil Nadu, Karnataka, West Bengal, Andhra Pradesh, Kerala, Delhi, Bihar and Jammu & Kashmir. Maharashtra and Gujarat together registered 80 per cent value of the onion export. Maharashtra (mainly Nashik) stood as largest onion exporter state in India and recorded USD 191.09 million in 2017 which represents 62% of the total's output. Gujarat and Tami Nadu recorded USD 56.41 million and USD 33.09 million from onion export. During Jan-Sept 2017, it is recorded that more than 1100 onion suppliers in India are supplying different varieties of onions to foreign countries. Jain Farm Fresh Foods Limited is one of the largest onion suppliers in India. It did onion export business worth of USD 20.46 million which represents approximately 7% of the total onion export value. The major onion exporters in India are Jain Farm Fresh Foods Ltd.; Sarah Exim Pvt. Ltd.; Pride Fresh Produce; Sanghar Exports and Oceanic Foods Limited. India is exporting onion to foreign countries from around 40 ports. JNPT is the biggest Indian port which departs the maximum number of onion shipments. India recorded 60% value of onion export from JNPT only in 2017 i.e. USD 186.37 million. JNPT is followed by Mundra Sea, Pipavav, Bhusawal ICD and Chennai Sea.

Onion can be processed to paste and dried products like powder, flakes and grits. There are about 75 onion dehydration units in Gujarat (86% in Mahuva, Bhavnagar) and one large export oriented dehydration unit at Jalgaon. India produces about 65,000 MT of dehydrated onion, of which 85 per cent is exported. The local demand for processed onion is limited but is on rise. In export market,

India competes with Turkey and China and they offer dehydrated onion at a very low rate ($1700 -2500 per MT) as against the Indian rate of $2600 per MT. Due to spiraling prices of onion, raw material prices go up, making onion processing unprofitable. During 2014-15, more than 75 per cent of onion dehydration units remained shut due to high raw material prices. Jain Irrigation Systems Ltd. has set up a modern dehydration unit at Jalgaon with full backward integration with farmers for producing processing quality white onion. The company has a total installed capacity of 14,000 MT/ annum, of which 9,500 MT/ annum is in Jalgaon. The company is connected to more than 6,000 farmers through contract farming for supply of onion in Maharashtra and Gujarat. Since the entire value chain of onion is addressed by the company, it has been able to become a market leader in dehydrated onion. As the domestic demand for dehydrated onion is very limited, growth of onion dehydration industry is moving at snail's pace.

## 10. Seasonal Behaviour in Prices of Onion

Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals and prices of onion. The results revealed the existence of seasonality in all the markets. Higher indices of market arrivals of onion were noticed immediately after harvest in the selected markets arrivals reached peak during April (262.72) in Mahuva which decrease to 6.05 in October and relatively shoot up in March. In Gondal market the peak indices was found in February (172.41) followed by March (169.77). Ahmadabad market showed lowest arrivals in September (75.87) while it peaked during March (116.30). Surat market witnessed the lowest arrivals in October (70.12) and highest during May (135.19). Arrivals reached a peak during December (151.90) in Rajkot market while they were the lowest in August (69.87). The higher market arrival indices were observed (more than 100) in the months of to December to April and lower arrival indices was found during July to October (less than 100).

The pattern of market prices showed slight differences among the selected markets. The price index in Mahuva market was the highest in the month of December (127.76) and relatively higher during the months of August to January. Gondal market witnessed peak price during October (152.81). The indices in other months varied from 57.18 to 121.95. A peak of 135.56 in index was observed during December in Ahmadabad market followed by October (134.96) and November (133.0). However, the price index of other months was between in 61.54 to 143.61. Surat market witnessed highest price index of 143.61 in October month. The market prices of onion in Rajkot found to be the highest in October (157.13). The lowest index was seen in May (60.19). Price index was between in 67.04 to 136.80 during other period. Price indices were more than 100 in the months of August to January. Lower indices were observed during May. The majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices. To analyze the arrivals pattern of onion during different months of the year and their impact on price, seasonal indices were computed adopting 12 months moving averages. Onion crop were sown in the month of October to December. It comes

to harvest during Feb to April. Thus, fluctuation in the monthly indices of onion arrivals was more than the monthly indices of prices in selected market during the study period. The price movement also demonstrates significant seasonal fluctuations in the selected markets. As a short term fluctuations, one will notice a general finding that the price is low when the arrivals were large and the price being high when the arrivals were low.

## 11. Status and Potential of Onion Infrastructure

Lack of adequate and appropriate storage facility is one the major constraint which enforces distress sale on farmers. The present storage capacities are either in adequate or unscientific. As a result of glut situation the price variability has been too high in the recent past. To improve the situation, GOI desired to create appropriate storage structures for onion, both at farm level as well as at market places. It drew a capital subsidy programme for the infrastructure development in which NABARD has been playing a pivotal role. The present storage capacity for onion is about 4.6 lakh tonnes. This is quite inadequate compared to our total production. Even most of the structures available are traditional and unscientific. If 40 per cent of the stocks are earmarked for scientific storage the potential for new storage structures is about 12.6 lakh tonnes. However, it has been projected by the Expert Committee on Cold Storage and Onion Storage that about 1.5 lakh tonnes on-farm capacity in production areas and 3.0 lakh tonnes capacity at APMCs and other market places are required in next 5 years. Thus, there remains a vast potential to be tapped.

## 12. Post Harvest Losses:

The total storage losses in onion in different storage structures in ranges between 3.46 per cent to 13.75 percent, while in cold storage, losses were only 5 per cent after 4 month of storage from may and October. While the storage losses in ambient storage conditions during the same period were 34 per cent. The weight loss, i.e. moisture loss and shrinkage were around 5 per cent and 21 per cent in cold storage and ambient store respectively. There was no diseases infection and sprouting in the cold stored onion, while around 11 per cent rotting and 2 per cent sprouting was notices in ambient storage. Higher infection of black mould was also found in ambient stored bulbs.

Post harvest loss in onion cultivation is believed to be very high, reportedly as much as 25 to 30 percent. Physical injury during and after harvest, greening of onion due to exposure to sunlight, sprouting and injuries during storage due to ammonia, controlled-atmosphere storage, and freezing also cause postharvest losses. Postharvest diseases on onion such as bacterial soft rot, black mould, bulb rot, neck rot, and smudge, cause significant losses in the quantity and quality of onions during storage.

## 13. Cold Storages Facility

The present storage capacity for onion is quite inadequate and inefficient in preventing post harvest losses. The structures available are traditional and

unscientific. Onion cold storage system is used in many countries of the world to store Indian onion. As Gujarat ranks second in Onion production and increasing area under onion require additional Onion cold storage facility to prevent post harvest losses, which is currently around 20-25 per cent of production and in value terms approximately INR 300 to 350 million every year. The cold chain industry in Gujarat is growing rapidly and now there are 625 cold storages with capacity of 23.2 lakh metric tonnes of which about two third of utilization was recorded by horticultural produce followed by animal husbandry and processed food (Table 4.8). Mahuva APMC in Bhavanagar district of Gujarat has constructed cold storage from the APEDA's grant in which 1200 tonnes of dehydrated onions can be stored.

As per State Department of Horticulture of Government of Gujarat, about 500 on farm structures of 25 to 35 mt ech has been created with support of MIDH have been created. Storage facilities are established by processors as well as traders, farmers and cooperatives. It is estimated that 1.5 lakh mt storage is available for open market. There is the highest storage gap is recorded in Maharashtra followed by in Karnataka and Gujarat state .

## 14. Findings from Field Survey Data

### 14.1. Farmer Households

- The demographic profile of the selected sample households indicate that all the respondents were male and average age of respondent of selected farmers was around 42 years.
- Data indicate that on an average per household owned land holding size was 3.21 ha with all area under irrigation. The category wise average land holding of small, medium and large category sample households was estimated to be 1.46, 3.36, and 6.40 hectare, respectively. On an average, per household 1.12 ha land was under onion cultivation, which accounts for about 35 per cent of total cultivated area. Across the selected land size groups, medium size holders put up relatively larger share of area under onion followed by small and large land holders group. Thus, it indicates that selected farm households had put around one third of total cultivated land under onion cultivation. There are number of reasons for cultivation of onion crop as it is short duration crop, best suitable land for onion cultivation, better price gain in onion crop other than competitive crops and number of onion processing also high.
- About 50 per cent selected farmers had market as a major source of planting material and had homemade seedlings used with good quality of planting material. All the respondents from large farmers group has used homemade planting material and did not face any difficulty in getting of these materials. Only 20 per cent farmers had received training or information about marketing practices of onion crops. About 80 per cent selected household have received price information from commission agent, AMPC and wholesaler for deciding production and marketing of

Onion produces and about 90 per cent households had sold their produce immediate after harvest due to perishable crop, lack of storage facility and hot climate condition in these producing area of Gujarat

- About 436.5 quintals of onion were sold by selected household during the year 2017-18 which was 36 per cent more than previous year. The highest average quantity of onion was sold by large land holding size group house (540 quintals) followed by medium (481.25 quintals) and small farmers (288.25 quintals). In the case of season wise trade, the highest share of 80.81 per cent onion was traded in rabi season followed by sale in early rabi (9.26) and summer (7.64) season. About 80 per cent selected household has immediately sold after harvest due to lack of storage facility and perishable nature of product.
- All the onion producer respondents had sold onion in local markets of Mahuva and Bhavnagar district. On an average 36 kilometer distance was travelled for marketing onion by spending average time of around 1.27 hours by road. About Rs. 496 per ton cost was incurred by respondent famers on transportation of produce.
- On an average 80 per cent respondents had sold their onion produce in local market and rest sold within the state. The average operational cost incurred by the household (including loading and unloading) was estimated to be Rs. 89.58 per quintal. The cost was relatively higher in case of large land size group and the lowest was in case of small land holders which may be due to average distance travelled in sale of the onion produce. The major reason for preferred by respondent farmers these market were to get better price, low cost of transportation and near to village.
- About 10 percent of the farmers had storage facilities, which capacity of 25 tonnes of onion store. The onion crop is perishable crop and has 1-2 months of self life. During the months of June-July, almost all selected respondents required storage facility with a capacity of 25 tonnes. Around 5-10 per cent loss occurs during storage of onion. Almost selected respondent farmers cited few reasons behind not having farmer own onion storage unit such as due to high cost storage construction, small farmer, no space available, high labor cost and Weight loss and spoilage.
- As far as the farmers awareness about market charges are concerned, it was found that none of the respondent was not aware about the market charge prescribed by rule (such as Commission, Hamali/ Handling, weight men and market fees) and also were whether they were charged than prescribed rate. But all the respondents told that expense of unloading the market is too much (Table 5.8).
- During the discussion with farmers and field visits to selected study area, it was noted that majors problem faced in marketing of onion produce were high transportation cost, high marketing cost and lack Infrastructure facility like market sub-yard and storage facility. Few suggestions given by the respondents for the improvement of marketing facility and its benefits were creating warehouse facility at village level, APMC should provide market

agent at village level and Market sub yard facility at village level to reduce marketing costs and reduce waste of time and production of onion.

- About 90 percent of selected farmer households had opined that they did not see any cartel and collusive behaviour of traders and commission agents in the market. Only one fourth of total middle land size group farmers had reported collusion among traders and commission agent
- At the time of sowing, farmers had expected price of Rs. 2500 per quintal while at the time before harvesting and after harvesting, expected rate was Rs. 2558.33 and Rs. 3125.0 per quintal, but actual price received by the onion farmer was less than expectation at any time, i.e. Rs. 2366.25 per quintal only.
- About 60 per cent of onion growers were satisfied with the existing production, marketing, storage and processing infrastructure however they have faced some problems. In case of onion production, it was reported that the most of respondents had faced the problem of low productivity, attack of pest–diseases, and quality of product. While marketing of produce, onion growers had faced with low price for produce, high labour and marketing cost. Lack of storage facility, high wastage of produce and reduction of weight during storage were infrastructure related problems were encounter by the respondents. In case of processing of onion produce, problems faced were high cost of processing, low value while after processing also export related problems were faced by onion grower.
- The selected farmers were asked to give their suggestions on various aspects of onion cultivation, marketing and export. The suggestions given by the farmers are given below.
    1. Export of onion should be promoted by keeping in view the increase in its demand and prices.
    2. Proper and sound storage facility for onion should be created by the Government, as onion is semi-perishable commodity.
    3. Adequate number of processing/dehydration units needs to be created/installed to increase the onion demand in market.
    4. Awareness about use of dried/dehydrated onion among the consumer needs to be increased though consumer awareness programme.
    5. Appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion; otherwise farmers will divert to the other crop.
    6. Advance information of weather should be made available to the farmers by the nearby Meteorology department of Agricultural University.
    7. Inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce.

8. The number of available regulated markets are inefficient to handle the buffer produce of onion.
9. The minimum support price for onion should be declared for onion crop as well (as market intervention scheme for onion was not declared in near past).
10. There is a need to arrange and maintain cold storage of adequate capacity at some selected village / taluka level.
11. Government should develop proper and sound marketing system.

## 14.2 Market Functionaries

### Traders

- On an average, mainly three varieties of onion, viz. local, red and white onion arrivals is reported in the regulated market. It was also found that trader had on an average 36 years of experience in onion trading. The trader and Trader cum Commission agent licenses availed from APMC/Marketing Dept/Board. It shows that on an average about 8000 tons average quantity of onion is marketed annually and 5800 tons quantity of onion was traded previous year. The maximum quantity was traded during the rabi season 55.62 per cent and followed by early rabi season (28.13), summer season (10.63) and kharif season (5.62). Out of total quantity traded, only 100 MT onion was stored by the traders for emergency demand.
- Marketing strategy encompasses selecting and analyzing the target and creating and maintaining an appropriate marketing mix that satisfies the target consumers. The targeted purchasers and consumers of onion in selected market of the State are given in Table 5.18. In the selected markets, out of total procured quantity of onion, 90 per cent onion was procured from local market of Mahuva area and rest of 10 per cent was purchased within the state (Bhavnagar and Rajkot) and out of state (Nasik, Maharashtra) procured by traders. The average maximum transportation cost rupees of Rs. 3.5 per kg for procure from outside of state followed by Rs. 3.0 per kg within state and Rs 1.5 per kg onion procure from local market. The traders have then targeted to local area. This happens due to availability of onion at low cost. The road was the major mode of transportation for procurement and sale of onion by trader in Mahuva market. As far as onion sale by the traders is concerned, overall 85 per cent of the traders had sold the product outside the state; whereas only 5 per cent of them had sold within the state. Transportation cost incurred by trader for trading outside the state was estimated to be about Rs. 3.0 to 5.5 per kg. The major targeted consumers markets were in the states of Delhi, Punjab, Haryana, Rajasthan, Assam, Bihar and Bengal.
- Most of traders preferred to purchase onion from local market because onion produce is generally available at low price with good quality. Most of

the traders had preferred to sale their produce with in state due to good prices and less storable product.

- On an average, operation cost of per ton of onion procurement varied from Rs. 200/- to 850/- which includes transportation, loading and unloading, rent for storage, fees, monitoring and administering. In the process of trading, operational cost was borne by the buyer.
- Selected traders had expected high trade margin on total value to trade and also received high percentage of margin after trading of onion produce.
- Traders have faced major problems of lack of efficient transportation facility and high transportation cost. The respondents were asked to share their suggestions to solve these problems and they suggested that marketing facility should be made available by government at subsidize rate which includes transport facility, charges for loading and unloading of produce.
- Though onion is predominantly a winter crop, it is grown in all the three seasons depending upon the availability of irrigation facilities. The bulk of the onion is produced in the winter season which arrives in the market during April-May. However, the consumption of onion is spread throughout the year and there is steady demand for onion bulbs all the year round. Onion trader had 5 own storages with 3000 ton storage capacity and they require 2 more storage on rent with 1000 ton capacity at peak season. During the peak season, the product is sold within 15 days while 3-4 days in lean season.
- Onion is a seasonal crop, semi perishable in nature and has comparatively low storage ability and bulbs are usually stored until the harvest of next season crop or for longer period due to seasonal glut in the market. Significant losses in quality and quantity of onion occur during storage. Storage of onion bulbs has therefore, become a serious problem in the state. Onion is grown mostly during rabi crop and huge quantity of arrivals is reported in the market in the month of Feb to April. Rabi onion has shelf life of about 2-6 months while traders generally store onion for 2-5 months period during this period. While Kharif onion which has shelf life of about 1-3 months and about 20 to 40 per cent total produce get loss during the storage period.
- Open auction method was followed by all the traders in selected Mahuva onion market.

**Commission Agent**

- The average years of experience of commission agents in these markets varied from 30 to 34 years. Apart from these, it also comes out from the table that most of commission agents owning shops had extended trading and storage area along with a separate space for a small office. In Vasana APMC, all respondents were awarded licenses as a Commission agent,

whereas in Mahuva APMC, about half of the respondents were Trader and Commission agents.

- Average onion transaction is higher during rabi season which was about 25 mt followed by in early rabi (13.75 Metric tons), kharif (7.0 Metric tons) and Summer (5.00 Metric tons) season in the selected market. The average quantities transacted by commission agent were significantly higher in Ahmadabad APMC as compared to AMPC Mahuva, indicating either there is greater hold on market transactions or over-reported figures. Out of total quantity traded, only 17.5 mt of onion was stored by commission agent for emergency demand.
- Most of commission agents have reported that they adjusted their purchase and sale pattern in times of very high or low prices. The commission agents at Vasana APMC as well as at Ahmadabad APMC were well equipped with information and were connected with other markets. Quantities transacted by commission agent of Vasana were quite high in volumes which was sold in outside the state while the commission agents of Mahuva market had traded the onion within the state.
- With respect to purchase of onion, it was observed that most of respondents' preferred local market due to relatively lower prices and availability of quality onion while preference for within state and outside the state market as per their choice for local onion requirement in the selected market. The choices of place for sale of onion by commission agent was for sale within state and out of state for high price received, while local market was preferred due to perishability of commodity and better price.
- On an average 3 per cent of total traded volume as a operational cost of onion incurred by commission agent which including transportation, loading and unloading, rent for storage, fees, monitoring and administering.
- High price fluctuation and lack of storage facility are the major problems faced by the commission agents during marketing and transport of produce. The respondents were asked to share their suggestions to solve these problems and they suggested that market intelligence and storage facility at major onion market need to be created/enhanced.
- During the peak season, the product is disposed within 2-3 days while it takes 3 to 5 days in the lean season. None of trader had onion storage facility. Despite of same, due to high perishablilty of product, they don't require any storage facility.
- Among the various types of trading mechanism followed during the purchase and sale Onion, mutual agreement and open auction method was followed by all commission agents in both selected onion market.

**Processor**

- On account of rapid urbanization, hectic schedules and rising working population, the demand for onion powder is witnessing a tremendous growth, particularly in India. In order to save time, consumers are not

willing to indulge in difficult cooking procedures such as chopping onions. Apart from this, food processing represents one of the largest sectors in India which is bolstering the demand for onion powder. Rising consumer awareness about the improved shelf life of dehydrated foods has contributed to the growing adoption of dry onions among consumers, especially within developing economies. Onion dehydration industry of the state is the biggest in the country and it comprises 80 per cent of the total dehydration units which process nearly one lakh tonnes of onion. High initial investment in onion processing industry and high uncertainty in production enhanced the risk in this business.

- The details of onion processing unit in Mahuva market indicate that processor had purcahsed only three variety of onion for processing and on an average about 75 MT of onion is processed annually. About 50 mt of onions were purchased in previous year and in which about 60 percent was purchased in Rabi season followed by early Rabi (20 per cent) season. The processor had onion storage and only 30 percent of the total quantity of purchase is stored by processor for emergency demand.
- About 90 per cent of onion was purchased from local market and while rest of quantity was procured from outside the state.
- One of the prime reasons behind high volatility in onion prices stems from a lack of storage facilities that have not kept pace with rising production. Also, the traditional storage practices incur losses as high as 40 per cent. Processor has storage facility and the storage capacity is 250 meters. The current facility of onion storage is not enough for the processor because of huge market arrives in the month of December to May and it requires high storage facilities with high storage capacity. Onion is perishable crop and it has only 3 to 5 month shelf life while processor stores in only 3 months. There is no difficulty faced in obtaining processor licenses by the processor.
- The market structure of onion is unilaterally dictated by the traders, not farmers. Minimal role of farmers in price discovery due to low size of average farm holdings, unfavorable weather conditions and price risk were cited as major reasons for the situation.
- Processor had faced problems regarding marketing and storage of onion. The area of market yard and auction place is very small and all functionaries of marketing face problem in peak arrival. The majority of the respondents had suggested to increase the infrastructure facility likes market yard, auction place and storage facility in Mahuva market to overcome problems in marketing of onion.

**Warehouses**

- Onion is stored in ambient storage condition in state where the storage losses are very high. These losses are comprises of physiological loss in weight (PLW) i.e. moisture losses and shrinkage, rotting and sprouting. The storability of onion is influenced by several factors such as varieties, cultural practices, pre-harvest treatments and post harvest handing

practices. The storage environment during the period of storage plays an important role in the storage life and losses during the storage.

- All type of onion varieties have been stored and on an average 50 MT onions annually purchase by stockiest. Stockiest, nearly 30 Onion warehouse have capacity of 75 MT. The warehouse is located in Mahuwa city of Bhavnagar District. About 35 million tonnes of onion procure was done during the last one year, which purchased 57.14 per cent Rabi seasons and 42.86 per cent in the early Rabi season.
- In selected markets, out of the total procured quantity, 80 per cent onion was procured from local market of Mahuva area and rest 20 per cent was from other places within the state (Bhavnagar and Rajkot). The stockiest have then targeted to local area. This happens due to availability of onion high at low cost. The road is major mode of transportation for procure and sold of onion stockiest in Mahuva market. As far as onion sold by the traders is concerned, overall 100 per cent of the traders sold the product to outside the state. About Rs. 3.0 to 5.5/ kg transportation cost incurred by stokiest for trading outside the state. The major targeted consumers markets Delhi, Punjab, Haryana and Rajasthan.
- Average years of work experience of onion storage in these markets was 45 years and it worked as trader cum warehouse owner. The respondent has 30 warehouses with about 70 Metric tons of storage capacity and enough storage capacity in warehouse. They have lease out the storage to traders for three months. Onion has only 3-4 month shelf life but they store the onions in the warehouse for 3 months. In temporary storage structures onion is generally stored for one to three months while in semi-permanent and permanent structures, onions can be stored for 3 to 5 months depending upon the market rates. As for as the storage losses are concerned, the losses were high in temporary type structures despite of lesser period of storage. There was no difficulty faced in obtaining warehouse licenses by the traders. The owner of the warehouse has no loan facility provide for people who have onion in storage.
- Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption. On an average of Rs. 50 to 70 per quintal charged on the storage of onions for a period of one to two months. Most of onion stored in warehouse by the traders and big farmers.

## 15 Policy Recommendations:

- The price spikes of onion in many ways cannot be explained fully by the fundamentals of demand-supply. High inflation of food commodities cannot always be attributed to risks, exogenous shocks and mismatch of demand and supply, it can also be caused by market inefficiencies, weak supply chains and monopolies in the market. States Government must act against hoarders. Central government must reduce transportation bottleneck by making available railway wagons/racks for transport of onions. Besides,

there is a need to create regional storages to cater need of the region as per requirement.

- The available regulated markets are inefficient to handle the buffer produce of onion. Also inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce. Therefore, the appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion. NAFED or any other notified procurement agency/ies should procure onion at least 5 per cent of produce from open market and should store it.
- Though, India holds premier positions in area and production, the productivity of onion is very low compared to other countries. There is need to increase productivity by making them available quality seed (suitable to soil and weather condition) to farmer at reasonable rate by the concern State Agricultural University/State Seed Corporation.
- There is a poor post-harvest management at farm level. The total storage losses in onion in different storage structures estimated to be about 15 percent. Effective crop planning and creation of post-harvest management infrastructure for onion will go a long way to solve the issues related to onion supply chain. Efforts will have to be made to improve the present post-harvest processing and storage systems and educating the farmers and traders in handling/processing the produce hygienically and efficiently.
- It was observed in the study that most of the onion crop is sold in APMC and farmers preferred this channel because they were familiar with the system which was practiced over the years and they received timely payments. Marketing infrastructure in the Mahua market was very good, whereas at other places, infrastructure up-gradation is required as per requirement.
- Marketing information is needed by farmers in planning production and marketing, and equally needed by other market participants in arriving at optimal trading decisions. Therefore, agricultural marketing extension system needs to be strengthened.
- Onion dry product needs to be promoted in the market. The adequate number of processing/dehydration units needs to be created/installed to increase the onion demand in market. The awareness about use of dried/dehydrated onion among the consumer needs to be made though consumer awareness programme.
- The advance information on weather should be made available to the farmers by the nearby Meteorology department of Agricultural University. Also crop insurance facility should be provided to the farmers.
- Farmers suggested that in case price of onion falls to unduly levels, the government must step in and purchase the produce to avoid distress sales. Market Intervention Scheme should be implemented in time as and when

prices drastically fall below the minimum level. On Pilot basis, Government support scheme with minimum assured purchase price to farmers for any future date purchase declared in advance can be attempted so that farmer can keep stock it.

- The difference in freight charges at different port should be removed. Proper storage facility at port on minimal rate should be provided. The loan arrangement at subsidies rate on the basis of quantum of export should be provided to the exporters. Also insurance facility should be provided to exporters in order to cover the loss due to cancellation of order and delay in delivery in respective countries.
- A visit was made to Mahua APMC and discussions were held with concerned market functionaries. It was quite clear from the discussions that some traders also stored onions in anticipation of higher prices. After making purchases from farmers, they sometimes stored the onions instead of immediate sales. These commission agents also indicated that they stored onions. However, when an attempt was made to find out the quantity stored by them, they were very reluctant to disclose the quantity stored and only complained of transport bottlenecks because of which they were forced to store.
- The discussion with market functionaries and stakeholders reveal that even the media plays a role in causing sudden rise or downfall in prices by publishing certain news for which they are paid. For example, there may be sudden news of very high auction prices in upcountry markets which immediately lead to spiraling of prices in urban centres. In reality only one transaction may have been at very high price, but the media hypes it up, and wholesalers and retailers jack up the prices. Conversely, the media may talk about falling demand for onions and low prices prevailing in several markets. This acts as a downward pressure on prices and onion growers may have to make distress sales.
- Meeting with traders revealed that it is mostly the retailers who charge higher prices than warranted to the consumers. There is no regulation on prices charged by retailers and at times their rates are exorbitant, especially when the produce is in short supply.
- A meeting with wholesalers and exporters revealed that there are several bottlenecks in onion trade, transportation is major one. Another major problem facing traders is the export ban which is sometimes imposed when onion prices show an upward trend. Exporters lose their credibility in export markets as irregular suppliers in international markets. Added to this is the practice of fixing Minimum Export Prices (MEP) for onions. At times the MEP is fixed at very high levels and exporters actually sell at prices below MEP though the L/C (letter of credit) is prepared at MEP. Therefore the profit realized by exporters shows an inflated figure leading to higher tax liability. Also fixation of MEP makes exporters reluctant to export which sometimes leads to excess supplies in domestic markets, leading to fall in prices. Farmers also loose when prices show downward trend. In view of

these difficulties, export ban on onions coupled with fixation of MEP must be discouraged.

- A large number of exporters meet their export requirements from APMCs in Bhavnagar, Junagarh. However, their produce is often not cleared at port for 3 to 4 days. They therefore refrain from entering the local markets till their export commitments are dispatched. Since supply is choked up, exporters do not enter the market till their consignments are dispatched leading to price fall. Hence, if export orders are timely dispatched, it is possible that volume of exports may increase which will benefit farmers.
- Farmers normally store onions in onion meda/chawls (temporary storage structure) to benefit from lean season rise in prices. However, this method of storage leads to deterioration in quality, spoilage and shrinkage. Often storing of onions leads to losses of 30-40 percent. Traders therefore stated that storing of onions in meda/chawls is a very rudimentary method of storage and there is urgent need for technology such as well designed cold storage which will enable the crop to remain in the same condition without spoilage or shrinkage. This will help to even out supplies throughout the year and also lead to better production planning of the crop and more stability in prices.
- Onion cooperatives and FPOs must be encouraged to form and work in study area because presence of cooperatives would help the farmers to receive better prices and help to prevent collusion amongst traders not to bid beyond a certain price and also discipline prices.
- Besides, Farmer Producers Organization should be promoted to create required storages structures with support of subsidy. Government should assign the work, provide resolving fund or help for pledge loan and compensate interests.
- Sprouting of onion during storage in high humidity and low light conditions is a major constraint leading to huge losses to the farmers/ traders. Irradiation, a cold preservation method is highly effective in controlling sprouting of onion. Govt. of India had approved irradiation of onion, potato and spices in 1994 for internal marketing and consumption. Department of Atomic Energy (DAE) has set up two 500 kg/hr capacity demonstration plants at Lasalgaon and Navi Mumbai. Commercial units have also been set up in Karnataka and Rajasthan. More such facilities need to be created to arrest large spoilage of onion in the country.
- There is a dearth of cold chain infrastructure for onion. It should be stored at low temperature ($2^{O}C$) and 75-80 per cent RH condition. Onion requires special type of cold storage having facility for maintaining desired humidity during storage, drying of onion after off-loading at 20-$25^{O}C$ to avoid sweating (moisture accumulation on the surface) leading to faster decay. Onion can also be stored for a long period without any spoilage under ultra-low oxygen controlled atmosphere (CA) storages.

**Chapter I**

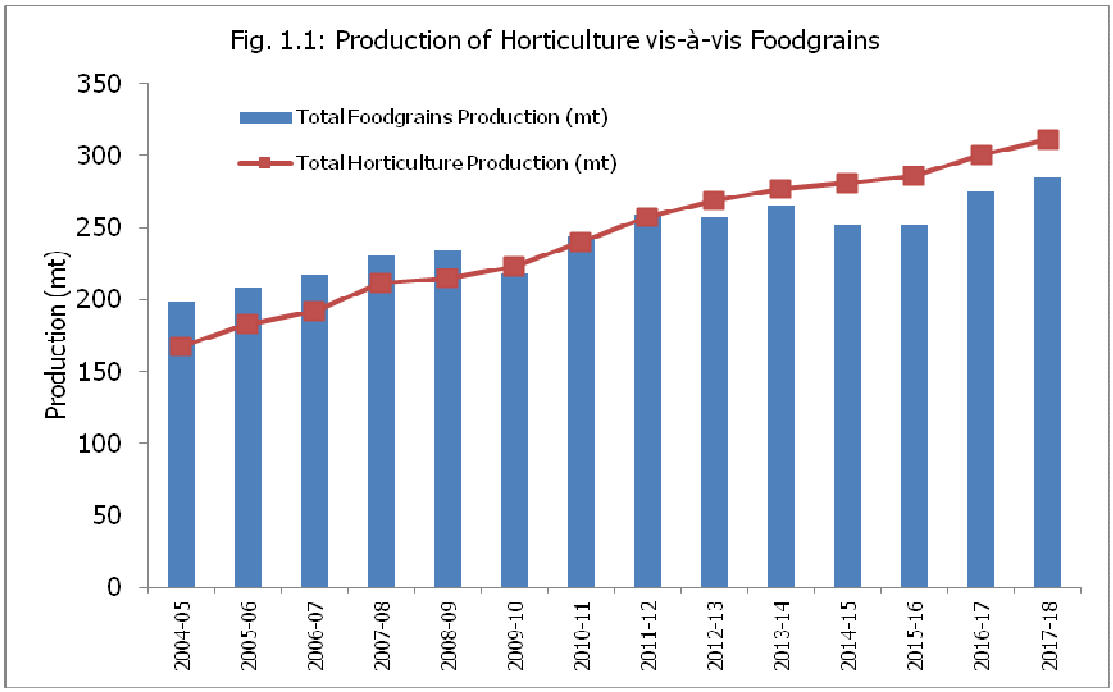
# Introduction

## 1.1 Introduction

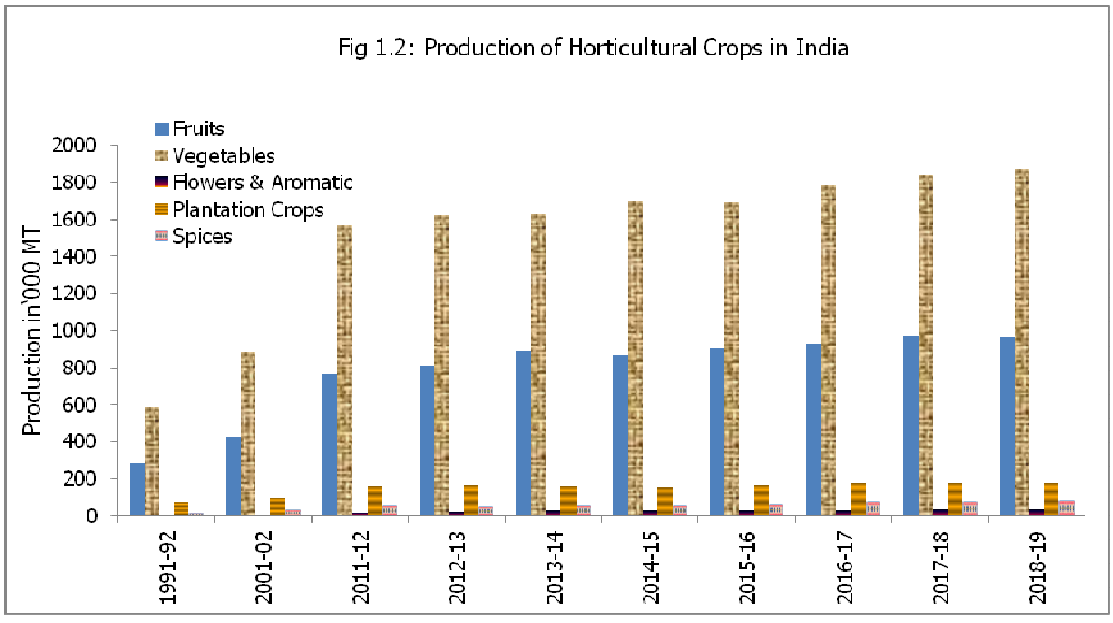
India has made impressive strides on the agricultural front during the last six decades or so. Food grains production has increased more than five times from 50.82 million tones (mt) in 1950-51 to about 284.83 mt in 2017-18. Virtually all of the increase in the production resulted from yield gains rather than expansion of cultivated area under food grains, which remain stagnant at around 141 million hectares since last more than four decades. The country has followed a multi-pronged strategy to improve and sustain food and nutrition security. The strategy includes (i) strong support for raising food production, (ii) stable supply of some food staples and (iii) making food available at affordable prices. This strategy embraces several instruments that cover generation and adoption of technology, better availability of inputs, institutional credit, subsidy on farm inputs, improved infrastructure, expansion of irrigation, institutional reforms and mechanism, competitive markets, remunerative prices for farmers/producers, public procurement, system of buffer stocks, open market sales, supply of food through public distribution system, nutrition interventions and trade policy (Chand and Jumrani, 2013).

After self sufficiency in food grains was met, the policy makers realized the need for diversification of agriculture to achieve higher growth rates as well as to adjust to the changing consumption pattern of the population which was experiencing due to urbanization and rising per capita incomes. Thus, dairy, horticulture, poultry and other allied sectors were given impetus and are being promoted through various policy measures. The public as well as private investment in horticulture and dairy sector increased manifold over the plans resulted in significant increase in production of horticultural crops (Fig 1.1 and 1.2) and milk production. India now ranks first in the world in milk production, second in fruits and vegetables and third in production of eggs (GOI, 2017).

This increased production has brought in its wake new challenges to handle in terms of huge marketable surplus. Thus, while increasing productivity and production in the agriculture and allied sector have always been the focus of Indian agriculture, attention is now being drawn on building up an efficient marketing system which includes adequate physical facilities for safe and economic handling of produce as well as institutional and legal support for orderly transactions. However, increased production has resulted in fluctuation of prices of agricultural commodities which made income of farmers unstable.




Source:https://eands.dacnet.nic.in/PDF/Agricultural_Statistics_2017.pdf



## 1.2 Price Volatility in Agricultural Commodities:

The global food and nutrition security is in question today with ever-increasing food prices resulting from adverse climatic effects on agricultural production, rise in oil prices, increasing use of grains for biofuels, and almost 50 per cent reduction in public spending on agricultural sector over the last three decades. The world has experienced an unprecedented increase in population during the past century, with a billion people added every decade during the last three decades alone. Thus, changes in food availability, rising commodity prices and new producer–consumer linkages have crucial implications for the livelihoods of poor and food-insecure people (Braun, 2007). In fact, global food prices witnessed a very sharp increase in 2007 and they continue to rise. Initially it was thought that the increase in food prices was a part of their cyclical nature, aggravated by the adverse impact of weather on production in some parts of the world. However, the continuing surge and the high level of global food prices seen so far till 2008 make it abundantly clear that the recent trend cannot be attributed to any volatility of international prices and there are fears that food prices may stay at these levels or may rise even further. The spurt in food inflation in the recent months has brought back into focus the critical issues of price volatility in agricultural commodities, agricultural market structures and market efficiency. Price volatility describes the magnitude of price fluctuations or the risk of large, unexpected price changes. The risk of extreme price events can intensify and contribute to broader social risks in terms of food security, human development, and political stability.

Regular price fluctuations - 'day-to-day' or 'normal volatility' is both typical and requisite for competitive market functioning. However the high price variability in the case of primary products affects both producers as well as consumers through a spillover effect to the other sectors, thereby leading to high inflation in the economy. The prices of the agricultural commodities are normally more volatile than those of the non-farm commodities due to biological nature of production, low price and income elasticity of demand and

risk in production due to exogenous shocks from weather. Such high volatility of prices in agricultural commodities can have a disproportional impact on the economies that endure exceptional shocks, and that impacts are nonlinear, typically being asymmetric. This arises because governments and households are well-adapted to normal volatility but neither anticipates nor considers making worthwhile provisions against extreme shocks, and assign low probability to the risk of such events. However the high inflation of food commodities cannot always be attributed to risks, exogenous shocks and mismatch of demand and supply, it can also be caused by market inefficiencies, weak supply chains and monopolies in the market (Chengappa, et al., 2012). Particularly, price spikes in onion could not be explained fully by the fundamentals of demand-supply and that underscores the need to delve into the agro-market structures and identify the real causes of price volatility.

Against this backdrop and given that market structure, degree of competition and efficiency at the various levels of the supply chain has impact on the final prices paid by the end consumers with respect to agriculture products; the study proposes to price volatility and major issues in demand and supply management of onion in Gujarat. Irrational speculative driven bubbles and hoardings by trader lobbies have sometimes been blamed for episodes of high price volatility in India, but with no clear implications in terms of which possible policies could effectively prevent repetition of such crisis. This study aims to find major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure in Gujarat.

## 1.3 Global Onion Production

Onion is a crop of mass consumption round the year all over the world. Globally, 97.86 million tones of onions are produced (2017), while the vegetable ranks as first by harvested area (25.29 per cent). China, India, and the US are the world's leading onion producing countries, while around two third of global onion output comes from the ten top onion producing countries which includes. China, India, United States of America, Iran (Islamic Republic

of), Egypt, Russian Federation, Turkey, Bangladesh, Pakistan, Netherlands). About 170 countries of the world cultivate onions for domestic use while some also grow onions for trade. About 5.2 million hectares of onions are harvested each year on a global scale and it is estimated that around 8 per cent of this harvest is internationally traded. Onions are used as spice, condiment and vegetable almost daily. Because of special pungency, onions have more value for seasoning a wide variety of dishes. Dehydrated flakes or powder are in great demand both in the domestic and export markets. In fact onion is third most eaten vegetable in the US, right after tomato and potato.

India is the second largest producer of onion in the world after China with an annual production of 24.34 million metric tons from an area of 1.305 million hectare (2016-17), accounting 22.43 per cent share in total world onion production in 2017 (FAO[1], 2017). The country is also the major consumer of onion with an annual demand of 16.50-18.0 million mt (Premi and Premi, 2017). Though, India holds premier positions in area and production, the productivity of onion (16.00 tons/ha) is very low compared to other countries. The inherent lower productivity in sub-tropical countries vis-à-vis European counties, shortage and high prices of quality seeds, high incidence of pests and diseases typical under tropical conditions, moisture stress or excess rains during critical growth stages are factors constraining yield.

## 1.4 Onion Production in India

Onion is one of the most important commercial and important vegetable grown in India which is next to Potato, which is used either in raw or dehydrated form to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. Onion is consumed all over the country and is an important constituent of Indian daily diet. Onion is typically cultivated thrice a year and all three crops are available

[1] http://www.fao.org/faostat/en/#data/QC

for export, with rabi having the longer shelf life. Out of total production of about 24 million tones of onion, two third of total production is rabi crop while 20 per cent is late kharif and rest is kharif crop (Table 1.1). The diverse agro-climatic conditions enable to India to produce onion in one or the other part round the year. Onion is largely grown in the western, northern and southern parts both in rabi and kharif seasons. Its supply is available throughout the year albeit with different volumes. India produces all three varieties of onion, i.e. red, yellow and white. In the northern part of the country, onion is usually grown in the winter (rabi) season. While in the southern and western states of Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat and Maharashtra, it is grown in winter (rabi) as well as in the rainy (kharif) seasons. Currently, onion cultivation in kharif is gaining ground in the northern part of the country. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Andhra Pradesh, Haryana, West Bengal, Gujarat and Uttar Pradesh in the country. These States account for almost 90 per cent of the total onion production of the country (Table 1.2). Maharashtra accounts for about one third of onion production in our country.

Table 1.1: Season-wise Onion Production in India

| Agriculture Year: July-June | | | Production in Lakh Tonnes | | |
|---|---|---|---|---|---|
| Season | Transplanting | Harvesting Period | 2013-14 to 2017-18 | 2017-18 | 2018-19* |
| Kharif | July - August | October-December | 32 (15.24) | 35 (15.09) | 36 (15.25) |
| Late Kharif | October - November | January- March | 42 (20.0) | 46 (19.93) | 47 (19.92) |
| Rabi | December - January | End of March to May | 136 (64.76) | 151 (65.09) | 153 (64.83) |
| Total | | | 210 | 232 | 236 |

Notes: *- first advance estimate; figures in parenthesis are percentage to total.
Source: GOI (2019).

The onions from India are famous for their strong flavor. India export its considerable quantity of onion to countries like Malaysia, Singapore, Sri Lanka, Bangladesh, Pakistan, Indonesia, UK, Gulf countries, etc. Our exports

generally hover around 1.5-2.5 million tons per annum. As onions have no substitutes, demand for it is completely inelastic. It is also exported in the form of dehydrated onion, canned onion and onion pickle. Dehydrated onions are seen as a potential valued product in world trade and India is the second largest producer of dehydrated onions in the world.

Table 1.2: State-wise Onion Production in the Country

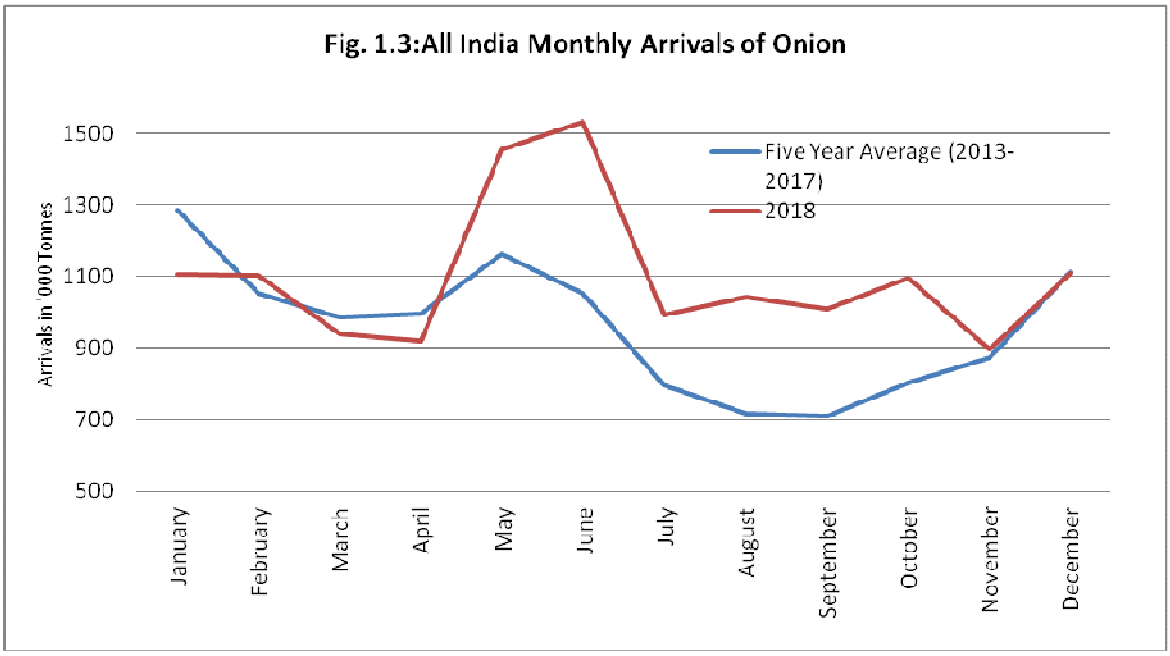
Production in '000 Tonnes

| STATE/Uts | Five year Average (2013-14 to 2017-18) | | 2017-18 | | 2018-19 (1st A.E.) | |
|---|---|---|---|---|---|---|
| | Production | % Share | Production | % Share | Production | % Share |
| Maharashtra | 6668.64 | 31.77 | 8854.09 | 38.06 | 8474.73 | 35.89 |
| Madhya Pradesh | 3187.73 | 15.19 | 3701.01 | 15.91 | 3725.21 | 15.78 |
| Karnataka | 2804.85 | 13.36 | 2986.59 | 12.84 | 3076.19 | 13.03 |
| Bihar | 1257.67 | 5.99 | 1240.59 | 5.33 | 1302.86 | 5.52 |
| Rajasthan | 1049.38 | 5.00 | 996.73 | 4.28 | 1073.01 | 4.54 |
| Andhra Pradesh | 859.54 | 4.10 | 915.73 | 3.94 | 994.07 | 4.21 |
| Haryana | 680.52 | 3.24 | 701.50 | 3.02 | 908.83 | 3.85 |
| West Bengal | 473.32 | 2.25 | 633.60 | 2.72 | 638.38 | 2.70 |
| Gujarat | 1233.98 | 5.88 | 546.20 | 2.35 | 540.67 | 2.29 |
| Uttar Pradesh | 422.59 | 2.01 | 439.64 | 1.89 | 440.38 | 1.87 |
| Chhattisgarh | 367.38 | 1.75 | 421.21 | 1.81 | 426.07 | 1.80 |
| Odisha | 392.91 | 1.87 | 379.34 | 1.63 | 379.34 | 1.61 |
| Telangana | 399.94 | 1.91 | 326.59 | 1.40 | 326.59 | 1.38 |
| Tamil Nadu | 433.01 | 2.06 | 301.14 | 1.29 | 311.18 | 1.32 |
| Jharkhand | 295.90 | 1.41 | 289.04 | 1.24 | 287.54 | 1.22 |
| Assam | 60.64 | 0.29 | 80.37 | 0.35 | 243.50 | 1.03 |
| Punjab | 196.87 | 0.94 | 214.55 | 0.92 | 233.96 | 0.99 |
| Jammu & Kashmir | 64.58 | 0.31 | 57.96 | 0.25 | 55.84 | 0.24 |
| Himachal Pradesh | 46.73 | 0.22 | 52.19 | 0.22 | 52.62 | 0.22 |
| Uttarakhand | 40.92 | 0.19 | 44.09 | 0.19 | 44.09 | 0.19 |
| Sikkim | 8.42 | 0.04 | 35.00 | 0.15 | 35.35 | 0.15 |
| Nagaland | 7.40 | 0.04 | 7.20 | 0.03 | 7.20 | 0.03 |
| Manipur | 5.45 | 0.03 | 6.84 | 0.03 | 6.76 | 0.03 |
| Meghalaya | 4.60 | 0.02 | 5.06 | 0.02 | 5.19 | 0.02 |
| Mizoram | 7.71 | 0.04 | 7.93 | 0.03 | 1.80 | 0.01 |
| Tripura | 2.07 | 0.01 | 1.05 | 0.00 | 0.98 | 0.00 |
| Kerala | 0.26 | 0.00 | 0.31 | 0.00 | 0.20 | 0.00 |
| Others | 17.49 | 0.08 | 16.77 | 0.07 | 17.49 | 0.07 |
| Total | 20990.01 | 100.0 | 23262.33 | 100.0 | 23610.01 | 100.0 |

Source: GOI (2019).

## 1.5 Onion Price Volatility

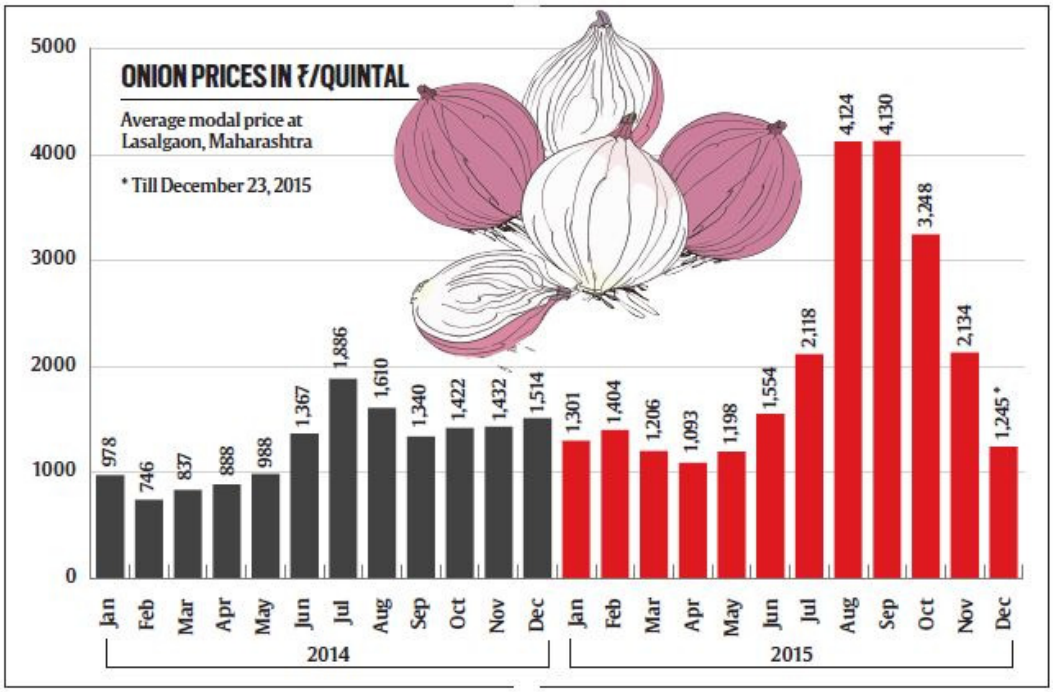
Onion is a politically-sensitive commodity which is one of the closely monitored agricultural commodities produced in India. Onion is the only vegetable that can bring down a government from power (Sudhir, 2004), as prices of onion have direct bearing on the common man's consumption basket. Therefore, this commodity is always in focus of the government. Though there is always a surplus production, fluctuating domestic and export demand often creates demand supply mismatch leading to spiral effect on the prices of onion. The prices sometimes fall below cost of production making it uneconomical for the farmers. Central Government uses Minimum Export Price (MEP) as a tool to ensure regulated exports so that there is an adequate supply of onion in the domestic market. State Governments with the support of Central Government also implement as and when require Market intervention Scheme (MIS) in view of possible glut in market. Month-wise arrival of onion during last five years indicates high fluctuation in arrival of onion in markets across months (Fig. 1.3) that to year to year and monthwise arrival is not consistent.




Rabi crop comprises approximately 60 per cent of the total production which is available till October November and also for exports. Prices are hiked mainly when the Rabi crops fails. In 2015 alone, prices swayed in retail market

from Rs.10 to Rs.100 per Kg, this kind of fluctuation is not seen in any other commodity (Fig 1.4a).

Fig. 1.4a: Price Volatility of Onion during the year 2015



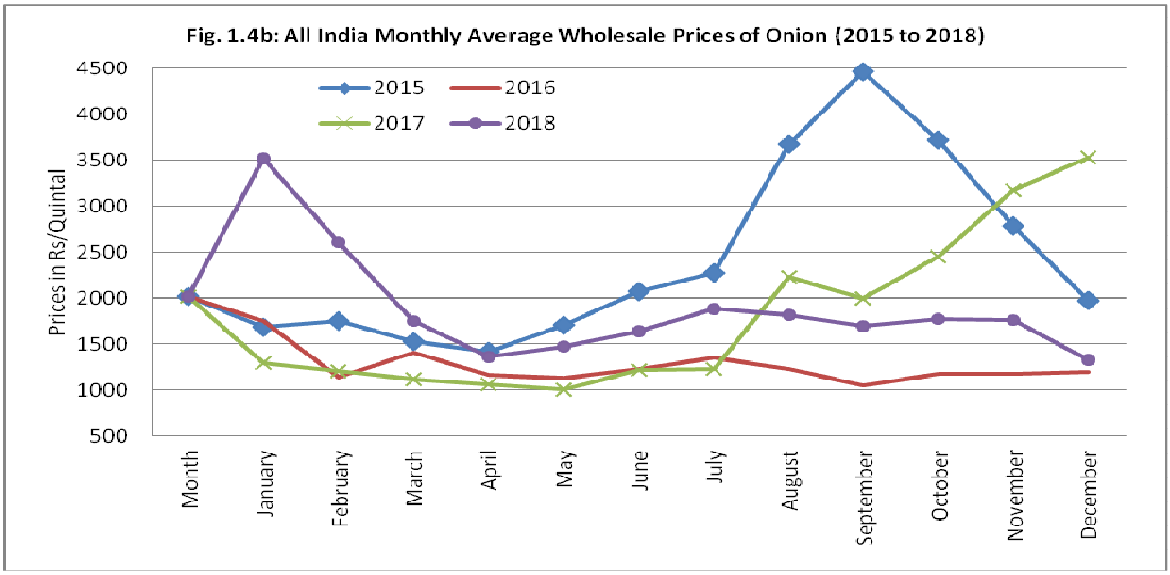

Due to its highly volatile prices, during May 2014, Central Government brought onion under the Essential Commodities Act, 1955 imposing stock holding limits. Despite of same, wide variation in average wholesale prices of onion are recorded during last four years which is presented in Figure 1.4b. The prices remained quite high in 2015, 2017 and 2018, especially during July to December. Average wholesale prices fell sharply in September 2016 below Rs. 1060/Qtl. After some improvement during remaining months of 2016 and beginning of 2017, the onion prices again crashed in May 2017 below Rs. 1010/-. The picture is more worrisome when we compare wholesale prices of onion across the states (Table 1.3). During January 2018 prices were very high as compared to December 2018 and January 2019 and about 60 per cent deviation is recorded. This spiral effect of onion prices led to heavy losses to the farmers. While the middlemen take advantage of price movements, it affects farmers and consumers badly. The high fluctuation in prices of onion can be attributed to hoarding by traders with expectation of

price rise, higher retailers' mark up, changes in MEP by Government and lack of proper forecasting system.

Table 1.3: Status of Statewise Average Wholesale Prices of Onion

| State | Monthly Average Wholesale Prices (Rs/Quintal) | | | % variation over month of December, 2018 | % variation over month of January, 2018 |
|---|---|---|---|---|---|
| | January, 2019 | December, 2018 | January, 2018 | | |
| Andhra Pradesh | 592.71 | 457.46 | 2568.48 | 29.57% | -76.92% |
| Arunachal Pradesh | NA | NA | 5561.37 | NA | NA |
| Assam | 1424.79 | 1510.28 | 4029.62 | -5.66% | -64.64% |
| Chandigarh | 750.00 | 750.00 | 3054.00 | 0.00% | -75.44% |
| Chhattisgarh | 931.81 | 936.34 | 3547.25 | -0.48% | -73.73% |
| Goa | 1029.73 | 836.35 | 2731.71 | 23.12% | -62.30% |
| **Gujarat** | **682.72** | **670.91** | **2043.92** | **1.76%** | **-66.60%** |
| Haryana | 946.74 | 994.16 | 3143.99 | -4.77% | -69.89% |
| Himachal Pradesh | 1228.62 | 1269.61 | 3799.52 | -3.23% | -67.66% |
| Jammu and Kashmir | 1081.31 | 1304.10 | 3768.46 | -17.08% | -71.31% |
| Jharkhand | 1544.35 | 2335.91 | 4207.40 | -33.89% | -63.29% |
| Karnataka | 699.22 | 679.76 | 2644.07 | 2.86% | -73.56% |
| Kerala | 1931.36 | 1983.27 | 4526.66 | -2.62% | -57.33% |
| Madhya Pradesh | 479.16 | 547.55 | 2249.46 | -12.49% | -78.70% |
| Maharashtra | 517.98 | 624.70 | 2486.98 | -17.08% | -79.17% |
| Manipur | 2511.01 | 2956.52 | 4930.69 | -15.07% | -49.07% |
| Meghalaya | 2489.21 | 2485.66 | 5500.00 | 0.14% | -54.74% |
| Mizoram | 3656.88 | NA | 5264.00 | NA | -30.53% |
| Nagaland | 5718.52 | 4215.38 | NA | 35.66% | NA |
| NCT of Delhi | 710.71 | 810.79 | 2841.71 | -12.34% | -74.99% |
| Odisha | 1445.88 | 1644.79 | 3914.87 | -12.09% | -63.07% |
| Punjab | 836.50 | 937.41 | 2932.13 | -10.76% | -71.47% |
| Rajasthan | 625.55 | 671.11 | 2658.73 | -6.79% | -76.47% |
| Telangana | 665.31 | 693.87 | 2485.06 | -4.12% | -73.23% |
| Tripura | 1719.52 | 1945.92 | 4521.71 | -11.63% | -61.97% |
| Uttar Pradesh | 934.51 | 1067.14 | 2907.99 | -12.43% | -67.86% |
| Uttrakhand | 775.61 | 955.26 | 2600.05 | -18.81% | -70.17% |
| West Bengal | 1217.28 | 1326.50 | 3961.56 | -8.23% | -69.27% |
| Average | 1375.81 | 1331.18 | 3514.13 | 3.35% | -60.85% |

Source: GOI (2019).




The onion export brought under Canalization Scheme through National Agricultural Cooperative Marketing Federation of India Limited (NAFED) in 1974 by Government of India, which substantially increased export of quality produce and also the foreign exchange earnings. However, it was felt by NAFED and onion exporters that there is need to improve both production and quality of onion for export as well as to meet the domestic needs for which research and developmental programmes are to be undertaken. But spiraling price of onion is always a cause for concern. The prices raise sky high in years of deficit production and nose dip when there is glut. Wide price fluctuations make it a risky crop discouraging large scale adoption of input intensive production techniques and good management practices by farmers. Therefore, onion is generally referred as a high risk, high return crop for the farmers and traders. The high price variability affects both producers and consumers through a spillover effect to the other sectors thereby leading to high inflation in the economy.

The Government of India has approved Operation Greens, the Central sector scheme aimed at the integrated development of value chain for three commodities, viz. tomato, onion and potato (TOP). It aimed at the stabilisation of the prices of these commodities, which have seen serious volatility in the past and reduction in post-harvest losses by way of farm gate infrastructure.

TOP scheme also aim on value addition to increase the shelf life of the product, as well as enhance the value addition. Besides, emphasis would be on creation of a market intelligence network to collate real-time data on demand and supply in order to check the localized gluts of TOP crops. The government wants it to be implemented in a two-pronged strategy, the first being a short-term strategy focused on price stabilisation and the second being a long-term one focusing on the development of integrated value chain development. The National Agricultural Cooperative Marketing Federation of India (NAFED) will be the nodal agency for the price stabilisation measures, which will create an e-platform for demand and supply management of TOP crops based on market intelligence inputs. Under the scheme, the clusters for onions include Nasik in Maharashtra; Gadag and Dharwad in Karnataka, Bhavnagar and Amreli in Gujarat and Nalanda in Bihar.

**Box 1: Operation Greens (TOP)**

In the budget speech of Union Budget 2018-19, a new Scheme "Operation Greens" was announced on the line of "Operation Flood", with an outlay of Rs.500 crore to promote Farmer Producers Organizations (FPOs #), agri-logistics, processing facilities and professional management. Accordingly, the Ministry has formulated a scheme for integrated development of Tomato, Onion and Potato (TOP) value chain.

***Objectives:***

- Enhancing value realisation of TOP farmers by targeted interventions to strengthen TOP production clusters and their FPOs, and linking/connecting them with the market.
- Price stabilisation for producers and consumers by proper production planning in the TOP clusters and introduction of dual use varieties.
- Reduction in post-harvest losses by creation of farm gate infrastructure, development of suitable agro-logistics, creation of appropriate storage capacity linking consumption centres.
- Increase in food processing capacities and value addition in TOP value chain with firm linkages with production clusters.
- Setting up of a market intelligence network to collect and collate real time data on demand and supply and price of TOP crops.

The strategy will comprise of a series of measures as decided by the Ministry which include:

**(I) Short term Price Stabilisation Measures**

NAFED will be the Nodal Agency to implement price stabilisation measures. MoFPI will provide 50% of the subsidy on the following two components:

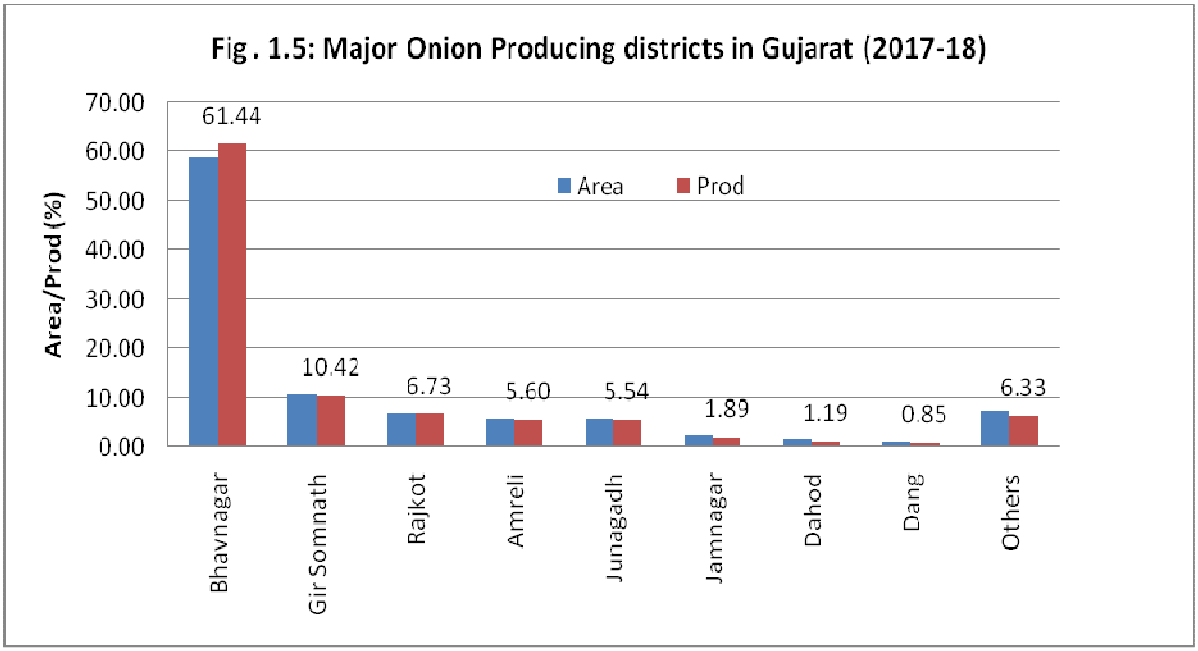
i. Transportation of Tomato Onion Potato(TOP) Crops from production to storage;
ii. Hiring of appropriate storage facilities for TOP Crops;

**(II) Long Term Integrated value chain development projects**

i. Capacity Building of FPOs & their consortium
ii. Quality production
iii. Post-harvest processing facilities
iv. Agri-Logistics
v. Marketing / Consumption Points
vi. Creation and Management of e-platform for demand and supply management of TOP Crops.

## 1.6 Onion Production in Gujarat

Gujarat has achieved considerable growth rate in horticulture during last five years because of serious efforts made by the State Government. The area and production of horticulture crop was 4.80 lakh ha and 43.03 lakh tons in 1994-95 which increased up to 16.87 lakh ha and 234.35 lakh tons respectively in 2017-18. It accounts for about 11.76 per cent of total area under vegetable crops and 11.84 per cent of total vegetable production in the state. The state of Gujarat is the eighth largest onion producing states in India, which accounts for about 2.3 percent of production of the country from area share around 4.0 percent. It was estimated that during the year 2017-18, total onion production in the state was 14.16 lakh tones and major onion producing district were Bhavnagar, Gir Somanath, Rajkot, Junagarh, Amreli and Junagadh (Fig. 1.5).




In view of above discususon, the present study was undertaken for the state of Gujarat with folowing specific objectives.

## 1.7 Objectives of the Study:

1. To analyse trends in area, production and productivity of onion in the Gujarat State.
2. To assess price volatility in major onion production and consumption markets in the Gujarat State.

3. To estimate the status and potential of onion infrastructure with specific focus on storage structures.
4. To assess major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure and remedial measures from stakeholder's perspectives.

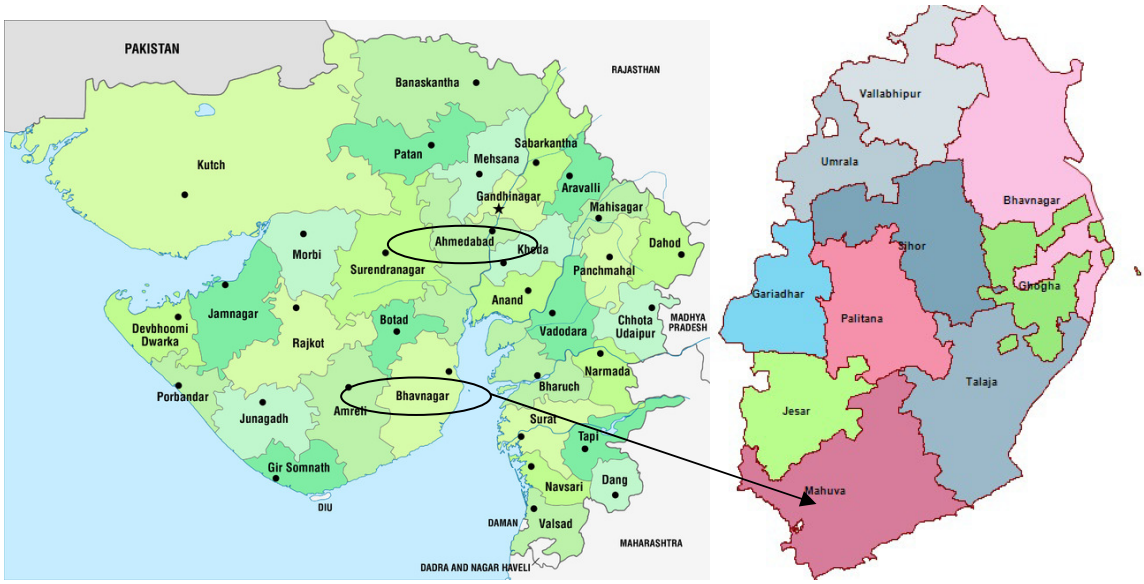
## 1.8 Data and Methodology:

The study was undertaken for the state of Gujarat. The study has been carried out by utilizing both secondary as well as field survey data collected from Gujarat. The secondary level data has been collected from the various government publications, offices and related websites on districtwise area, production and productivity of onion, monthwise arrival and wholesale prices of onion storage structure available and related parameters. The primary data survey were carried out from the one of the largest onion producing districts of Gujarat, i.e. Bhavnagar (Producer market, Map 1.1). Primary survey was carried out with a structured questionnaire for farmers and market intermediaries for the year 2017-18. Data were collected from 10 sample farmer households; 2 Trader, 2 Commission Agent, 2 warehouse owner and 1 Onion Processor. Besides, data were also collected from 2 commission agent from Sevana APMC of Ahmadabad and 2 APMC Mahuva (Bhavnagar) and this makes a total of 21 households (Table 1.4). A focus group discussion with the committee members of APMC and with market functionaries was also held in order to get a clear picture of market charges, market practices, etc.

Table 1.4: District wise Selected Taluka and Sample Villages in Gujarat

| Sr.No. | Districts | Selected sample | Selected Market |
|---|---|---|---|
| 1 | Farmer | 10 | Mahuva Market |
| 2 | Trader | 2 | Mahuva Market |
| 3 | Commission Agent | 2+2=4 | Mahuva (Bhavnagar) and Vasna Ahmadabad) APMC Market |
| 4 | Warehouse owner | 2 | Mahuva (Bhavnagar) APMC |
| 5 | Processor | 1 | Mahuva (Bhavnagar) APMC |
| 6 | APMC | 2 | Mahuva (Bhavnagar) and Vasna Ahmadabad) APMC Market |
| | Total | 21 | |

Map 1.1: Location map of Study area




Source: https://en.wikipedia.org

## 1.8 Data Analysis:

Simple tabular analysis was used to estimate change of area, production and productivity of onion crop, arrival and wholesale prices of onion. Compound growth rates were estimated using semi log function. The integration of markets was estimated as mentioned below. The data used in the co-integration analysis consists of monthly wholesale prices of five onion dominated markets i.e. Ahmadabad, Gondal, Rajkot, Mahuva and Surat markets of Gujarat for the period from 2005 to 2017.

## 1.9 Limitations of the Study:

The main limitation of the study was that as per the study design, it was not possible to get adequate numbers of farmers, traders and Commission agent, Processor and warehouse owner in some of the study area/markets. Some of the farmers were not aware about exact name of onion variety they had grown; therefore local name of onion is used. Most of the traders and Commission agent, Processor and warehouse owner were not willing to share their transaction/purchase and sale related information. Therefore data received limited numbers of respondent is discussed in this report. The data collected from the farmers and market intermediaries is based on their

memories and thus, has some limitations. In view of sample size, data constraints, the findings of the study cannot be generalized.

The main limitation of the study was inadequate information on storage for onion. The data collected from the farmers and market functionaries is based on their memories and thus has limitations.

**1.10 Organization of Report:**

The report is organized in six chapters. The introductory chapter contains brief information on onion production at global and national level, major concerns expressed over the recent undue price volatility noticed in the onion markets of India, some major marketing problems associated with onion markets, objectives of the study and methodology adopted in the study. The review of literature related to price volatility, supply chain issue and state interventions in production and marketing of onion produce is discussed provided in the second chapter. The overview of onion markets and price volatility economy is provided in the third chapter. The fourth chapter briefly reviews the status of infrastructure in general and storage in particular along with analysis of price volatility in onion. The pattern of seasonal arrivals and price volatility in onion at wholesale and retail level is also analyzed. The analysis of market linkages, storage and major issues faced by stakeholders in the supply chain of onion is dealt with in the fifth chapter. The chapter mainly attempts to map market linkages from different points in supply chain and existing number of storage and capacities with the stakeholders to understand the conduct of market functionaries in the supply chain. It takes in to account the problems faced by various market stakeholders and major infrastructural bottlenecks observed in agricultural marketing of onion in the selected states. The concluding chapter summarizes the findings of the study and policy suggestions are offered for reducing price volatility and smooth functioning of onion markets in selected areas of Gujarat.

The next chapter presents brief review of literature.

**Chapter II**

# Price Volatility, Supply Chain Issue and State Interventions: Evidences from Literature

## 2.1 Price Volatility of Onion: Supply Demand issues, Causes & Suggestions:

Kulkarni and Basargekar (1997) identified the factors influencing onion prices and tried to quantify their influence by using secondary data for a period of 15 years (1978-79 to 1992-93) and observed that onion prices witness a good seasonality, which is larger in prices prevailing in producing markets than in overall all onion prices. The authors opinioned that the acreage under onion is influenced by prices prevailing in the previous two years, while the export quantity is influences by domestic prices and domestic production. The onion prices themselves are influenced by the production in the previous year, exported quantity in the previous and export price in the current year. These three factors explained about 78 per cent of variation in onion prices. The authors suggested that the construction of proper storage facilities at the village level and encouraging farmers to store their produce during peak season by offering them credit facilities is necessary to safeguard the interests of farmers from heavy seasonal fall in prices.

Mehta and Kamra (1999) analysed the price variability of onion and mentioned that study of onion price fluctuations have stressed the need of a system of price variation alert. The research studies show the seasonality in onion price behavior and revealed that, the pattern of harvesting and market arrivals have direct bearing on price behavior and its movements. The price is considered as a barometer of the system providing equilibrium of supply and demand; therefore, the study suggested evolvement of a procedure for scrutinizing the price variation and to give alert signals for timely policy intervention.

Molla and Atteri (2000) analysed the price behavior of vegetables in Delhi wholesale market with focus on potato and onion. Authors mentioned that lagged price of onion had a positive and significant correlation with their respective current prices but current prices had a negative correlation with the current arrivals. Trend and seasonality components were significant in the time series analysis of prices of onions. However, trend was not significant in case of arrival of onion. Arrival fluctuations played an important role causing high fluctuations in prices.

A study on 'Demand and Supply Analysis of Onion under Uncertain Production Situations' by Murthy and Subrahmanyam (2003) revealed that production is just sufficient to meet the demand requirements in future under normal production periods. Any increase or decrease in onion production due to bumper or adverse conditions will have significant impact on the prices especially at the higher levels of deficits and excess supply.

Sharma et al., (2011) revealed that there was significant increase in onion production resulting in a rise in market arrivals. However, due to unseasonal rains, the production of onions declined by about 20 per cent in three major growing States during 2009-10 and 2010-11. The excessive increase in the prices of onions was a result of hoarding of the stocks in expectation of a rise in the price and higher retailer's markup. The rise in prices was also partly due to the reduction in MEP and consequent increase in exports during November 2010. The Onion price hike was due to exploitation and hoarding by traders and it happens every year between early August and October. This was due to powerful onion traders' lobby, which leads to artificial scarcity.

Chengappa, et al., (2012) in their study report prepared for Competition Commission of India, Government of India, discussed the arrival and price seasonality, the arrival price relationship, onion market structure etc. It is also piercing in the study that, the speculative traders are making supernormal profits in onions. In Delhi, the mark up price for retailers is 135 per cent which is quite higher than the wholesale price. It is pointed out that retailers and

traders exploit the situation of yield loss and make large profits. During the field visits in Hubli and Belgaum APMCs, authors observed two types of collusions, namely price fixing and bid rigging came to our notice. The local commission agents and traders were having strong networks with traders in other states (i.e. Goa and Andhra Pradesh). Our discussion with some local commission agents and traders indicated that they purchased onion for big traders of Goa and Andhra Pradesh. The quantity and price of the onion was decided over the phone on a day before the onion market opened. From the discussion, the local traders and commission agents maintained good networks with the traders in Goa and Andhra Pradesh to get bulk orders at better prices. The relationship with farmers, however noticed to be casual as there were hardly farmers who supplied the produce at regular basis.

Sultan, et al., (2012) attempted to forecast demand and supply onion in Pakistani Punjab and estimated the requirement of production of 372.403 thousand tones of onion in 2025 with an area coverage of 47.484 thousand hectares. Author further noted that there would be severe gap in production and consumption of onion in the coming years, such gap could be addressed by taking appropriate measures in research and development and policy-making as well.

Kodag (2013) studied largest onion market in India, i.e. Lasalgaon APMC from Maharashtra State and found that factors likes huge post-harvest losses, non-availability of proper storage structures and mall practices in trading were highly responsible for onion price fluctuation.

Immanuelraj, et al., (2014) found that the major reason for market price volatility of onion in Maharashtra was instability of onion production, while after period II it was due to area instability and partly due to yield instability. Authors opined that onion production in Maharashtra is mainly determined by acreage distribution, but in the long-run increasing area under onion may not be feasible without reducing the area of other important crops.

Chandrashekar et al., (2015) analysed the supply and demand for selected fruits and vegetables in Karnataka and observed that the demand and

supply gap is considerably high for onion (27 lakh tons) as compared to other vegetable crops. The study projected the supply, demand and demand-supply gap for Karnataka State for major vegetable crops viz., potato, onion and tomato.

Varma and Issar (2017) examined the pricing behavior of Indian onion exporters in the world market for onions. The study investigated the port-Level analysis of Onion export pricing. Study observed that, competitive market structure in majority of the destination markets. However, the pricing-to-market behavior was prevalent in three destination markets viz., Bangladesh, Oman and Qatar. In these markets, the exporters were following local currency price stabilization i.e., reducing the price whenever the Indian currency appreciates against the importer's currency. The dummy variable for minimum export price was positive and statistically significant in those markets where the pricing to market behavior was observed indicating that even when the minimum export price requirement was in place, exporters were able to adjust their price downward and sell in those markets.

## 2.2 Issues in Supply Chain: Production, Marketing, Processing, Storage and Value addition

Nawadkar et al. (1992) examined arrivals and prices of selected commodities at Gultekadi regulated market (Pune) in Maharashtra state covering the period from 1983-84 to 1990-91 using data from annual reports of the market committee. An increasing trend was observed for the average price of all cereals, sesame and chickpeas during the period. A large change was noted in the arrivals of sesame, chickpeas, tomatoes and onions and in the prices of sesame, chickpeas, tomatoes, aubergines and onions.

Wahid (1995) analysed price fluctuation and growth of Rabi crops in Bangladesh and found that the range of fluctuation of chili price occupied the top position (-72 to 363 per cent), followed by garlic (-55 to 369 per cent), 7 onion (-45 to 198 per cent), wheat (-60 to 142 per cent) and potato (-51 to 144 per cent) during the period 1972/73 to 1992193. The range of fluctuations

of area, yield and production of those crops were comparatively much lower than price fluctuation. Significant negative growths of real prices were observed in case of potato (-4 per cent) and Boro rice (-3 per cent). The growths of areas of wheat (9 per cent), chilli 1 per cent) and Boro rice (9 per cent) were significant. The growths of yields of potato (3 per cent), wheat (5 per cent) and Boro rice (9 per cent) were also significant. So it was reported that high yield reduced the prices of respective crops during the study period.

Hobbs (1996) in his article on "A Transaction Cost Approach to Supply Chain Management" indicated that the practice of SCM encompasses the disciplines of economics, marketing, logistics and organizational behavior to study how supply chains are organized and how institutional arrangements influence industry efficiency, competitions and profitability.

Wilson (1996) in his study on supply chain of perishable products in Northern Europe found out that the supermarket chain was more important in the retail marketing of fresh products and he suggested that increased use of supply chain management techniques could increase the margins of the innovative and competitive firms that remain in the chain. Further the inherent cost of distribution networks and channels of fresh produce could be reduced substantially by using supply chain management. The fruit and vegetable supply chain has traditionally been fragmented. Some links have performed well but others have caused bottle necks.

Kulkarni and Basargekar (1997) identified the factors influencing onion prices and tried to quantify their influence by using secondary data for a period of 15 years (1978-79 to 1992-93). Authors observed that onion prices witness a good seasonality, which is larger in prices prevailing in producing markets than in overall all onion prices. The authors opinioned that the acreage under onion is influenced by prices prevailing in the previous two years, while the export quantity is influences by domestic prices and domestic production. The onion prices themselves are influenced by the production in the previous year, exported quantity in the previous and export price in the current year. The authors suggested that the construction of proper storage

facilities at the village level and encouraging farmers to store their produce during peak season by offering them credit facilities is necessary to safeguard the interests of farmers from heavy seasonal fall in prices.

Zairi (1998) in his study on the best practices of supply chain management in retail sector noted that the retail sector is undergoing major changes resulting from factors such as increased competition and tighter profit margins. He found out that an integrated management through the extended supply chain is the most effective means to achieve good value provision to the end consumer, which can be achieved through better product, better quality, better assortment, better in-stock service, less cost throughout the chain, accurate and timely information and committed business leaders.

Ricks et al. (1999) in their study revealed that the appropriate combination of vertical coordination arrangements like contracts, informal agreement and joint venture can improve supply chain performance by providing adequate supplies to the shippers from packers and growers, aiding standardization and packaging of fruit products and risk sharing between the shippers, packers and growers.

Wysocki (2000) in his study on the supply chain management of past and future noted that in the future, supply chains and not firms will compete for dominance. He also concluded that retailers have a large role to play in any supply chain because of their closeness to the consumer and their access to buying data.

Murthy and Subrahmanyam (2003) analysed the impact of arrivals on prices of onions and observed that there was negative and significant relationship between them indicating that an increase in the prices of onion would reduce the supply of onion to the market and vice versa.

Kumar and Arora (2003) studied the marketed surplus and marketing cost of vegetables in Uttaranchal and observed that there was 93.01 percent marketed surplus in case of onion. The important components of marketing cost of vegetables were packing costs, transportation and commission charges. The commission was an important component in almost all the vegetables.

Improper weighing practices, lack of market information, delay in sale process, delay in payment and lack of effective market regulations were important problems noticed in the selected area.

Elenchezhian and Kombairaju (2003) attempted to compare the marketing efficiency of farmers' market with central vegetable market by collecting data from 90 farmers from three farmers market in Madurai on selected vegetables, viz. brinjal, bhendi, tomato and small onion. Authors noted that two marketing channels existed in the markets for selected commodities, i.e. first starts from farmers and ends with consumers, while another starts with farmers flows through commission agent, wholesaler cum retailer, retailer and finally the ultimate consumer. The farmer's share in consumer rupee was as high as 95 percent in channel I for small onion, while it was very low in Channel II (55 percent). The marketing efficiency was higher in channel I with 16.02 percent for onion as compared to 2.44 percent in channel II. Thus, marketing efficiency in farmer market was higher than central market. Authors concluded that Farmers Market helped in increased farmer's share in consumer's rupee and providing fresh vegetables to consumers at relatively low prices.

Shroff (2003) in her study on 'Building up of An Efficient Marketing System to Obviate the Need for Large State Intervention in Maharashtra' with case studies of cotton, sugar cane and onion observed that marketing costs and margins as a percentage of retail prices for onion was 40.67 per cent and 14 per cent respectively in Lasalgaon, while the corresponding figure for Pune was 42.42 per cent and 15.17 per cent. The study concluded that, the share of the farmer in retail price was less than half the retail prices, the balance being accounted by marketing costs and margins.

Perumal and Mohan (2004) studied onion production and market arrivals in Dindigal onion market of Tamil Nadu and noted that imposition of five percent cess on onion in the Madurai and Dindigal markets have created price disparity. Therefore, traders and farmers have demanded that the government should remove cess from onions and ensure price stabilization.

Shroff (2004) based on the study of price spread of onion in Lasalgaon and Pune farmers received less than half the retailer price (45.33%), the balance being accounted by marketing costs (40.67%) and marketing margins (14.00%) to regulate the situation, storage should be undertaken by providing and planting higher shelf life varieties and processing into dehydrated flakes.

Verma, et al. (2004) analyzed the price spread, marketing efficiency and constraints in marketing of onion in Indore district of Madhya Pradesh and observed that producer received the maximum share of consumer's rupee in channel I (97.33 percent, Producer- Consumer), followed by channel II (72.00 percent, Producer- Retailer-Consumer) and channel III (58.12 percent, Producer- Wholesaler-Retailer-Consumer). The highest share obtained in channel I due to no intermediary. Thus intervention of market intermediaries has reduced the producer's share in consumer's rupee. The coefficient of correlation between monthly arrivals and prices of onion were mostly positively correlated during the year 1999-2000 to 2001-02. While same were negatively correlated during the year 1996-97 to 1998-99. The prices of onion not only vary year to year but also months of same year. The prices were low in the month of April followed by May. Non availability of adequate storage facilities of onion was the main problem expressed by 88.75 percent of the sample farmers, followed by price fluctuations (73.75 per cent). The problem of collusion (secret agreement) between commission agents and the buyers (outside traders) during the auction was also reported by 35 percent of the sample farmers. Problem of higher market charges was reported by 68.75 percent of total sample farmers followed by delay in payment (37.5 percent) and cheating in weighing by the traders (30 percent). About 72.5 percent farmers felt that there is need for temporary storage facilities in the market because sometimes farm produce could not be sold on the same day due to low price or lack of adequate number of buyers in the market. Authors suggest for constriction of storages at village level and firm onion export policy. Authors identified following issues that required attention for improving production and marketing: a) Bank credit and financial assistance should be

made available to individual farmers for development of production technology and marketing Infrastructures', b) Training of farmers in the areas of production technique, grading, standardization and quality control and modern methods of marketing is required.

While studying the marketing of onion in Dindigul district of Tamil Nadu, Indra and Velan (2004) observed that major share of marketing expenses is the commission charges of commission agents forming 10 percent of value of auction. The authors suggested that the commission agents charges should be reduced by the commission agents to a reasonable level. Also onion grower may group together to form association or cooperatives which can help the storage of excess production and marketing of onion by avoiding dependence on wholesaler and commission agents. They also suggested that onion may be notified in regulated markets of Tamil Nadu and necessary services should be provided to fetch more arrivals in market.

Shroff (2004) studied the price spread and marketing costs of onions in the markets of Lasalgaon and Pune of Maharashtra state and observed that marketing of onions takes place in regulated markets through auction method and the farmer sell it to the wholesalers through the commission agent. The marketing channel observed in the selected market was Farmer, Commission Agent, Wholesaler, Retailer and Consumer. The producer's share in consumer rupee was 45.33 percent in Lasalgaon and 41.88 percent in Pune market. Thus, the share of the farmer in the retail price was less than half the retail price, the balance being accounted by marketing costs and margins. All farmers responded that although transport to APMC is easily available and loading and unloading is done timely, the transport charges are very high. The study suggests reduction in the length of the marketing channel and also encouragement of cooperative marketing so that farmers can benefit from scale economies.

Reddy (2005) in his study revealed that supply chain management showed a way to cost minimization and value optimization all along the chain, starting from the customer order to the delivery of goods to him. It involves

coordinated management of material, information and manpower in the entire process within an organization. Managing was found to be the effective method to reduce operational costs and increase customer satisfaction.

Goyal (2008) studied the growth and instability in revised export marketing of onion during 1985 to 2004 and observed that onion production has increased at 4 percent per annum. The revealed comparative advantage ratio of r export in onion was above unity in all the years under study which implies that India has comparative advantage in onion export. However comparative advantage may not be in price terms due to high delivery cost.

Khunt et al. (2008) revealed that area, production and yield is growing positively at compound rate indicating assurance of onion supply for export as well as for sustaining fast growing onion dehydration industries of the State.

Malaisamy, *et al.,* (2008) studied economic analysis of supply chain management and marketing efficiency of fruits and vegetables in Tamil Nadu and observed that in case of onion, two marketing channels prevailed in Dindigul, Oddanchatram and Trichy markets. In the first channel, producer, commission agents, wholesalers, retailers and consumers participated in the process of marketing. However, producer, commission agent, retailers and consumers participated in the second marketing channels. They observed that farmer's share in consumer's rupee was varied between 60.1 to 75.5 percent. It was found to be higher in Channel II in all the three markets compared to Channel I. This is because of the fact that there is direct purchase of onion by the retailers from the commission agents. They also noted that this type of marketing channel was not common and more than 70 percent of onion is marketed through wholesaler to retailer facilitated by commission agent. Thus, commission agent plays a major role in marketing of onion in three selected markets. Authors suggested that as stored onion fetches better prices, storage facilities should be provided to the farmers.

The study conducted by Jat and Jain (2008) revealed, out of the total marketing cost of onion incurred by the producer-seller, the commission charge accounted for major component (44.35%) followed by expenditure on

transportation (33.98%) and cost of packing (9.22%). Similar pattern was observed in all the markets except Jaora and Piploda where transportation cost was the major component followed by cost on packing and commission charges. These components accounted major portion of marketing cost incurred by the farmers (87.55%).

Rasheed *et al.,* (2010) studied the organized retailing of fresh fruits and vegetables in a vegetable growing cluster in Hyderabad and observed that producers benefit in terms of better price realization in case of sales to organized retail as compared to *mandi.* The farmers also saved on marketing costs, especially commission charges. Further in case of sales to organized retail there was digital weighing system, which did not exist in the *mandi.* The *mandi* also lacked basic infrastructure such as storage facilities, parking and clean drinking water. However, the study noted that while the *mandi* purchased all the produce brought by the farmers, the purchases by retailers was very limited and hence all farmers could not benefit from the better marketing operations of organized retailers. Finally it was pointed out in the study that some organized retailers also provided inputs and technical advice to farmers.

Sidhu (2010) empirically analyzed the total cost of cultivation, which was estimated at Rs 49563/ha and net returns was found Rs 74597/ha for onion. Majority crop was being disposed off through commission agent/wholesaler (>90%) followed by retailer and directly to the consumer. The wholesale markets of Pune, Ludhiana and Patiala have been found integrated with price of onion. The highest elasticity of price transmission in onion has been observed between Ludhiana and Patiala markets with almost 90 per cent of the price change in Ludhiana getting transmitted to the Patiala market.

Barakade et al. (2011) opined that, marketing efficiency was higher in the channel I mainly because of higher price realization by the farmers due to reduced marketing cost. Marketing efficiency calculating using only Shepherd formula was much higher in channel-I (13.41) than in channel-II (4.61),

channel-III (4.51) and channel-IV (4.13). This indicated that the higher marketing margins taken away by the market intermediaries in channel-II, III and channel-IV. Narasimha and Yashodhara (2012) based on the study conducted in Chitradurga district of Karnataka. The findings of the study depicted 51.25 per cent of onion growers sell their produce of onion one month after harvest and 48.75 per cent of onion growers sell onion immediately after harvest. Majority (53.75%) of the onion growers marketed to commission agents followed by traders (21.25%), wholesaler (16.25%) and village level traders (8.75%).

Shorff, *et. al* (2011) studied the impact of emerging marketing channel in agricultural Marketing in Maharashtra and observed that although the farmers in the sample received Rs 711/- per quintal, they had to incur marketing costs of Rs 74.94/- per quintal and hence their net price after deducting marketing costs was Rs 636.06/- per quintal. The farmers sold to wholesalers who incurred marketing costs and margins of Rs 445.05/- per quintal. There was also wastage of onions during the time taken to transport the produce from the APMC to the retail outlets. The sale price of the onion retailer was Rs 1437.65 /- per quintal. Finally, it was observed that the share of the farmer in the retailer's price under traditional marketing channel was 44.24 percent, while marketing costs as a percentage of retailer's price was 44.25 and marketing margins as percentage of retailer's price was 11.05 percent. Farmers benefitted by selling their produce through emerging channels because they did not bear marketing costs. However, marketing operations of emerging channels are very limited and restricted to purchase of superior quality produce which enables farmers to secure higher price. Further, these operations by and large reach farmers who have received farm advisory services of emerging channels, through expert advice, field visits and crop guidance. As far as traditional chain is concerned, strengthening and upgradation of infrastructure in regulated markets is necessary so as to reduce post harvest losses and benefit the producer and consumer.

Chengappa, et al, (2012), has examined competitiveness in the onion markets in Central India. Secondary and primary data were collected from all the actors involved in the onion supply chain located in five major onion markets in Karnataka and six major onion markets in Maharashtra. Primary survey was carried out in these 11 markets, from farmers, retailers and wholesale traders and other market functionaries. The primary survey has been used to find out structure and conduct of onion markets and for assessing the competitiveness of onion markets in India. Secondary data provided the historical and recent trends of onion production, area under onion cultivation and yield of the onion. The same has also been used to find the seasonality of onion arrivals and prices in the major markets, and wholesale and retail prices of the onion in major markets. The study covered states of Maharashtra and Karnataka as two prominent onion growing states. The results indicate clear imperfections in the onion markets and presence of interested cartels. From the field survey the prevailing market imperfections clearly come out. It was noticed that almost 65.6 percent of the sample farmers in Karnataka were victims of interlocked market. About 55.2 per cent sample farmers experienced problems related to weighment and more than one fourth noticed unreasonable grading and anomalies in price fixation. Though these problems were not prominent in Maharashtra, some farmers did observe the problems like barrier to entry, anomalies in price fixation and interlocked market. For instance, evidence of market imperfection, particularly collusion was observed during price formation in Ahmednagar market amongst traders. While bidding on certain lots was taking place, traders started with about Rs 300 per quintal and kept bidding higher prices with minute increments till one purchaser quoted Rs 400 per quintal and another bid at Rs 405 per quintal. This is a standard method to „fire off" the seller. The commission agent intervenes to the auction and saying that the two bidders should equally share the produce that was being auctioned. Perhaps the Asymmetric information has been one of the key concerns in the market failures. Farmers in particular have found themselves as the main victim. As

observed in our field survey, about 94.6 per cent of the sample farmers in Maharashtra and 86.4 per cent in Karnataka were not aware about marketing channels in APMC and were also not aware of other options to sell their produce. The figures on the extent of awareness about Minimum Support Price (MSP) are close to the figures of NSS Situation Assessment Survey (59$^{th}$ round, 2003), indicating despite realizing the problem much less has been done on dissemination of market information.

Kalamkar, et al (2012) conducted a study to find out structure of onion markets and conduct of major players in onion markets in Maharashtra by collecting primary survey data from six largest AMPC markets (mandis) in Maharashtra, i.e. Lasalgaon/Pimpalgaon Basant, Yeola, Sangamner, Ahmednagar, Pune and Mumbai (Vashi). The study clearly reveals that there are both intra seasonal as well as inter seasonal fluctuations in prices of onions. Onion is also a perishable commodity and while kharif onion has low keeping quality, rabi crop can be stored for four to six months. A large part of the area in Maharashtra is cultivated in the kharif season and is rainfed. Hence production of the crop is subject to weather and rainfall conditions which also impact prices and cause fluctuations which are sometimes quite severe. Onion marketing is mainly conducted in APMCs through auction method. However, in urban APMCs such as Pune and Mumbai (Vashi), sales often take place through negotiations between traders. The supply chain in onion trade includes a few intermediaries. Traders revealed that it is mostly the retailers who charge higher prices than warranted to the consumers. There is no regulation on prices charged by retailers and at times their rates are exorbitant, especially when the produce is in short supply.

Reddy et al.(2012) studied the availability of market intelligence on various aspects like the potential markets, quantity arrived and prevailing and expected prices in different regions during different months of the year are important in mitigating many of market related problems. Study revealed that there was high variability in the arrival of onion in the month of March and April in selected markets. Among the markets, the coefficient of variation in

both arrivals and prices were found to be higher in Ahmadabad and Kolkata. The zero order correlation matrix between two markets average wholesale prices of onion indicated the high integration among the selected markets except Ahmadabad with Mumbai market. This might be due to the movement of produce from one market area to another depending upon price prevailed in the markets. The competitive conditions prevailing in the selected markets might have influenced the movement of prices in the same direction.

NIAM (2013) studied the trends in marketing and export of onion in India by colleting the data from the stakeholders from the selected two markets of Maharashtra and three markets of Karnataka. The findings of the study revealed that, the astronomical increase in the prices of onion was a result of hoarding of the stocks in anticipation of rise in the price and higher retailers mark-up. Moreover, the crop situations were not predicted timely and thus, the information on loss in production was not anticipated by market intelligence. Proper staggered planting of onions with suitable varieties can address supply gap during the slack period, there by stabilizing the prices across the year uniformly. As part of market reforms, implementing market intelligence systems can help in discovering the right prices for producers as well as consumers.

BanuuPriya et al., (2014) opined that, method of storages adopted in India are mostly depend on the traditional and commonly practiced methods viz., bag, pucca/room, tat storage, bambo, chawl structure and the losses associated with this kind are quite higher. Sprouting, desiccation and microbial spoilage are often observed in storage and it advised to use advanced techniques like modified ventilated structures, modified atmospheric (MA) and controlled atmospheric (CA) storage.

Shukla and Rai (2014) This study has been undertaken with the twin objectives of examining the variability pattern of market arrivals and prices of selected crops (Onion, Garlic and Turmeric) in selected markets (Lucknow and Kanpur) of Uttar Pradesh and analysing the relationship between market arrivals and prices. The study is based on market arrivals and wholesale prices

of selected crops collected from Rajya Krishi Utapadan Mandi Parishad, Lucknow (U.P.), Krishi Utapadan Mandi Samiti, Lucknow and Krishi Utapadan Mandi Samiti, Kanpur for the period 2001-2010. The study has shown that the extent of variability in market arrival of onion was lower in Lucknow market but higher in Kanpur market Its prices variability was lower in Kanpur market and higher in Lucknow market In case of garlic, the variability in market arrivals and prices was lower in Kanpur market but higher in Lucknow market In case of turmeric, the variability in market arrivals and prices was lower in Lucknow market but higher in Kanpur market The study has confirmed the negative relationship between market arrivals prices of onion, garlic and turmeric over the years in all two markets. However, across different months, there have been several instances of positive relationship between market arrivals and prices in Lucknow and Kanpur market.

Kalamkar et al (2015) analyzed the relationship between wholesale prices, retail prices, and details of contributing factors for the price difference of onion in Gujarat by conducting primary survey of 150 famers from three largest onion producing districts of Gujarat, i.e. Bhavnagar, Rajkot and Junagadh. Besides data were collected from other stakeholders such as exporters (07), wholesalers (10) and retailer/local vendors (13). The total cost of cultivation for onion at overall level was estimated to be Rs. 139106 per hectare, in which around 86 percent was input cost and remaining was storage, transportation and marketing cost. At overall level, on an average selected farmer households had received net returns of Rs. 68329 per hectare or Rs. 285 per quintal. In case of per quintal price received, on an average Rs.899 per quintal price was released by the selected farmers. Across the places of sale of output, the price per quintal realized by farmers was the highest in case of village sale, followed by private trader and then APMC. The sale through village trader was very meager and that to in off period and therefore the price realized was the highest. The selected farmers had sold their maximum output during the three months of Jan, February and March, in which March month sale was the highest one. In case of prices, October and

May prices were the relatively higher than other months. The average retail price was more than 76 percent higher than the wholesale price. However, the deviation was found higher in retail prices than wholesale prices. Across the months, the average markup range of prices was between 43 percent to 104.4 percent, with an average of 76.1 percent. While across the years, the corresponding figure ranges from 50.5 percent to 113.6 percent. Thus, it is very much clear that increase in prices was very high when it reaches through the retailer. The major problems faced by the selected farmer households in cultivating onion crop were distance market, lack of market information, poor underground water, collusion among traders/trade malpractices, poor road network for transportation, poor refrigeration facilities, non-availability of good quality of seed, and lack of MSP/government procurement.

Laxmi et al., (2017) The Results of the study revealed that, among all the States in India, Bihar publicized highest and significant growth in area under onion cultivation followed by Gujarat (12.75%). From the major onion exporting countries China is indicating the highest growth of 19.37 per cent per annum during last two decades followed by India (9.68%).

## 2.3 State Interventions with respect to Onion Price Volatility and Storage

Singh (1998) reported that the study of HOPCOMS, showed that, the optimum procurement pattern of tomato and onion in southern Karnataka showed little variations from month to month and relatively higher prices were observed during the month of September through December, the purchases were found to be lower in the subsequent months.

Praduman Kumar et al., (1998) in their study on management of export marketing of horticultural products, present status, constraints and future strategies concluded that the NAFED procures onion from mandies in the major growing states of Maharashtra, Gujarat, Andhra Pradesh and Tamil Nadu through open auctions. It does not enter into contractual arrangements with the farmers for the supply commitments through open market purchase.

Raveendaran, et al., (2007) analyzed the impact of agricultural policy on integration of markets of onion and found that; major share of the marketing expenses was commission charges of the commission agents forming around 10 per cent of value of auction. The farmer receives the 'Patti' that is total bill only after deduction of commission charges. The study suggested that arrangement of transport facility, storage facility and pledge loan facility should be made available at the regulated markets.

Rajkumar et al., (2008) stated that, the coverage of farmers under the Market Intervention scheme (MIS) has not been found satisfactory. The main problems being faced by the farmers in availing MIS benefits have been identified to include procedural complexities of the scheme, delayed payments and the requirement of meeting Fair Average Quality (FAQ) stipulations for the crops. Further revealed that, farther the procurement centers, more is the likelihood of the farmers to go in for open market sales. The study has suggested including a larger number of farmers under MIS by simplifying the procedures, making timely payments and increasing the number of procurement centers in the region.

Gummagolmath (2012) analysed the trends in Marketing and Export of Onion in India. Author noted that government market intervention operations with minimum support price under the FPS actually took place for onion only thrice during the last eight years of its implementation. In the first year of operation 1999-2000, the total amount disbursed from the revolving fund for the procurement operation during that year was Rs.1.06 crore. The quantity of onion procured was 3204 tons, mainly in Dharwad and Belgaum districts. During the crop years 2004-05 and 2006-07, the Government market interventions in onion market were significantly higher and involved in procurement of 26,333 tons of onion at the cost of Rs.12.98 crore. As against this, during the crop year 2006-07, the Government involvement has increased more than five times. The quantity procured has gone up to 1,43,207 tons and the financial outlay has gone up to Rs.85.19 crores. To overcome short falls in production, gaps in the supply chain, speculative activities by traders,

inclement weather, etc., the prices of onions and some agri-horticultural crops tend to be volatile. In order to regulate the spike in prices of commodities such as onion, potato and some pulses, the Ministry has launched a Price Stabilization Fund (PSF) with a corpus of Rs. 500 crores during 2015-16. (GoI, 2016).

Reddy et al., (2012) reported high variability in the arrivals of onions in the months of March and April. While discussing the arrival and price relationship in the selected markets, it is stated that an increase in market arrivals by one metric ton (M.T.) in a month led to an increase in prices by Rs. 6/MT and Rs. 4/MT in Bengaluru and Delhi respectively. But prices decreased in Ahmednagar (Rs. 6/MT), Mumbai (Rs.10/MT), and Kolkata (Rs.2/MT) markets with an increase in arrival by one M.T.in a month. Market integration is found to be significant.

Maity and Sharangi (2016) examined the supply chain for onion is different from general agricultural produce, even from other horticultural products. This is due to the fact that marketing of this unique crop is complex and risky particularly taking into account their seasonality and bulkiness. Proper planning for production, post-harvest management and marketing may help growers to get better prices for good quality produce.

## 2.4 Chapter Summary:

The review of literature on price volatility, supply chain issue and state interventions indicate that onion prices prevailed in the markets is greatly influenced by production in the previous year, exported quantity in the previous year and export price in the current year, while pattern of harvesting and market arrivals have direct bearing on price behavior and its movements. Besides factors likes huge post-harvest losses, non-availability of proper storage structures and mall practices in trading were highly responsible for onion price fluctuation. It was observed that Farmers Market helped in increased farmer's share in consumer's rupee and providing fresh vegetables to consumers at relatively low prices. While share of the farmer in retail price

was less than half the retail prices in traditional market, the balance being accounted by marketing costs and margins. The reduction in the length of the marketing channel and also encouragement of cooperative marketing is needed so that farmers can benefit from scale economies. As far as traditional chain is concerned, strengthening and upgradation of infrastructure in regulated markets is necessary so as to reduce post harvest losses and benefit the producer and consumer. As part of market reforms, implementing market intelligence systems can help in discovering the right prices for producers as well as consumers. Proper planning for production, post-harvest management and marketing may help growers to get better prices for good quality produce.

The next chapter presents onion markets and price volatility.

**Chapter III**

# Onion Markets and Price Volatility

## 3.1 Seasonal Variations in Area, Production and Yield

Onion is the important vegetable crop grown in the state. It is generally grown as late kharif or rabi crop. It accounts for about 5.3 per cent of total area under vegetable crops and 6.7 per cent of total vegetable production in the state. Though, state has shared hardly 2.7 per cent area and 4.2 per cent production of country, the highest productivity level (24415 kg/ha) was recorded as compared to all India average of 15989 kg/ha in 2012-13. The top five major onion growing districts are Bhavnagar, Rajkot, Junagarh, Amreli and Jamnagar. The major varieties of onion grown in the State are Nashik Red/ Nashik 53, Red Patti (local name), Nashik white, Pillipatti/Yellow and NHRDF.

The seasonal calendar of onion sowing, transplanting and harvesting in Gujarat is given in Table 3.1. Onion crop is grown during kharif (August-September) and rabi season (October-November) while transplanting was done during September- October and December- January respectively in kharif and rabi season. Harvesting month of kharif onion is done during November to January while Rabi onion harvest period is from March and April month.

Table 3. 1: Seasonal Calendar of Onion Sowing, Transplanting & Harvesting in Gujarat

| Activities | Season | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | March | April | May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sowing | Kharif | | | ■ | ■ | | | | | | | | |
| | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | Rabi | | | | | ■ | ■ | | | | | | |
| Transplanting | Kharif | | | | ■ | ■ | | | | | | | |
| | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | Rabi | | | | | | | ■ | ■ | | | | |
| Harvesting | Kharif | | | | | | ■ | ■ | ■ | | | | |
| | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | Rabi | | | | | | | | | | ■ | ■ | |

Note – Shed with black color or use tick mark

The *Rabi* season crop is the largest accounting for about 60 percent of annual production with *kharif* and late *kharif* accounting for about 20 percent each. Seasonal calendar in normal year of onions sowing, transplanting and harvesting across major regions in the Gujarat are given in the Table 3.2.

**Table 3.2: Seasonal Calendar (Normal Years) of Onion Sowing, Transplanting and Harvesting across major regions in the Gujarat**

| Major districts | Activities | Season | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | March | April | May |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bhavnagar Amreli Surendranagar Junagadh Gir Somnath Rajkot Dahod | Sowing | Kharif | | | ■ | ■ | | | | | | | | |
| | | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | | Rabi | | | | | ■ | ■ | | | | | | |
| | Transplanting | Kharif | | | | ■ | ■ | | | | | | | |
| | | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | | Rabi | | | | | | | ■ | ■ | | | | |
| | Harvesting | Kharif | | | | | | ■ | ■ | ■ | | | | |
| | | Late Kharif /Early Rabi | | | | | | | | | | | | |
| | | Rabi | | | | | | | | | | ■ | ■ | |

## *Growth in Area and Production of Onion in Gujarat vis-à-vis India*

The year wise area, production and productivity of Onion in Gujarat and India during 1980-81 to 2016-17 are presented in Table 3.3 and Figures 3.1 to 3.4. It can be seen from the table that area under Onion crop in Gujarat was 51.61 thousand hectares during the year 2016-17 with total production of 1290 thousand metric tonnes and productivity of 25 tonnes per hectare. The area under onion in Gujarat state has been unstable and fluctuating year to years, which was all the time high in the year 2005-06 (76 thousand ha). The analysis of production data also recorded the fluctuations with highest production of 2128 thousand mt in 2005-06. The productivity of onion in Gujarat is relatively higher and much stable that area under onion in the state.

However, unstable area under onion in Gujarat has not been seen any significant impact at national level.

Table 3.3: Year wise area, production and productivity of Onion in Gujarat and India during 1980-81 to 2016-17

| Year | Area ('000 ha) | | Production ('000 MT) | | Yield (Ton/ha) | |
|---|---|---|---|---|---|---|
| | Gujarat | India | Gujarat | India | Gujarat | India |
| 1980-81 | 11.6 | 250.0 | 249.2 | 2500.0 | 21.5 | 9.96 |
| 1981-82 | 13.1 | 250.0 | 339.4 | 2650.0 | 25.9 | 10.56 |
| 1982-83 | 14.1 | 240.0 | 269.9 | 2430.0 | 19.1 | 10.33 |
| 1983-84 | 14.7 | 270.0 | 364.1 | 2700.0 | 24.8 | 9.98 |
| 1984-85 | 14.9 | 280.0 | 491.1 | 3100.0 | 33.0 | 11.14 |
| 1985-86 | 16.9 | 280.0 | 477.7 | 2860.0 | 28.3 | 10.20 |
| 1986-87 | 16.9 | 260.0 | 477.7 | 2530.0 | 28.3 | 9.66 |
| 1987-88 | 9.4 | 270.0 | 216.2 | 2700.0 | 23.0 | 9.86 |
| 1988-89 | 18.0 | 320.0 | 528.0 | 3350.0 | 29.3 | 10.62 |
| 1989-90 | 16.6 | 300.0 | 453.4 | 3070.0 | 27.3 | 10.18 |
| 1990-91 | 17.9 | 300.0 | 463.6 | 3230.0 | 25.9 | 10.69 |
| 1991-92 | 17.4 | 320.0 | 424.4 | 3580.0 | 24.4 | 11.09 |
| 1992-93 | 25.8 | 320.0 | 605.3 | 3490.0 | 23.5 | 10.79 |
| 1993-94 | 23.0 | 370.0 | 549.3 | 4010.0 | 23.9 | 10.90 |
| 1994-95 | 20.3 | 380.0 | 561.5 | 4040.0 | 27.7 | 10.66 |
| 1995-96 | 19.0 | 400.0 | 444.0 | 4080.0 | 23.4 | 10.32 |
| 1996-97 | 16.0 | 400.0 | 433.0 | 4180.0 | 27.1 | 10.35 |
| 1997-98 | 20.9 | 400.0 | 619.0 | 3620.0 | 29.6 | 9.09 |
| 1998-99 | 52.2 | 470.0 | 1462.1 | 5330.0 | 28.0 | 11.39 |
| 1999-00 | 19.9 | 490.0 | 450.7 | 4900.0 | 22.7 | 9.93 |
| 2000-01 | 6.4 | 420.0 | 131.2 | 4550.0 | 20.5 | 10.79 |
| 2001-02 | 24.2 | 450.0 | 640.2 | 4830.0 | 26.5 | 10.69 |
| 2002-03 | 25.0 | 420.0 | 717.4 | 4210.0 | 28.7 | 9.91 |
| 2003-04 | 49.1 | 500.0 | 1479.3 | 5920.0 | 30.1 | 11.78 |
| 2004-05 | 44.0 | 550.0 | 1223.0 | 6430.0 | 27.8 | 11.72 |
| 2005-06 | 76.0 | 660.0 | 2128.0 | 8680.0 | 28.0 | 13.12 |
| 2006-07 | 76.0 | 770.0 | 2128.0 | 10850.0 | 28.0 | 14.10 |
| 2007-08 | 65.0 | 820.0 | 2059.0 | 13900.0 | 31.7 | 16.90 |
| 2008-09 | 57.6 | 830.0 | 1409.6 | 13560.0 | 24.5 | 16.30 |
| 2009-10 | 43.4 | 760.0 | 1078.6 | 12160.0 | 24.9 | 16.10 |
| 2010-11 | 62.0 | 1060.0 | 1514.1 | 15120.0 | 24.4 | 14.20 |
| 2011-12 | 61.3 | 1080.0 | 1562.2 | 17510.0 | 25.5 | 16.10 |
| 2012-13 | 28.9 | 1050.0 | 704.4 | 16810.0 | 24.4 | 16.00 |
| 2013-14 | 72.8 | 1200.0 | 1851.2 | 19400.0 | 25.4 | 15.10 |
| 2014-15 | 44.3 | 1170.0 | 1126.6 | 18930.0 | 25.4 | 16.10 |
| 2015-16 | 53.2 | 1320.0 | 1355.8 | 20930.0 | 25.5 | 15.90 |
| 2016-17 | 51.6 | 1270.0 | 1290.2 | 21560.0 | 25.0 | 17.00 |

Source: GOI (2017), Agricultural Statistics at A Glance 2017.

Fig 3.1: Growth in Area, Production and Productivity of Onion in Gujarat (1980-81 to 2016-17)

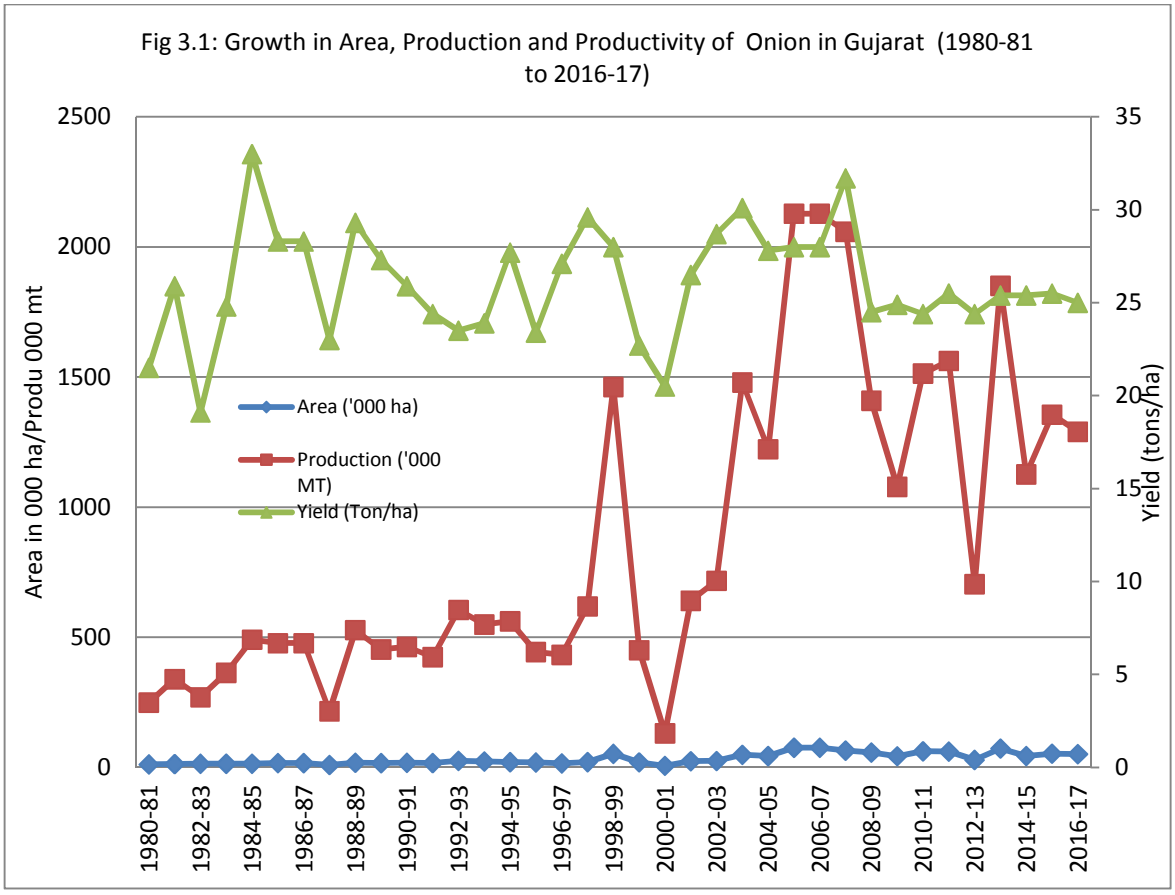



Fig 3.2: Growth in Area, Production, and Productivity of onion in India (1980-81 to 2016-17)

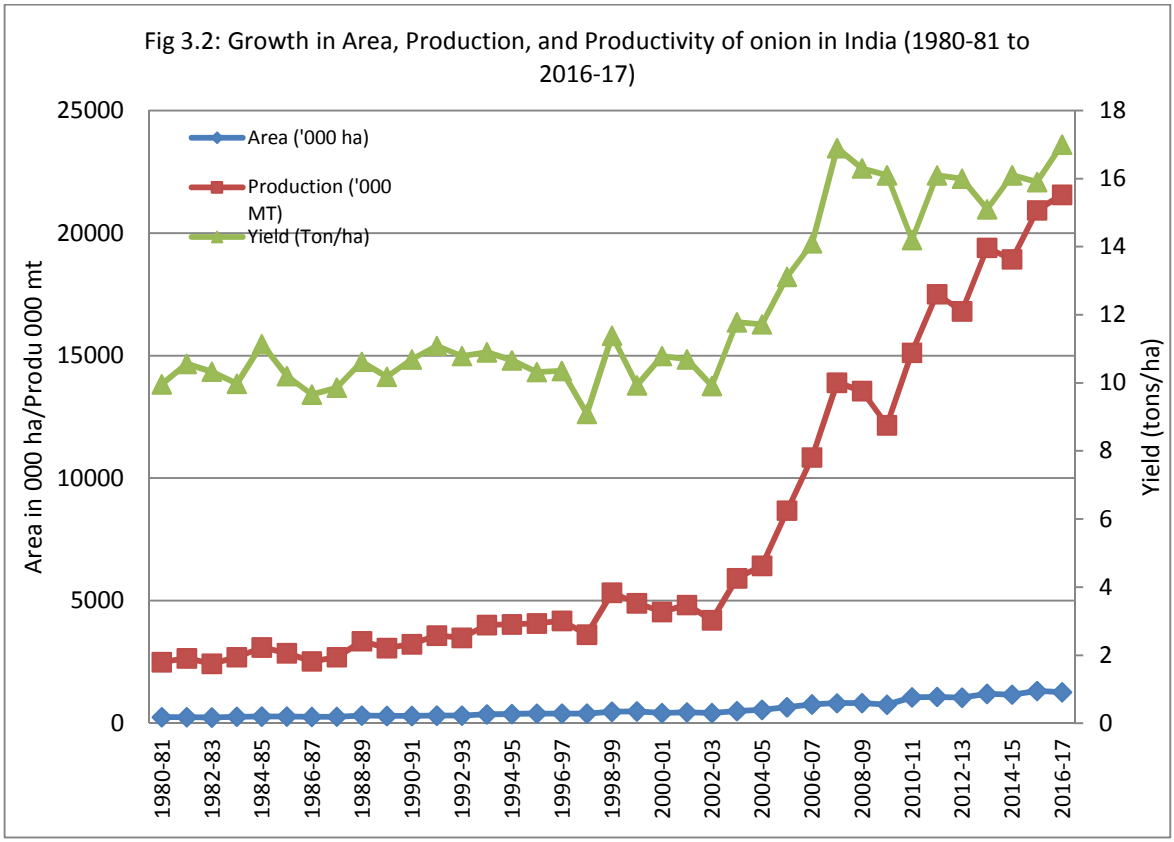


**Fig 3.3: Growth in Area under Onion in Gujarat (1980-81 to 2016-17)**

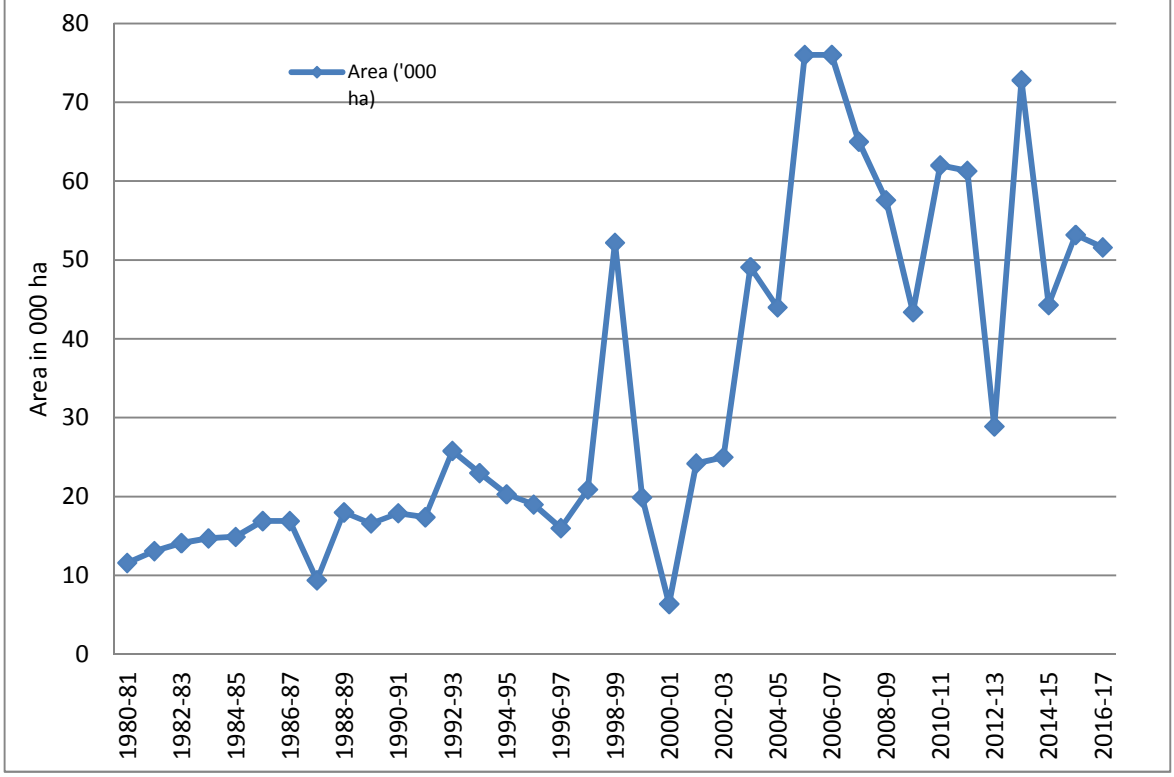
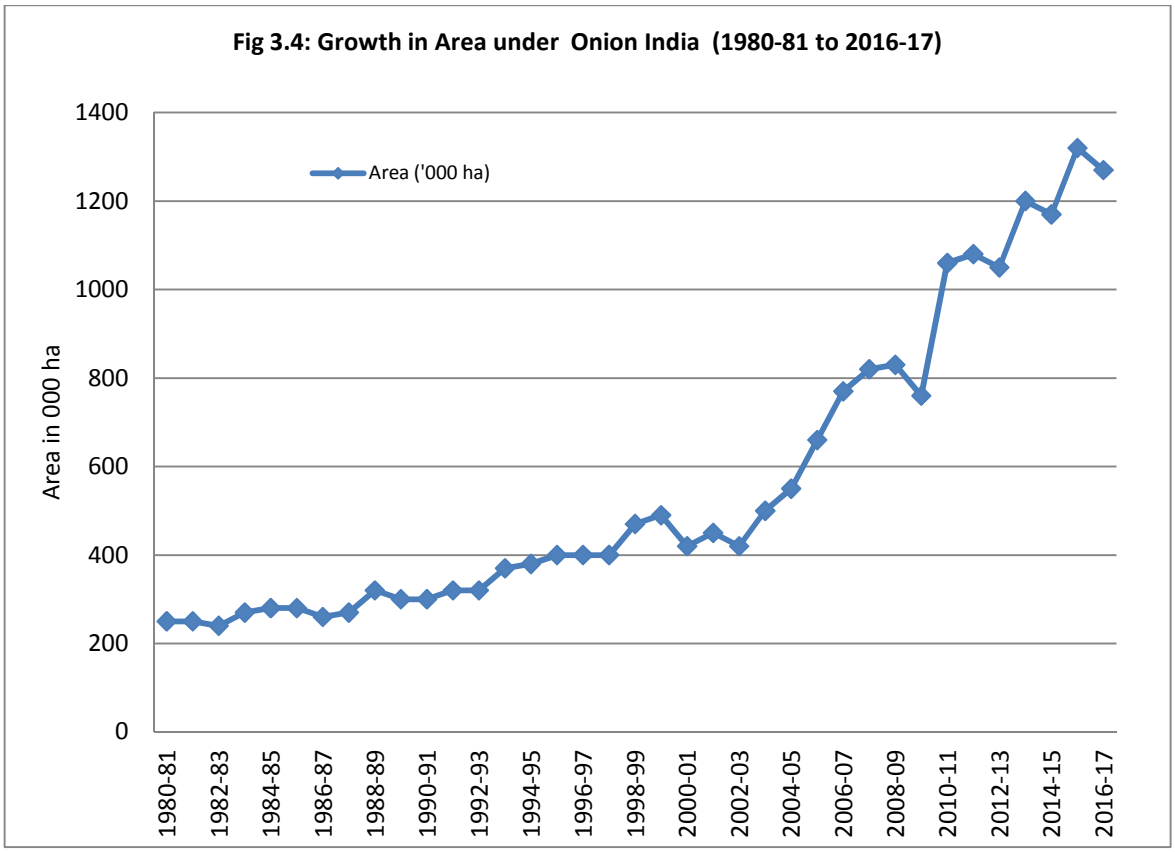



**Fig 3.4: Growth in Area under Onion India (1980-81 to 2016-17)**



Onion is the important vegetable crop grown in the state. It is generally grown as late kharif or rabi crop. It accounts for about 8.38% of total area under vegetable crops and 10.70 per cent of total vegetable production in the state during 2017-18. Though, state has shared hardly 4 per cent area and 2.3 per cent production of Country, the highest productivity level (26 tonnes/ha) was recorded as compared to all India average of 21.5 tones kg/ha. The top five major onion growing districts are Bhavnagar, Rajkot, Junagarh, Amreli and Jamnagar. Gujarat is the eighth largest producer of onion in India (2017-18), accounted for 2.3 per cent of total onion produced in our country. However, state ranks seventh place in term of area under onion (4.6 per cent share in total area). It is estimated that during 2017-18, total area under onion in the state was 55.59 thousand hectares (provisional) with annual production of 1417 thousand tones.

Compound growth in area, production and productivity of onion in Gujarat State for the period I (1980-81 to 1989-90), II (1990-91 to 1999-2000), period III (2000-01 to 2009-10), period IV (2010-11 to 2016-17) and overall period (1980-81 to 2016-17) were worked out which are given in Table 3.4a and coefficient of variations estimated are presented in Table 3.4b. It can be seen from tables that the highest rate of growth in production of onion in Gujarat and India was recorded during period III (2000-01 to 2009-10), which was mainly due to increase in area in case of Gujarat while at national level, both area and productivity growth contributed in production growth. During the period IV (2010-11 to 2016-17), due to decline in area under onion in Gujarat, rate of production growth estimated negative though productivity growth was positive. However, effect of decline in same had not much affected national level production as evidence from positive growth at national level. High instability in area under onion which has affected production of onion in Gujarat over the period of time despite productivity level is relatively stable compared to national average.

During the overall period, production of onion in Gujarat has increased at the rate of 5.05 per cent which was mainly due to increase in area under onion at the rate of 4.95 per cent with almost stagnant or meager rate of growth in productivity (0.09 %). While at all India level, significant rate of growth in production was recorded of 6.66 per cent per annum, which was due to significant increase in area at the rate of 5.02 per cent per annum followed by 1.53 per cent per annum growth in productivity. Thus, it can be concluded from the above discussion that there was significant growth of production of onion crop in Gujarat except during period IV mainly due to increase in area under onion crop. However productivity growth was not much impressive. At national level, growth in area followed by productivity growth has helped in significant increase in production during all period, more significant during second period under study.

**Table 3.4a: Compound Growth rates of Area, Production and Productivity of Onion**

| Particulars | 1980-81 to 1989-90 | | 1991-92 to 1999-2000 | | 2000-01 to 2009-10 | | 2010-11 to 2016-17 | | 1980-81 to 2016-17 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Guj | IND | Guj | IND | Guj | IND | Guj | IND | Guj | IND |
| Area | 2.43 | 2.36 | 3.98 | 5.29** | 19.89 | 9.15 | -1.44 | 3.83 | 4.95 | 5.02** |
| Prod | 5.07 | 2.29 | 4.69 | 4.24** | 20.96 | 15.77 | -1.04 | 5.65 | 5.05 | 6.66** |
| Yield | 2.57 | -0.12 | 0.69 | -0.91 | 0.89 | 6.17 | 0.4 | 1.88 | 0.09 | 1.53** |

Note:** Significant at 5% level of significance

**Table 3.4b: Coefficient of Variation of Area, Production and Productivity of Onion**

| Particulars | 1980-81 to 1989-90 | | 1991-92 to 1999-2000 | | 2000-01 to 2009-10 | | 2010-11 to 2016-17 | | 1980-81 to 2016-17 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Guj | IND | Guj | IND | Guj | IND | Guj | IND | Guj | IND |
| Area | 18.35 | 8.97 | 45.44 | 16.16 | 49.46 | 27.29 | 26.48 | 9.13 | 64.35 | 59.66 |
| Prod | 29.39 | 10.76 | 51.76 | 16 | 52.49 | 45.03 | 27.06 | 12.3 | 67.38 | 80.82 |
| Yield | 15.65 | 4.24 | 9.31 | 6.18 | 11.74 | 19.59 | 1.95 | 5.62 | 11.3 | 20.99 |

## 3.2 District wise Area, Production, Yield and VOP

The district wise area, production, productivity and value of product of onion in Gujarat are given in the Figure 3.5 and Table 3.5. It can be seen from the table that Bhavnagar district is the major district which accounts for more

than two third of total area under and production of onion in Gujarat. The other major onion growing districts are Amreli, Gir Somath and Rajkot which account around 5-7 per cent of State production, followed by Surendranagar and Dahod districts.

**Fig. 3.5: Major Onion districts in Gujarat (2016-17)**

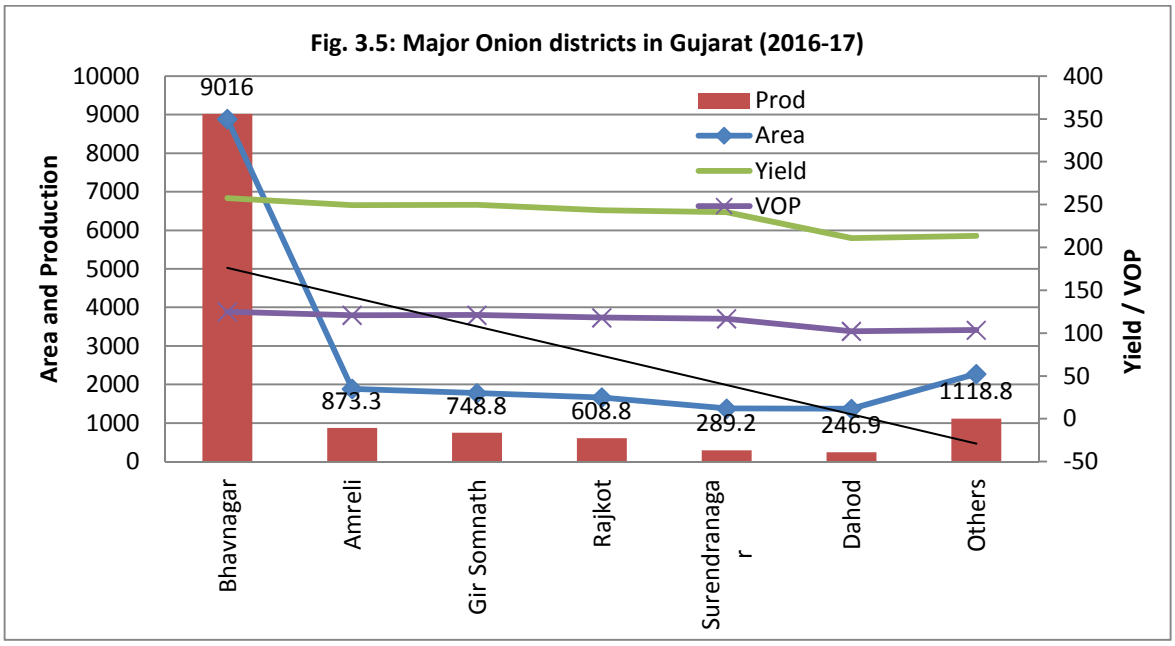



**Table 3.5: Area, Production and Yield of Onion across Major Districts of Gujarat (2012-13 to 2015-16)**

(Area in '00 ha, Production in '00 mts., VOP -Rs in lakh )

| Sr. no. | Major Districts | 2012-13 | | | | 2013-14 | | | | 2014-15 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Area | Prod | Yield | VOP (Rs) | Area | Prod | Yield | VOP (Rs) | Area | Prod | Yield | VOP (Rs) |
| 1 | Bhavnagar | 85.2 | 2052.4 | 240.9 | 243.8 | 414.0 | 10557.0 | 255.0 | 200.9 | 271.0 | 7005.4 | 258.5 | 309.2 |
| 2 | Amreli | 8.9 | 230.4 | 257.8 | 260.9 | 37.0 | 953.9 | 257.8 | 203.1 | 10.0 | 258.5 | 258.5 | 309.2 |
| 3 | Gir Somnath | | | | | | | | | | | | |
| 4 | Rajkot | 12.5 | 326.2 | 261.8 | 264.9 | 104.7 | 2774.1 | 265.0 | 208.8 | 22.0 | 566.5 | 257.5 | 308.0 |
| 5 | Surendranagar | 25.7 | 576.9 | 224.7 | 227.4 | 15.6 | 344.1 | 220.0 | 173.4 | 43.0 | 965.4 | 224.5 | 268.5 |
| 6 | Dahod | 24.5 | 493.2 | 201.4 | 203.8 | 15.0 | 285.0 | 190.0 | 149.7 | 22.0 | 436.7 | 198.5 | 237.4 |
| 7 | Others | 131.7 | 3364.6 | 255.5 | 258.5 | 141.6 | 3489.7 | 246.5 | 194.3 | 77.0 | 2033.5 | 264.1 | 315.9 |
| | Gujarat State | 288.5 | 7043.8 | 244.2 | 247.1 | 727.9 | 18403.7 | 252.8 | 199.2 | 445.0 | 11265.9 | 253.2 | 302.8 |

**Table 3.5 continues..**

| Sr. no. | Major District | 2015-16 | | | | 2016-17 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Area | Prod | Yield | | Area | Prod | Yield | VOP |
| 1 | Bhavnagar | 355.0 | 9265.5 | 261.0 | 230.2 | 350.0 | 9016.0 | 257.6 | 124.9 |
| 2 | Amreli | 42.0 | 1079.4 | 257.0 | 226.7 | 35.0 | 873.3 | 249.5 | 121.0 |
| 3 | Gir Somnath | 36.0 | 900.0 | 250.0 | 220.5 | 30.0 | 748.8 | 249.6 | 121.1 |
| 4 | Rajkot | 17.0 | 442.0 | 260.0 | 229.3 | 25.0 | 608.8 | 243.5 | 118.1 |
| 5 | Surendranagar | 13.0 | 315.5 | 242.7 | 214.1 | 12.0 | 289.2 | 241.0 | 116.9 |
| 6 | Dahod | 17.0 | 337.5 | 198.5 | 175.1 | 11.7 | 246.9 | 211.0 | 102.3 |
| 7 | Others | 52.0 | 1218.0 | 234.2 | 206.6 | 52.4 | 1118.8 | 213.6 | 103.6 |
| | Gujarat State | 532.0 | 13557.8 | 254.9 | 224.8 | 516.1 | 12901.7 | 250.0 | 121.2 |

Note: Prices- Weighted Average for one agriculture year (June to May)

### 3.3: Production and Consumption of Onion in India and Gujarat

Onion is one of the most important vegetable grown in India. Which is used either in raw or dehydrated form to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. Historically, onion consumption per capita in India reached an all time high of 13.5 kg in 2013. When compared to India's main peers, onion consumption per capita in Bangladesh amounted to 9.27 kg, 14.0 kg in China, 8.35 kg in Pakistan and 13.1 kg in Sri Lanka in 2013. Consumption of onion in India is subject to fluctuation on account of religious considerations. A section of the society avoids onions totally and a few others leave out onion from their daily diet during observance of religious occasions (Navaratras/Pitru Paksh). Table consumption of onions tends to decline when other fresh vegetables like carrot, radish and cucumber are available at affordable prices. Thus during winter, onion consumption in North India is comparatively lower. The monthwise per capita onion consumption as per NSSO survey as resented in Table 3.6 & Figure 3.6 indicate that consumption of onion during 2011-12 in rural area was relatively lower of 0.84 kg while in urban area, same was 0.95 kg. The corresponding figures for the state of Gujarat were 0.70 and 0.88 kg per capita, which was lower than all India average. The highest per capita consumption was recorded in Chhattisgarh State (1.7 and 1.53 kg in rural and urban area respectively) in 2011-12. Over the period of time, consumption of onion at all India level has increased in both rural and urban area, however, consumption of onion had declined in rural areas of Gujarat while same had increased in urban areas in 2011-12 over 2009-10. India produced enough onion, leaving a record surplus of about 2.92 MMT in 2015-16 and 4.501 mmt in 2018-19. Surplus onion was exported to a number of other countries (Table 3.7). While in case of Gujarat, estimates indicate deficit of 0.308 mmt of onion during 2018-19. Gupta, et al (2015) estimated that onion consumption in the rural area was estimated to be 48.10 g/person/day while same was 50.97 g/person/day in urban side (Table 3.8).

## Table 3.6: Monthly per capita consumption of Onion (kg)

| State/UT | 2011-12 | | 2009-10 | | 2004-05 | | % Increase 2009-10 over 2004-05 | | % Increase 20011-12 over 2009-10 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural | Urban |
| Andhra Pradesh | 1.080 | 1.064 | 0.961 | 1.021 | 0.719 | 0.72 | 33.66 | 41.81 | 12.38 | 4.21 |
| Arunachal Pradesh | 0.351 | 0.540 | 0.443 | 0.635 | 0.262 | 0.391 | 69.08 | 62.40 | -20.77 | -14.96 |
| Assam | 0.468 | 0.594 | 0.362 | 0.488 | 0.357 | 0.472 | 1.40 | 3.39 | 29.28 | 21.72 |
| Bihar | 1.041 | 1.156 | 0.797 | 0.905 | 0.574 | 0.714 | 38.85 | 26.75 | 30.61 | 27.73 |
| Chhattisgarh | 0.711 | 0.923 | 0.618 | 0.879 | 0.477 | 0.646 | 29.56 | 36.07 | 15.05 | 5.01 |
| Delhi | 1.022 | 0.944 | 0.680 | 0.769 | 0.936 | 1.084 | -27.35 | -29.06 | 50.29 | 22.76 |
| Goa | 1.088 | 1.395 | 1.060 | 1.326 | 0.702 | 0.736 | 51.00 | 80.16 | 2.64 | 5.20 |
| **Gujarat** | **0.703** | **0.882** | **0.775** | **0.878** | **0.585** | **0.593** | **32.48** | **48.06** | **-9.29** | **0.46** |
| Haryana | 1.076 | 1.171 | 0.940 | 1.037 | 0.697 | 0.820 | 34.86 | 26.46 | 14.47 | 12.92 |
| Himachal Pradesh | 0.884 | 1.044 | 0.880 | 1.079 | 0.583 | 0.745 | 50.94 | 44.83 | 0.45 | -3.24 |
| J & Kashmir | 0.868 | 1.017 | 0.910 | 0.819 | 0.592 | 0.634 | 53.72 | 29.18 | -4.62 | 24.18 |
| Jharkhand | 0.858 | 1.041 | 0.753 | 0.930 | 0.622 | 0.840 | 21.06 | 10.71 | 13.94 | 11.94 |
| Karnataka | 0.888 | 0.981 | 0.802 | 0.901 | 0.660 | 0.701 | 21.52 | 28.53 | 10.72 | 8.88 |
| Kerala | 0.815 | 0.917 | 0.746 | 0.792 | 0.543 | 0.586 | 37.38 | 35.15 | 9.25 | 15.78 |
| Madhya Pradesh | 0.755 | 0.922 | 0.715 | 0.848 | 0.527 | 0.618 | 35.67 | 37.22 | 5.59 | 8.73 |
| Maharashtra | 0.918 | 0.970 | 0.797 | 0.903 | 0.608 | 0.709 | 31.09 | 27.36 | 15.18 | 7.42 |
| Manipur | 0.279 | 0.289 | 0.268 | 0.312 | 0.166 | 0.260 | 61.45 | 20.00 | 4.10 | -7.37 |
| Meghalaya | 0.423 | 0.452 | 0.388 | 0.337 | 0.399 | 0.428 | -2.76 | -21.26 | 9.02 | 34.12 |
| Mizoram | 0.298 | 0.357 | 0.289 | 0.373 | 0.685 | 0.243 | -57.81 | 53.50 | 3.11 | -4.29 |
| Nagaland | 0.275 | 0.382 | 0.160 | 0.283 | 0.214 | 0.314 | -25.23 | -9.87 | 71.88 | 34.98 |
| Odisha | 0.685 | 0.888 | 0.575 | 0.704 | 0.423 | 0.575 | 35.93 | 22.43 | 19.13 | 26.14 |
| Punjab | 1.513 | 1.441 | 1.146 | 1.263 | 0.894 | 0.897 | 28.19 | 40.80 | 32.02 | 14.09 |
| Rajasthan | 0.901 | 0.929 | 0.777 | 0.786 | 0.533 | 0.559 | 45.78 | 40.61 | 15.96 | 18.19 |
| Sikkim | 0.411 | 0.546 | 0.381 | 0.432 | 0.370 | 0.528 | 2.97 | -18.18 | 7.87 | 26.39 |
| Tamil Nadu | 0.899 | 0.995 | 0.757 | 0.877 | 0.602 | 0.648 | 25.75 | 35.34 | 18.76 | 13.45 |
| Tripura | 0.415 | 0.532 | 0.359 | 0.520 | 0.319 | 0.412 | 12.54 | 26.21 | 15.60 | 2.31 |
| Uttar Pradesh | 0.724 | 0.834 | 0.674 | 0.688 | 0.516 | 0.587 | 30.62 | 17.21 | 7.42 | 21.22 |
| Uttarakhand | 0.837 | 0.866 | 0.631 | 0.778 | 0.481 | 0.608 | 31.19 | 27.96 | 32.65 | 11.31 |
| West Bengal | 0.707 | 0.739 | 0.651 | 0.728 | 0.485 | 1.180 | 34.23 | -38.31 | 8.60 | 1.51 |
| A & N Islands | 0.808 | 0.936 | 0.634 | 1.004 | 0.630 | 0.768 | 0.63 | 30.73 | 27.44 | -6.77 |
| Chandigarh | 1.709 | 1.534 | 1.017 | 1.315 | 1.050 | 1.163 | -3.14 | 13.07 | 68.04 | 16.65 |
| D & N. Haveli | 0.485 | 0.748 | 1.158 | 1.239 | 0.520 | 0.705 | 122.69 | 75.74 | -58.12 | -39.63 |
| Daman & Diu | 0.990 | 0.572 | 1.111 | 0.997 | 0.544 | 0.438 | 104.23 | 127.63 | -10.89 | -42.63 |
| Lakshadweep | 0.872 | 0.956 | 0.652 | 1.080 | 0.980 | 0.761 | -33.47 | 41.92 | 33.74 | -11.48 |
| Puducherry | 0.987 | 1.130 | 1.022 | 1.162 | 0.699 | 0.744 | 46.21 | 56.18 | -3.42 | -2.75 |
| **All-India** | **0.842** | **0.951** | **0.741** | **0.854** | **0.561** | **0.720** | **32.09** | **18.61** | **13.63** | **11.36** |

Source: NSSO (2015), Household Consumption of Various Goods and Services in India: NSS 66th Round, 61st Round & 68th Round

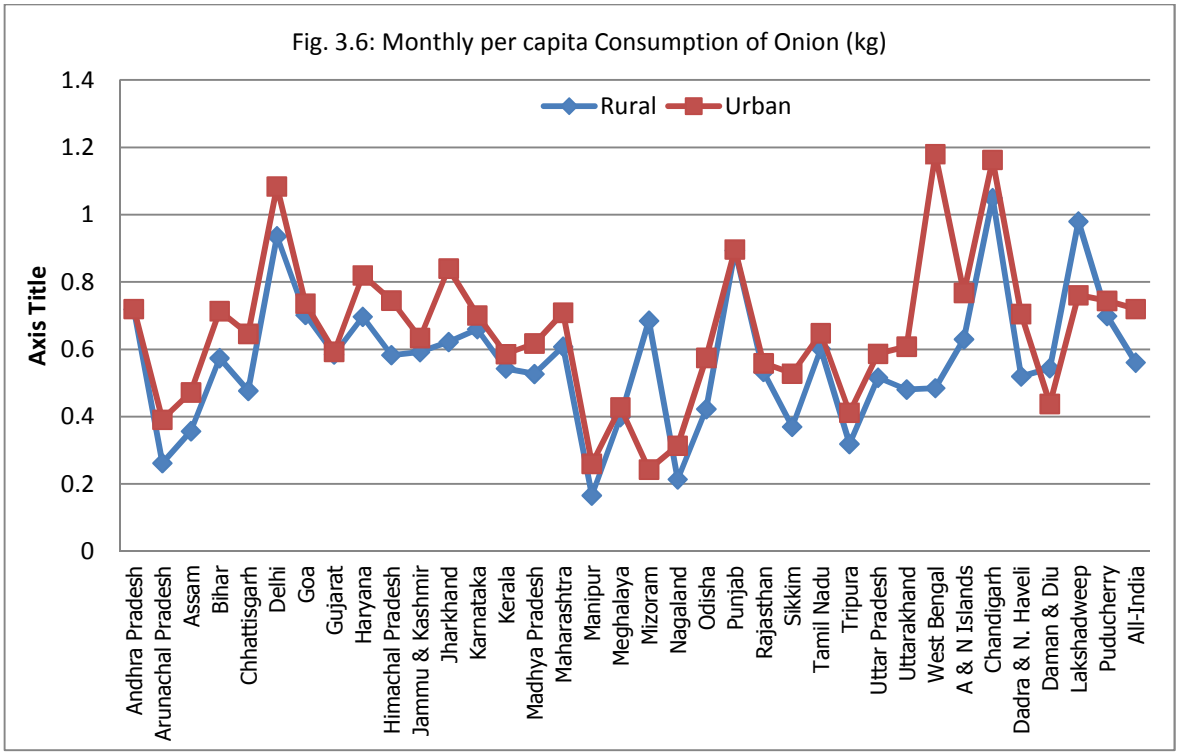



Table 3.7: Demand Supply Situation of Onion in Gujarat & India (2015-16 & 2018-19)

| Sr No. | Particulars | Demand supply situation of onion in | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | India 2015-16 | | | India 2018-19 | | | Gujarat 2018-19 | | |
| | | Rural | Urban | Total | Rural | Urban | Total | Rural | Urban | Total |
| A | Estimated Population (million) | 948.24 | 365.11 | 1313.35 | 908.49 | 460.25 | 1368.7 | 40.019 | 30.190 | 70.208 |
| B | Direct consumption | | | | | | | | | |
| | Per capita (Kg/month) | 0.842 | 0.951 | | 0.842 | 0.951 | | 0.703 | 0.882 | |
| | Monthly requirement (MMT) | 0.800 | 0.350 | 1.150 | 0.765 | 0.438 | 1.203 | 0.028 | 0.027 | 0.055 |
| | Annual Requirement (MMT) | 9.680 | 4.210 | 13.890 | 9.179 | 5.252 | 14.432 | 0.338 | 0.320 | 0.657 |
| C | Indirect use | | | 4.120 | | | 4.330 | | | 0.197 |
| | Total domestic demand (MMT) | | | 18.010 | | | 18.761 | | | 0.854 |
| D | Total Supply (MMT) | | | 20.930 | | | 23.262 | | | 0.546 |
| E | Surplus (MMT) | | | 2.920 | | | 4.501 | | | -0.308 |

Source: Authors Calculations with base of Premi and Premi, 2017 & NSSO (2013).

Table 3.8: Consumption Pattern of Onion in Gujarat

| Sr. No. | District | Onion-Consumption/persons/day (g) | | |
|---|---|---|---|---|
| | | Rural Area | Urban | All |
| 1 | Rajkot | 48 | 67 | 59.46 |
| 2 | Amreli | 30 | 49 | 37.28 |
| 3 | Bhavnagar | 36 | 44 | 37.85 |
| 4 | Jamnagar | 60 | 36 | 51.24 |
| 5 | Junagarh | 66 | 59 | 61.65 |
| | Total | 48.10 | 50.97 | 49.32 |

Note: Total sample of 7999 persons; Person in the age group of 0-5 years considered not to intake onion.
Source: Gupta et. al., (2015).

## 3.4 Cost of Cultivation and Income from Onion

The production of onion crop is associated with number of variables used in production process. The production of this vegetable depends on natural environment, input use and combination of inputs and management practices. Onion is seasonal during their production period so issues related with their production cost accountability are few. To work out production costs of the onion, all the financial activity carried out during the production period have been considered, as reported in various reports of Commission for Agricultural Cost and Prices, GOI. The cost of production of onion is classified into fixed cost including land input and variable costs including labour and capital inputs. Land input is fixed cost in the sense that rent of land for the period of production and cultivation is not subject of frequent variation as in case of materials and labour. The prevalent rent of land in the study areas are collected on annual basis and distributed in the crop standing period including own land. The labour input cost includes all those cost incurred on field operations and production practices starting from land preparation up to harvesting which is performed by human, animal and machinery. The main labour costs include the cost of land preparation, sowing, irrigation, weeding and harvesting and shed curing. The capital cost accounts the cost of seed, fertilizers and farm yard manures, pesticides and herbicides and interest on input charges. Analysis of cost of cultivation of onion per ha and cost of production per quintal has been given in Table 3.9. Cost of cultivation of onion in Gujarat is estimated to be 125082.69 per hectare as C2 cost during 2015-16 while per quintal cost of production is estimated to be Rs. 722.97. Among various components of operational costs, cost of labour accounted for the highest share of 37.5 per cent in total cost of cultivation followed by seed (27 per cent). It can be seen from above mentioned tables and Figures 3.7 and 3.8 that cost of cultivation and production varies considerable across the years and thus negative profit per hectare and quintal of onion was observed during the year 2005-06, 2007-08 and 2011-12.

Table 3.9: Major Components of Cost of Cultivation and Income from Onion (per ha) in Gujarat (2005-06 to 2015-16)

| Sr. No | Items | Gujarat | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 |
|---|---|---|---|---|---|---|---|
| I | Cost of Cultivation (Rs./Hectare) | | | | | | |
| 1.1 | | A1 | 26483.18 | 27633.79 | 38342.56 | 40673.40 | 40257.41 |
| 1.2 | | A2 | 26483.18 | 27633.79 | 38342.56 | 40980.59 | 41047.58 |
| 1.3 | | B1 | 27785.29 | 28321.10 | 39259.08 | 42609.57 | 41076.27 |
| 1.4 | | B2 | 34384.50 | 45430.54 | 47568.42 | 68418.05 | 70803.04 |
| 1.5 | | C1 | 34680.94 | 33189.17 | 44706.61 | 48564.07 | 48039.77 |
| 1.6 | | C2 | 41280.15 | 50298.61 | 53015.98 | 74372.55 | 77766.55 |
| 1.7 | | C2 Revised | 41510.65 | 50298.61 | 53582.02 | 74758.74 | 78880.84 |
| II | Cost of Production (Rs./Qtl) | | | | | | |
| 2.1 | | A1 | 112.47 | 184.10 | 194.11 | 169.40 | 172.67 |
| 2.2 | | A2 | 112.47 | 184.10 | 194.11 | 171.55 | 176.39 |
| 2.3 | | B1 | 117.41 | 189.56 | 199.50 | 177.37 | 176.25 |
| 2.4 | | B2 | 143.62 | 301.05 | 247.09 | 281.53 | 305.79 |
| 2.5 | | C1 | 145.13 | 226.65 | 230.17 | 206.29 | 206.67 |
| 2.6 | | C2 | 171.34 | 338.15 | 277.77 | 310.46 | 336.21 |
| 2.7 | | C2 Revised | 172.29 | 338.15 | 280.73 | 312.08 | 341.02 |
| 2.8 | | C3 | 189.52 | 371.97 | 308.80 | 343.28 | 375.12 |
| 3 | Value of Main Product (Rs./Hectare) | | 39128.23 | 102636.20 | 49821.34 | 154677.0 | 189786.50 |
| 4 | Value of By- Product (Rs./Hectare) | | 459.13 | 0.00 | 24.98 | 137.41 | 566.71 |
| 5 | Material & Labour Input per Hectare of | | | | | | |
| 5.1 | Seed (Kg.) | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.2 | Fertilizer (Kg. Nutrients) | | 207.74 | 177.62 | 192.35 | 238.07 | 208.85 |
| 5.3 | Manure (Qtl.) | | 0.00 | 29.80 | 0.00 | 2.33 | 5.27 |
| 5.4 | Human Labour* (Man Hrs.) | | 1654.30 | 1196.15 | 1495.15 | 1561.36 | 1572.98 |
| 5.5 | Animal Labour (Pair Hrs.) | | 12.82 | 9.89 | 24.70 | 14.55 | 29.99 |
| 6 | Rate per Unit (Rs.) | | | | | | |
| 6.1 | Seed (Kg.) | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.2 | Fertilizer (Kg. Nutrients) | | 13.23 | 12.90 | 14.45 | 14.31 | 14.71 |
| 6.3 | Manure (Qtl.) | | 0.00 | 25.00 | 0.00 | 30.00 | 26.47 |
| 6.4 | Human Labour (Man Hrs.) | | 9.27 | 9.27 | 9.74 | 12.19 | 11.79 |
| 6.5 | Animal Labour (Pair Hrs.) | | 44.29 | 53.52 | 54.28 | 44.73 | 50.74 |
| 7 | Implicit Rate (Rs./Qtl.) | | 163.29 | 610.09 | 272.73 | 684.53 | 930.63 |
| 8.1 | Number of Holdings in Sample | | 14 | 8 | 12.00 | 27.00 | 34.00 |
| 8.2 | Number of Tehsils in Sample | | 6 | 7 | 6.00 | 10.00 | 16.00 |
| 9 | Derived Yield (Qtl./Hectare) | | 237.17 | 148.75 | 190.81 | 239.35 | 230.51 |

Table 3.9 continues……

| Sr. No | Items | Gujarat | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 |
|---|---|---|---|---|---|---|---|
| 10 | *Break-Up Human Labour Hours:- | | | | | | |
| 10.1 | Family | | 757.34 | 511.43 | 593.83 | 504.75 | 616.61 |
| 10.2 | Attached | | 0.00 | 3.47 | 0.00 | 66.70 | 38.11 |
| 10.3 | Casual | | 896.96 | 681.25 | 901.32 | 989.91 | 918.26 |
| 10.4 | Total | | 1654.30 | 1196.15 | 1495.15 | 1561.36 | 1572.98 |
| II | Item wise Breakup of Cost of Cultivation (Rs. per Hectare) | | | | | | |
| 11 | Operational Cost | | 33285.33 | 32349.88 | 43681.94 | 46463.25 | 47086.11 |
| 11.1.1 | Human Labour | 6895.66 | 4868.07 | 1794.69 | 5447.52 | 5954.50 | 6963.50 |
| 11.1.2 | Attached | | 0.00 | 28.31 | 0.00 | 771.11 | 437.56 |
| 11.1.3 | Casual | | 8440.80 | 6191.39 | 9117.36 | 12311.52 | 11146.90 |
| 11.1.4 | Total | | 15336.46 | 11087.77 | 14564.88 | 19037.13 | 18547.96 |
| 11.2.1 | Animal Labour | 13.05 | 0.00 | 138.86 | 0.00 | 123.38 | 110.11 |
| 11.2.2 | Owned | | 554.77 | 529.31 | 1340.61 | 527.55 | 1411.47 |
| 11.2.3 | Total | | 567.82 | 529.31 | 1340.61 | 650.93 | 1521.58 |
| 11.3.1 | Machine Labour | 1698.33 | 669.81 | 2452.07 | 176.84 | 922.12 | 693.76 |
| 11.3.2 | Owned | | 295.29 | 941.82 | 603.34 | 158.68 | 87.28 |
| 11.3.3 | Total | | 1993.62 | 1611.63 | 780.18 | 1080.80 | 781.04 |
| 11.4 | Seed | | 7144.34 | 11094.45 | 18735.38 | 16241.93 | 16842.75 |
| 11.5.1 | Fertilizer & Manure | 2748.39 | 2290.72 | 1817.34 | 2779.89 | 3407.29 | 3072.98 |
| 11.5.2 | Manure | | 0.00 | 745.04 | 0.00 | 70.03 | 139.43 |
| 11.5.3 | Total | | 2748.39 | 3035.76 | 2779.89 | 3477.32 | 3212.41 |
| 11.6 | Insecticides | | 491.77 | 1409.38 | 1491.17 | 1511.18 | 1673.10 |
| 11.7 | Irrigation Charges | | 4125.20 | 2748.81 | 2831.21 | 3236.42 | 3291.43 |
| 11.8 | Miscellaneous | | 78.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11.9 | Interest on Working Capital | | 799.69 | 832.77 | 1158.62 | 1227.54 | 1215.84 |
| 12 | Fixed Costs | | 7994.82 | 17948.73 | 9334.04 | 27909.30 | 30680.44 |
| 12.1 | Rental Value of Owned Land | | 6599.21 | 17109.45 | 8309.38 | 25501.28 | 28936.61 |
| 12.2 | Rent Paid For Leased-in-Land | | 0.00 | 0.00 | 0.00 | 307.19 | 790.16 |
| 12.3 | Land Revenue, Taxes, Cesses | | 14.52 | 14.21 | 14.46 | 5.06 | 6.30 |
| 12.4 | Depreciation on Implements & Farm Building | | 78.99 | 137.77 | 93.68 | 159.60 | 128.51 |
| 12.5 | Interest on Fixed Capital | | 1302.10 | 687.30 | 916.52 | 1936.17 | 818.86 |
| 13 | Total Cost [11+12] | | 41280.15 | 50298.61 | 53015.98 | 74372.55 | 77766.55 |
| 14 | Per ha profit (Rs) | | -1692.8 | 52337.6 | -3169.7 | 80441.9 | 112586.7 |
| 15 | per quintal profit (Rs) | | -7.3 | 351.8 | -19.6 | 334.2 | 482.3 |

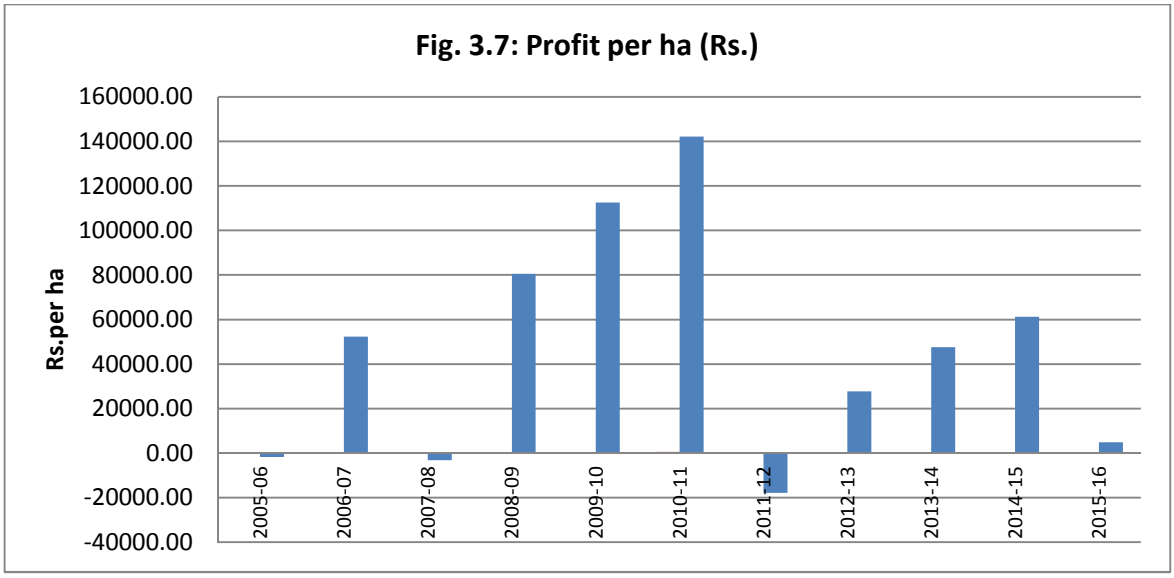
Table 3.9 continues……

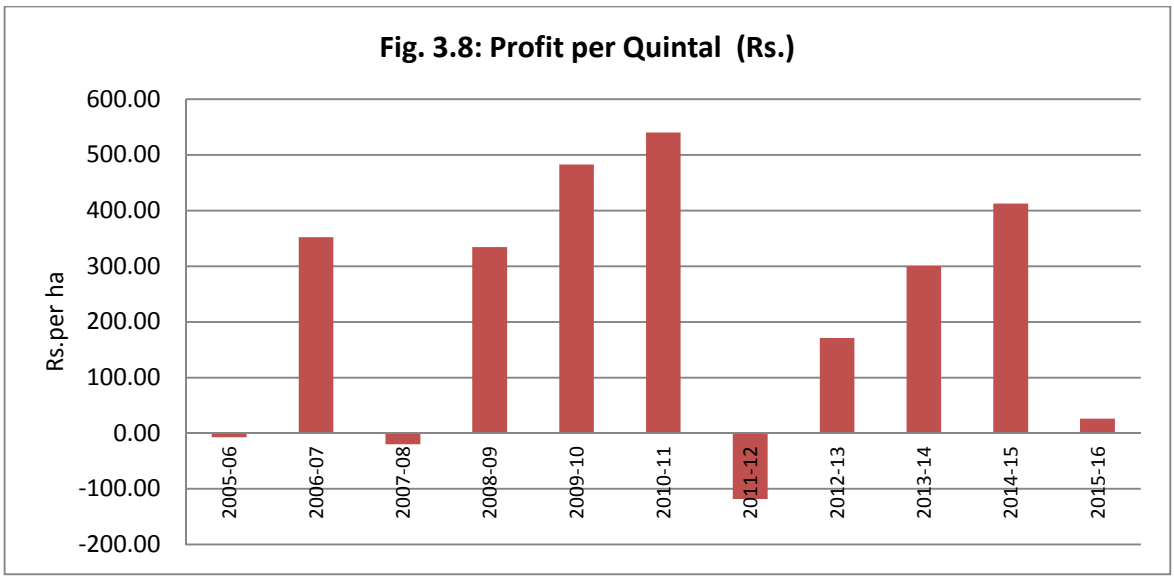
| Sr. No | Items | Gujarat | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---|---|---|---|---|---|---|---|
| I | Cost of Cultivation (Rs./Hectare) | | | | | | | |
| 1.1 | | A1 | 53725.16 | 51925.26 | 68000.07 | 65147.88 | 75158.29 | 85649.52 |
| 1.2 | | A2 | 53911.80 | 52423.01 | 68000.07 | 65387.93 | 75198.68 | 85706.08 |
| 1.3 | | B1 | 54817.41 | 53080.36 | 69457.30 | 67020.61 | 77330.48 | 87427.04 |
| 1.4 | | B2 | 94186.05 | 62229.75 | 91401.12 | 92096.95 | 108442.20 | 108832.90 |
| 1.5 | | C1 | 60453.84 | 62501.16 | 82018.70 | 79294.79 | 94604.45 | 103384.40 |
| 1.6 | | C2 | 99822.48 | 71650.55 | 103962.50 | 104371.10 | 125716.20 | 124790.20 |
| 1.7 | | C2 Revised | 99905.84 | 72157.32 | 106087.29 | 104975.39 | 126188.82 | 125082.69 |
| II | Cost of Production (Rs./Qtl) | | | | | | | |
| 2.1 | | A1 | 207.12 | 331.80 | 442.79 | 405.36 | 532.73 | 495.27 |
| 2.2 | | A2 | 208.15 | 335.86 | 442.79 | 407.28 | 534.50 | 495.51 |
| 2.3 | | B1 | 212.17 | 339.47 | 452.75 | 417.40 | 545.07 | 507.18 |
| 2.4 | | B2 | 356.60 | 397.86 | 594.12 | 571.25 | 713.46 | 627.34 |
| 2.5 | | C1 | 235.21 | 403.51 | 551.10 | 508.25 | 683.86 | 601.13 |
| 2.6 | | C2 | 379.64 | 461.90 | 692.47 | 662.10 | 852.24 | 721.29 |
| 2.7 | | C2 Revised | 379.95 | 465.18 | 706.61 | 665.92 | 855.46 | 722.97 |
| 2.8 | | C3 | 417.95 | 511.70 | 777.27 | 732.51 | 941.00 | 795.27 |
| 3 | Value of Main Product (Rs./Hectare) | | 241820.20 | 53672.52 | 130996.20 | 150336.60 | 186170.50 | 128604.10 |
| 4 | Value of By- Product (Rs./Hectare) | | 136.56 | 146.82 | 640.35 | 1586.91 | 841.20 | 1035.45 |
| 5 | Material & Labour Input per Hectare of | | | | | | | |
| 5.1 | Seed (Kg.) | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.2 | Fertilizer (Kg. Nutrients) | | 309.70 | 184.12 | 167.27 | 177.76 | 199.53 | 184.50 |
| 5.3 | Manure (Qtl.) | | 21.33 | 0.00 | 0.29 | 0.72 | 7.09 | 5.15 |
| 5.4 | Human Labour* (Man Hrs.) | | 1344.67 | 1395.84 | 1610.33 | 1393.13 | 1692.90 | 1707.09 |
| 5.5 | Animal Labour (Pair Hrs.) | | 24.25 | 13.91 | 9.98 | 9.16 | 3.22 | 7.81 |
| 6 | Rate per Unit (Rs.) | | | | | | | |
| 6.1 | Seed (Kg.) | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.2 | Fertilizer (Kg. Nutrients) | | 14.09 | 20.58 | 28.08 | 25.90 | 27.33 | 29.94 |
| 6.3 | Manure (Qtl.) | | 30.89 | 0.00 | 100.00 | 51.69 | 100.00 | 102.59 |
| 6.4 | Human Labour (Man Hrs.) | | 13.91 | 22.40 | 26.21 | 29.61 | 27.12 | 27.45 |
| 6.5 | Animal Labour (Pair Hrs.) | | 60.15 | 65.55 | 67.43 | 79.89 | 89.40 | 113.66 |
| 7 | Implicit Rate (Rs./Qtl.) | | 824.50 | 328.63 | 886.77 | 793.80 | 1001.73 | 690.97 |
| 8.1 | Number of Holdings in Sample | | 33.00 | 27.00 | 20.00 | 34 | 26 | 45 |
| 8.2 | Number of Tehsils in Sample | | 13.00 | 12.00 | 13.00 | 14 | 14 | 17 |
| 9 | Derived Yield (Qtl./Hectare) | | 262.80 | 154.63 | 149.31 | 155.60 | 146.81 | 171.62 |

Table 3.9 continues……

| Sr. No | Items | Gujarat | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 10 | *Break-Up Human Labour Hours:- | | | | | | | |
| 10.1 | | Family | 400.30 | 436.39 | 533.59 | 428.26 | 647.53 | 588.14 |
| 10.2 | | Attached | 49.41 | 0.00 | 0.00 | 2.64 | 0.00 | 0.00 |
| 10.3 | | Casual | 894.96 | 959.45 | 1076.74 | 962.23 | 1045.37 | 1118.95 |
| 10.4 | | Total | 1344.67 | 1395.84 | 1610.33 | 1393.13 | 1692.90 | 1707.09 |
| II | Item wise Breakup of Cost of Cultivation (Rs. per Hectare) | | | | | | | |
| 11 | Operational Cost | | 59256.82 | 61237.91 | 80408.71 | 77330.84 | 92309.73 | 101490.93 |
| 11.1.1 | Human Labour | Family | 5636.43 | 9420.80 | 12561.39 | 12274.17 | 15957.32 | 15957.32 |
| 11.1.2 | | Attached | 565.68 | 0.00 | 0.00 | 63.82 | 0.00 | 0.00 |
| 11.1.3 | | Casual | 12499.57 | 21841.75 | 29646.20 | 28907.35 | 28638.88 | 30900.02 |
| 11.1.4 | | Total | 18701.68 | 31262.55 | 42207.59 | 41245.34 | 45912.84 | 46857.34 |
| 11.2.1 | Animal Labour | Hired | 29.18 | 145.37 | 24.78 | 11.57 | 392.13 | 392.13 |
| 11.2.2 | | Owned | 1429.52 | 766.69 | 648.48 | 719.89 | 265.23 | 495.12 |
| 11.2.3 | | Total | 1458.70 | 912.06 | 673.26 | 731.46 | 288.17 | 887.25 |
| 11.3.1 | Machine Labour | Hired | 807.72 | 1005.23 | 1379.25 | 1325.44 | 3317.34 | 3317.34 |
| 11.3.2 | | Owned | 57.38 | 183.37 | 1191.09 | 441.68 | 2131.32 | 684.93 |
| 11.3.3 | | Total | 865.10 | 1188.60 | 2570.34 | 1767.12 | 3622.82 | 4002.27 |
| 11.4 | Seed | | 27299.93 | 18309.05 | 19791.19 | 20823.09 | 28888.63 | 33771.88 |
| 11.5.1 | Fertilizer & Manure | Fertilizer | 4363.50 | 3788.98 | 4697.54 | 4604.73 | 5523.13 | 5523.13 |
| 11.5.2 | | Manure | 658.89 | 0.00 | 29.26 | 37.17 | 709.29 | 528.28 |
| 11.5.3 | | Total | 5022.39 | 3788.98 | 4726.80 | 4641.90 | 6162.43 | 6051.41 |
| 11.6 | Insecticides | | 1804.15 | 1331.81 | 1844.47 | 2029.73 | 1772.36 | 3387.31 |
| 11.7 | Irrigation Charges | | 2480.02 | 2874.64 | 6539.08 | 4120.79 | 3388.67 | 3941.54 |
| 11.8 | Miscellaneous | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11.9 | Interest on Working Capital | | 1624.85 | 1570.22 | 2055.98 | 1971.41 | 2273.81 | 2591.93 |
| 12 | Fixed Costs | | 40565.66 | 10412.64 | 23553.79 | 27040.26 | 33406.47 | 23299.27 |
| 12.1 | Rental Value of Owned Land | | 39182.00 | 8651.64 | 21943.81 | 24836.27 | 31071.32 | 21349.25 |
| 12.2 | Rent Paid For Leased-in-Land | | 186.64 | 497.75 | 0.00 | 240.05 | 40.39 | 56.56 |
| 12.3 | Land Revenue, Taxes, Cesses | | 7.14 | 6.33 | 7.69 | 5.41 | 3.05 | 4.62 |
| 12.4 | Depreciation on Implements & Farm Building | | 97.64 | 101.82 | 145.05 | 85.79 | 119.51 | 111.31 |
| 12.5 | Interest on Fixed Capital | | 1092.24 | 1155.10 | 1457.24 | 1872.74 | 2172.20 | 1777.53 |
| 13 | Total Cost [11+12] | | 99822.48 | 71650.55 | 103962.50 | 104371.10 | 125716.20 | 124790.20 |
| 14 | Per ha profit (Rs) | | 142134.3 | -17831 | 27674.1 | 47552.4 | 61295.5 | 4849.4 |
| 15 | per quintal profit (Rs) | | 540.2 | -118.1 | 170.7 | 300.3 | 412.6 | 26.4 |

Source: CACP, GOI (http://agricoop.nic.in

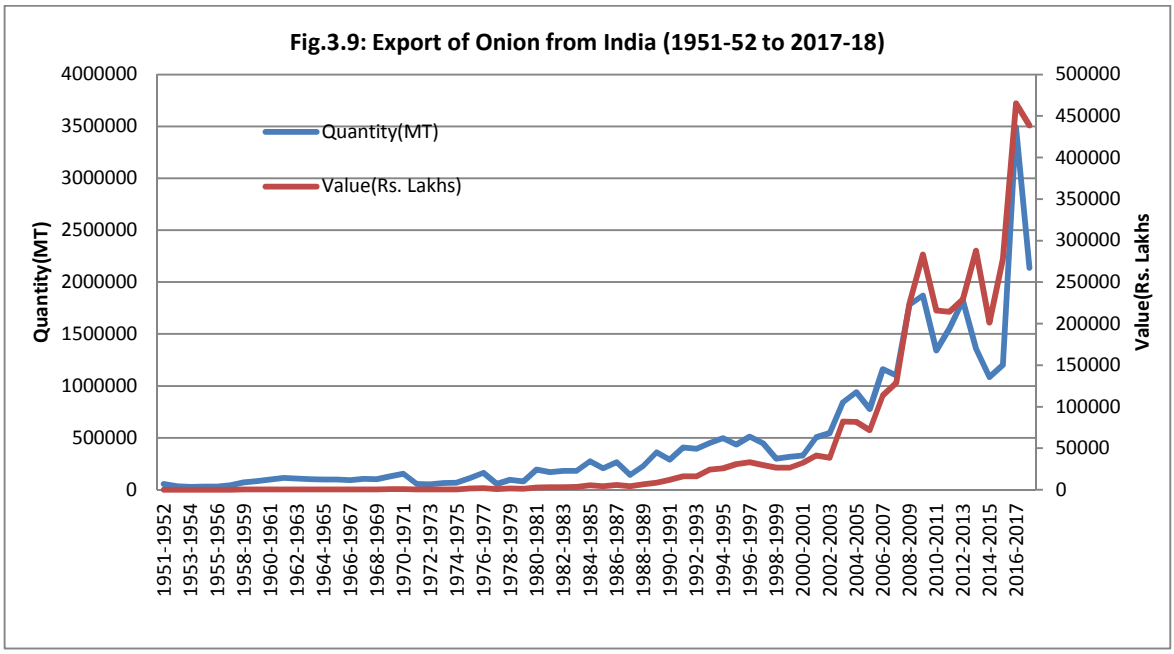



## 3.5 External Trade Scenario

India is a traditional exporter of fresh onions. With over 70 million tonnes onions produced globally, China occupies the first position accounting for over 25 percent of total production, followed by India contributing around 20 percent of world onion production. However India leads the list of exporters of onion followed by Netherlands. Netherlands has traditionally dominated global trade in onions and is having a strong hold over the European market for onions, which are basically white/yellow varieties that are less pungent. Soon after Independence in 1951-52 the country was exporting 56986 mt of onions worth Rs 106.69 lakh. Exports of

onions started expanding rapidly during the 1960s and reached a high of 512880 tonnes in 1996-97 and 941448 mt in 2004-05. There was substantial increase in per unit value of onion from Rs 1236/- in 1975-76, Rs. 1,733/ ton during 1981-82 to Rs 9800/ ton during 2000-2001. Over the years there has been a progressive increase in the exports of onion from India and touched a peak of 18,73,002 tonnes during 2009-10. The quantum had touched a level of 3492718 mt during the financial year of 2016-17 (Table 3). The large export is also one of the reasons for sudden spurt in the prices of onion during December 2010. Although there has been an increasing trend in the quantum and value of exports of onions 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 onions have not been free but are canalized through National Agricultural Cooperative Marketing Federation (NAFED) and now through some other agencies. Such agencies are protecting the domestic consumer and producer from unduly high prices and gluts as well. The cause of fluctuations in the exports may be due to the occasional restriction put on exports (Sudhir 2004), keeping in mind the domestic requirement. No doubt, exports of onion have fetched the country valuable foreign exchange and at the same time have given high price per tonne to the producer.



Exports of onions from India are regulated and permitted only through certain designated canalising agencies. One of the prime agencies is the NAFED, which is the sole agency for exports of onion from India. NAFED intervenes in the domestic marketing whenever there is glut and prices reach uneconomical levels for onion. Prices prevailing in major markets all over the country are reviewed every day in this process. Procurement prices of onions are decided by NAFED on the basis of the cost of production, and procurement is initiated in the markets and from the farmers directly. In the event of a large rise in prices, the commodities are sold at a controlled price to the consumers through its outlets of other agencies.

Indian onions are famous for their pungency and are available round the year. Indian onion has two crop cycles, first harvesting starts in November to January and the second harvesting from January to May. There is a lot of demand of Indian Onion in the world, the country has exported 1588985.72 MT of fresh onion to the world for the worth of Rs. 3088.82 crores / 479.32 USD Millions during the year 2017-18[1]. Major export destinations (2017-18) are Bangladesh, Malaysia, Sri Lanka, United Arab Emeritus and Nepal (Fig. 3.9), which is not stable since last one and half decade period (Fig. 3.10).

India mainly exports fresh onions to foreign countries followed by dehydrated onion. During 2017 (Jan-Sept), fresh onion export from India recorded USD 216.95 million which represented 70.29% of the total onion exports while it was USD 72.49 million (23.49%) for dehydrated onion. The varieties of onion in India that exports are Podisu onion, Red Onion, White Onion, Krishnapuram rose onion, Bangalore rose onion etc. The major onion varieties found in India are Agrifound Dark Red, Agrifound Light Red, NHRDF Red, Agrifound White, Agrifound Rose and Agrifound Red, Pusa Ratnar, Pusa Red, Pusa White Round. There are certain varieties of yellow onion which are suitable for export in European countries namely Tana F1, Arad-H, Suprex, Granex 55, HA 60 and Granex 429.

[1] http://apeda.gov.in/apedawebsite/SubHead_Products/Onions.htm

**FIg 3.10: Top five India's Onion Export Destinations 2017-18**

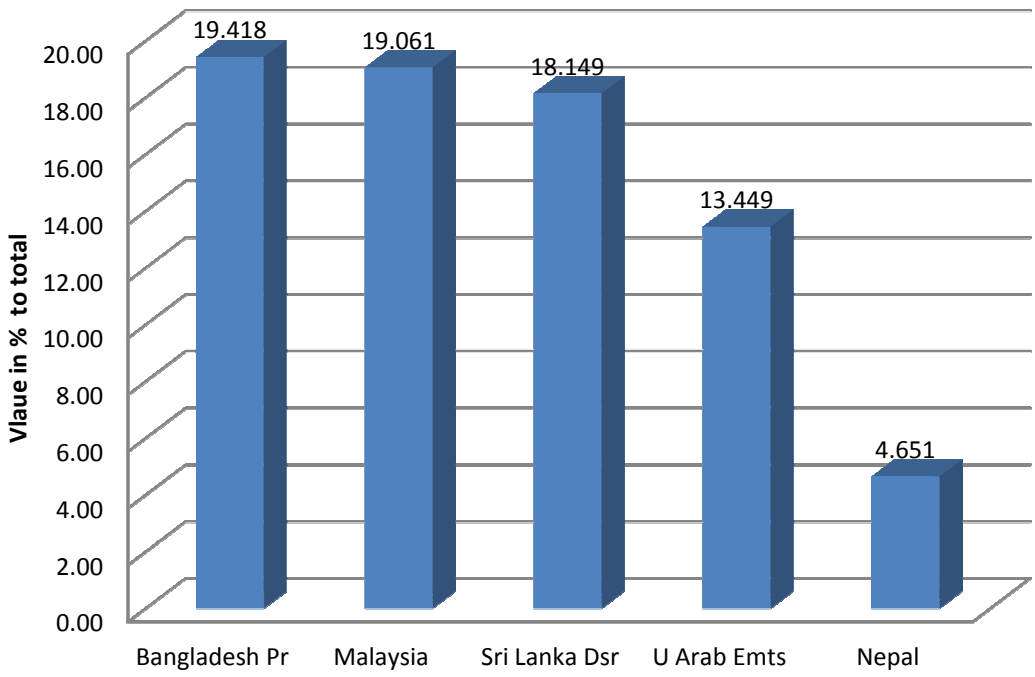



**Fig 3.11: Onion Export from India 2000-01 to 2017-18**

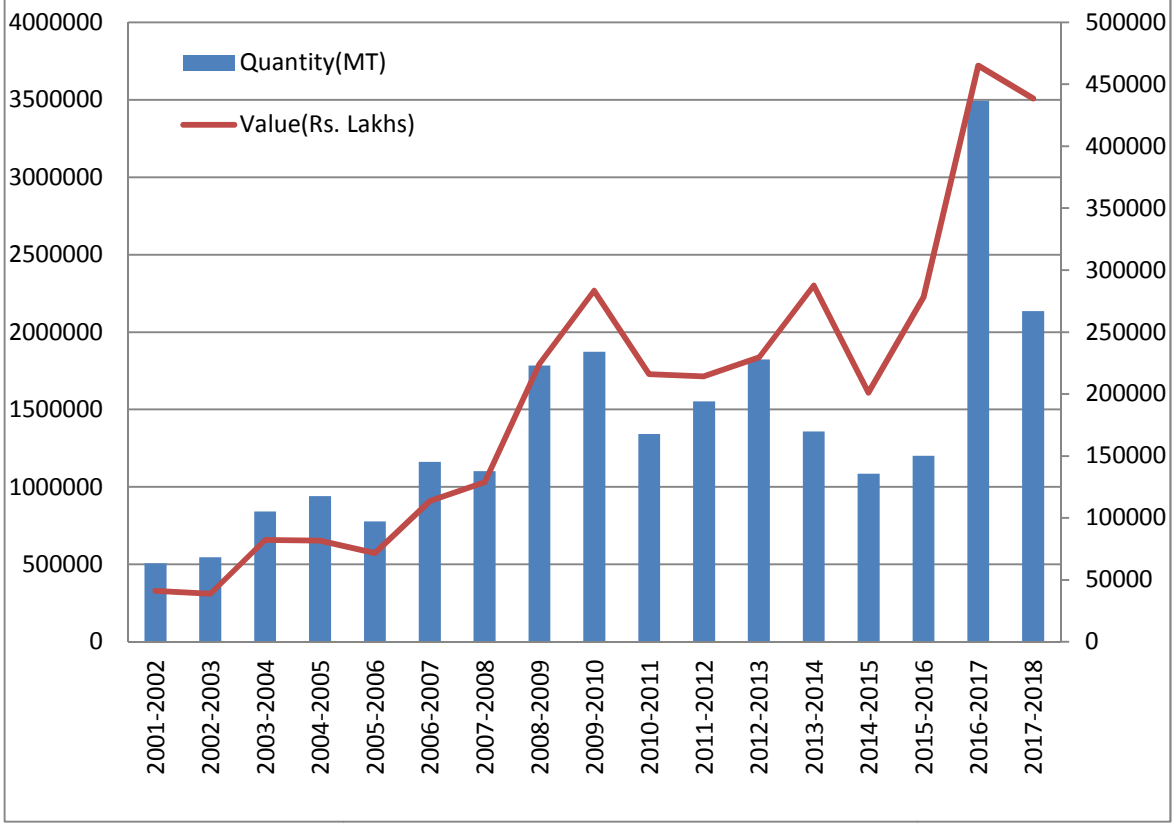
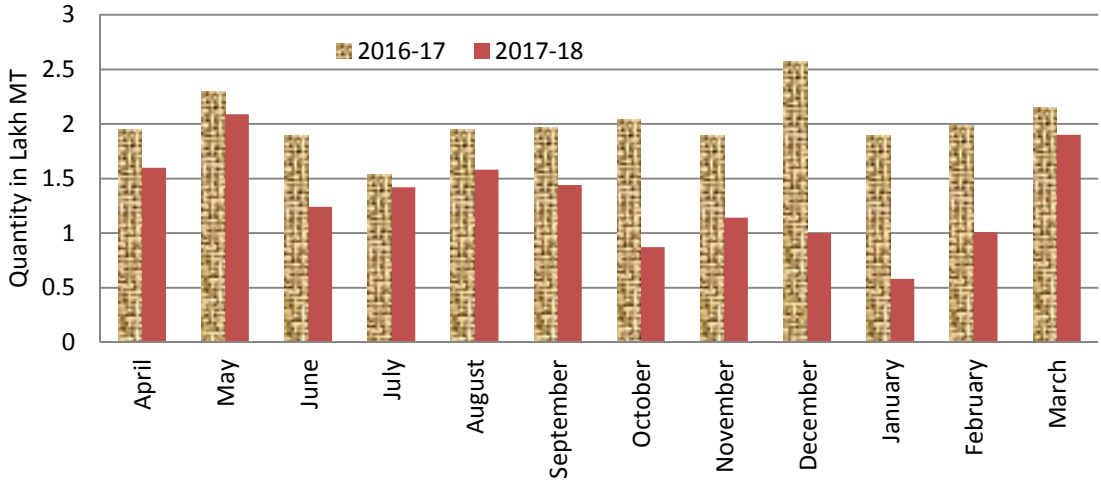
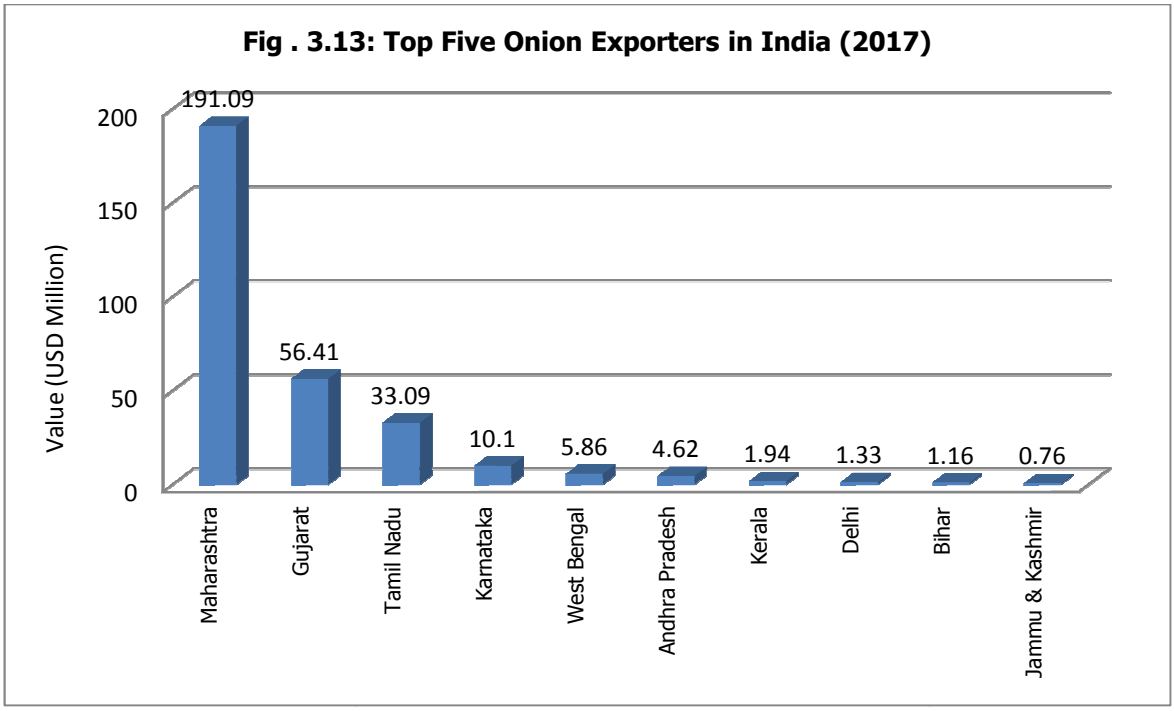


Fig. 3.12: Monthwise Onion Export during 2016-17 and 2017-18

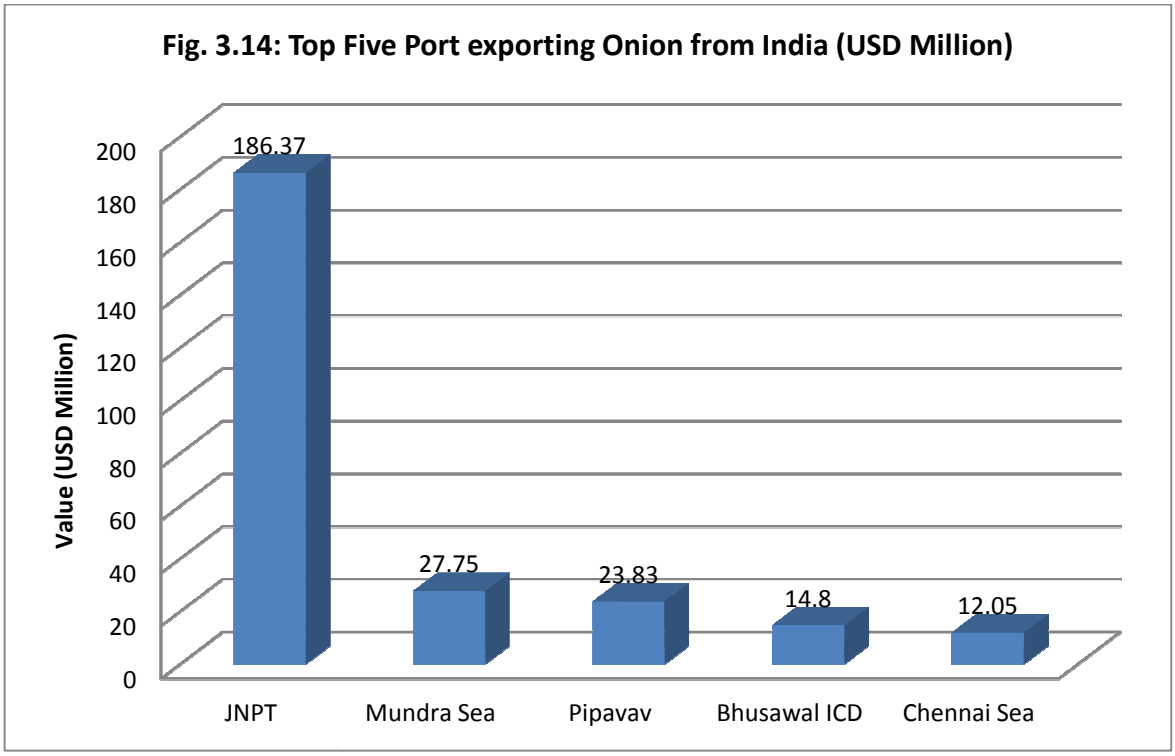



There are 23 states of India which are exporting onion to other countries[2]. The major onion exporting states are Maharashtra, Gujarat, Tamil Nadu, Karnataka, West Bengal, Andhra Pradesh, Kerala, Delhi, Bihar and Jammu & Kashmir. Maharashtra and Gujarat together registered 80 per cent value of the onion export. Maharashtra (mainly Nashik) stood as largest onion exporter state in India and recorded USD 191.09 million in 2017 which represents 62% of the total's output. Gujarat and Tami Nadu recorded USD 56.41 million and USD 33.09 million from onion export. During Jan-Sept 2017, it is recorded that more than 1100 onion suppliers in India are supplying different varieties of onions to foreign countries. Jain Farm Fresh Foods Limited is one of the largest onion suppliers in India. It did onion export business worth of USD 20.46 million which represents approximately 7% of the total onion export value. The major onion exporters in India are Jain Farm Fresh Foods Ltd.; Sarah Exim Pvt. Ltd.; Pride Fresh Produce; Sanghar Exports and Oceanic Foods Limited.

[2] https://www.exportgenius.in/blog/onion-export-from-india-list-of-onion-suppliers-in-india-129.php




India is exporting onion to foreign countries from around 40 ports. JNPT is the biggest Indian port which departs the maximum number of onion shipments. India recorded 60% value of onion export from JNPT only in 2017 i.e. USD 186.37 million. JNPT is followed by Mundra Sea, Pipavav, Bhusawal ICD and Chennai Sea (Fig 3.14).



Onion can be processed to paste and dried products like powder, flakes and grits. There are about 75 onion dehydration units in Gujarat (86% in Mahuva, Bhavnagar) and one large export oriented dehydration unit at Jalgaon. India produces about 65,000 MT of dehydrated onion, of which 85 per cent is exported. The local demand for processed onion is limited but is on rise. In export market, India competes with Turkey and China and they offer dehydrated onion at a very low rate ($1700 -2500 per MT) as against the Indian rate of $2600 per MT. Due to spiraling prices of onion, raw material prices go up, making onion processing unprofitable. During 2014-15, more than 75 per cent of onion dehydration units remained shut due to high raw material prices. Jain Irrigation Systems Ltd. has set up a modern dehydration unit at Jalgaon with full backward integration with farmers for producing processing quality white onion. The company has a total installed capacity of 14,000 MT/ annum, of which 9,500 MT/ annum is in Jalgaon. The company is connected to more than 6,000 farmers through contract farming for supply of onion in Maharashtra and Gujarat. Since the entire value chain of onion is addressed by the company, it has been able to become a market leader in dehydrated onion. As the domestic demand for dehydrated onion is very limited, growth of onion dehydration industry is moving at snail's pace.

### 3.6 Analysis of Arrivals and Price Volatility:

Onion is an important vegetable crop in India and is an integral component of Indian culinary. Being an essential food item, it is also a highly politically sensitive commodity. The high agricultural commodity prices in recent years have raised the question of whether or not volatility is increasing and leading to more frequent extreme price swings. This section is intended to contribute to the existing field of work on agricultural commodity price volatility. In this section, volatility is defined as the variation (amplitude and frequency) of commodity price changes around their mean value. The impact of price volatility can be twofold. First, high volatility may involve quickly declining prices. On the other hand high price volatility may rapidly increase

the price, although if the price volatility persists the price can come down even faster (Pietola et al. 2010). Price volatility creates uncertainty about future prices, leading to high risks in the market due to farmers' inability to forecast prices and thus, welfare losses for market participants (Apergis and Rezitis 2003)

The analysis of prices and market arrivals over time is important for formulating a sound agricultural price policy. Fluctuations in market arrivals largely contribute to the price instability of onion in the state. The transaction in commodity exchanges also plays an important role on the spot price of onion as it gives some indication of future price. In order to reduce the instability in price fluctuations of onion, there is a need to have a thorough understanding of the price behaviour over time and over space. The long run equilibrium between the market prices of onion is indicated by the Vector Error Correction Model (VECM) for the non-stationary individually with a long run relationship in the time series data. Hence, attempt was made to assess the volatility and market integration of onion crop in Gujarat. The data used in the co-integration analysis consists of monthly wholesale prices of five onion dominated markets i.e. Ahmadabad, Gondal, Rajkot, Mahuwa and Surat markets of Gujarat for the period from 2005 to 2017.

Trend represents the general direction of change in arrivals and prices over a period of time. Trend component is affected by changes in demand such as change in population, income, habits, customs, establishment of processing industries, etc. Price trend is also affected by adjustment in supply arising out of development of cold storage and marketing facilities, production technology and market arrivals over long period. The estimated parameters for trend value for arrivals (A) and prices (P) of onion crops for different markets viz., Surat, Rajkot, Mahuva, Gondal and Ahmadabad are given in Table 3.8. A positive trend in arrival was observed in all selected markets for onion and all the selected markets showed positive trend in prices also.

Table 3.10: Arrivals and Prices Trends of Onion in Different selected market of Gujarat

| Market | Arrivals (Y=a+bx) | Prices (Y=a+bp) |
|---|---|---|
| Surat | Yt = 29881 + 3.8×t | Yt = 366.3 + 7.361×t |
| Rajkot | Yt = 11183 + 144.3×t | Yt = 286.4 + 4.995×t |
| Mahuva | Yt = 12514 + 4066×t | Yt = 315.7 + 5.278×t |
| Gondal | Yt = 38892 + 2.7×t | Yt = 278.5 + 5.489×t |
| Ahmadabad | Yt = 6246 + 1082.5×t | Yt = 489.5 + 6.61×t |

### *Seasonal Behaviour in Prices of Onion*

In this section, seasonal variation in arrivals and prices of onion for different markets *viz;* Surat, Rajkot, Mahuva, Gondal and Ahmadabad with the help of seasonal indices are discussed. The seasonal indices of market arrivals and prices of onion in the selected markets are present in Table 3.9 and 3.10 and line graph of arrivals and price indices are depicted in Fig. 3.11 to 3.15 of selected markets. Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals and prices of onion. The results revealed the existence of seasonality in all the markets. Higher indices of market arrivals of onion were noticed immediately after harvest in the selected markets arrivals reached peak during April (262.72) in Mahuva which decrease to 6.05 in October and relatively shoot up in March. In Gondal market the peak indices was found in February (172.41) followed by March (169.77). Ahmadabad market showed lowest arrivals in September (75.87) while it peaked during March (116.30). Surat market witnessed the lowest arrivals in October (70.12) and highest during May (135.19). Arrivals reached a peak during December (151.90) in Rajkot market while they were the lowest in August (69.87). The higher market arrival indices were observed (more than 100) in the months of to December to April and lower arrival indices was found during July to October (less than 100).

The pattern of market prices showed slight differences among the selected markets. The price index in Mahuva market was the highest in the

month of December (127.76) and relatively higher during the months of August to January. Gondal market witnessed peak price during October (152.81). The indices in other months varied from 57.18 to 121.95. A peak of 135.56 in index was observed during December in Ahmadabad market followed by October (134.96) and November (133.0). However, the price index of other months was between in 61.54 to 143.61. Surat market witnessed highest price index of 143.61 in October month. The market prices of onion in Rajkot found to be the highest in October (157.13). The lowest index was seen in May (60.19). Price index was between in 67.04 to 136.80 during other period. Price indices were more than 100 in the months of August to January. Lower indices were observed during May. The majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices.

To analyze the arrivals pattern of onion during different months of the year and their impact on price, seasonal indices were computed adopting 12 months moving averages. Onion crop were sown in the month of October to December. It comes to harvest during Feb to April. Thus, fluctuation in the monthly indices of onion arrivals was more than the monthly indices of prices in selected market during the study period. The price movement also demonstrates significant seasonal fluctuations in the selected markets. As a short term fluctuations, one will notice a general finding that the price is low when the arrivals were large and the price being high when the arrivals were low.

**Table 3.11: Seasonal Indices of Monthly Arrivals of Onion in Major Market of Gujarat**

| Month | Mahuva | Gondal | Ahmadabad | Surat | Rajkot |
|---|---|---|---|---|---|
| January | 184.53 | 160.77 | 106.59 | 103.66 | 121.88 |
| February | 261.37 | 172.41 | 109.68 | 103.54 | 90.59 |
| March | 262.34 | 169.77 | 116.30 | 94.43 | 91.66 |
| April | 262.72 | 147.88 | 108.39 | 103.91 | 95.43 |
| May | 122.85 | 99.24 | 112.46 | 135.19 | 100.14 |
| June | 12.27 | 34.09 | 106.29 | 134.17 | 80.34 |
| July | 6.49 | 35.58 | 94.61 | 113.71 | 81.36 |
| August | 6.28 | 47.78 | 87.93 | 73.89 | 69.87 |
| September | 7.49 | 69.29 | 75.87 | 80.78 | 74.77 |
| October | 6.05 | 54.39 | 80.80 | 70.12 | 104.94 |
| November | 10.77 | 65.71 | 93.03 | 81.84 | 137.11 |
| December | 56.85 | 143.11 | 108.07 | 104.76 | 151.90 |

**Table3.12: Seasonal Indices of Monthly Prices of Onion in Major Market of Gujarat**

| Months | Mahuva | Gondal | Ahmadabad | Surat | Rajkot |
|---|---|---|---|---|---|
| January | 105.90 | 121.95 | 96.03 | 102.15 | 104.80 |
| February | 94.25 | 101.94 | 99.27 | 95.08 | 82.99 |
| March | 85.38 | 70.71 | 76.96 | 76.87 | 69.60 |
| April | 73.50 | 61.63 | 63.97 | 66.13 | 67.04 |
| May | 70.24 | 57.18 | 58.41 | 61.54 | 60.19 |
| June | 78.41 | 79.70 | 81.36 | 73.96 | 78.67 |
| July | 96.73 | 89.50 | 99.01 | 101.10 | 90.73 |
| August | 108.46 | 114.53 | 108.26 | 119.99 | 111.87 |
| September | 109.73 | 109.80 | 113.22 | 118.38 | 131.22 |
| October | 124.69 | 152.81 | 134.96 | 143.61 | 157.13 |
| November | 124.94 | 119.55 | 133.00 | 122.56 | 136.80 |
| December | 127.76 | 120.70 | 135.56 | 118.62 | 108.97 |

**Fig. 3.15 Seasonal Indices of monthly arriavals and prices of Onion in Mahuva**

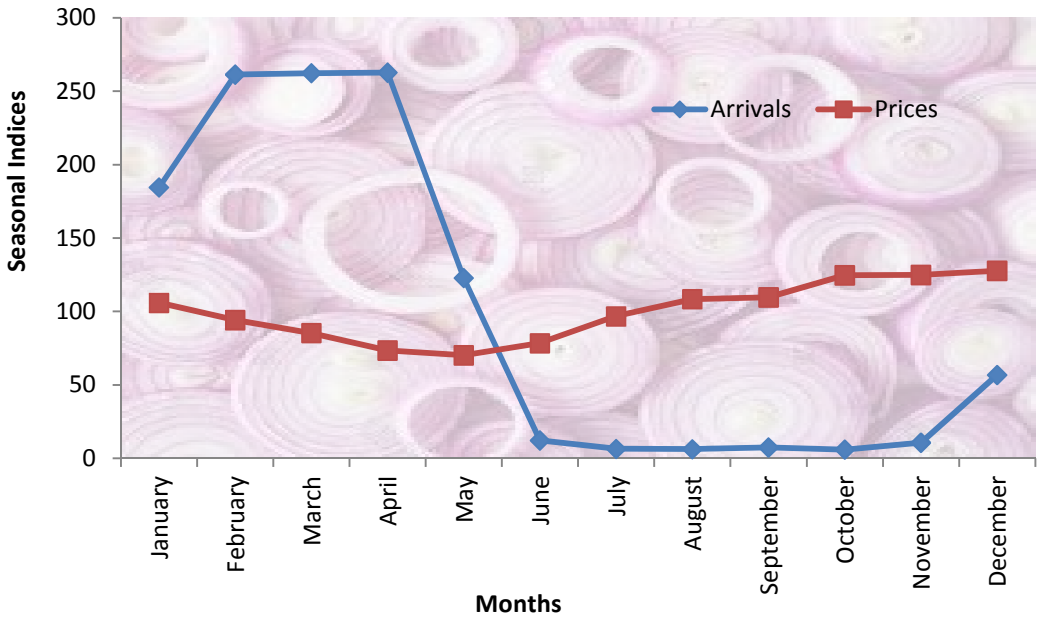



**Fig. 3.16: Seasonal Indices of monthly arriavals and prices of Onion in Gondal**

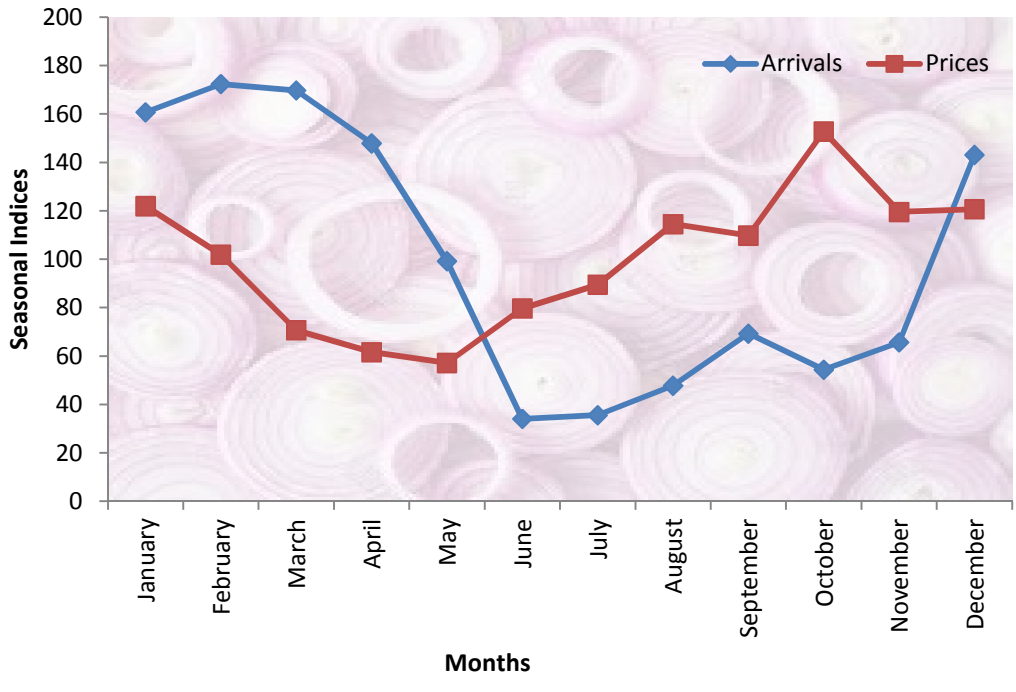


**Fig. 3.17. Seasonal Indices of monthly arriavals and prices of Onion in Ahmedabad**

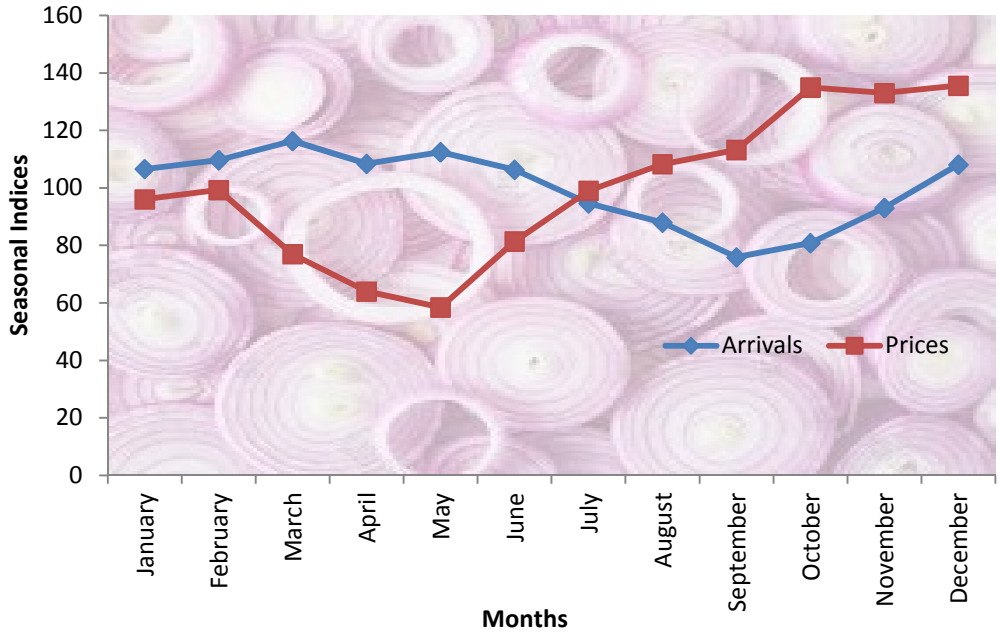



**Fig. 3.18. Seasonal Indices of monthly arriavals and prices of Onion in Surat Market**

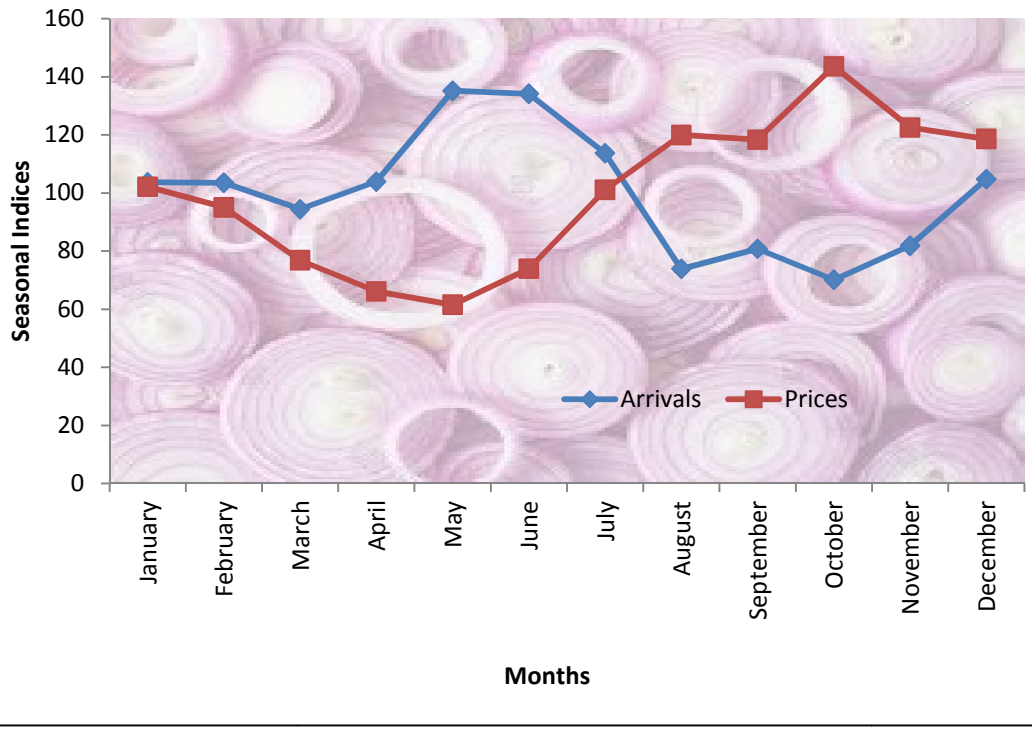
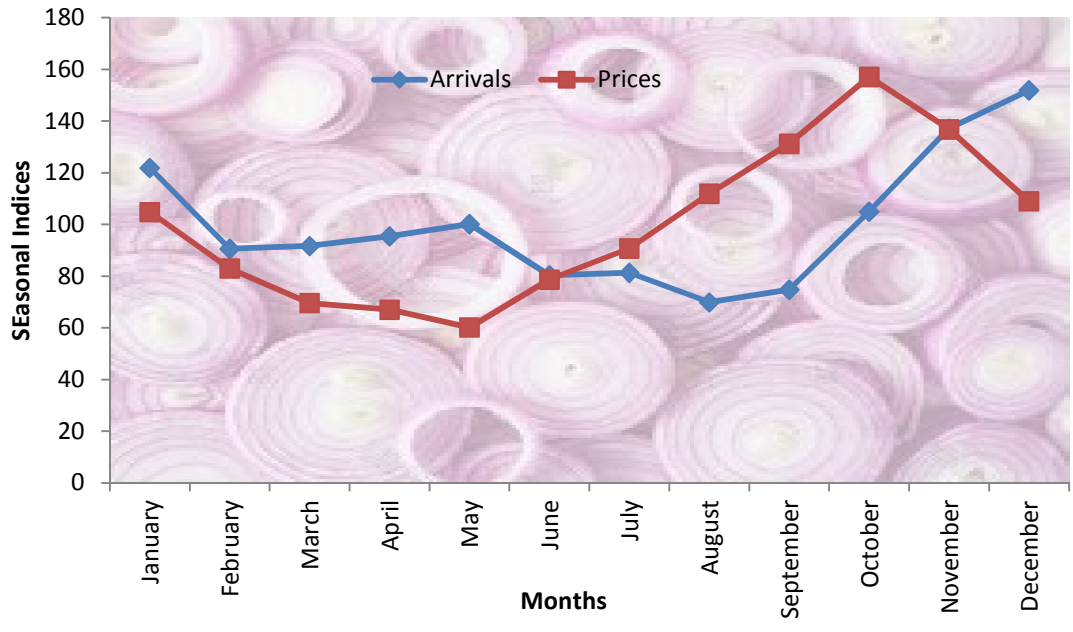


**Fig. 3.19. Seasonal Indices of monthly arriavals and prices of Onion in Rajkot Market**




## 3.7 Market Integration in Prices

Testing for market integration is central to the design of any agricultural price policy in many developing countries and has been an area of abiding research interest. This literature can be divided into three broad categories. Until recently three broad approaches were used to investigate market integration: (i) that devised prior to the use of cointegration techniques, (ii) those using cointegration methods of the Engle-Granger variety, and (iii) those using Johansen maximum-likelihood techniques (Johansen, 1988). To the extent that agricultural prices tested are non-stationary, the latter technique is more appropriate.

The concept of co-integration developed by Engle and Granger (1987) was used in testing the market integration. Most market commodity prices, whether international or domestic, are basically non-stationary. A stochastic process is said to be stationary, if its mean and variance between any two

time periods depend only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed.

If the non-stationary time series data like prices are used, it usually would yield a high $R^2$ and t ratios which are biased towards rejecting the null hypothesis if no relationship between the variables is concerned.

Co-integration test starts with the premise that for a long-run equilibrium relationship to exist between two variables, it is necessary that they should have the same inter temporal characteristics. Thus, the first step involves testing for stationarity for variables. Economic interest in the theory of testing the unit roots have led to development of a variety of tests to test for the order of integration and the presence of unit roots in time series data. In econometrics, a time series that has a unit root is known as a random walk which is an example of a non-stationary time series. If the original series is found to be non-stationary, the first difference of the series is tested for stationarity.

The most widely used tests for unit roots are the Dickey-Fuller (DF) test and the Augmented Dickey-Fuller test (ADF). Both tests the null hypothesis that the series has a unit root or in other words, it is not stationary. The DF test was applied by running the regression of the following form:

$$\Delta Y_t = \beta_t + \delta Y_{t-1} + U_t$$

$$\text{Where, } \Delta Y_t = (Y_t - Y_{t-1});\ Y_t = \text{In } Y_t$$

The ADF test was run with the following equation,

$$\Delta Y_t = \beta_t + \delta Y_{t-1} + \alpha_i + \sum_{i=1}^{n} \Delta Y_{t-1} + e_t$$

$$\text{Where, } \Delta Y_t = (Y_t - Y_{t-1});\ \Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$$

**Co-Integration**

Cointegration means that despite being individually non-stationary, a linear combination of two or more time series can be stationary. The series

that satisfy this requirement are said to be co-integrated. Following Granger (1988), a time series $x_t$ which has a stationary, invertible, non-deterministic ARMA representation after differencing *d* times is integrated of order *d* and is denoted by $x_t \sim I(d)$. The components of the vector $x_t$ are said to be co integrated of order *d, b*, denoted CI (d,b), if

all the components of $x_t$ are I(d); and

there exists a vector ' $x_t$ is 1(d-b), b>0

The vector is then called a cointegrating vector. A necessary condition for cointegration is that the data series for each variable involved exhibit similar statistical properties, that is, to be integrated to the same order with evidence of some linear combination of the integrated series.

**Error Correction Methodology (ECM)**

ECM captures the short-run dis-equilibrium situations as well as the long-run equilibrium adjustments between prices. ECM can incorporate such short-run and long-run changes in the price movements. A generalized ECM formulation to understand both the short-run and long-run behaviour of prices can be considered by first taking the autoregressive distributed lag (ADL) equation as follows:

$$Y_t = \alpha_{01} X_t + a_{11} X_{t-1} + a_{12} Y_{t-1} + \varepsilon_t$$

$$\Delta Y_t = a_{01} \Delta X_t + (1 - a_{12}) \left[ \frac{(a_{01} + a_{11})}{(1 - a_{12})} X_{t-1} - Y_{t-1} \right] + \varepsilon_t$$

The generalized form of this equation for k lags and an intercept term is as follows:

$$\Delta Y_t = a_{00} + \sum_{i=0}^{k-1} a_{i1} \Delta X_{t-i} + \sum_{i-1}^{k-1} a_{i2} \Delta Y_{t-i} + m_0 [m_1 X_{t-k} - Y_{t-k}] + \varepsilon_t$$

where $m_0 = (1 - \sum_{i=1}^{k} a_{i2}), and\ m_1 = \frac{\sum_{i=0}^{k} a_{i1}}{m_0}$

The parameters $m_0$ measures the rate of adjustment of the short-run deviations towards the long run equilibrium. Theoretically, this parameter lies between 0 and 1. The value 0 denotes no adjustment and 1 indicates an instantaneous adjustment. A value between 0 and 1 indicates that any deviations will have gradual adjustment to the long-run equilibrium values.

**Engle-Granger causality**

An autoregressive distributed lag (ADL) model for the Granger-causality test was developed following the Engle and Granger (1987) specification provided below:

$$P_t^1 = \alpha + \beta_0 T + \sum_{j=1}^{j} \beta_j P_{t-j}^1 + \sum_{k=1}^{k} h_k P_{t-k}^2 + \varepsilon_t$$

where T is the time trend, $\varepsilon_t$ is the error term, and other terms are as defined in earlier equations.

Lags for the ADL model were selected to minimize the Akaike's Information Criterion. Granger causality tests were specified as:

$$P_t^1 = \alpha + \beta_0 T + \sum_{j=1}^{j} \beta_j P_{t-j}^1 + \sum_{k=1}^{k} h_k P_{t-k}^2 + \varepsilon_t$$

$$H_0 : h_1 = h_2 = ... = h_k = 0$$

$$P_t^2 = \delta + \phi_0 T + \sum_{j=1}^{j} \Omega_j P_{t-j}^1 + \sum_{k=1}^{k} \varphi_k P_{t-k}^2 + \upsilon_t$$

$$H_0 : \varphi_1 = \varphi_2 = ... = \varphi_k = 0$$

From the Table 3.13, it could be inferred that the original data were stationary. If, the original price series of onion are non stationary and had a unit root. The occurrence of unit root in the price data generation process of onion gave a preliminary indication of shocks which may have permanent or long-lasting effect.

Table 3.13: ADF unit root test for prices of Onion

| Sr. no. | Market | Augmented Dickey-Fuller (ADF) test value | |
|---|---|---|---|
| | | Level | Critical value (1%) |
| 1 | Ahmadabad | - 5.763350 | -4.018748 |
| 2 | Gondal | -5.718698 | |
| 3 | Rajkot | -5.783407 | |
| 4 | Mahuva | -5.461770 | |
| 5 | Surat | -5.604763 | |

From the table it could be inferred that Augmented Dickey Fuller test values are less the critical value (1 %) given by MacKinnon statistical tables at levels implying that the series are stationary at their levels indicating the free from the consequence of unit root. All the stationary series which is obvious from the fact that calculated values (-5.461770 to-5.783407) for all the markets were less than the critical value (- 4.018748) and were free from the consequence of unit root.

**Multiple Co-integration Analysis for Onion**

Based on the Johansen multiple co-integration procedure, the integration between the markets was analyzed by E-views software. Unrestricted co-integration rank tests (Trace and Maximum Eigen value) indicated the presence of at least three co-integrating equation at 5 per cent level of significance. Hence markets were having long run equilibrium relationship. Similar results were obtained by Sharma and Burark *(*2016) while studying the market integration of wheat. The results are presented in Table 3.14.

**Table 3.14: Results of Multiple Co-integration Analysis for Onion**

| Un restricted co integration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| Hypothesized NO. of CE (s) | Eigen value | Trace Statistic | 0.05 critical value | Prob.** |
| None * | 0. 252237811 | 121.8500839 | 88.80380062 | 3.49666809 |
| At most 1* | 0.188428305 | 77.95887139 | 63.87610361 | 0.00210345 |
| AT most 2* | 0.12842863 | 46.43270662 | 42.91524702 | 0.02136275 |
| At most 3 | 0.084468603 | 25.67662035 | 25.87210792 | 0.05284204 |
| At most 4 | 0.078537523 | 12.35077657 | 12.51798289 | 0.05330696 |
| Trace test indicates 3 co integrating eqn(s) at the 0.05 level<br>*Denotes rejection of the hypothesis is at the 0.05 level<br>** MacKinnon-Haug-Michelis(1999)p-values | | | | |

## Vector Error Correction Model

The error correction term indicates the speed of adjustment among the variables before converging to equilibrium in the dynamic model. The coefficients show how quickly variables return back to equilibrium. The Table 3.9 clearly shows that all onion markets not came to short run equilibrium as indicated by the level of significance and the rapid speed of adjustment. In long run, Ahmadabad onion market prices were influenced by one month lagged price of Surat market. Gondal market prices were influenced by its own one and two month legged prices and one month lagged prices of Rajkot market. Rajkot market prices were influenced 1 and 2 months lagged price by its own market price and Gondal market. Mahuwa market prices were being influenced by Rajkot market prices in one month lag. Surat market prices were influenced by one month lagged price of Ahmadabad market. Analyses results using Vector Error Correction Model (VECM) showed that most of the markets considered under this study are integrated to each other. Similar results were obtained different studies (Ghosh 2000, Patel 2000, Ghosh 2003 and Ravinderan 2007) of the market integration.

**Table 3.15: Results of Vector Error Correction Model for selected Onion Markets**

| Error Correction: | D(ADI) | D(GNDL) | D(RJK) | D(MH) | D(SRT) |
|---|---|---|---|---|---|
| CoinEq1 | -0.188900 | -0.073600 | 0.232669 | 0.042493 | -0.179038 |
| | (0.16532) | (0.14839) | (0.13795) | (0.11672) | (0.16374) |
| | [-1.14261] | [-0.49599] | [ 1.68660] | [ 0.36407] | [-1.09340] |
| D(ADI(-1)) | -0.470639 | 0.278680 | 0.182124 | -0.030172 | 0.349052 |
| | (0.28814) | (0.25863) | (0.24043) | (0.20342) | (0.28539) |
| | [-1.63338] | [ 1.07753] | [ 0.75749] | [-0.14832] | [ 2.22309] |
| D(ADI(-2)) | 0.165444 | 0.477409 | 0.421501 | 0.208282 | 0.406045 |
| | (0.29825) | (0.26771) | (0.24887) | (0.21056) | (0.29540) |
| | [ 0.55471] | [ 1.78334] | [ 1.69366] | [ 0.98917] | [ 1.37455] |
| D(GNDL(-1)) | -0.161656 | -0.744093 | -0.640876 | -0.245509 | -0.050176 |
| | (0.28219) | (0.25329) | (0.23547) | (0.19923) | (0.27950) |
| | [-0.57285] | [-2.93767] | [-2.72166] | [-1.23231] | [-0.17952] |
| D(GNDL(-2)) | -0.373543 | -0.631378 | -0.708514 | -0.293211 | -0.412799 |
| | (0.26717) | (0.23980) | (0.22293) | (0.18862) | (0.26461) |
| | [-1.39816] | [-2.63289] | [-3.17816] | [-1.55453] | [-1.56000] |
| D(RJK(-1)) | 0.676620 | 0.688204 | 0.697069 | 0.637725 | 0.486179 |
| | (0.37273) | (0.33455) | (0.31102) | (0.26314) | (0.36917) |
| | [ 1.81532] | [ 2.05708] | [ 2.24126] | [ 2.42350] | [1.31696] |
| D(RJK(-2)) | 0.271292 | 0.483232 | 0.528984 | 0.262426 | 0.351111 |
| | (0.29036) | (0.26062) | (0.24228) | (0.20499) | (0.28758) |
| | [ 0.93433] | [ 1.85416] | [ 2.18332] | [ 1.28019] | [ 1.22090] |
| D(MH(-1)) | 0.027925 | 0.029142 | 0.074341 | -0.223265 | -0.251742 |
| | (0.30103) | (0.27020) | (0.25118) | (0.21252) | (0.29815) |
| | [ 0.09277] | [ 0.10786] | [ 0.29596] | [-1.05056] | [-0.84435] |
| D(MH(-2)) | -0.330273 | -0.347543 | -0.324279 | -0.337444 | -0.266655 |
| | (0.30674) | (0.27532) | (0.25595) | (0.21655) | (0.30381) |
| | [-1.07673] | [-1.26232] | [-1.26696] | [-1.55826] | [-0.87771] |
| D(SRT(-1)) | 0.457220 | 0.208857 | 0.138567 | 0.252675 | -0.111385 |
| | (0.19897) | (0.17859) | (0.16602) | (0.140470) | (0.19707) |
| | [ 2.29796] | [ 1.16947] | [ 0.83462] | [ 1.79880] | [-0.56522] |
| D(SRT(-2)) | 0.049054 | -0.188069 | -0.091853 | -0.027332 | -0.209849 |
| | (0.19960) | (0.17916) | (0.16655) | (0.14092) | (0.19769) |
| | [ 0.24576] | [-1.04974] | [-0.55149] | [-0.19396] | [-1.06149] |
| C | 11.91253 | 12.21265 | 9.366880 | 9.735237 | 12.99064 |
| | (29.0670) | (26.0901) | (24.2544) | (20.5210) | (28.7894) |
| | [0.40983] | [0.46810] | [0.38619] | [0.47440] | [ 0.45123] |
| R-squared | 0.295493 | 0.315752 | 0.237493 | 0.293507 | 0.285917 |
| Adi. R-squared | 0.240532 | 0.262371 | 0.178006 | 0.238391 | 0.230208 |
| Sum sq. resids | 18168736 | 14637743 | 12650429 | 9055656 | 17823276 |
| S.E. equation | 358.9656 | 322.2015 | 299.5319 | 253.4255 | 355.5365 |
| Log likelihood | -1110.983 | -1094.451 | -1083.289 | -1057.715 | -1109.514 |
| Akaike AIC | 14.67951 | 14.46342 | 14.31750 | 13.98320 | 14.66032 |
| Schwarz SC | 14.91720 | 14.70110 | 14.55518 | 14.22088 | 14.89800 |
| Mean dependent | 18.62092 | 16.82353 | 14.01307 | | 17.98693 |
| S.D. dependent | 411.9059 | 375.1531 | 330.3763 | 290.3917 | 405.2263 |
| Standard error in() & t-statistics in [] | | | | | |

## Granger Causality Test

In order to know the direction of causation between the markets, Granger Causality test was employed. When a co-integration relationship is

present for two variables, a Granger Causality Test (Granger, 1996) can be used to analyse the direction of this co-movement relationship. Theoretically, a variable is said to granger-cause another variable, if the current value is conditional on the past value. It was observed that there was a bidirectional influence on onion prices of Gondal and Ahmadabad, Gondal and Mahuwa, Surat and Gondal, Surat and Rajkot. Ahmadabad onion price shows unidirectional causality with Surat and Rajkot. Mahuwa market price influenced Surat and Rajkot market prices. The onion price of Gondal market was influenced by the prices of Rajkot market. Since in all these cases the probability value was less than 0.05.Thus, different markets of onion in the state of Gujarat were closely linked with each other for the movement of Onion prices.

**Table 3.16: Pair wise granger causality tests results for Onion wholesale prices.**

| Null hypothesis | Obs | f- statistic | prob |
|---|---|---|---|
| MH does not Granger Cause ADI | 154 | 1.20864 | 0.3015 |
| ADI does not Granger Cause MH | 154 | 2.22764 | 0.11174 |
| GNDL does not Granger Cause ADI | 154 | 4.52109 | 0.0124 |
| ADI does not Granger Cause GNDL | 154 | 6.5513 | 0.0019 |
| SRT does not Granger Cause ADI | 154 | 8.66795 | 0.0003 |
| ADI does not Granger Cause SRT | 154 | 1.35109 | 0.2621 |
| RJK does not Granger Cause ADI | 154 | 13.6484 | 4.00E-06 |
| ADI does not Granger Cause RJK | 154 | 2.77267 | 0.0657 |
| GNDL does not Granger Cause MH | 154 | 3.11985 | 0.0471 |
| MH does not Granger Cause GNDL | 154 | 4.41938 | 0.0137 |
| SRT does not Granger Cause MH | 154 | 7.14852 | 0.0011 |
| MH does not Granger Cause SRT | 154 | 0.90603 | 0.4063 |
| RJK does not Granger Cause MH | 154 | 9.86616 | 9.00E-05 |
| MH does not Granger Cause RJK | 154 | 1.89615 | 0.1538 |
| SRT does not granger Cause GNDL | 154 | 9.66387 | 0.0001 |
| GNDL does not Granger Cause SRT | 154 | 3.30495 | 0.0394 |
| RJK does not Granger Cause GNDL | 154 | 13.003 | 6.00E-06 |
| GNDL does not Granger Cause RJK | 154 | 0.86096 | 0.4248 |
| RJK does not Granger Cause SRT | 154 | 7.03926 | 0.0012 |
| SRT does not Granger cause RJK | 154 | 3.1814 | 0.0444 |

## Price volatility

To assess the presence of price fluctuations in the different markets for Onion ARCH-GARCH analysis was carried out for the following wholesale price series viz., Ahmadabad Surat, Mahuwa, Rajkot and Gondal onion markets. The sum of Alpha and Beta values indicated the presence of persistent fluctuation. The value close to 1 indicates the persistence of volatility in the market. The results confirmed that there was high volatility in onion prices in these markets as the sum of Alpha (A) and Beta (B) values ranged from 1.13 to 1.28 in prices of onion as shown in Table 2.10. These values were above to one.

**Table 3.17: ARCH- GARCH Analysis results for selected Onion markets**

| Variable | Ahmadabad | Surat | Mahuva | Rajkot | Gondal |
|---|---|---|---|---|---|
| Alpha(A) | 1.357869 | 1.501726 | 1.2987 | 1.349179 | 1.353099 |
| Beta (B) | -0.135094 | -0.245381 | -0.15878 | -0.073969 | -0.06735 |
| Sum of A & B | **1.222775** | **1.256345** | **1.139918** | **1.27521** | **1.285751** |

The results of the Augmented Dickey-Fuller (ADF) unit root test for onion showed All the stationary series which is obvious from the fact that calculated values (-5.461770 to-5.783407) for all the markets were less than the critical value (- 4.018748) and were free from the consequence of unit root. Johansen's co-integration test for onion indicated the presence of at least three co-integrating equation at 5 percent level of significance. Hence markets were having long run equilibrium relationship. The high volatility in price of onion was observed in all selected market. Uncertainty in weather conditions, heavy/low rains and temperature effect the crop production, low stocks facility and delayed shipments is the source of high prices. Policies need to be developed to control the volatile nature of onion prices, which is directly affecting the low income group. Therefore, in order to continue the present system of market integration, there is need to establish cells to generate market information and market intelligence which would provide a better platform for guiding the farmers in marketing their produce.

## 3.8 Concluding Remarks

Onion production has shown a steady upward trend, with a few exceptions, in response to increase in planted area and to a lesser account due to improvement in productivity. Per capita onion consumption has shown a significant growth in recent years. Onion prices typically exhibit a seasonal trend peaking during the lean season of September- October and falling during April – May coinciding with the peak arrival season of the major *rabi* season crop. The onion retail mark up in the past has ranged from 50 percent to 200 percent- the mark up percent is high when wholesale prices are low and vice versa. Besides fulfilling the increasing demand of domestic population, India has emerged as a major exporter of onion. One of the reasons for the high domestic onion prices is believed to be increasing exports.

**Chapter IV**

# Status and Potential of Onion Infrastructure

## 4.1 Status of Agricultural Marketing Structures:

Agricultural marketing in India is handled both by private trade as well as government intervention though major part of the agricultural produce is handled by private traders. The objectives and form of government intervention however change over time with the intention of protecting the interest of producers and consumers. However, barring direct intervention by the government in some commodities, marketing in most others is dominated by the private sector. According to some sources, the quantity of agricultural produce handled by government agencies has not been more than 10 percent of the total value of marketed surplus. Another 10 percent of the marketed surplus is handled by the cooperatives. Thus, rest of the 80 percent marketed surplus comes in the ambit of private trade. As large part of agricultural produce is marketed through private trade, there are a number of functionaries operating in different activities of marketing of various commodities. Apart from wholesalers and retailers, processors enter the market as bulk buyers and sellers. In the case of fruits and vegetables, only 2 percent of total production is processed and rest 98 percent is traded as fresh farm products in the fruit and vegetable markets. However, Indian food policy and agricultural commodity trade till the early 1990s was based on government interventions to protect consumer and producer interests through regulation of markets, limitation of private stocking, restricted movement of food grains, prohibition of private sector in the international trade of food grains and the dominance of large government parastatals like FCI, NAFED, etc. The establishment of regulated markets has helped in creating orderly and transparent marketing conditions in primary assembling markets. Further, increase in the number of regulated market yards, from 286 at the time of independence to 6746 in the year 2015, which helped in increasing the access

of farmers to such orderly market places. These regulated markets (6746) consist of 2479 principal markets and 4267 sub yards (Table 4.1).

Table 4.1: Details of Wholesale, Rural primary and Regulated markets in different State/Uts – 2015

| **State** | Number of markets | | | Regulated markets | | |
|---|---|---|---|---|---|---|
| | Whole Sale | Primary | Total | Principal | Submarket yards | Total |
| Andhra Pradesh | 190 | 157 | 347 | 190 | 157 | 347 |
| Arunachal Pradesh | 5 | 66 | 71 | 0 | 0 | 0 |
| Assam | 405 | 735 | 1140 | 20 | 206 | 226 |
| Jharkhand | 201 | 602 | 803 | 28 | 173 | 201 |
| Goa | 4 | 24 | 28 | 1 | 7 | 8 |
| **Gujarat** | **205** | **129** | **334** | **213** | **187** | **400** |
| Haryana | 281 | 195 | 476 | 107 | 174 | 281 |
| Himachal Pradesh | 42 | 35 | 77 | 10 | 44 | 54 |
| Jammu & Kashmir | 0 | 8 | 8 | 11 | 0 | 11 |
| Karnataka | 315 | 730 | 1045 | 157 | 356 | 513 |
| Madhya Pradesh | 0 | 0 | 0 | 254 | 284 | 538 |
| Chhattisgarh | 2 | 1132 | 1134 | 69 | 118 | 187 |
| Maharashtra | 881 | 3500 | 4381 | 305 | 603 | 908 |
| Meghalaya | 35 | 85 | 120 | 2 | 0 | 2 |
| Nagaland | 19 | 174 | 193 | 18 | 0 | 18 |
| Orissa | 398 | 1150 | 1548 | 54 | 382 | 436 |
| Punjab | 424 | 1390 | 1814 | 150 | 274 | 424 |
| Rajasthan | 446 | 312 | 758 | 134 | 312 | 446 |
| Tamil Nadu | 0 | 0 | 0 | 227 | 6 | 283 |
| Telangana | 150 | 110 | 260 | 150 | 110 | 260 |
| Tripura | 84 | 470 | 554 | 21 | 0 | 21 |
| Uttar Pradesh | 584 | 3464 | 4048 | 250 | 365 | 615 |
| Uttarakhand | 36 | 30 | 66 | 26 | 32 | 58 |
| West Bengal | 279 | 3250 | 3529 | 20 | 464 | 484 |
| A & N Islands | 0 | 28 | 28 | NIL | NIL | NIL |
| Chandigarh | 1 | 0 | 1 | 1 | 0 | 1 |
| Delhi | 30 | 0 | 30 | 7 | 8 | 15 |
| Puducherry | 4 | 5 | 9 | 4 | 5 | 9 |
| Bihar | 325 | 1469 | 1794 | APMC act REPEALED | | |
| Kerala | 348 | 1014 | 1362 | APMC act REPEALED | | |
| Manipur | 24 | 95 | 119 | APMC act REPEALED | | |
| Mizoram | 7 | 218 | 225 | APMC act REPEALED | | |
| Sikkim | 7 | 12 | 19 | APMC act REPEALED | | |
| Dadra & N. Haveli | 0 | 0 | 0 | APMC act REPEALED | | |
| Daman & Diu | 0 | 0 | 0 | APMC act REPEALED | | |
| Lakshadweep | 0 | 0 | 0 | APMC act REPEALED | | |
| **Total** | **5732** | **20589** | **26321** | **2429** | **4267** | **6746** |

In the aftermath of structural adjustment programmes (SAP), liberalization of other sectors of the economy raised reservations about government regulations of several spheres of agricultural sector. It was felt that the APMC act has become obsolete and no longer serves its purpose. The regulated markets mainly created a privileged group of licensed traders who blocked entry of new players thus defeating the aim of competition and inhibiting private investment to benefit marketing. A Model Market Act 2003 was passed to reform the market by allowing more competition and encouraging innovative methods to evolve. Private cooperatives, direct marketing and contract farming were to be promoted to bring the producers closer to the processors and the consumers. A system of warehouse receipts that supported grain storage was introduced and the Forward Market Act 1952 was amended in 2007 to allow futures trading in cereals.

Owing to a widening of the production base of the agricultural sector, the market orientation of the farm sector has considerably increased. However, these institutional reforms have not been successful in terms of coverage over the whole of India. There is a huge variation in the density of regulated markets in different parts of the country, which varies from 103 sq km. in Punjab to 1185 sq km. in HP. The all-India average area served by a regulated market is 459 sq km, against the recommendation of the National Farmers Commission (2004) that a regulated market should be available to farmers within a radius of 5 Km (corresponding market area of about 80 sq. km.). This indicates that extant system has failed to provide adequate number of markets to handle ever increasing marketed surplus efficiently and easy market access to farmers (Table 4.2). Market imperfections continue to operate in most of the areas where an agricultural breakthrough has not taken place. In the backward regions markets continue to be dominated by the trader-cum-money lender nexus. Due to the lack of market infrastructure, the marketing system is highly inadequate and consequently the system continues to be non-competative and dominated by monopolistic interests. Till date, the most common method of sales of agricultural commodities has remained through regulated markets.

However, with amendments in APMC, a number of corporates are entering into the retail segment especially with respect to fruits and vegetables. They provide crop specific and soil specific advisory services to farmers, to build brand loyalty, enhance quality of produce and thus increase farm production. They also cater to export markets.

Table 4.2: State-wise Total Number of Regulated Markets and Area Served in India

| State | Geographical Area Served by Per Regulated Market (Area in sq. Km) | | | Area (GCA) Served by Per Regulated Market (Area in 000 ha) | | |
|---|---|---|---|---|---|---|
| | 1991 | 2001 | 2010 | 1991 | 2001 | 2010 |
| WB | 263 | 160 | 129 | 26 | 16 | 14 |
| AP | 484 | 319 | 305 | 23 | 16 | 15 |
| PUN | 76 | 75 | 103 | 11 | 12 | 16 |
| ASS | 2451 | 2241 | 347 | 119 | 117 | 18 |
| HP | 1071 | 1591 | 1185 | 19 | 27 | 20 |
| TN | 471 | 482 | 445 | 24 | 23 | 20 |
| HAR | 172 | 156 | 156 | 23 | 22 | 23 |
| Others | 4510 | 3422 | 596 | 49 | 176 | 23 |
| KAR | 483 | 405 | 383 | 30 | 26 | 25 |
| MAH | 398 | 359 | 350 | 28 | 26 | 25 |
| **GUJ** | **575** | **495** | **473** | **30** | **26** | **28** |
| ORI | 1198 | 1081 | 496 | 74 | 55 | 29 |
| MP | 834 | 720 | 636 | 45 | 29 | 30 |
| UP | 464 | 456 | 444 | 40 | 39 | 40 |
| RAJ | 903 | 835 | 796 | 51 | 47 | 53 |
| BIH | 218 | 214 | - | 13 | 10 | - |
| KER | 9716 | - | - | 755 | - | - |
| J&K | - | - | - | - | - | - |
| India | 529 | 461 | 459 | 30 | 26 | 27 |

Note – GCA; Gross Cropped Area

Source – Based on Data on DM&I and Compendium of Selected Economic Indicators, CSO 2011

## 4.2 Types of Onion Storage Structures and Utilization:

India is the second largest onion growing country in the world. Indian onions are famous for their pungency and are available round the year. Therefore, there is a lot of demand of Indian onion in the world. Most of the onion produced in India comes from the state of Maharashtra, Madhya Pradesh, Karnataka, Andhra Pradesh, Bihar, Gujarat and Haryana. Lack of adequate and appropriate storage facility is one the major constraint which enforces distress sale on farmers. The present storage capacities are either in

adequate or unscientific. As a result of glut situation the price variability has been too high in the recent past.

To improve the situation, GOI desired to create appropriate storage structures for onion, both at farm level as well as at market places. It drew a capital subsidy programme for the infrastructure development in which NABARD[1] has been playing a pivotal role. It has been planned to create a storage capacity of 4.5 lakh tonnes of onion during 1999-2000 and 2000-2001 through capital investment subsidy programme. Subsidy to the extent of 25% of the investment cost subject to a maximum of 500 per tonne has been proposed to be routed through NABARD for the credit delivery system.

The present storage capacity for onion is about 4.6 lakh tonnes. This is quite inadequate compared to our total production. Even most of the structures available are traditional and unscientific. If 40 per cent of the stocks are earmarked for scientific storage the potential for new storage structures is about 12.6 lakh tonnes. However, it has been projected by the Expert Committee on Cold Storage and Onion Storage that about 1.5 lakh tonnes on-farm capacity in production areas and 3.0 lakh tonnes capacity at APMCs and other market places are required in next 5 years. Thus, there remains a vast potential to be tapped.

### 4.3 Post Harvest Losses:

Onion is one of the important commercial vegetable crops grown on a large scale in India. As the onion bulbs are to be stored for long period for use during off-season, a considerable loss occurs by way of rotting, sprouting, physiological loss in weight, moisture evaporation observed in storage. Work has been done on storage of bulbs using growth retardants to reduce post-harvest sprouting and rotting losses. Several workers have reported that curing is an important post-harvest operation which reduces post-harvest losses of onion bulbs. The onion bulbs are generally stored from May to November for a period of four to six months. However, 50-90 per cent storage

[1] http://agricoop.nic.in/sites/default/files/Model%20Scheme%20for%20Onion%20Storage.pdf

losses are recorded depending upon genotype and storage conditions. The total storage losses are comprised of physiological loss in weight (PLW) i.e. moisture loss and shrinkage (30-40%), rotting (20-30%) and sprouting (20-40%). The PLW can be minimized by harvesting at right time, proper curing of onion bulbs and subsequent storage at desired temperature and humidity conditions. Generally, the rotting losses are at peak in initial months of storage, particularly in June and July, when high temperature coupled with high humidity result the losses. However, proper grading and selection of quality bulbs and good ventilation conditions can reduce the rotting losses. Application of post harvest fungicidal sprays can also reduce the rottings. But this is not a practice in India. Sprouting losses are usually recorded at the end of storage period or when exposed to high temperature of humid air. Noticeable sprouting losses are observed because of storage of poor quality bulbs having less rest and dormant period and also having thick neck. Comparatively, more sprouting losses are recorded in dark red and white onion cultivars than the light red onion cultivars. Postharvest diseases on onion cause significant losses in the quantity and quality of onions during storage. Hence there is need to increase and improve onion storage infrastructure.

Onions are stored either loose or in bags. The famers/traders may be advised to sort the onions prior to storage and thereafter at least once in thirty days to take out the rotten/ infected onions in order to avoid further spread of diseases/ losses. Generally, a loss of about 20-30 per cent is there during a storage season in the form of weight loss of onions which can be controlled with proper care. However, the other types of losses can be controlled to a greater extent if the structure is designed to facilitate maximum natural ventilation through the stored onion and sorting is done at regular intervals. The low cost farm level storage structures needs to be developed to extend the storage life of onion to increase its marketability and to make fresh onion available to the consumer throughout the year at a reasonable price.

Table 4.3: Qualitative losses in Rabi Onion stored in different Storage Structures

| Storage structures | Total (%) | | | |
|---|---|---|---|---|
| | 2003 | 2004 | 2005 | Av. |
| Traditional double row storage structure | 5.18 | 2.0 | 8.46 | 5.21 |
| Modified bottom ventilated double row storage structure | 21.01 | 6.52 | 6.51 | 11.06 |
| Top and bottom ventilated storage structure with mud plastered walls | 34.67 | 1.52 | 5.07 | 13.75 |
| Modified bottom ventilated storage structure chain linked side walls | 19.17 | 2.28 | 5.18 | 8.88 |
| Traditional single row storage structure | 15.13 | 2.1 | 6.36 | 7.86 |
| Bottom ventilated single row storage structure | 19.58 | 4.74 | 5.28 | 9.87 |
| Bottom ventilated single row low cost thatched roof storage structure | 4.81 | 2.45 | 3.11 | 3.46 |
| **Average** | 17.08 | 3.02 | 5.72 | 8.60 |

The total storage losses in onion in different storage structures in ranges between 3.46 per cent to 13.75 percent (Table 4.3), while in cold storage, losses were only 5 per cent after 4 month of storage from may and October. While the storage losses in ambient storage conditions during the same period were 34 per cent (Table 4.4). The weight loss, i.e. moisture loss and shrinkage were around 5 per cent and 21 per cent in cold storage and ambient store respectively. There was no diseases infection and sprouting in the cold stored onion, while around 11 per cent rotting and 2 per cent sprouting was notices in ambient storage. Higher infection of black mould was also found in ambient stored bulbs.

Table 4.4: Comparison of Storage Losses in Onion under Cold Store and Ambient Store

| Sr. No. | Storage conditions | Storage losses (%) | | | |
|---|---|---|---|---|---|
| | | Weight loss | Disease infection | Sprouting | Total |
| 1 | Ambient storage | 21.0 | 11.0 | 2.0 | 34.0 |
| 2 | Cold storage | 5.0 | 0 | 0 | 5.0 |

Source: NRCOG (2006).

Post harvest loss in onion cultivation is believed to be very high, reportedly as much as 25 to 30 percent. Physical injury during and after harvest, greening of onion due to exposure to sunlight, sprouting and injuries during storage due to ammonia, controlled-atmosphere storage, and freezing also cause postharvest losses. Postharvest diseases on onion such as bacterial soft rot, black mould, bulb rot, neck rot, and smudge, cause significant losses in the quantity and quality of onions during storage.

### 4.3 Onion Storage Structure Requirements:

For effective long storage of onion the parameters essential to be looked after are the bulb size, choice of cultivars, cultivation practices, time of harvest, field curing, removal of tops, drying, grading, packing, storage conditions (optimum storage range of relative humidity 65% to 70% with the temperature ranging between 25°C to 30°C). Salient Features of Improved Storage Structures are:

1) Construction of structure on a raised platform to prevent moisture and dampness due to direct contact of bulbs with the soil.
2) Use of Mangalore tile type roof or other suitable materials to prevent built up of high inside temperature.
3) Increased centre height and more slope for better air circulation and preventing humid micro climate inside godown.
4) Providing bottom and side ventilations for free and faster air circulation and to avoid formation of hot and humid pockets between the onion layers.
5) Avoid direct sunlight or rain water falling on onion bulbs to reduce sun scald, fading of colour and quality deterioration.
6) Maintenance of stacking height to avoid pressure bruising.
7) Periodical disinfection of structures and premises to check rottage.
8) Cost effectiveness of structures is based on utilization of locally available material for the construction.

### 4.3.1 Onion Storages Structures

The various types of onion storage structures and capacity utilization is presented in Table 4.5, while Table 4.6 presents various storage structures with cost and materials.

Table 4.5: Types of onion storage structures & capacity utilization

| Sr. No. | Type of storage | Capacity (tons) | Storage cost (Rs) |
|---|---|---|---|
| 1 | Traditional storage structure | 22-66 | 65000-200000 |
| 2 | Low cost bottom ventilated structure | 5-10 | 5000-10000 |
| 3 | Bottom and side ventilated storage structures | 25-50 | 75000-100000 |
| 4 | Top and bottom ventilated storage structure | 25-50 | 90000-180000 |

Table 4.6: Details on Various Storage Structures with Cost and Materials

| Particulars | Traditional double row storage structure | Modified bottom ventilated double row storage structure | Top and bottom ventilated storage structure with mud plastered walls | Modified bottom ventilated storage structure chain linked side walls | Traditional single row storage structure | Bottom ventilated single row storage structure | Bottom ventilated single row low cost thatched roof storage structure |
|---|---|---|---|---|---|---|---|
| Cost of construction (in million Rs) | 0.225 | 0.19 | 0.149 | 0.125 | 0.035 | 0.040 | 0.005 |
| Length (m) | 9.60 | 9.9 | 9.9 | 9.9 | 5.0 | 5.0 | 4.9 |
| Width (m) | 7.5 | 6.0 | 4.75 | 3.6 | 1.2 | 1.2 | 1.2 |
| Side height (m) | 2.25 | 2.25 | 2.25 | 2.25 | 1.2 | 1.2 | 1.6 |
| Central height (m) | 3.50 | 4.5 | 4.0 | 4.0 | 2.2 | 2.2 | 1.9 |
| Storage capacity | 38 | 42 | 31 | 25 | 5 | 5 | 5 |
| Expected life (years) | 20 | 20 | 20 | 20 | 20 | 20 | 5 |
| Cost of storage (Rs./Kg/tear) | 0.38 | 0.23 | 0.30 | 0.25 | 0.35 | 0.40 | 0.20 |
| Construction material | | | | | | | |
| Roof | Asbestos | Asbestos with extended roof | Asbestos | Asbestos | Mangal ore tiles | Mangalore tiles | Sugarcan e leaves/th atch |
| Side wall | Wooden bantam | Wooden bantam | Split bamboo plastered with mud | Chain link | Split Bamboo | Split Bamboo | Split Bamboo |
| Floor | PCC | Wooden bantam with C channel support | Wooden bantam with C channel support | Wooden bantam with C channel support | PCC | Split bamboo bantam with C channel support | Split bamboo bantam with C channel support |
| Foundation | PCC | RCC Pillar | RCC Pillar | RCC Pillar | PCC | Grouted C channel | Brick support |

### 4.3.2 Cold Storages Facility

The present storage capacity for onion is quite inadequate and inefficient in preventing post harvest losses. The structures available are traditional and unscientific. Onion cold storage system is used in many countries of the world to store Indian onion. The state-wise number and capacity of cold storages in India (2014-2015 to 2017-2018) constructed during 2014-15 to 2017-18 under different schemes are presented in Table 4.7 indicate that the highest cold storage structures with maximum capacity are constructed during this period.

Table 4.7: State-wise Number and Capacity of Cold Storages in India (2014-2015 to 2017-2018)

| States/UTs | NHB, NHM | | MoFPI | | Total | |
|---|---|---|---|---|---|---|
| | No. | Capacity (In MT) | No. | Capacity (In MT) | No. | Capacity (In MT) |
| Andaman and Nicobar Islands | 0 | 0 | 0 | 0 | 0 | 0 |
| Andhra Pradesh Telangana | 42 | 212338 | 3 | 10700 | 45 | 223038 |
| Arunachal Pradesh | 0 | 0 | 0 | 0 | 0 | 0 |
| Assam | 5 | 36756 | 2 | 8100 | 7 | 44856 |
| Bihar | 1 | 5000 | 0 | 0 | 1 | 5000 |
| Chandigarh | 1 | 246 | 0 | 0 | 1 | 246 |
| Chhattisgarh | 9 | 48254 | 2 | 9000 | 11 | 57254 |
| Delhi/Goa | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gujarat** | **313** | **1432163** | **5** | **8300** | **318** | **1440463** |
| Haryana | 53 | 168031 | 5 | 28600 | 58 | 196631 |
| Himachal Pradesh | 33 | 66985 | 5 | 9000 | 38 | 75985 |
| Jammu and Kashmir | 25 | 110458 | 3 | 5200 | 28 | 115658 |
| Jharkhand | 3 | 19400 | 0 | 0 | 3 | 19400 |
| Karnataka | 15 | 60937 | 3 | 4500 | 18 | 65437 |
| Kerala | 1 | 1300 | 1 | 1500 | 2 | 2800 |
| Lakshadweep, Puducherry | 0 | 0 | 0 | 0 | 0 | 0 |
| Madhya Pradesh | 36 | 175978 | 3 | 11000 | 39 | 186978 |
| Maharashtra | 29 | 99399 | 22 | 78500 | 51 | 177899 |
| Manipur | 1 | 1600 | 1 | 3000 | 2 | 4600 |
| Meghalaya/Mizoram/Nagaland | 0 | 0 | 0 | 0 | 0 | 0 |
| Odisha | 65 | 237682 | 2 | 2000 | 67 | 239682 |
| Punjab | 57 | 194558 | 8 | 23500 | 65 | 218058 |
| Rajasthan | 8 | 34341 | 3 | 16300 | 11 | 50641 |
| Sikkim | 1 | 100 | 0 | 0 | 1 | 100 |
| Tamil Nadu | 3 | 24212 | 1 | 2800 | 4 | 27012 |
| Tripura | 1 | 6296 | 0 | 0 | 1 | 6296 |
| Uttar Pradesh | 175 | 822127 | 6 | 11500 | 181 | 833627 |
| Uttarakhand | 14 | 29794 | 12 | 41400 | 26 | 71194 |
| West Bengal | 6 | 16389 | 3 | 13000 | 9 | 29389 |
| NHB/States | 3 | 20195 | 0 | 0 | 3 | 20195 |
| **India** | **900** | **3824539** | **90** | **287900** | **990** | **4112439** |

As Gujarat ranks second in Onion production and increasing area under onion require additional Onion cold storage facility to prevent post harvest losses, which is currently around 20-25 per cent of production and in value terms approximately INR 300 to 350 million every year. The cold chain industry in Gujarat is growing rapidly and now there are 625 cold storages with capacity of 23.2 lakh metric tonnes of which about two third of utilization was recorded by horticultural produce followed by animal husbandry and processed food (Table 4.8). Mahuva APMC in Bhavanagar district of Gujarat has constructed cold storage from the APEDA's grant in which 1200 tonnes of dehydrated onions can be stored.

Table 4.8: Cold Chain Industry in Gujarat[2]

| Sr. No. | Particulars | |
|---|---|---|
| 1 | No. of cold storages | 625 |
| 2 | Storage capacity | 23.2 lakh MT |
| 3 | Total manpower | 18,343 |
| 4 | Average age of cold storages | 12 years |
| | *Product types in cold storages* | |
| 5 | Horticulture/agriculture | 65% |
| 6 | Processed food | 10% |
| 7 | Animal husbandry | 25% |

As per State Department of Horticulture of Government of Gujarat, about 500 on farm structures of 25 to 35 mt each has been created with support of MIDH have been created. Storage facilities are established by processors as well as traders, farmers and cooperatives. It is estimated that 1.5 lakh mt storage is available for open market.

### 4.3.2 Estimation of Storage requirements

The state-wise current and required storage capacity for onion is present in Table 4.8. It can be seen from the table that highest storage gap is recorded in Maharashtra followed by in Karnataka and Gujarat state.

[2] https://cdn.vibrantgujarat.com/website/writereaddata/images/pdf/project-profiles/Cold-Storage-Unit-For-Fresh-Onions.pdf

Table 4.9: Current and Required Storage Capacity for Onion

| Sino | States | Onion storage capacity $ (Lakh M.T.) | Percentage Share In Total Capacity | Average Onion Production (TE 2016-17) | Percentage Onion Storage Capacity Created (%) 6 = [ (3/5)*100] | Required Storage Capacity for Onion (Lakh MT) 7 = (5*2/3) | Storage Gap (7-3) |
|---|---|---|---|---|---|---|---|
| 1 | Maharashtra | 18.00 | 36.94 | 59.14 | 30.44 | 39.42 | 21.42 |
| 2 | Madhya Pradesh | 13.5 | 27.70 | 26.49 | 50.96 | 17.66 | 4.16 |
| 3 | Bihar | 3.75 | 7.70 | 12.47 | 30.07 | 8.31 | 4.56 |
| 4 | Uttar Pradesh | 3.50 | 7.18 | 4.19 | 83.53 | 2.79 | -0.71 |
| 5 | West Bengal | 3.05 | 6.26 | 4.63 | 65.87 | 3.09 | 0.04 |
| 6 | Haryana | 1.75 | 3.59 | 7.14 | 24.51 | 4.76 | 3.01 |
| 7 | Punjab | 1.25 | 2.57 | 1.29 | 65.10 | 1.28 | 0.03 |
| **8** | **Gujarat** | **1.25** | **2.57** | **12.79** | **9.77** | **8.53** | **7.28** |
| 9 | Rajasthan | 1.00 | 2.05 | 12.49 | 8.01 | 8.33 | 7.33 |
| 10 | Karnataka | 0.40 | 0.82 | 28.97 | 1.38 | 19.31 | 18.91 |
| 11 | Tamil Nadu | 0.18 | 0.37 | 3.41 | 5.28 | 2.27 | 2.09 |
| 12 | Odisha | 0.35 | 0.72 | 3.84 | 9.11 | 2.56 | 2.21 |
| 13 | Andhra Pradesh | - | - | 11.77 | - | 7.85 | - |
| 14 | Chhattisgarh | - | - | 3.53 | - | 2.35 | - |
| 15 | Jharkhand | - | - | 2.77 | - | 1.85 | - |
| 16 | Others | 0.75 | 1.54 | 3.01 | 24.92 | 2.01 | 1.26 |
| **17** | **Total** | **48.73** | **100.00** | **198.57** | **24.54** | **132.37** | **83.64** |

Note - $ Estimated for 2017; (-) information not available

## 4.4 Chapter Summary:

The above discussion indicates that there is a need to create adequate storage strictures for onion, not only in production area but also at selected hubs in different regions of country. Besides, inadequate information on storage for onion is major bottleneck in planning of future strategies.

The results of field survey data is discussed in next chapter.

Chapter V

# Onion Prices and Major Supply Demand Issues

## 5.1 Introduction:

This chapter presents the results of field survey data. As mentioned earlier, data were collected from 10 sample farmer households, 2 Trader, 2 Commission Agent, 2 warehouse owner and 1 Onion Processor. Besides data were also collected from 2 commission agent from Sevana APMC of Ahmadabad and 2 from APMC Mahuva (Bhavnagar) which makes a total of 21 sample respondents.

## 5.2 Farmer Households

### 5.2.1 Demographic Profile of Sample Households

The demographic profile of the selected sample households is presented in Table 5.1. It can be seen from the table that all the respondents were male and average age of respondent of selected farmers was around 42 years.

Table 5.1: Demographic Profile of the Selected Sample Respondents

| Sr. No. | Farm Category | Age (years) | | |
|---|---|---|---|---|
| | | Males | Females | Total |
| * | Total No. of Members | | | |
| 1 | Small-S (n=4) | 49.00 | 0 | 49.00 |
| 2 | Medium-M (n=4) | 38.00 | 0 | 38.00 |
| 3 | Large-L (n=2) | 36.50 | 0 | 36.50 |
| 4 | All Average-Av (n=10) | 42.10 | 0 | 42.10 |

Source: Field Survey Data.

### 5.2.2 Land Holding and Irrigation Status

The details on irrigated and un-irrigated land pattern of selected sample households (ha/household) presented in Table 5.2. Data indicate that on an average per household owned land holding size was 3.21 ha with all area under irrigation. The category wise average land holding of small, medium and

large category sample households was estimated to be 1.46, 3.36, and 6.40 hectare, respectively. On an average, per household 1.12 ha land was under onion cultivation, which accounts for about 35 per cent of total cultivated area. Across the selected land size groups, medium size holders put up relatively larger share of area under onion followed by small and large land holders group. Thus, it indicates that selected farm households had put around one third of total cultivated land under onion cultivation. There are number of reasons for cultivation of onion crop as it is short duration crop, best suitable land for onion cultivation, better price gain in onion crop other than competitive crops and number of onion processing also high.

Table 5.2: Details on Land Holding of Selected Sample Households

| Sr. No. | Particulars | Land Holding of Selected Sample Households (ha) | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1a | Total Irrigated owned land | 1.46 | 3.36 | 6.40 | 3.21 |
| a | Total Un-irrigated owned land | 0.00 | 0.00 | 0.00 | 0.00 |
| **a** | **Total Irrigated owned land** | **1.46** | **3.36** | **6.40** | **3.21** |
| 2b | Total Irrigated cultivated area | 1.46 | 3.36 | 6.40 | 3.21 |
| b | Total Un-irrigated cultivated area | 0.00 | 0.00 | 0.00 | 0.00 |
| **b** | **Total cultivated area** | **1.46** | **3.36** | **6.40** | **3.21** |
| 3c | Total Irrigated area under onion | 0.52 | 1.28 | 2.00 | 1.12 |
| c | Total Un-irrigated area under onion | 0.00 | 0.00 | 0.00 | 0.00 |
| **c** | **Total area under onion** | **0.52** *(35.62)* | **1.28** *(38.09)* | **2.00** *(31.25)* | **1.12** *(34.89)* |

Notes: S- Small; M-Medium AND l- Large; Figures in parenthesis are percentage to total.
Source: Field Survey Data.

### 5.2.3 Planting Material and Marketing of Onion

It can be seen from the Table 5.3 that about 50 per cent selected farmers had market as a major source of planting material and had homemade seedlings used with good quality of planting material. All the respondents from large farmers group has used homemade planting material and did not face any difficulty in getting of these materials. Only 20 per cent farmers had

received training or information about marketing practices of onion crops. About 80 per cent selected household have received price information from commission agent, AMPC and wholesaler for deciding production and marketing of Onion produces and about 90 per cent households had sold their produce immediate after harvest due to perishable crop, lack of storage facility and hot climate condition in these producing area of Gujarat.

Table 5.3: Farmers Perception regarding Planting Material and Marketing of Onion

| Sr. No. | Particulars | Farmers Perception regarding Planting Material and Marketing of Onion (%) | | | | |
|---|---|---|---|---|---|---|
| | | S | M | L | Av | Reason |
| 1 | Where do you source the planting materials/Seedlings for onion? And what is their quality | | | | | |
| a | Market | 50 | 50 | 0 | 50 | Good Quality |
| b | Home made | 50 | 50 | 100 | 50 | Good Quality |
| 2 | Do you face any difficulty in getting planting material | | | | | |
| a | Yes | 20 | 20 | 0 | 20 | Shortage in market |
| b | No | 80 | 80 | 100 | 80 | |
| 3 | Have received any training or information about production, harvesting, storage and marketing practices to be followed including technology | | | | | |
| a | Yes | 25 | 25 | 0 | 20 | Regarding Marketing |
| b | No | 75 | 75 | 100 | 80 | |
| 4 | Have received any weather/price information before deciding production and marketing | | | | | |
| a | Yes | 50 | 100 | 100 | 80 | Commission Agent, Wholesaler, APMC |
| b | No | 50 | 0 | 0 | 20 | |
| 5 | Do you sell your produce immediately after harvest? | | | | | |
| a | Yes | 100 | 75 | 100 | 90 | Lack of Storage Facility, Perishable and Hot Climate |
| b | No | 0 | 25 | 0 | 10 | Storage Facility and can be Store 2 Month |

Source: Field survey data.

### 5.2.4 Extent of Onion Marketed

The extent of onion marketed by sample households is presented in Table 5.4. It can be seen from the table that about average quantity of 436.5 quintals of onion were sold by selected household during the year 2017-18 which was 36 per cent more than previous year. The highest average quantity of onion was sold by large land holding size group house (540 quintals) followed by medium (481.25 quintals) and small farmers (288.25 quintals). In the case of season wise trade, the highest share of 80.81 per cent onion was traded in rabi season followed by sale in early rabi (9.26) and summer (7.64) season. About 80 per cent selected household has immediately sold after harvest due to lack of storage facility and perishable nature of product.

Table 5.4: Extent of Onion Marketed

| Sr. No | Particulars | | Extent of onion marketed | | | |
|---|---|---|---|---|---|---|
| | | | S | M | L | Av |
| A | What is the average quantity of onion sold by you annually? (qtls) | | 288.25 | 481.25 | 540 | 436.5 |
| B | What was the quantity sold by during previous year? (qtls) | | 190.63 | 472.5 | 300 | 321.04 |
| C | Provide the details of season wise trade? (qtls) | Kharif | 30.00 | 0.00 | 0.00 | 10.00 (2.29) |
| | | Early Rabi | 38.75 | 82.50 | 0.00 | 40.42 (9.26) |
| | | Rabi | 209.50 | 318.75 | 530.00 | 352.75 (80.81) |
| | | Summer | 10.00 | 80.00 | 10.00 | 33.33 (7.64) |
| D | Of the total production how much do you store and how long? | % Immediately sold | 100.00 | 90.00 | 90.00 | 80.00 |
| | | % of total sold | 0.00 | 10.00 | 10.00 | 20.00 |

Note: Figures in parenthesis presents percentage to total sale.
Source: Field survey data.

### 5.2.5 Place-wise Sell of Onion Produce

The details of place of sell and percentage of quantity sold in the markets during last year by respondent farmers are presented in the Table

5.5. It can be seen from the table that all the onion producer respondents had sold onion in local markets of Mahuva and Bhavnagar district. On an average 36 kilometer distance was travelled for marketing onion by spending average time of around 1.27 hours by road. About Rs. 496 per ton cost was incurred by respondent famers on transportation of produce.

Table 5.5: Place-wise Sell of Onion Produce

| Sr. No. | Particulars | Place-wise Sell of Onion Produce | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | Places of Destination (%) | | | | |
| a | On farm | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Local | 100 | 75.00 | 50.00 | 80.00 |
| c | Within State | 0.0 | 25.00 | 50.00 | 20.00 |
| d | Outside State | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Major markets & places | Mahuva | Mahuva, Bhavnagar | Mahuva, Bhavnagar | Mahuva, Bhavnagar |
| 3 | Approximate distance (km) | 13.75 | 45.50 | 50.40 | 36.55 |
| 4 | Time (hours) | 1.13 | 1.25 | 1.45 | 1.27 |
| 5 | Mode of transporter (%) | | | | |
| a | Rail | - | - | - | - |
| b | Road | 100.00 | 100.00 | 100.00 | 100.00 |
| c | Both | - | - | - | - |
| 6 | Transportation cost per Bag (Rs) | 14.75 | 15.00 | 16.50 | 15.42 |
| 7 | Transportation cost per ton (Rs) | 460.00 | 502.50 | 525.00 | 495.83 |

Source: Field survey data.

### 5.2.6 Cost incurred and Reason for Preference to Sale

As depicted from Table 5.6, on an average 80 per cent respondents had sold their onion produce in local market and rest sold within the state. The average operational cost incurred by the household (including loading and unloading) was estimated to be Rs. 89.58 per quintal. The cost was relatively higher in case of large land size group and the lowest was in case of small land holders which may be due to average distance travelled in sale of the

onion produce. The major reason for preferred by respondent farmers these market were to get better price, low cost of transportation and near to village.

Table 5.6: Cost incurred and Reason for Preference to Sale in Destination Market

| Sr. No | Particulars | Cost incurred and Reason for Preference to Sale in Destination Market | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | Places of Destination (%) | | | | |
| a | On farm | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Local | 100.00 | 75.00 | 50.00 | 80.00 |
| c | Within State | 0.00 | 25.00 | 50.00 | 20.00 |
| d | Outside State | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Name of Reference Market for which cost estimated* | APMC Mahuva | APMC Mahuva/ Bhavnagar | APMC Mahuva/ Bhavnagar | APMC Mahuva/ Bhavnagar |
| 3 | Operational/ Trade cost per quintal (Rs.) (transportation cost per quintal including loading and unloading) | 79.25 | 83.50 | 106.00 | 89.58 |
| 4 | Factors behind your preferences | Near to village, Better price, Low cost of transportation | Near to village, Better price, Low cost of transportation | Near to village, Better price, Low cost of transportation | Near to village, Better price, Low cost of transportation |

Source: Field survey data.

### 5.2.7 Availability of Onion Storage Facility

The respondents were asked to share information regarding onion storage facility and reasons behind for not having (constructing) own storage unit for onion. It can be seen in from Table 5.7 that about 10 percent of the farmers had storage facilities, which capacity of 25 tonnes of onion store. The onion crop is perishable crop and has 1-2 months of self life. During the months of June-July, almost all selected respondents required storage facility

with a capacity of 25 tonnes. Around 5-10 per cent loss occurs during storage of onion. Almost selected respondent farmers cited few reasons behind not having farmer own onion storage unit such as due to high cost storage construction, small farmer, no space available, high labor cost and weight loss and spoilage.

Table 5.7: Details on Storage Facility with Respondent Farmers

| Sr. No | Particulars | Storage Facility by Respondent Farmers | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | Farmers having (own) storage unit for onion (%) | | | | |
| | Yes | 0.00 | 25.00 | 0.00 | 10.00 |
| | No | 100.00 | 75.00 | 100.00 | 90.00 |
| 2 | Where do store the produced | | | | |
| a | Own | 0.00 | 25.00 | 0.00 | 0.33 |
| b | Rented | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Average Capacity of storage (Qtls) | 0.00 | 25.00 | 0.00 | 25.00 |
| 4 | Required store the produced | 25.00 | 25.00 | 50.00 | 66.60 |
| 5 | Average Capacity of storage (In Qtl.) | 25.00 | 25.00 | 50.00 | 25.00 |
| 6 | **Information on storage**. | | | | |
| a | During which months you need storage | June – July | June - July | June - July | June – July |
| b | What is the shelf life of onion you produce | 1-2 Month | 1-2 Month | 1-2 Month | 1-2 Month |
| c | How long you store the onion in storage(month) | 2 | 2 | 2 | 2 |
| d | How much of total produce do you lose (%) during storage | 5-10 | 5-10 | 5-10 | 5-10 |
| 7 | Nos. of farmers gives reasons for not having (constructing) their own storage unit for onion (multiple responses-%) | | | | |
| a | Higher cost | 100 | 75 | 100 | 90 |
| b | Small farmer | 75 | 25 | 0 | 40 |
| c | No space available | 75 | 25 | 0 | 40 |
| d | high labour cost | 75 | 50 | 50 | 60 |
| e | Weight loss & spoilage | 75 | 50 | 50 | 60 |

Source: Field survey data.

### 5.2.8 Place-wise Sell of Onion Produce

As far as the farmers awareness about market charges are concerned, it was found that none of the respondent was aware about the market charge prescribed by rule (such as Commission, Hamali/ Handling, weight men and market fees) and also were whether they were charged than prescribed rate. But all the respondents told that expense of unloading the market is too much (Table 5.8).

Table 5.8: Information on Market Charges and Awareness about Market Charges

| Sr. No. | Particulars | Market Charges and Awareness of the Market Charges | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Do you aware of the market charges prescribed in rule | | | | Do you ever charged more than prescribed | | | |
| | | S | M | L | Av | S | M | L | Av |
| 1 | Commission (%) | | | | | | | | |
| | Yes | | | | | | | | |
| | No | 100 | 100 | 100 | 100 | | | | |
| | Unknown | | | | | 100 | 100 | 100 | 100 |
| 2 | Weigh men (%) | | | | | | | | |
| | Yes | | | | | | | | |
| | No | 100 | 100 | 100 | 100 | | | | |
| | Unknown | | | | | 100 | 100 | 100 | 100 |
| 3 | Handling/hamali (%) | | | | | | | | |
| | Yes | | | | | | | | |
| | No | 100 | 100 | 100 | 100 | | | | |
| | Unknown | | | | | 100 | 100 | 100 | 100 |
| 4 | Market fee (%) | | | | | | | | |
| | Yes | | | | | | | | |
| | No | 100 | 100 | 100 | 100 | | | | |
| | Unknown | | | | | 100 | 100 | 100 | 100 |
| 5 | Other charges | | | | | | | | |
| | Unloading high (%) | 100 | 100 | 100 | 100 | | | | |
| | Charges (Rs 1Rs/ Bag | 1Rs/ Bag | 1Rs/ Bag | 1Rs/ Bag | 1Rs/ Bag | | | | |
| | Charge high (%) | | | | | 100 | 100 | 100 | 100 |

Source: Field survey data.

### 5.2.9 Problems in Transport and Marketing of Produce

The major feedback provided by the farmers on the problems faced and their suggestions to solve same are presented in Table 5.9. During the discussion with farmers and field visits to selected study area, it was noted that major problems faced in marketing of onion produce were high

transportation cost, high marketing cost and lack of infrastructure facility like market sub-yard and storage facility. Few suggestions given by the respondents for the improvement of marketing facility and its benefits were creating warehouse facility at village level, APMC should provide market agent at village level and Market sub yard facility at village level to reduce marketing costs and reduce waste of time and production of onion.

Table 5.9: Major Problems Faced by Farmers during Marketing and Transport of the Produce and their Suggestions

| Sr. No | Particulars | Major Problems and their Suggestions | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | High Transportation Cost | 75 | 75 | 100 | 80 |
| | Suggestion | Market sub yard facility at village level | Market sub yard facility at village level | Market sub yard facility at village level | Market sub yard facility at village level |
| 2 | Infrastructure facility | 100 | 100 | 100 | 100 |
| | Suggestion | Warehouse facility at village level | Warehouse facility at village level | Warehouse facility at village level | Warehouse facility at village level |
| 3 | High Marketing Cost | 75 | 75 | 100 | 80 |
| | Suggestion | APMC should provide agent at village level | APMC should provide agent at village level | APMC should provide agent at village level | APMC should provide agent at village level |

Source: Field survey data.

### 5.2.10 Cartels and Collusive behaviour among marketing Agents

The selected farmer households were asked about cartels and collusive behaviour in onion marketing among the marketing agent. It can be seen from Table 5.10 that about 90 percent of selected farmer households had opined that they did not see any cartel and collusive behaviour of traders and commission agents in the market. Only one fourth of total middle land size group farmers had reported collusion among traders and commission agents.

Table 5.10: Cartels and Collusive behaviour in Onion Marketing among Marketing Agent

| Sr. No. | Particulars | Cartels and Collusive Behaviour in Onion Marketing | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| a | Traders | | | | |
| | Yes | 0.00 | 25.00 | 0.00 | 10.00 |
| | No | 100.00 | 75.00 | 100.00 | 90.00 |
| | Suggestions to overcome | | | | |
| b | Commission Agents | | | | |
| | Yes | 0.00 | 25.00 | 0.00 | 10.00 |
| | No | 100.00 | 75.00 | 100.00 | 90.00 |
| | Suggestions to overcome | | | | |
| c | Commission Agents & Traders | | | | |
| | Yes | 0.00 | 25.00 | 0.00 | 10.00 |
| | No | 100.00 | 75.00 | 100.00 | 90.00 |
| | Suggestions to overcome | | | | |

Source: Field survey data.

### 5.2.11 Price Expectation and Actual Price received

The selected farmer households were asked about the price expectation at the time of sowing, before harvesting, after harvesting and actual price received by respondent which are given in Table 5.11. It can be seen from the table that the at the time of sowing, they expected price of Rs. 2500 per quintal while at the time before harvesting and after harvesting, expected rate was Rs. 2558.33 and Rs. 3125.0 per quintal, but actual price received by the onion farmer was less than expectation at any time, i.e. Rs. 2366.25 per quintal only.

Table 5.11: Price Expectation and Actual Price received by Selected Onion Grower

| Sr. No. | Particulars | Price Expectation and Actual Price received | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | Expected Average price (Rs/quintal) | | | | |
| a | at the time of Sowing | 2375.00 | 2750.00 | 2375.00 | 2500.00 |
| b | at the time of before harvesting | 2637.50 | 2537.50 | 2500.00 | 2558.33 |
| c | at the time of after harvesting | 2937.50 | 3312.50 | 3125.00 | 3125.00 |
| d | Actual Price | 2316.25 | 2390.00 | 2392.50 | 2366.25 |

Source: Field survey data.

### 5.2.12 Problems on Infrastructure & Cultivation and Suggestions

The major problems faced by the selected onion producer are presented in Table 5.12. It can be seen from the table that about 60 per cent of onion growers were satisfied with the existing production, marketing, storage and processing infrastructure however they have faced some problems. In case of onion production, it was reported that the most of respondents had faced the problem of low productivity, attack of pest–diseases, and quality of product. While marketing of produce, onion growers had faced with low price for produce, high labour and marketing cost. Lack of storage facility, high wastage of produce and reduction of weight during storage were infrastructure related problems were encounter by the respondents. In case of processing of onion produce, problems faced were high cost of processing, low value while after processing also export related problems were faced by onion grower.

The selected farmers were asked to give their suggestions on various aspects of onion cultivation, marketing and export. The suggestions given by the farmers are given below.

1. Export of onion should be promoted by keeping in view the increase in its demand and prices.
2. Proper and sound storage facility for onion should be created by the Government, as onion is semi-perishable commodity.
3. Adequate number of processing/dehydration units needs to be created/installed to increase the onion demand in market.
4. Awareness about use of dried/dehydrated onion among the consumer needs to be increased though consumer awareness programme.
5. Appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion; otherwise farmers will divert to the other crop.
6. Advance information of weather should be made available to the farmers by the nearby Meteorology department of Agricultural University.

7. Inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce.
8. The REQUIRED NUMBER OF available regulated markets are inefficient to handle the buffer produce of onion.
9. The minimum support price for onion should be declared for onion crop as well (as market intervention scheme for onion was not declared in near past).
10. There is a need to arrange and maintain cold storage of adequate capacity at some selected village / taluka level.
11. Government should develop proper and sound marketing system.

Table 5.12: Major Problems Faced and Suggestions by Respondent for the Required Infrastructure and to Improve Onion Cultivation

| Sr. No. | Particulars | Major Problems Faced and Suggestions | | | |
|---|---|---|---|---|---|
| | | S | M | L | Av |
| 1 | Nos. of farmers are satisfied with the existing production, marketing, storage and processing infrastructure | | | | |
| | Yes | 75.00 | 75.00 | 0.00 | 60.00 |
| | No | 25.00 | 25.00 | 100.00 | 40.00 |
| 2 | Major problems you face and give suggestions for the required infrastructure and to improve onion cultivation | | | | |
| a | **Production** | | | | |
| | Low Productivity | 75.00 | 100.00 | 100.00 | 90.00 |
| | Pest diseases | 0.00 | 25.00 | 50.00 | 30.00 |
| | quality, size | 75.00 | 75.00 | 50.00 | 70.00 |
| b | **Marketing** | | | | |
| | Low prices, | 100.00 | 100.00 | 100.00 | 100.00 |
| | high labour cost, | 100.00 | 100.00 | 100.00 | 100.00 |
| | high marketing cost | 100.00 | 100.00 | 100.00 | 100.00 |
| c | **Storage** | | | | |
| | Insufficient storage facilities | 100.00 | 75.00 | 100.00 | 90.00 |
| | Wastage, | 50.00 | 50.00 | 50.00 | 50.00 |
| | Decrease in weight, | 0.00 | 50.00 | 0.00 | 20.00 |
| d | **Processing** | | | | |
| | High Processing cost | 100.00 | 100.00 | 100.00 | 100.00 |
| | Low value | 100.00 | 100.00 | 100.00 | 100.00 |
| | Export related problems | 0.00 | 75.00 | 100.00 | 50.00 |

Source: Field survey data.

## 5.3 Selected Markets

Agrarian promotion was passed on in the parish level with the normal shortcomings such as high promotion cost, unauthorized inferences, and commonness of misconducts and being of dealers. These dealers browbeat the agriculturalists significantly in footings of value. Hence, the agriculturalists were not receiving their unpaid portion of value for their agrarian harvest. In order to avert and deliver better directive of procurement and vending of agrarian harvest, the State Government transported in lawmaking named "Local Saleable Yields Bazaars Act" in the year 1933. Later, Gujarat Agricultural Produce Market Committee (APMC) Act was passed in 1948. As per the requirements of the act 1963 market groups were recognized in many regions to control the marketing of agrarian product. Market directive was applied by founding controlled markets. All the controlled markets are achieved by the individual market groups. Selected APMC are among the market groups recognized conferring to the requirements of the Gujarat State Agricultural Marketing Board was established in 1985 under `The Gujarat Agricultural Produce Market Act, 1963'.

### 5.3.1 APMC, Ahmedabad

The details of general information about selected APMC are given in the Table 5.13. It can be seen in the table that the APMC Ahmadabad is the main marketplace operated at Jamalpur Gate and known as Sardar Patel Market. APMC Ahmadabad was established in 1948 under 'Gujarat Agricultural Produce Markets Act. The APMC Ahmadabad is operating through dealing with sub-yard and its exact location is known as business hub of Gujarat state. Vasna was established in 1996 as a sub yard of APMC Ahmedabad. The total land area of this market yard is 50,000 square feet. This market yard is located near Vasna toll plaza on Ahmadabad-Rajkot highway. In the market yard, potato-onion general commission agents have been provided with an average of 40 x 20 sizes of 120 shops-cum-godown and above the same, area is used for free use, toilet blocks, etc. Apart from this, the water coolers and toilet facilities have been arranged for every 12 shops for the traders/commission agents and

farmers, laborers etc. Apart from this, 19 shops, banks, independent tube well, 70-feet wide roads, parking, etc. have been provided to meet the requirements of the living room, farmers' bedrooms, large canteens; three banks have been provided to the farmers.

### 5.3.2 APMC, Mahuva

The Agricultural Produce Market Committee, Mahuva was established in 1958 by a local lawyer named Shree Jugaldas Mehta. The APMC was established for the purpose of regulating the marketing of different kinds of Agricultural Produce. It was primarily set up to cater to the marketing needs of the farmers and provide them a platform for selling agricultural produce in various markets and at competitive prices. It is spread across 90 bighas of land. Mahuva and its surrounding villages are best known for its onion production in India. The region is the largest producers of white onions and second largest producer of red onions in the country. Therefore Onion is the largest trading commodity in Mahuva APMC. Peanuts, cotton and Coconuts are also major trading commodities of this market. There are 400 Commission agents, 136 Traders, 15 Transporters, 75 Stockiest/ warehouse and 115 Processors are working in APMC.

Table 5.13: Details about Selected APMCs

| Sr. No. | Particulars | APMC, Vasna | APMC, Mahuva |
|---|---|---|---|
| 1 | Year of Establishment | 1996 | 1958 |
| 2 | Varieties of onion arriving to APMC | | |
| a | Local | Yes | Yes |
| b | Red | Yes | Yes |
| c | White | Yes | Yes |
| d | Pink | Yes | Yes |
| e | Yellow | Yes | Yes |
| 3 | Market Functionaries | | |
| a | Trader | 0 | 135 |
| b | Commission Agent | 120 | 400 |
| c | Transporters | 0 | 15 |
| d | Stockiest/Warehouse | 0 | 75 |
| e | Processors | 0 | 115 |

Source: Field survey data.

In the study area, an effort is made to collect the information about available storage facilities. The details of storage facility in selected APMC are given in the table 5.14. It can be seen in the table that in Mahuva APMC, there are total 146 storages structures, of which one is with public, 30 are private storage and 115 are processing unit storage. Mahuva APMC has constructed cold storage from the APEDA's grant in which 1200 tonnes of dehydrated onions can be stored. APMC also installed a grading machine for onions so that farmers can realize the best price. The storage facilities were not available/accessible in the Vasna, Ahmadabad selected regulated markets.

Table 5.14: Details on Storage Facility in selected APMCs

| Sr. No. | Particulars | Unit | Storage Facility | |
|---|---|---|---|---|
| | | | Mahuva | Vasana |
| 1 | Public | | | |
| | Existing storage | Number | 1 | NA |
| | Capacity | Tons | 1500 | NA |
| | Required storages | Number | on leased | NA |
| | Capacity | Tons | NA | NA |
| 2 | Private | | | |
| | Existing storage | Number | 30 | NA |
| | Capacity | Tons | 90000 | NA |
| | Required storages | Number | NA | NA |
| | Capacity | Tons | NA | NA |
| 3 | Processing Units | | | |
| | Existing storage | Number | 115 | NA |
| | Capacity | Tons | 100000 | NA |
| | Required storages | Number | NA | NA |
| | Capacity | Tons | NA | NA |
| 4 | Cooperatives | | | |
| | Existing storage | Number | NA | NA |
| | Capacity | Tons | NA | NA |
| | Required storages | Number | NA | NA |
| | Capacity | Tons | NA | NA |

Source: Field survey data.

A detail of flow of onion from market to other places is presented in the Table 5.15. From the table, it can be seen that in Mahuva APMC, all the onion produce was procured from local area and the maximum selling destination was out of the state. In Vasna APMC, commission agents of Vasana, Ahmadabad APMC are well equipped with information and connected with

other markets. It is quite evident that quantities transacted by commission agent of Vasna, APMC were quite high in volumes in outside the state. There are no direct purchase centers operating outside the market yard and no one outside traders (from other markets and state) had participated in the bidding process in both selected markets. APMC observed no cartels and collusive behaviour in the APMC during onion trading. APMC has set up a target to set a country's first Onion Park in the land of Mahuva that will not only enhance the quality of Onion growing farmers but across the nation.

Table 5.15: Detail on Marketing Operation

| Sr. No. | Particulars | | Marketing Operation | |
|---|---|---|---|---|
| | | | APMC, Vasana | APMC, Mahuva |
| 1 | Details on flow of onion from market to other places (%) | Local | 40.00 | 100.00 |
| | | Within State | 40.00 | 0.00 |
| | | Outside State | 20.00 | 0.00 |
| 2 | Details on flow of onion from market to other places (%) Delhi, Punjab, Sikkim, Gowhati, Bengal, Export gulf countries | Local | 15.00 | 20.00 |
| | | Within State | 15.00 | 40.00 |
| | | Outside State | 70.00 | 40.00 |
| 3 | There any private market operating outside the market yard under the license (%) | Yes | 0.0 | 0.0 |
| | | No | 100 | 100 |
| 4 | There any direct purchase centers operating outside the market yard under the license (%) | Yes | | |
| | | No | 100 | 100 |
| 5 | How many outside traders (from other markets and state) actively participate in the bidding process (%) | Yes | 0.0 | 0.0 |
| | | No | 100 | 100 |
| 6 | APMC have provision of contract farming (%) | Yes | 0.0 | 0.0 |
| | | No | 100 | 100 |
| 7 | APMC observe the presence of cartels, collusive behaviour in the APMC during onion trading among (%) | Yes | 0.0 | 0.0 |
| | | No | 100 | 100 |

Source: Field survey data.

## 5.4 Market Functionaries

The agriculture marketing chain is a complex network of enterprises of varying sizes and activities. It includes the farmers (producers), aggregators at village level, commission agents (Kutcha Arhatiya), traders, buyers/wholesalers/exporters (Pakka Arhatiya), processors, marketing organizations including agricultural produce marketing committees, where commodities' buying-selling process is carried out through open auction process, agriculture marketing co-operatives viz. NAFED, GUJCOMASOL etc. and distributors (wholesalers, retailers etc.).

### 5.4.1 Traders

Person or entity has holding capability with the objective to earn the profit through arbitrage opportunity (buying and selling of the commodities) in the same market or between the markets within particular time period are called the traders. They amass the commodities by purchasing from the particular market-yard through commission agent, store it for a particular period and sell it when they get adequate price of the stored products through again commission agent or directly to the other intermediaries in the chain. They do not posses mostly; not always; any infrastructure required adding value to the products. They consume the services (i.e. storage, arrangement for sale and purchase of products, packaging etc.) provided by the commission agents or other intermediaries on paying the charges for the services avail by them.

The varieties wise details on Onion arrivals in APMC is presented in Table 5.16. On an average, mainly three varieties of onion, viz. local, red and white onion arrivals is reported in the regulated market. It was also found that trader had on an average 36 years of experience in onion trading. The trader and Trader cum Commission agent licenses availed from APMC/Marketing Dept/Board.

The details on average quantity marketed are presented in Tables 5.17. It shows that on an average about 8000 tons average quantity of onion is

marketed annually and 5800 tons quantity of onion was traded previous year. The maximum quantity was traded during the rabi season 55.62 per cent and followed by early rabi season (28.13), summer season (10.63) and kharif season (5.62). Out of total quantity traded, only 100 MT onion was stored by the traders for emergency demand.

Table 5.16: Details of Selected Traders

| Sr. No. | Particulars | Year |
|---|---|---|
| 1 | Experience as a trader (years) | 36 |
| 2 | Varieties of onion arriving to APMC | |
| | Local | Yes |
| | Red | Yes |
| | White | Yes |
| | Telgi | No |
| | If other specify | |
| 3 | Licenses availed from APMC/Marketing Dept/Board | |
| | Trader | Yes |
| | Commission Agent | Yes |
| | Stockiest | No |
| | Transporter | No |

Source: Field survey data.

Table 5.17: Details on the Quantity of Onion Traded by Traders

| Sr. No. | Details on the Quantity of Onion Traded | Average Quantity (tons) |
|---|---|---|
| 1 | Average Quantity of Onion traded Annually | 8000 |
| 2 | Quantity Traded During Previous Year | 5800 |
| 3 | The Details Of Season Wise Trade | |
| a | Kharif | 444 (5.62) |
| b | Early Rabi | 2250(28.13) |
| c | Rabi | 4450(55.62) |
| d | Summer | 850(10.63) |
| 4 | Total Quantity Store | 100 |

Source: Field survey data.

Marketing strategy encompasses selecting and analyzing the target and creating and maintaining an appropriate marketing mix that satisfies the target consumers. The targeted purchasers and consumers of onion in selected market of the State are given in Table 5.18. In the selected markets, out of total procured quantity of onion, 90 per cent onion was procured from local

market of Mahuva area and rest of 10 per cent was purchased within the state (Bhavnagar and Rajkot) and out of state (Nasik, Maharashtra) procured by traders. The average maximum transportation cost rupees of Rs. 3.5 per kg for procure from outside of state followed by Rs. 3.0 per kg within state and Rs 1.5 per kg onion procures from local market. The traders have then targeted to local area. This happens due to availability of onion at low cost. The road was the major mode of transportation for procurement and sale of onion by trader in Mahuva market. As far as onion sale by the traders is concerned, overall 85 per cent of the traders had sold the product outside the state; whereas only 5 per cent of them had sold within the state. Transportation cost incurred by trader for trading outside the state was estimated to be about Rs. 3.0 to 5.5 per kg. The major targeted consumers markets were in the states of Delhi, Punjab, Haryana, Rajasthan, Assam, Bihar and Bengal.

Table 5.18: Details on Procurement and Sale of Onion

| Sr. No. | Place of Origin | Received (%) | Approximate distance (km) | Time (hrs) | Major markets & places | Mode of transport | Transportation cost (Rs per kg) |
|---|---|---|---|---|---|---|---|
| **1** | **Place of Procurement** | | | | | | |
| a | Local | 90 | 20 | 1 | Mahuva | Road | 1.5 |
| b | Within State | 5 | 300 | 7 | Bhavnagar, Rajkot | Road | 3.0 |
| c | Outside State | 5 | 600 | 12 to 15 | Nasik(Maharashtra) | Road | 3.5 |
| **2** | **Place of Sale** | | | | | | |
| a | Local | 10 | 20 | 1 | Mahuva | Road | 1.5 |
| b | Within State | 5 | 300 | 7 | Bhavnagar, Rajkot | Road | 3 .0 |
| c | Outside State | 85 | 1800 | 18 to 36 | Delhi, Punjab, Haryana, Rajasthan, Assam , Bihar and Bengal | Road & Rail | 3.0-5.5 |

Source: Field survey data.

The detail on reasons to prefer the place of purchase and sale of onion by traders is given in Table 5.19. From the table, it can be seen that most of traders preferred to purchase onion from local market because onion produce is generally available at low price with good quality. Most of the traders had

preferred to sale their produce with in state due to good prices and less storable product.

Table 5.19: Reason behind for prefer to receive/send from these markets

| Sr. No. | Markets | Destinations |
|---|---|---|
| 1 | Place of origin (Purchase) | |
| | Local | Good quality and low Price |
| | Within State | for Local requirement |
| | Outside State | for Local requirement |
| 2 | Markets-Places of destination (sell) | |
| | Local | Perishable commodity and Good price |
| | Within State | Perishable commodity and good price |
| | Outside State | for High price |

Source: Field survey data.

The operational cost incurred by the traders in the trading process is given table 5.20. It can be seen in the table that on average, operation cost of per ton of onion procurement varied from Rs. 200/- to 850/- which includes transportation, loading and unloading, rent for storage, fees, monitoring and administering. In the process of trading, operational cost was borne by the buyer.

Table 5.20: Details on Operational Cost incurred by Trader

| Sr. No. | Markets | Name reference Market for which cost estimated | Operational/trade Cost per ton |
|---|---|---|---|
| 1 | Place of origin (Purchase) | | |
| | Local | Mahuva | 200 |
| | Within State | Rajkot | 350 |
| | Outside State | Nasik (Maharashtra), Rajasthan | 850 |
| 2 | Markets-Places of destination(sell) | | |
| | Local | NIL | NIL |
| | Within State | NIL | NIL |
| | Outside State | NIL | NIL |

Source: Field survey data.

The expected and actual percentage of trade margin is given in table 5.21. It can be seen from the table that the selected trader had responded that they has expected high trade margin on total value to trade and also received high percentage of margin after trading of onion produce.

Table 5.21: Expected and Actual Percentage of Trade Margin (of total value of trade)

| Sr. No. | Markets | Category (Low/Normal/High) |
|---|---|---|
| | | High |
| 1 | Expected trade margin | |
| | local | High |
| | Within state | High |
| | Outside state | High |
| 2 | Received trade margin | |
| | local | High |
| | Within state | High |
| | Outside state | High |

Source: Field survey data.

Major problems faced during marketing and transport of produce and suggestions towards same are given in the table 5.22. It can be seen that from that traders have faced major problems of lack of efficient transportation facility and high transportation cost. The respondents were asked to share their suggestions to solve these problems and they suggested that marketing facility should be made available by government at subsidize rate which includes transport facility, charges for loading and unloading of produce.

Table 5.22: Major Problems faced and Suggestions by Respondent

| Sr. No. | Problems faced | Suggestions to solve |
|---|---|---|
| 1 | lack of efficient Transportation facility | Marketing facilities should be provided by government at subsidy rate |
| 2 | High transportation Cost | |

Source: Field survey data.

Though onion is predominantly a winter crop, it is grown in all the three seasons depending upon the availability of irrigation facilities. The bulk of the onion is produced in the winter season which arrives in the market during April-May. However, the consumption of onion is spread throughout the year and there is steady demand for onion bulbs all the year round. The existing and required storage facilities by trader are given in table 5.23. It can be seen in the table that the onion trader had 5 own storages with 3000 ton storage capacity and they require 2 more storage on rent with 1000 ton capacity at peak season. During the peak season, the product is sold within 15 days while 3-4 days in lean season.

Table 5.23: Existing and Required Storage facility and their Capacity

| Sr. No. | Particulars | Remarks |
|---|---|---|
| 1 | Existing storage Number | |
| | Own | 5 |
| | Rented | NIL |
| 2 | Existing storage Capacity (ton) | |
| | Own | 3000 |
| | Rented | Nil |
| 3 | Required storage Number | |
| | Own | |
| | Rented | 2 |
| 4 | Required storage Capacity (ton) | |
| | Own | |
| | Rented | 1000 |
| 5 | Time taken for the produce to disposed | |
| a | During peak arrival season | 15 Day |
| b | During less arrival season | 3 to 4 Day |

Source: Field survey data.

Onion is a seasonal crop, semi perishable in nature and has comparatively low storage ability and bulbs are usually stored until the harvest of next season crop or for longer period due to seasonal glut in the market. Significant losses in quality and quantity of onion occur during storage. Storage of onion bulbs has therefore, become a serious problem in the state. The detail of onion storage is given in table 5.24. It can be seen from the table

that onion is grown mostly during rabi crop and huge quantity of arrivals is reported in the market in the month of Feb to April. Rabi onion has shelf life of about 2-6 months while traders generally store onion for 2-5 months period during this period. While Kharif onion which has shelf life of about 1-3 months and about 20 to 40 per cent total produce get loss during the storage period.

Table 5.24: Detail of Storage Quantity

| Sr. No. | Month of huge quantities for storage | Shelf life of onion | Storage Duration | Total produce lose (%) during storage |
|---|---|---|---|---|
| 1 | March to May | 2 to 6 Month | 2 to 5 Month | 30-40 |
| 2 | May to September | 1 to 3 Month | 2 to 3 Month | 20-25 |

Source: Field survey data.

Among the types of trading mechanism followed during the purchase and sale of onion are given in table 5.25. As far as mode of marketing is concerned, open auction method was followed by all the traders in selected Mahuva onion market.

Table 5.25: Type of Trading Mechanism follow during Purchase and Sale Onion

| Sr. no. | Type of Trading mechanism | Rank applicable according to preference level (Purchase) | Rank applicable according to preference level (sell) | Rank applicable according to preference level (in case same for both purchase & sell) |
|---|---|---|---|---|
| 1 | Mutual agreement | 0 | 0 | 0 |
| 2 | Open Auction | Yes | Yes | Yes |
| 3 | Tender System | 0 | 0 | 0 |
| 4 | Online/E-Trading | 0 | 0 | 0 |
| 5 | Mutual agreement | 0 | 0 | 0 |

Source: Field survey data.

### 5.4.2 Commission Agent

The details on the years of experience, method of purchase and category of shop owned by market functionaries provide us a better

information on the nature of market functioning are given in table 5.26. The average years of experience of commission agents in these markets varied from 30 to 34 years. Apart from these, it also comes out from the table that most of commission agents owning shops had extended trading and storage area along with a separate space for a small office. In Vasana APMC, all respondents were awarded licenses as a Commission agent, whereas in Mahuva APMC, about half of the respondents were Trader and Commission agents.

Table 5.26: Experience and License availed by Commission Agent (APMC)

| Sr. No. | Particulars | Vasna, Ahmadabad | Mahuva Bhavnagar |
|---|---|---|---|
| 1 | Experience (Year) | 30 | 34 |
| 2 | License availed from APMC/Marketing Dept/Board (%) | | |
| a | Trader | 0.00 | 50.0 |
| b | Commission Agent | 100.0 | 50.0 |
| c | Stockiest | 0.00 | 0.00 |
| d | Transporter | 0.00 | 0.00 |
| 3 | Trading with Onion Variety | | |
| | local | Yes | Yes |
| | Red | Yes | Yes |
| | White | Yes | Yes |
| | Telgi/pink | Yes | Yes |
| | If other specify | | |

Source: Field survey data.

The annual transactions by per commission agent are presented in table 5.27. It can be seen from the table that average onion transaction is higher during rabi season which was about 25 mt followed by in early rabi (13.75 Metric tons), kharif (7.0 Metric tons) and Summer (5.00 Metric tons) season in the selected market. The average quantities transacted by commission agent were significantly higher in Ahmadabad APMC as compared to AMPC Mahuva, indicating either there is greater hold on market transactions or over-reported figures. Out of total quantity traded, only 17.5 mt of onion was stored by commission agent for emergency demand.

Table 5.27: Details on the Quantity of Onion Traded by Commission Agent

| Sr. No. | Variety | Average Quantity in Metric tons | | |
|---|---|---|---|---|
| | | Ahmadabad | Mahuva | Average |
| 1 | Average quantity of onion traded annually | 70 | 30 | 50 |
| 2 | Quantity traded during previous year | 52.50 | 29.50 | 41.00 |
| 3 | Season wise trade | 71.00 | 30.50 | 50.75 |
| a | Kharif | 10.00 | 4.00 | 7.00 |
| b | Early Rabi | 18.00 | 9.50 | 13.75 |
| c | Rabi | 35.00 | 15.00 | 25.00 |
| d | Summer | 8.00 | 2.00 | 5.00 |
| 4 | Total Quantity Store | 20 | 15 | 17.5 |

Source: Field survey data.

The details on purchase and sale by commission agent and the time taken with mode of transport at which these transactions were made are presented in Tables 5.28. Most of commission agents have reported that they adjusted their purchase and sale pattern in times of very high or low prices. The commission agents at Vasana APMC as well as at Ahmadabad APMC were well equipped with information and were connected with other markets. From table, it is quite evident that quantities transacted by commission agent of Vasana were quite high in volumes which was sold in outside the state while the commission agents of Mahuva market had traded the onion within the state.

Table 5.29 presents the choice of place for purchase of onion by Commission agent in selected market of the State. With respect to purchase of onion, it was observed that most of respondents' preferred local market due to relatively lower prices and availability of quality onion while preference for within state and outside the state market as per their choice for local onion requirement in the selected market. The choices of place for sale of onion by commission agent was for sale within state and out of state for high price received, while local market was preferred due to perishability of commodity and better price.

Table 5.28: Details of Place of Procure and Sale of Onion by Commission Agent

| Sr. No | Particulars | APMC Ahmadabad Vasana | | | APMC Mahuva Bhavnagar | | |
|---|---|---|---|---|---|---|---|
| | Place of origin | Local | Within state | Outside state | Local | Within state | Outside state |
| 1 | Place of Procure | | | | | | |
| a | Major Markets/places | Ahmadabad | Rajkot, Bhavnagar, Surat | Maharashtra , Rajasthan | Mahuva | Rajkot, Bhavnagar | |
| b | Received % | 25 | 25 | 50 | 75 | 25 | |
| c | Approximate distance (km) | 50 | 300 | 600-1500 | 30 | 100-150 | |
| d | Time taken (hour) | 2 | 8 | 12 to 24 | 1 | 3 | |
| e | Mode of trans port | Road | Road & Rail | Road & Rail | Road | Road | |
| 2 | Place of Sale | | | | | | |
| a | Major Markets/places | Ahmadabad | All Gujarat | Maharashtra , Rajasthan | Mahuva | Ahmadabad | |
| b | Sent % | 25 | 50 | 25 | 50 | 50 | |
| c | Approximate distance (km) | 50 | 300-500 | 700-1200 | Nil | 200 | |
| d | Time taken (hour) | 2 | 7 | 12 to 20 | | 5 | |
| e | Mode of trans port | Road | Road & Rail | Road & Rail | Road | Road | |
| | Note: Transport costs are borne by the seller | | | | | | |

Source: Field survey data.

Table 5.29: Reasons for Selection of Market for Procure and Sale

| Sr. No. | Markets Place | Selected Market |
|---|---|---|
| 1 | Place of origin (Purchase) | |
| | Local | Good quality and low Price |
| | Within State | for Local requirement |
| | Outside State | for Local requirement |
| 2 | Markets-Places of destination(sell) | |
| | Local | Good price |
| | Within State | Perishable commodity and good price |
| | Outside State | for High price |

Source: Field survey data.

The operational cost incurred by the commission agent in the trading process is given table 5.30. It can be seen in the table that on an average 3 per cent of total traded volume as a operational cost of onion incurred by commission agent which including transportation, loading and unloading, rent for storage, fees, monitoring and administering.

Table 5.30: Cost Incurred by the Commission Agent in Trading Process

| Sr. No. | Markets | Vasana Ahmadabad | Mahuva Bhavnagar |
|---|---|---|---|
| 1 | Place of origin (Purchase) | 3 percent of total traded volume | 3 percent of total traded volume |
| a | Local | | |
| b | Within State | | |
| c | Outside State | | |
| 2 | Markets-Places of destination(sell) | | |
| a | Local | | |
| b | Within State | | |
| c | Outside State | | |

Source: Field survey data.

From the table 5.31, it can be seen that the high price fluctuation and lack of storage facility are the major problems faced by the commission agents during marketing and transport of produce. The respondents were asked to share their suggestions to solve these problems and they suggested that market intelligence and storage facility at major onion market need to be created/enhanced.

Table 5.31: Details of Problem faced by Commission Agent and their Suggestion

| Sr. No. | APMC | Problems faced | Suggestions to solve |
|---|---|---|---|
| 1 | Vasana Ahmadabad | High Price Fluctuation | Market Intelligence and Storage facility |
| 2 | Mahuva Bhavnagar | High Price Fluctuation | Storage facility should be provide at major onion markets |
| | | Lack of Storage facility | |

Source: Field survey data.

From the table 5.32, it revealed that during the peak season, the product is disposed within 2-3 days while it takes 3 to 5 days in the lean season. None of trader had onion storage facility. Despite of same, due to high perishability of product, they don't require any storage facility.

Table 5.32: Details of duration of Onion Disposed in Different Seasons

| Sr. No. | APMC | During peak arrival season | During less arrival season |
|---|---|---|---|
| 1 | Vasna Ahmadabad | 2 Day | 3-5 |
| 2 | Mahuva Bhavnagar | 2-3 day | 3-5 |

Source: Field survey data.

Among the various types of trading mechanism followed during the purchase and sale Onion, mutual agreement and open auction method was followed by all commission agents in both selected onion market.

Table 5.33: Most Preferred Trading Mechanism during the Purchase and Sale Onion

| Sr. No | Type of Trading mechanism | Existing Method of sale | Rank applicable according to preference level (Purchase) | Rank applicable according to preference level (sell) | Rank applicable according to preference level (in case same for both purchase & sell) |
|---|---|---|---|---|---|
| 1 | Mutual agreement | Yes | 2 | 2 | 2 |
| 2 | Open auction | Yes | 1 | 1 | 1 |
| 3 | Tender system | 0 | 0 | 0 | 0 |
| 4 | Online/e-trading | 0 | 0 | 0 | 0 |
| 5 | Mutual agreement | 0 | 0 | 0 | 0 |

Note : Both selected markets have the same priority
Source: Field survey data.

### 5.4.3 Processor

Onion is an important vegetable crop grown in India and forms a part of daily diet in almost all households throughout the year. Onion is one of the most important but perishable groups known. On account of rapid urbanization, hectic schedules and rising working population, the demand for onion powder is witnessing a tremendous growth, particularly in India. In order to save time, consumers are not willing to indulge in difficult cooking procedures such as chopping onions. Apart from this, food processing represents one of the largest sectors in India which is bolstering the demand

for onion powder. Moreover, onion powder is used in ready-to-eat food products, like packaged soups, sauces, oats, noodles, pasta, frozen food and instant mixes. Further, onion powder is used in seasonings, dry rubs, marinades and condiments for preparing appetizers, seafood and meat. Dehydrated onions register widespread consumption worldwide, predominantly due to growing popularity of convenience/packaged food products. Manufacturers are constantly striving to provide nutrition-rich dried products through their offerings of on-the-go or ready-to-cook meals and snacks, which is believed to be another key factor impacting adoption of dry vegetables globally. Rising consumer awareness about the improved shelf life of dehydrated foods has contributed to the growing adoption of dry onions among consumers, especially within developing economies. Onion dehydration industry of the state is the biggest in the country and it comprises 80 per cent of the total dehydration units which process nearly one lakh tonnes of onion. High initial investment in onion processing industry and high uncertainty in production enhanced the risk in this business.

The details of onion processing unit in Mahuva market are given in table 5.34. It can be seen from the table that the processor had purchased only three variety of onion for processing and on an average about 75 MT of onion is processed annually. About 50 mt of onions were purchased in previous year and in which about 60 percent was purchased in Rabi season followed by early Rabi (20 per cent) season. The processor had onion storage and only 30 percent of the total quantity of purchase is stored by processor for emergency demand.

The details of onion procured from different places are given in table 5.35. From the table, it indicated that about 90 per cent of onion was purchased from local market and while rest of quantity was procured from outside the state.

Table 5.34: Primary details of Onion Processing by Processor

| Sr. no. | Particulars | Quantity (MT) |
|---|---|---|
| | Varieties of Onion stored | |
| a | Local | Yes |
| b | Red | Yes |
| c | White | Yes |
| 2 | Quantity of onion purchased annually (on an average during last five years(MT) | 75 |
| 3 | Quantity of onion stored during last one year(MT) | 50 (100) |
| 4 | Season wise purchase during last one year(MT) | |
| | Kharif | 5 (10) |
| | Early Rabi | 10 (20) |
| | Rabi | 30(60) |
| | Summer | 5(10) |
| 5 | Out of total produce bought Percentage of Store | 30 |

Source: Field survey data.

Table 5.35: Approximate Percentage of Onion arriving from Different Place

| Sr. No. | Onion arrivals | Place of Purchase & Quantity |
|---|---|---|
| 1 | Local | |
| | Name of market from where onion purchased | Mahuva |
| | % of onion produce purchased | 90 |
| 2 | Within State | |
| | Name of market from where onion purchased | |
| | % of onion produce purchased | |
| 3 | Outside State | |
| | Name of market from where onion purchased | Nasik (Mh) |
| | % of onion produce purchased | 10 |

Source: Field survey data.

One of the prime reasons behind high volatility in onion prices stems from a lack of storage facilities that have not kept pace with rising production. Also, the traditional storage practices incur losses as high as 40 per cent. The details of number of storage unit and storage capacity are given in table 5.36. It can be seen in the table that the processor has storage facility and the storage capacity is 250 meters. The current facility of onion storage is not enough for the processor because of huge market arrives in the month of December to May and it requires high storage facilities with high storage capacity. Onion is perishable crop and it has only 3 to 5 month shelf life while

processor stores in only 3 months. There is no difficulty faced in obtaining processor licenses by the processor.

Table 5.36: Details of Number of Storage Units for Onion and Storage Capacity

| Sr. No | Type of storage/ Warehouse | Warehouse |
|---|---|---|
| 1 | Storage facility | |
| | No. of storage units | 1 |
| | Capacity in metric tons | 250 |
| 2 | Existing capacity of onion storage units are sufficient | Not Sufficient |
| | If No, how much is requirements Capacity(MT) | 2000 MT |
| 3 | During which periods you get huge quantities for storage | Dec to May |
| 4 | Hire/lease any godown for onion storage | No |
| | If So, What is its current capacity (MT) | 2500 |
| 5 | The shelf life of onion you procure | 5 Month |
| 6 | How long store the onion in storage | 3 Month |
| 7 | Total produce lose(%) during storage | if Store 1 month 10 % and If two month 15% |
| 8 | Difficulty faced in obtaining processor license | No |

Source: Field survey data.

The market structure of onion is unilaterally dictated by the traders, not farmers. Minimal role of farmers in price discovery due to low size of average farm holdings, unfavorable weather conditions and price risk were cited as major reasons for the situation (Table 5.37).

Table 5.37: Opinion of Processor regarding Marketing Function

| Sr. No. | Particulars | Remarks |
|---|---|---|
| 1 | Do you observe presence of cartels, collusive behavior among traders | Some times |
| 2 | Suggestion to improve the functioning of the onion trading | Present onion trading function well and Good |
| 3 | Observation behind sudden fall or rise in onion please provides some suggestions to solve the problem of price volatility | Onion price high volatile due Climate condition and Seasonal pattern |

Source: Field survey data.

The detail of problems faced by processor with the existing production, marketing, storage and processing infrastructure are given in table 5.38. From the table it is indicated that the processor had faced problems regarding marketing and storage of onion. The area of market yard and auction place is very small and all functionaries of marketing face problem in peak arrival. The majority of the respondents had suggested to increase the infrastructure facility likes market yard, auction place and storage facility in Mahuva market to overcome problems in marketing of onion.

Table 5.38: Detail of Problems faced by Processor with the Existing Infrastructure

| Sr. No. | Problems | Suggestion |
|---|---|---|
| 1 | No Sufficient place for onion auction in the market | Infrastructure facility should be increase like Market area, Market Shed, Auction Place |
| 2 | Market shed is not enough | |
| 3 | The Mahuva market is very small and it's very congested at the time peak arrivals | |

Source: Field survey data.

## 5.5 Warehouses

Onion is stored in ambient storage condition in state where the storage losses are very high. These losses are comprises of physiological loss in weight (PLW) i.e. moisture losses and shrinkage, rotting and sprouting. The storability of onion is influenced by several factors such as varieties, cultural practices, pre-harvest treatments and post harvest handing practices. The storage environment during the period of storage plays an important role in the storage life and losses during the storage. The details of type of onion variety and season wise onion stored by stockiest are given in table 5.39. It can be seen from the table that the all type of onion varieties have been stored and on an average 50 MT onions annually purchase by stockiest. Stockiest, nearly 30 Onion warehouse have capacity of 75 MT. The warehouse is located in Mahuva city of Bhavnagar District. About 35 million tonnes of onion procure

was done during the last one year, which purchased 57.14 per cent Rabi seasons and 42.86 per cent in the early Rabi season.

Table 5.39: Details of Storage facility of Stockiest

| Sr. no. | Particulars | Quantity (MT) |
|---|---|---|
| 1 | Varieties of Onion stored | |
| a | Local | Yes |
| b | Red | Yes |
| c | White | Yes |
| | Pink and Yellow | Yes |
| 2 | Quantity of onion purchased annually (on an average during last five years(MT) | 50 |
| 3 | Quantity of onion stored during last one year(MT) | 35 (100) |
| 4 | Season wise purchase during last one year(MT) | |
| | Kharif | 0 (0) |
| | Early Rabi | 15(42.86) |
| | Rabi | 20(57.14) |
| | Summer | 0(0) |
| 5 | Type of storage/ Warehouse | Warehouse |
| 6 | Place where storage is located | Mahuva |
| 7 | No. of storage units | 30 |
| 8 | Capacity in metric tons | 75 |

Source: Field survey data.

The details of Onion procure to store and selling destination is given in the Table 5.40. In selected markets, out of the total procured quantity, 80 per cent onion was procured from local market of Mahuva area and rest 20 per cent was from other places within the state (Bhavnagar and Rajkot). The stockiest have then targeted to local area. This happens due to availability of onion high at low cost. The road is major mode of transportation for procure and sold of onion stockiest in Mahuva market. As far as onion sold by the traders is concerned, overall 100 per cent of the traders sold the product to outside the state. About Rs. 3.0 to 5.5/ kg transportation cost incurred by stockiest for trading outside the state. The major targeted consumers markets Delhi, Punjab, Haryana and Rajasthan.

Table 5.40: Details of Onion procure to store and selling destination

| Sr. No | Varieties | Market-Place of Purchase | Market-Place of Sale |
|---|---|---|---|
| 1 | Local | | |
| | Name of market | APMC Mahuva | --- |
| | % of onion produce | 80.00 | 0.00 |
| 2 | Within State | | |
| | Name of market | Bhavnagar and Rajkot | --- |
| | % of onion produce | 20.00 | 0.00 |
| 3 | Outside State | | |
| | Name of market | 0.00 | Delhi, Haryana, Punjab and Rajasthan |
| | % of onion produce | 0.00 | 100.00 |

Source: Field survey data.

The details on the years of experience and onion storage capacity are given in table 5.41. It can be seen from the table that the average years of work experience of onion storage in these markets was 45 years and it worked as trader cum warehouse owner. The respondent has 30 warehouses with about 70 Metric tons of storage capacity and enough storage capacity in warehouse. They have lease out the storage to traders for three months. Onion has only 3-4 month shelf life but they store the onions in the warehouse for 3 months. In temporary storage structures onion is generally stored for one to three months while in semi- permanent and permanent structures, onions can be stored for 3 to 5 months depending upon the market rates. As for as the storage losses are concerned, the losses were high in temporary type structures despite of lesser period of storage. There was no difficulty faced in obtaining warehouse licenses by the traders. The owner of the warehouse has no loan facility provide for people who have onion in storage.

Table 5.41: Details of Experience of Onion Storage

| Sr. No | Type of storage/ Warehouse | Unit | Warehouse |
|---|---|---|---|
| | Experience | Year | 45 |
| 1 | Storage facility | | |
| | No. of storage units | No. | 30 |
| | Capacity in metric tons | metric tons | 75 |
| 2 | Existing capacity of onion storage units are sufficient | | Sufficient |
| 3 | During which periods you get huge quantities for storage | Month | March to May |
| 4 | Hire/lease any godown for onion storage | | Lease out |
| 5 | The shelf life of onion you procure | Month | 2 to 4 |
| 6 | How long store the onion in storage | Month | 3 |
| 7 | Total produce lose during storage | % | 30-35 |
| 8 | Difficulty faced in obtaining processor license | | NO |
| 9 | Provides the pledge loan? | | NO |
| 10 | Arranging pledge loan facility for the persons who have stored onions in the storage | | NO |

Source: Field survey data.

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption. The details of charge for produce storage by traders, commission agents, farmers and others are given in the table 5.42. It can be seen from the table that on an average of Rs. 50 to 70 per quintal charged on the storage of onions for a period of one to two months. Most of onion stored in warehouse by the traders and big farmers.

Table 5.42: Details of Charges for Storage of Produce by Traders, Commission Agents Farmers and Others

| Sr. No. | Market Functionaries | Units | Charges |
|---|---|---|---|
| 1 | Traders | Per Beg (50 kg) | 25 Rs/one month and 35 Rs./two months |
| 2 | Commission agents | | --- |
| 3 | Transports | | --- |
| 4 | Other stockiest | | --- |
| 5 | Processor | | --- |
| 6 | Any other (farmers) | | 25 Rs /One month |

Source: Field survey data.

## 5.6 Chapter Summary:

This results of primary survey data was presented and discussed in this chapter. It was observed that about 10 percent of the farmers had storage facilities, which capacity of 25 tonnes of onion store. The major reasons for not having storage structures were high cost storage construction, small farmer, no space available, high labor cost and weight loss and spoilage. It was noted that major problems faced in marketing of onion produce were high transportation cost, high marketing cost and lack of infrastructure facility like market sub-yard and storage facility. About 90 percent of selected farmer households had opined that they did not see any cartel and collusive behaviour of traders and commission agents in the market. Lack of storage facility, high wastage of produce and reduction of weight during storage were infrastructure related problems were encounter by the respondents. In case of processing of onion produce, problems faced were high cost of processing, low value while after processing also export related problems were faced by onion grower.

Chapter VI

# Summary and Conclusions

## 6.1 Introduction

Onion is a crop of mass consumption round the year all over the world. Globally, 97.86 million tonnes of onions are produced (2017), while the vegetable ranks as first by harvested area (25.29 per cent). China, India, and the US are the world's leading onion producing countries, while around two third of global onion output comes from the ten top onion producing countries which includes. China, India, United States of America, Iran, Egypt, Russian Federation, Turkey, Bangladesh, Pakistan, Netherlands. About 5.2 million hectares of onions are harvested each year on a global scale and it is estimated that around 8 per cent of this harvest is internationally traded. Onions are used as spice, condiment and vegetable almost daily. Because of special pungency, onions have more value for seasoning a wide variety of dishes. Dehydrated flakes or powder are in great demand both in the domestic and export markets. In fact onion is third most eaten vegetable in the US, right after tomato and potato.

India is the second largest producer of onion in the world after China with an annual production of 24.34 million metric tonne from an area of 1.305 million hectare (2016-17), accounting 22.43 per cent share in total world onion production in 2017. The country is also the major consumer of onion with an annual demand of 16.50-18.0 million mt. Though, India holds premier positions in area and production, the productivity of onion (16.00 tons/ha) is very low compared to other countries. The inherent lower productivity in sub-tropical countries vis-à-vis European counties, shortage and high prices of quality seeds, high incidence of pests and diseases typical under tropical conditions, moisture stress or excess rains during critical growth stages are factors constraining yield.

Onion is one of the most important commercial and important vegetable grown in India which is next to Potato, which is used either in raw or dehydrated form to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. Onion is consumed all over the country and is an important constituent of Indian daily diet. Onion is typically cultivated thrice a year and all three crops are available for export, with rabi having the longer shelf life. Out of total production of about 24 million tones of onion, two third of total production is rabi crop while 20 per cent is late kharif and rest is kharif crop. The diverse agro-climatic conditions enable to India to produce onion in one or the other part round the year. Onion is largely grown in the western, northern and southern parts both in rabi and kharif seasons. Its supply is available throughout the year albeit with different volumes. India produces all three varieties of onion, i.e. red, yellow and white. In the northern part of the country, onion is usually grown in the winter (rabi) season. While in the southern and western states of Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat and Maharashtra, it is grown in winter (rabi) as well as in the rainy (kharif) seasons. Currently, onion cultivation in kharif is gaining ground in the northern part of the country. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Andhra Pradesh, Haryana, West Bengal, Gujarat and Uttar Pradesh in the country. These States account for almost 90 per cent of the total onion production of the country.

Table 6.1: Season-wise Onion Production in India

| Agriculture Year: July-June | | | Production in Lakh Tonnes | | |
|---|---|---|---|---|---|
| Season | Transplanting | Harvesting Period | 2013-14 to 2017-18 | 2017-18 | 2018-19* |
| Kharif | July - August | October-December | 32 (15.24) | 35 (15.09) | 36 (15.25) |
| Late Kharif | October - November | January- March | 42 (20.0) | 46 (19.93) | 47 (19.92) |
| Rabi | December - January | End of March to May | 136 (64.76) | 151 (65.09) | 153 (64.83) |
| Total | | | 210 | 232 | 236 |

Notes: *- first advance estimate; figures in parenthesis are percentage to total.
Source: GOI (2019).

The onions from India are famous for their strong flavor. India export its considerable quantity of onion to countries like Malaysia, Singapore, Sri Lanka, Bangladesh, Pakistan, Indonesia, UK, Gulf countries, etc. Our exports generally hover around 1.5-2.5 million tonnes per annum. As onions have no substitutes, demand for it is completely inelastic. It is also exported in the form of dehydrated onion, canned onion and onion pickle. Dehydrated onions are seen as a potential valued product in world trade and India is the second largest producer of dehydrated onions in the world.

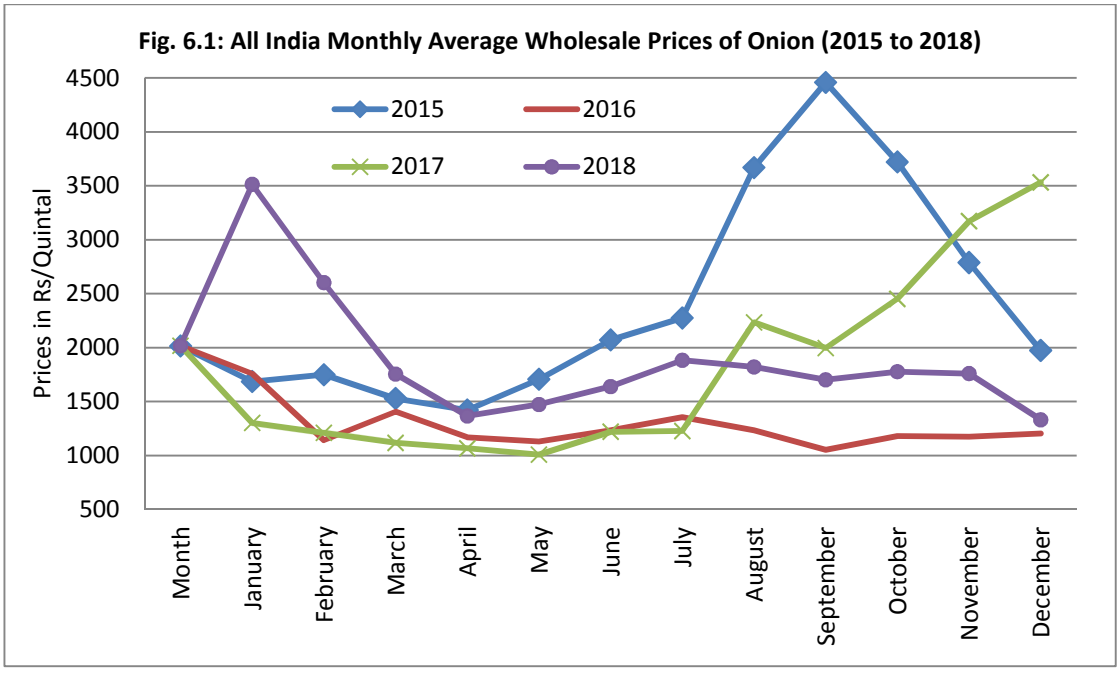
## 6.2 Onion Price Volatility

Onion is a politically-sensitive commodity which is one of the closely monitored agricultural commodities produced in India. Onion is the only vegetable that can bring down a government from power, as prices of onion have direct bearing on the common man's consumption basket. Therefore, this commodity is always in focus of the government. Though there is always a surplus production, fluctuating domestic and export demand often creates demand supply mismatch leading to spiral effect on the prices of onion. The prices sometimes fall below cost of production making it uneconomical for the farmers. Central Government uses Minimum Export Price (MEP) as a tool to ensure regulated exports so that there is an adequate supply of onion in the domestic market. State Governments with the support of Central Government also implement as and when require Market intervention Scheme (MIS) in view of possible glut in market. Month-wise arrival of onion during last five years indicates high fluctuation in arrival of onion in markets across months that to year to year and monthwise arrival is not consistent.

Due to its highly volatile prices, during May 2014, Central Government brought onion under the Essential Commodities Act, 1955 imposing stock holding limits. Despite of same, wide variation in average wholesale prices of onion are recorded during last four years which is presented in Figure 6.1. The prices remained quite high in 2015, 2017 and 2018, especially during July to December. Average wholesale prices fell sharply in September 2016

below Rs. 1060/Qtl. After some improvement during remaining months of 2016 and beginning of 2017, the onion prices again crashed in May 2017 below Rs. 1010/-. The picture is more worrisome when we compare wholesale prices of onion across the states. During January 2018 prices were very high as compared to December 2018 and January 2019 and about 60 per cent deviation is recorded. This spiral effect of onion prices led to heavy losses to the farmers. While the middlemen take advantage of price movements, it affects farmers and consumers badly. The high fluctuation in prices of onion can be attributed to hoarding by traders with expectation of price rise, higher retailers' mark up, changes in MEP by Government and lack of proper forecasting system.

**Fig. 6.1: All India Monthly Average Wholesale Prices of Onion (2015 to 2018)**




The onion export brought under Canalization Scheme through National Agricultural Cooperative Marketing Federation of India Limited (NAFED) in 1974 by Government of India, which substantially increased export of quality produce and also the foreign exchange earnings. However, it was felt by NAFED and onion exporters that there is need to improve both production and quality of onion for export as well as to meet the domestic needs for which research and developmental programmes are to be undertaken. But spiralling price of onion is always a cause for concern. The prices rise sky high in years

of deficit production and nose dip when there is glut. Wide price fluctuations make it a risky crop discouraging large scale adoption of input intensive production techniques and good management practices by farmers. Therefore, onion is generally referred as a high risk, high return crop for the farmers and traders. The high price variability affects both producers and consumers through a spillover effect to the other sectors thereby leading to high inflation in the economy.

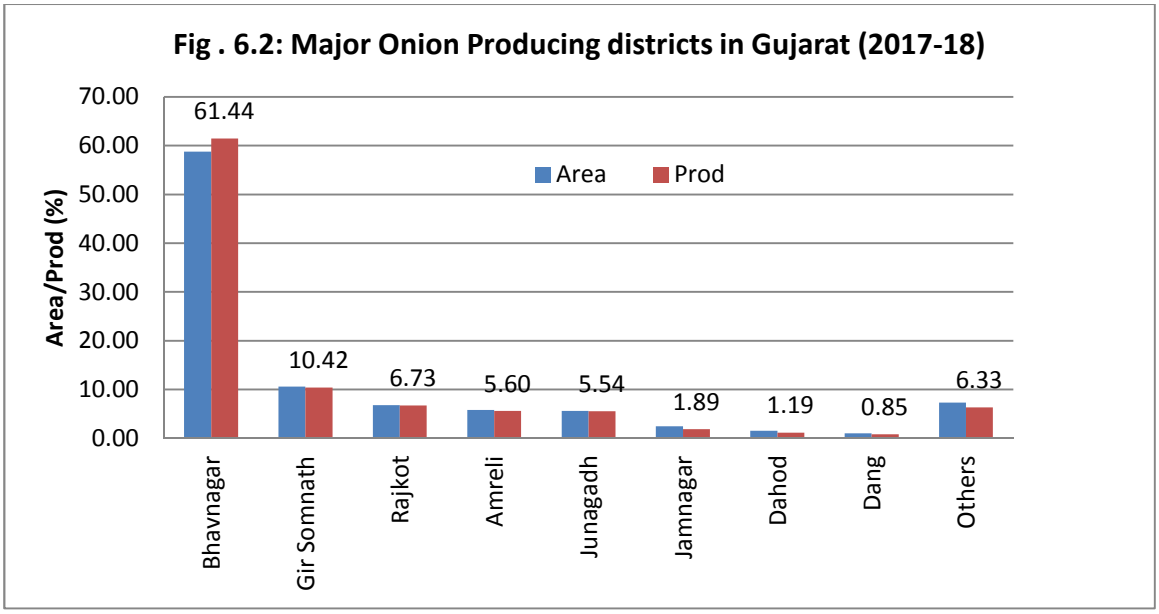
The Government of India has approved Operation Greens, the Central sector scheme aimed at the integrated development of value chain for three commodities, viz. tomato, onion and potato (TOP). It aimed at the stabilisation of the prices of these commodities, which have seen serious volatility in the past and reduction in post-harvest losses by way of farmgate infrastructure. TOP scheme also aim on value addition to increase the shelf life of the product, as well as enhance the value addition. Besides, emphasis would be on creation of a market intelligence network to collate real-time data on demand and supply in order to check the localised gluts of TOP crops. The government wants it to be implemented in a two-pronged strategy, the first being a short-term strategy focussed on price stabilisation and the second being a long-term one focussing on the development of integrated value chain development. The National Agricultural Cooperative Marketing Federation of India (NAFED) will be the nodal agency for the price stabilisation measures, which will create an e-platform for demand and supply management of TOP crops based on market intelligence inputs. Under the scheme, the clusters for onions includes Nashik in Maharashtra; Gadag and Dharwad in Karnataka, Bhavnagar and Amreli in Gujarat and Nalanda in Bihar.

### 6.3 Onion Production in Gujarat:

Gujarat has achieved considerable growth rate in horticulture during last five years because of serious efforts made by the State Government. The area and production of horticulture crop was 4.80 lakh ha and 43.03 lakh tons in 1994-95 which increased up to 16.87 lakh ha and 234.35 lakh tons

respectively in 2017-18. It accounts for about 11.76 per cent of total area under vegetable crops and 11.84 per cent of total vegetable production in the state. The state of Gujarat is the eighth largest onion producing states in India, which accounts for about 2.3 percent of production of the country from area share around 4.0 percent. It was estimated that during the year 2017-18, total onion production in the state was 14.16 lakh tones and major onion producing district were Bhavnagar, Gir Somanath, Rajkot, Junagarh, Amrelai and Junagadh.

**Fig . 6.2: Major Onion Producing districts in Gujarat (2017-18)**




## 6.4 Need of the Study:

Against this backdrop and given that market structure, degree of competition and efficiency at the various levels of the supply chain has impact on the final prices paid by the end consumers with respect to agriculture products; the study proposes to price volatility and major issues in demand and supply management of onion in Gujarat. Irrational speculative driven bubbles and hoardings by trader lobbies have sometimes been blamed for episodes of high price volatility in India, but with no clear implications in terms of which possible policies could effectively prevent repetition of such crisis. This study aims to find major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure in Gujarat.

## 6.5 Data and Methodology:

The study has been carried out by utilizing both secondary as well as field survey data collected in Gujarat. The secondary level data has been collected from the various published sources and websites. The primary data survey were carried out from the one of the largest onion producing districts of Gujarat, i.e. Bhavnagar (Producer market, Map 1.1). Primary survey was carried out with a structured questionnaire for farmers and market intermediaries for the year 2017-18. Data were collected from 10 sample farmer households; 2 Trader, 2 Commission Agent, 2 warehouse owner and 1 Onion Processor. Besides data were also collected from 2 commission agent from Sevana APMC of Ahmadabad and 2 APMC Mahuva (Bhavnagar) and Sevana ( Ahmadabad) this makes a total of 21 households (Table 1.4). A focus group discussion with the committee members of APMC and with market functionaries was also held in order to get a clear picture of market charges, market practices, etc. The co-integration analysis were carried out using monthly wholesale prices of five onion dominated markets i.e. Ahmadabad, Gondal, Rajkot, Mahuwa and Surat markets of Gujarat for the period from 2005 to 2017.

## 6.6 Evidences from Literature

The review of literature on price volatility, supply chain issue and state interventions indicate that onion prices prevailed in the markets is greatly influenced by production in the previous year, exported quantity in the previous year and export price in the current year, while pattern of harvesting and market arrivals have direct bearing on price behavior and its movements. Besides factors likes huge post-harvest losses, non-availability of proper storage structures and mall practices in trading were highly responsible for onion price fluctuation. It was observed that Farmers Market helped in increased farmer's share in consumer's rupee and providing fresh vegetables to consumers at relatively low prices. While share of the farmer in retail price was less than half the retail prices in traditional market, the balance being

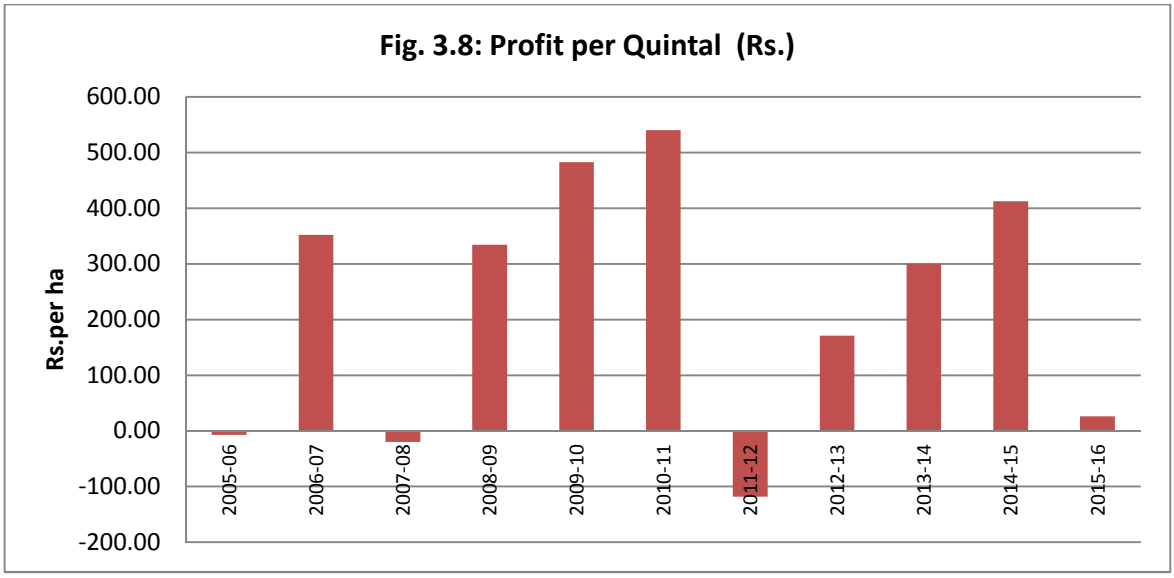
accounted by marketing costs and margins. The reduction in the length of the marketing channel and also encouragement of cooperative marketing is needed so that farmers can benefit from scale economies. As far as traditional chain is concerned, strengthening and upgradation of infrastructure in regulated markets is necessary so as to reduce post harvest losses and benefit the producer and consumer. As part of market reforms, implementing market intelligence systems can help in discovering the right prices for producers as well as consumers. Proper planning for production, post-harvest management and marketing may help growers to get better prices for good quality produce.

## 6.7 Consumption of Onion

Historically, onion consumption per capita in India reached an all time high of 13.5 kg in 2013. Consumption of onion in India is subject to fluctuation on account of religious considerations. The monthwise per capita onion consumption as per NSSO survey indicate that consumption of onion during 2011-12 in rural area was relatively lower of 0.84 kg while in urban area, same was 0.95 kg. India produced enough onion, leaving a record surplus of about 2.92 MMT. Surplus onion was exported to a number of other countries. Gupta, et al (2015) estimated that onion consumption in the rural area was estimated to be 48.10 g/person/day while same was 50.97 g/person/day in urban side.

## 6.8 Cost of Cultivation and Income from Onion

Cost of cultivation of onion in Gujarat is estimated to be 125082.69 per hectare as C2 cost during 2015-16 while per quintal cost of production is estimated to be Rs. 722.97. Among various components of operational costs, cost of labour accounted for the highest share of 37.5 per cent in total cost of cultivation followed by seed (27 per cent). The cost of cultivation and production varies considerable across the years and thus negative profit per hectare and quintal of onion was observed during the year 2005-06, 2007-08 and 2011-12.




## 6.9 External Trade Scenario

India is a traditional exporter of fresh onions. Although there has been an increasing trend in the quantum and value of exports of onions 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 onions have not been free but are canalised through National Agricultural Cooperative Marketing Federation (NAFED) and now through some other agencies. Indian onions are famous for their pungency and are available round the year. Indian onion has two crop cycles, first harvesting starts in November to January and the second harvesting from January to May. There is a lot of demand of Indian Onion in the world, the country has exported 1588985.72 MT of fresh onion to the world for the worth of Rs. 3088.82 crores / 479.32 USD Millions during the year 2017-18. Major export destinations (2017-18) are Bangladesh, Malaysia, Sri Lanka, United Arab Emeritus and Nepal, which is not stable since last one and half decade period.

India mainly exports fresh onions to foreign countries followed by dehydrated onion. During 2017 (Jan-Sept), fresh onion export from India recorded USD 216.95 million which represented 70.29% of the total onion exports while it was USD 72.49 million (23.49%) for dehydrated onion. The varieties of onion in India that exports are Podisu onion, Red Onion, White

Onion, Krishnapuram rose onion, Bangalore rose onion etc. The major onion varieties found in India are Agrifound Dark Red, Agrifound Light Red, NHRDF Red, Agrifound White, Agrifound Rose and Agrifound Red, Pusa Ratnar, Pusa Red, Pusa White Round. There are certain varieties of yellow onion which are suitable for export in European countries namely Tana F1, Arad-H, Suprex, Granex 55, HA 60 and Granex 429.

There are 23 states of India which are exporting onion to other countries. The major onion exporting states are Maharashtra, Gujarat, Tamil Nadu, Karnataka, West Bengal, Andhra Pradesh, Kerala, Delhi, Bihar and Jammu & Kashmir. Maharashtra and Gujarat together registered 80 per cent value of the onion export. Maharashtra (mainly Nashik) stood as largest onion exporter state in India and recorded USD 191.09 million in 2017 which represents 62% of the total's output. Gujarat and Tami Nadu recorded USD 56.41 million and USD 33.09 million from onion export. During Jan-Sept 2017, it is recorded that more than 1100 onion suppliers in India are supplying different varieties of onions to foreign countries. Jain Farm Fresh Foods Limited is one of the largest onion suppliers in India. It did onion export business worth of USD 20.46 million which represents approximately 7% of the total onion export value. The major onion exporters in India are Jain Farm Fresh Foods Ltd.; Sarah Exim Pvt. Ltd.; Pride Fresh Produce; Sanghar Exports and Oceanic Foods Limited. India is exporting onion to foreign countries from around 40 ports. JNPT is the biggest Indian port which departs the maximum number of onion shipments. India recorded 60% value of onion export from JNPT only in 2017 i.e. USD 186.37 million. JNPT is followed by Mundra Sea, Pipavav, Bhusawal ICD and Chennai Sea.

Onion can be processed to paste and dried products like powder, flakes and grits. There are about 75 onion dehydration units in Gujarat (86% in Mahuva, Bhavnagar) and one large export oriented dehydration unit at

Jalgaon. India produces about 65,000 MT of dehydrated onion, of which 85 per cent is exported. The local demand for processed onion is limited but is on rise. In export market, India competes with Turkey and China and they offer dehydrated onion at a very low rate ($1700 -2500 per MT) as against the Indian rate of $2600 per MT. Due to spiraling prices of onion, raw material prices go up, making onion processing unprofitable. During 2014-15, more than 75 per cent of onion dehydration units remained shut due to high raw material prices. Jain Irrigation Systems Ltd. has set up a modern dehydration unit at Jalgaon with full backward integration with farmers for producing processing quality white onion. The company has a total installed capacity of 14,000 MT/ annum, of which 9,500 MT/ annum is in Jalgaon. The company is connected to more than 6,000 farmers through contract farming for supply of onion in Maharashtra and Gujarat. Since the entire value chain of onion is addressed by the company, it has been able to become a market leader in dehydrated onion. As the domestic demand for dehydrated onion is very limited, growth of onion dehydration industry is moving at snail's pace.

### 6.10 Seasonal Behaviour in Prices of Onion

Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals and prices of onion. The results revealed the existence of seasonality in all the markets. Higher indices of market arrivals of onion were noticed immediately after harvest in the selected markets arrivals reached peak during April (262.72) in Mahuva which decrease to 6.05 in October and relatively shoot up in March. In Gondal market the peak indices was found in February (172.41) followed by March (169.77). Ahmadabad market showed lowest arrivals in September (75.87) while it peaked during March (116.30). Surat market witnessed the lowest arrivals in October (70.12) and highest during May (135.19). Arrivals reached a peak during December (151.90) in Rajkot market while they were the lowest in August (69.87). The higher market arrival indices were observed (more than 100) in the months of

to December to April and lower arrival indices was found during July to October (less than 100).

The pattern of market prices showed slight differences among the selected markets. The price index in Mahuva market was the highest in the month of December (127.76) and relatively higher during the months of August to January. Gondal market witnessed peak price during October (152.81). The indices in other months varied from 57.18 to 121.95. A peak of 135.56 in index was observed during December in Ahmadabad market followed by October (134.96) and November (133.0). However, the price index of other months was between in 61.54 to 143.61. Surat market witnessed highest price index of 143.61 in October month. The market prices of onion in Rajkot found to be the highest in October (157.13). The lowest index was seen in May (60.19). Price index was between in 67.04 to 136.80 during other period. Price indices were more than 100 in the months of August to January. Lower indices were observed during May. The majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices. To analyze the arrivals pattern of onion during different months of the year and their impact on price, seasonal indices were computed adopting 12 months moving averages. Onion crop were sown in the month of October to December. It comes to harvest during Feb to April. Thus, fluctuation in the monthly indices of onion arrivals was more than the monthly indices of prices in selected market during the study period. The price movement also demonstrates significant seasonal fluctuations in the selected markets. As a short term fluctuations, one will notice a general finding that the price is low when the arrivals were large and the price being high when the arrivals were low.

## 6.11 Status and Potential of Onion Infrastructure

Lack of adequate and appropriate storage facility is one the major constraint which enforces distress sale on farmers. The present storage

capacities are either in adequate or unscientific. As a result of glut situation the price variability has been too high in the recent past. To improve the situation, GOI desired to create appropriate storage structures for onion, both at farm level as well as at market places. It drew a capital subsidy programme for the infrastructure development in which NABARD has been playing a pivotal role. The present storage capacity for onion is about 4.6 lakh tonnes. This is quite inadequate compared to our total production. Even most of the structures available are traditional and unscientific. If 40 per cent of the stocks are earmarked for scientific storage the potential for new storage structures is about 12.6 lakh tonnes. However, it has been projected by the Expert Committee on Cold Storage and Onion Storage that about 1.5 lakh tonnes on-farm capacity in production areas and 3.0 lakh tonnes capacity at APMCs and other market places are required in next 5 years. Thus, there remains a vast potential to be tapped.

### 6.12 Post Harvest Losses:

The total storage losses in onion in different storage structures in ranges between 3.46 per cent to 13.75 percent, while in cold storage, losses were only 5 per cent after 4 month of storage from may and October. While the storage losses in ambient storage conditions during the same period were 34 per cent. The weight loss, i.e. moisture loss and shrinkage were around 5 per cent and 21 per cent in cold storage and ambient store respectively. There was no diseases infection and sprouting in the cold stored onion, while around 11 per cent rotting and 2 per cent sprouting was notices in ambient storage. Higher infection of black mould was also found in ambient stored bulbs.

Post harvest loss in onion cultivation is believed to be very high, reportedly as much as 25 to 30 percent. Physical injury during and after harvest, greening of onion due to exposure to sunlight, sprouting and injuries during storage due to ammonia, controlled-atmosphere storage, and freezing also cause postharvest losses. Postharvest diseases on onion such as bacterial

soft rot, black mould, bulb rot, neck rot, and smudge, cause significant losses in the quantity and quality of onions during storage.

## 6.13 Cold Storages Facility

The present storage capacity for onion is quite inadequate and inefficient in preventing post harvest losses. The structures available are traditional and unscientific. Onion cold storage system is used in many countries of the world to store Indian onion. As Gujarat ranks second in Onion production and increasing area under onion require additional Onion cold storage facility to prevent post harvest losses, which is currently around 20-25 per cent of production and in value terms approximately INR 300 to 350 million every year. The cold chain industry in Gujarat is growing rapidly and now there are 625 cold storages with capacity of 23.2 lakh metric tonnes of which about two third of utilization was recorded by horticultural produce followed by animal husbandry and processed food (Table 4.8). Mahuva APMC in Bhavanagar district of Gujarat has constructed cold storage from the APEDA's grant in which 1200 tonnes of dehydrated onions can be stored.

As per State Department of Horticulture of Government of Gujarat, about 500 on farm structures of 25 to 35 mt each has been created with support of MIDH have been created. Storage facilities are established by processors as well as traders, farmers and cooperatives. It is estimated that 1.5 lakh mt storage is available for open market. There is the highest storage gap is recorded in Maharashtra followed by in Karnataka and Gujarat state .

## 6.14 Findings from Field Survey Data

### 6.14.1. Farmer Households

- The demographic profile of the selected sample households indicate that all the respondents were male and average age of respondent of selected farmers was around 42 years.
- Data indicate that on an average per household owned land holding size was 3.21 ha with all area under irrigation. The category wise average

land holding of small, medium and large category sample households was estimated to be 1.46, 3.36, and 6.40 hectare, respectively. On an average, per household 1.12 ha land was under onion cultivation, which accounts for about 35 per cent of total cultivated area. Across the selected land size groups, medium size holders put up relatively larger share of area under onion followed by small and large land holders group. Thus, it indicates that selected farm households had put around one third of total cultivated land under onion cultivation. There are number of reasons for cultivation of onion crop as it is short duration crop, best suitable land for onion cultivation, better price gain in onion crop other than competitive crops and number of onion processing also high.

- About 50 per cent selected farmers had market as a major source of planting material and had homemade seedlings used with good quality of planting material. All the respondents from large farmers group has used homemade planting material and did not face any difficulty in getting of these materials. Only 20 per cent farmers had received training or information about marketing practices of onion crops. About 80 per cent selected household have received price information from commission agent, AMPC and wholesaler for deciding production and marketing of Onion produces and about 90 per cent households had sold their produce immediate after harvest due to perishable crop, lack of storage facility and hot climate condition in these producing area of Gujarat
- About 436.5 quintals of onion were sold by selected household during the year 2017-18 which was 36 per cent more than previous year. The highest average quantity of onion was sold by large land holding size group house (540 quintals) followed by medium (481.25 quintals) and small farmers (288.25 quintals). In the case of season wise trade, the highest share of 80.81 per cent onion was traded in rabi season followed by sale in early rabi (9.26) and summer (7.64) season. About

80 per cent selected household has immediately sold after harvest due to lack of storage facility and perishable nature of product.

- All the onion producer respondents had sold onion in local markets of Mahuva and Bhavnagar district. On an average 36 kilometer distance was travelled for marketing onion by spending average time of around 1.27 hours by road. About Rs. 496 per ton cost was incurred by respondent famers on transportation of produce.
- On an average 80 per cent respondents had sold their onion produce in local market and rest sold within the state. The average operational cost incurred by the household (including loading and unloading) was estimated to be Rs. 89.58 per quintal. The cost was relatively higher in case of large land size group and the lowest was in case of small land holders which may be due to average distance travelled in sale of the onion produce. The major reason for preferred by respondent farmers these market were to get better price, low cost of transportation and near to village.
- About 10 percent of the farmers had storage facilities, which capacity of 25 tonnes of onion store. The onion crop is perishable crop and has 1-2 months of self life. During the months of June-July, almost all selected respondents required storage facility with a capacity of 25 tonnes. Around 5-10 per cent loss occurs during storage of onion. Almost selected respondent farmers cited few reasons behind not having farmer own onion storage unit such as due to high cost storage construction, small farmer, no space available, high labor cost and Weight loss and spoilage.
- As far as the farmers awareness about market charges are concerned, it was found that none of the respondent was not aware about the market charge prescribed by rule (such as Commission, Hamali/ Handling, weight men and market fees) and also were whether they were charged than prescribed rate. But all the respondents told that expense of unloading the market is too much (Table 5.8).

- During the discussion with farmers and field visits to selected study area, it was noted that majors problem faced in marketing of onion produce were high transportation cost, high marketing cost and lack Infrastructure facility like market sub-yard and storage facility. Few suggestions given by the respondents for the improvement of marketing facility and its benefits were creating warehouse facility at village level, APMC should provide market agent at village level and Market sub yard facility at village level to reduce marketing costs and reduce waste of time and production of onion.
- About 90 percent of selected farmer households had opined that they did not see any cartel and collusive behaviour of traders and commission agents in the market. Only one fourth of total middle land size group farmers had reported collusion among traders and commission agent
- At the time of sowing, farmers had expected price of Rs. 2500 per quintal while at the time before harvesting and after harvesting, expected rate was Rs. 2558.33 and Rs. 3125.0 per quintal, but actual price received by the onion farmer was less than expectation at any time, i.e. Rs. 2366.25 per quintal only.
- About 60 per cent of onion growers were satisfied with the existing production, marketing, storage and processing infrastructure however they have faced some problems. In case of onion production, it was reported that the most of respondents had faced the problem of low productivity, attack of pest–diseases, and quality of product. While marketing of produce, onion growers had faced with low price for produce, high labour and marketing cost. Lack of storage facility, high wastage of produce and reduction of weight during storage were infrastructure related problems were encounter by the respondents. In case of processing of onion produce, problems faced were high cost of processing, low value while after processing also export related problems were faced by onion grower.

- The selected farmers were asked to give their suggestions on various aspects of onion cultivation, marketing and export. The suggestions given by the farmers are given below.
    1. Export of onion should be promoted by keeping in view the increase in its demand and prices.
    2. Proper and sound storage facility for onion should be created by the Government, as onion is semi-perishable commodity.
    3. Adequate number of processing/dehydration units needs to be created/installed to increase the onion demand in market.
    4. Awareness about use of dried/dehydrated onion among the consumer needs to be increased though consumer awareness programme.
    5. Appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion; otherwise farmers will divert to the other crop.
    6. Advance information of weather should be made available to the farmers by the nearby Meteorology department of Agricultural University.
    7. Inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce.
    8. The number of available regulated markets are inefficient to handle the buffer produce of onion.
    9. The minimum support price for onion should be declared for onion crop as well (as market intervention scheme for onion was not declared in near past).
    10. There is a need to arrange and maintain cold storage of adequate capacity at some selected village / taluka level.
    11. Government should develop proper and sound marketing system.

### 6.14.2 Market Functionaries

**Traders**

- On an average, mainly three varieties of onion, viz. local, red and white onion arrivals is reported in the regulated market. It was also found that trader had on an average 36 years of experience in onion trading. The trader and Trader cum Commission agent licenses availed from APMC/Marketing Dept/Board. It shows that on an average about 8000 tons average quantity of onion is marketed annually and 5800 tons quantity of onion was traded previous year. The maximum quantity was traded during the rabi season 55.62 per cent and followed by early rabi season (28.13), summer season (10.63) and kharif season (5.62). Out of total quantity traded, only 100 MT onion was stored by the traders for emergency demand.
- Marketing strategy encompasses selecting and analyzing the target and creating and maintaining an appropriate marketing mix that satisfies the target consumers. The targeted purchasers and consumers of onion in selected market of the State are given in Table 5.18. In the selected markets, out of total procured quantity of onion, 90 per cent onion was procured from local market of Mahuva area and rest of 10 per cent was purchased within the state (Bhavnagar and Rajkot) and out of state (Nasik, Maharashtra) procured by traders. The average maximum transportation cost rupees of Rs. 3.5 per kg for procure from outside of state followed by Rs. 3.0 per kg within state and Rs 1.5 per kg onion procure from local market. The traders have then targeted to local area. This happens due to availability of onion at low cost. The road was the major mode of transportation for procurement and sale of onion by trader in Mahuva market. As far as onion sale by the traders is concerned, overall 85 per cent of the traders had sold the product outside the state; whereas only 5 per cent of them had sold within the state. Transportation cost incurred by trader for trading outside the state was estimated to be about Rs. 3.0 to 5.5 per kg. The major

targeted consumers markets were in the states of Delhi, Punjab, Haryana, Rajasthan, Assam, Bihar and Bengal.

- Most of traders preferred to purchase onion from local market because onion produce is generally available at low price with good quality. Most of the traders had preferred to sale their produce with in state due to good prices and less storable product.
- On an average, operation cost of per ton of onion procurement varied from Rs. 200/- to 850/- which includes transportation, loading and unloading, rent for storage, fees, monitoring and administering. In the process of trading, operational cost was borne by the buyer.
- Selected traders had expected high trade margin on total value to trade and also received high percentage of margin after trading of onion produce.
- Traders have faced major problems of lack of efficient transportation facility and high transportation cost. The respondents were asked to share their suggestions to solve these problems and they suggested that marketing facility should be made available by government at subsidize rate which includes transport facility, charges for loading and unloading of produce.
- Though onion is predominantly a winter crop, it is grown in all the three seasons depending upon the availability of irrigation facilities. The bulk of the onion is produced in the winter season which arrives in the market during April-May. However, the consumption of onion is spread throughout the year and there is steady demand for onion bulbs all the year round. Onion trader had 5 own storages with 3000 ton storage capacity and they require 2 more storage on rent with 1000 ton capacity at peak season. During the peak season, the product is sold within 15 days while 3-4 days in lean season.
- Onion is a seasonal crop, semi perishable in nature and has comparatively low storage ability and bulbs are usually stored until the harvest of next season crop or for longer period due to seasonal glut in

the market. Significant losses in quality and quantity of onion occur during storage. Storage of onion bulbs has therefore, become a serious problem in the state. Onion is grown mostly during rabi crop and huge quantity of arrivals is reported in the market in the month of Feb to April. Rabi onion has shelf life of about 2-6 months while traders generally store onion for 2-5 months period during this period. While Kharif onion which has shelf life of about 1-3 months and about 20 to 40 per cent total produce get loss during the storage period.

- Open auction method was followed by all the traders in selected Mahuva onion market.

**Commission Agent**

- The average years of experience of commission agents in these markets varied from 30 to 34 years. Apart from these, it also comes out from the table that most of commission agents owning shops had extended trading and storage area along with a separate space for a small office. In Vasana APMC, all respondents were awarded licenses as a Commission agent, whereas in Mahuva APMC, about half of the respondents were Trader and Commission agents.
- Average onion transaction is higher during rabi season which was about 25 mt followed by in early rabi (13.75 Metric tons), kharif (7.0 Metric tons) and Summer (5.00 Metric tons) season in the selected market. The average quantities transacted by commission agent were significantly higher in Ahmadabad APMC as compared to AMPC Mahuva, indicating either there is greater hold on market transactions or over-reported figures. Out of total quantity traded, only 17.5 mt of onion was stored by commission agent for emergency demand.
- Most of commission agents have reported that they adjusted their purchase and sale pattern in times of very high or low prices. The commission agents at Vasana APMC as well as at Ahmadabad APMC were well equipped with information and were connected with other

markets. Quantities transacted by commission agent of Vasana were quite high in volumes which was sold in outside the state while the commission agents of Mahuva market had traded the onion within the state.

- With respect to purchase of onion, it was observed that most of respondents' preferred local market due to relatively lower prices and availability of quality onion while preference for within state and outside the state market as per their choice for local onion requirement in the selected market. The choices of place for sale of onion by commission agent was for sale within state and out of state for high price received, while local market was preferred due to perishability of commodity and better price.
- On an average 3 per cent of total traded volume as a operational cost of onion incurred by commission agent which including transportation, loading and unloading, rent for storage, fees, monitoring and administering.
- High price fluctuation and lack of storage facility are the major problems faced by the commission agents during marketing and transport of produce. The respondents were asked to share their suggestions to solve these problems and they suggested that market intelligence and storage facility at major onion market need to be created/enhanced.
- During the peak season, the product is disposed within 2-3 days while it takes 3 to 5 days in the lean season. None of trader had onion storage facility. Despite of same, due to high perishablilty of product, they don't require any storage facility.
- Among the various types of trading mechanism followed during the purchase and sale Onion, mutual agreement and open auction method was followed by all commission agents in both selected onion market.

**Processor**

- On account of rapid urbanization, hectic schedules and rising working population, the demand for onion powder is witnessing a tremendous growth, particularly in India. In order to save time, consumers are not willing to indulge in difficult cooking procedures such as chopping onions. Apart from this, food processing represents one of the largest sectors in India which is bolstering the demand for onion powder. Rising consumer awareness about the improved shelf life of dehydrated foods has contributed to the growing adoption of dry onions among consumers, especially within developing economies. Onion dehydration industry of the state is the biggest in the country and it comprises 80 per cent of the total dehydration units which process nearly one lakh tonnes of onion. High initial investment in onion processing industry and high uncertainty in production enhanced the risk in this business.
- The details of onion processing unit in Mahuva market indicate that processor had purcahsed only three variety of onion for processing and on an average about 75 MT of onion is processed annually. About 50 mt of onions were purchased in previous year and in which about 60 percent was purchased in Rabi season followed by early Rabi (20 per cent) season. The processor had onion storage and only 30 percent of the total quantity of purchase is stored by processor for emergency demand.
- About 90 per cent of onion was purchased from local market and while rest of quantity was procured from outside the state.
- One of the prime reasons behind high volatility in onion prices stems from a lack of storage facilities that have not kept pace with rising production. Also, the traditional storage practices incur losses as high as 40 per cent. Processor has storage facility and the storage capacity is 250 meters. The current facility of onion storage is not enough for the processor because of huge market arrives in the month of December to May and it requires high storage facilities with high storage capacity.

Onion is perishable crop and it has only 3 to 5 month shelf life while processor stores in only 3 months. There is no difficulty faced in obtaining processor licenses by the processor.

- The market structure of onion is unilaterally dictated by the traders, not farmers. Minimal role of farmers in price discovery due to low size of average farm holdings, unfavorable weather conditions and price risk were cited as major reasons for the situation.
- Processor had faced problems regarding marketing and storage of onion. The area of market yard and auction place is very small and all functionaries of marketing face problem in peak arrival. The majority of the respondents had suggested to increase the infrastructure facility likes market yard, auction place and storage facility in Mahuva market to overcome problems in marketing of onion.

**Warehouses**

- Onion is stored in ambient storage condition in state where the storage losses are very high. These losses are comprises of physiological loss in weight (PLW) i.e. moisture losses and shrinkage, rotting and sprouting. The storability of onion is influenced by several factors such as varieties, cultural practices, pre-harvest treatments and post harvest handing practices. The storage environment during the period of storage plays an important role in the storage life and losses during the storage.
- All type of onion varieties have been stored and on an average 50 MT onions annually purchase by stockiest. Stockiest, nearly 30 Onion warehouse have capacity of 75 MT. The warehouse is located in Mahuwa city of Bhavnagar District. About 35 million tonnes of onion procure was done during the last one year, which purchased 57.14 per cent Rabi seasons and 42.86 per cent in the early Rabi season.
- In selected markets, out of the total procured quantity, 80 per cent onion was procured from local market of Mahuva area and rest 20 per cent was from other places within the state (Bhavnagar and Rajkot).

The stockiest have then targeted to local area. This happens due to availability of onion high at low cost. The road is major mode of transportation for procure and sold of onion stockiest in Mahuva market. As far as onion sold by the traders is concerned, overall 100 per cent of the traders sold the product to outside the state. About Rs. 3.0 to 5.5/ kg transportation cost incurred by stokiest for trading outside the state. The major targeted consumers markets Delhi, Punjab, Haryana and Rajasthan.

- Average years of work experience of onion storage in these markets was 45 years and it worked as trader cum warehouse owner. The respondent has 30 warehouses with about 70 Metric tons of storage capacity and enough storage capacity in warehouse. They have lease out the storage to traders for three months. Onion has only 3-4 month shelf life but they store the onions in the warehouse for 3 months. In temporary storage structures onion is generally stored for one to three months while in semi- permanent and permanent structures, onions can be stored for 3 to 5 months depending upon the market rates. As for as the storage losses are concerned, the losses were high in temporary type structures despite of lesser period of storage. There was no difficulty faced in obtaining warehouse licenses by the traders. The owner of the warehouse has no loan facility provide for people who have onion in storage.
- Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption. On an average of Rs. 50 to 70 per quintal charged on the storage of onions for a period of one to two months. Most of onion stored in warehouse by the traders and big farmers.

## 6.15 Policy Recommendations:

*(a) Short Term policy interventions*

- Though, India holds premier positions in area and production, the productivity of onion is very low compared to other countries. There is need to increase productivity by making them available quality seed (suitable to soil and weather condition) to farmer at reasonable rate by the concern State Agricultural University/State Seed Corporation.
- The available regulated markets are inefficient to handle the buffer produce of onion. Also inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce. Therefore, the appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion. NAFED or any other notified procurement agency/ies should procure onion at least 5 per cent of produce from open market and should store it.
- The advance information on weather should be made available to the farmers by the nearby Meteorology department of Agricultural University. Also crop insurance facility should be provided to the farmers.
- Farmers suggested that in case price of onion falls to unduly levels, the government must step in and purchase the produce to avoid distress sales. Market Intervention Scheme should be implemented in time as and when prices drastically fall below the minimum level. On Pilot basis, Government support scheme with minimum assured purchase price to farmers for any future date purchase declared in advance can be attempted so that farmer can keep stock it.
- A visit was made to Mahua APMC and discussions were held with concerned market functionaries. It was quite clear from the discussions that some traders also stored onions in anticipation of higher prices.

After making purchases from farmers, they sometimes stored the onions instead of immediate sales. These commission agents also indicated that they stored onions. However, when an attempt was made to find out the quantity stored by them, they were very reluctant to disclose the quantity stored and only complained of transport bottlenecks because of which they were forced to store.

- The discussion with market functionaries and stakeholders reveal that even the media plays a role in causing sudden rise or downfall in prices by publishing certain news for which they are paid. For example, there may be sudden news of very high auction prices in upcountry markets which immediately lead to spiraling of prices in urban centres. In reality only one transaction may have been at very high price, but the media hypes it up, and wholesalers and retailers jack up the prices. Conversely, the media may talk about falling demand for onions and low prices prevailing in several markets. This acts as a downward pressure on prices and onion growers may have to make distress sales.
- Meeting with traders revealed that it is mostly the retailers who charge higher prices than warranted to the consumers. There is no regulation on prices charged by retailers and at times their rates are exorbitant, especially when the produce is in short supply.
- Onion cooperatives and FPOs must be encouraged to form and work in study area because presence of cooperatives would help the farmers to receive better prices and help to prevent collusion amongst traders not to bid beyond a certain price and also discipline prices.
- Besides, Farmer Producers Organization should be promoted to create required storages structures with support of subsidy. Government should assign the work, provide resolving fund or help for pledge loan and compensate interests.

*(b) Medium Term policy interventions*

- There is a poor post-harvest management at farm level. The total storage losses in onion in different storage structures estimated to be about 15 percent. Effective crop planning and creation of post-harvest management infrastructure for onion will go a long way to solve the issues related to onion supply chain. Efforts will have to be made to improve the present post-harvest processing and storage systems and educating the farmers and traders in handling/processing the produce hygienically and efficiently.
- Marketing information is needed by farmers in planning production and marketing, and equally needed by other market participants in arriving at optimal trading decisions. Therefore, agricultural marketing extension system needs to be strengthened.
- The price spikes of onion in many ways cannot be explained fully by the fundamentals of demand-supply. High inflation of food commodities cannot always be attributed to risks, exogenous shocks and mismatch of demand and supply, it can also be caused by market inefficiencies, weak supply chains and monopolies in the market. States Government must act against hoarders. Central government must reduce transportation bottleneck by making available railway wagons/racks for transport of onions. Besides, there is a need to create regional storages to cater need of the region as per requirement.
- The difference in freight charges at different port should be removed. Proper storage facility at port on minimal rate should be provided. The loan arrangement at subsidies rate on the basis of quantum of export should be provided to the exporters. Also insurance facility should be provided to exporters in order to cover the loss due to cancellation of order and delay in delivery in respective countries.
- A large number of exporters meet their export requirements from APMCs in Bhavnagar, Junagarh. However, their produce is often not

cleared at port for 3 to 4 days. They therefore refrain from entering the local markets till their export commitments are dispatched. Since supply is choked up, exporters do not enter the market till their consignments are dispatched leading to price fall. Hence, if export orders are timely dispatched, it is possible that volume of exports may increase which will benefit farmers.

- A meeting with wholesalers and exporters revealed that there are several bottlenecks in onion trade, transportation is major one. Another major problem facing traders is the export ban which is sometimes imposed when onion prices show an upward trend. Exporters lose their credibility in export markets as irregular suppliers in international markets. Added to this is the practice of fixing Minimum Export Prices (MEP) for onions. At times the MEP is fixed at very high levels and exporters actually sell at prices below MEP though the L/C (letter of credit) is prepared at MEP. Therefore the profit realized by exporters shows an inflated figure leading to higher tax liability. Also fixation of MEP makes exporters reluctant to export which sometimes leads to excess supplies in domestic markets, leading to fall in prices. Farmers also loose when prices show downward trend. In view of these difficulties, export ban on onions coupled with fixation of MEP must be discouraged.

*(c) Long Term policy interventions*

- It was observed in the study that most of the onion crop is sold in APMC and farmers preferred this channel because they were familiar with the system which was practiced over the years and they received timely payments. Marketing infrastructure in the Mahua market was very good, whereas at other places, infrastructure up-gradation is required as per requirement.
- Onion dry product needs to be promoted in the market. The adequate number of processing/dehydration units needs to be created/installed to

increase the onion demand in market. The awareness about use of dried/dehydrated onion among the consumer needs to be made though consumer awareness programme.

- Farmers normally store onions in onion meda/chawls (temporary storage structure) to benefit from lean season rise in prices. However, this method of storage leads to deterioration in quality, spoilage and shrinkage. Often storing of onions leads to losses of 30-40 percent. Traders therefore stated that storing of onions in meda/chawls is a very rudimentary method of storage and there is urgent need for technology such as well designed cold storage which will enable the crop to remain in the same condition without spoilage or shrinkage. This will help to even out supplies throughout the year and also lead to better production planning of the crop and more stability in prices.
- There is a dearth of cold chain infrastructure for onion. Onion can also be stored for a long period without any spoilage under ultra-low oxygen controlled atmosphere (CA) storages. Sprouting of onion during storage in high humidity and low light conditions is a major constraint leading to huge losses to the farmers/ traders. Irradiation, a cold preservation method is highly effective in controlling sprouting of onion. Govt. of India had approved irradiation of onion, potato and spices in 1994 for internal marketing and consumption. Department of Atomic Energy (DAE) has set up two 500 kg/hr capacity demonstration plants at Lasalgaon and Navi Mumbai. Commercial units have also been set up in Karnataka and Rajasthan. More such facilities need to be created to arrest large spoilage of onion in the country.

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# Annexures

## Annexure I: Different Varieties of Onion

**Onion : (Big)**

**Agrifound Dark Red:** Bulbs are dark red in colour, globular in shape with tight skin, moderately pungent. Mature in 95-110 days after transplanting. Recommended for growing in *Kharif* season to all over the country.

**Agrifound Light Red:** Bulbs are globular in shape with tight skin and light red colour. Mature in 110-120 days after transplanting having good keeping quality. Recommended for growing in *Rabi* season all over country.

**NHRDF-Red (LINE-28):** Bulbs are attractive dark red in colour. Variety is very popular among farmers in North India because of its attractive dark red colour and better storage performance. Mature in 110-120 days after transplanting. Recommend for cultivation in Northern, Central and Western India in *Rabi* season.

**NHRDF-Red-2 (L-355):** Bulbs are attractive red in colour, globular in shape with tight skin. Mature in 100-120 days after transplanting. Recommended for growing in *Rabi* season.

**Agrifound White**: Bulbs are globular in shape, tight skin and silvery attractive white colour. Mature in 110-130 days after transplanting having good keeping quality. Suitable for cultivation in *late Kharif* and *Rabi* seasons. Good variety for dehydration. Recommended for Maharashtra, Madhya Pradesh and Gujarat.

**Onion (Small)**

**Agrifound Rose**: Bulbs are flatish round in shape, deep scarlet red in colour. Mature in 95-110 days from sowing. Variety is suitable for growing in *Kharif* in Andhra Pradesh and in all three seasons in Karnataka.

**Onion (Multiplier)**

**Agrifound Red**: Average size of cluster is 7.15cm with average weight of 65-67 g. Average numbers of bulblets per cluster 5-6. Colour of bulblets is light red. Mature in 65-67 days after planting. Recommended for cultivation in *Kharif* and *Rabi* in Tamil Nadu, Karnataka and Kerala.

| Species name | Name of Developing University / Institution | Recommended for suitable weather |
|---|---|---|
| **Onions: Onions common red** | | |
| Punjab Selection | Punjab Agricultural University, Ludhiana, Punjab | Rabi |
| Pusa Ratnar | N.B.P.G.R., New Delhi | Rabi |
| Pusa Red | Indian Institute of Agricultural Research, New Delhi | Agatti Kharif and Rabi |
| N-2-4-1 | Department of Agriculture, Maharashtra | Agatti Kharif and Rabi |
| Pusa Madhavi | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Arka Niketan | Indian Institute of Horticultural Research, Bangalore, Karnataka | Agatti Kharif and Rabi |
| Arka Kalyan | Indian Institute of Horticultural Research, Bangalore, Karnataka | Agatti Kharif and Rabi |
| Agrifound Dark Red | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Kharif |
| Kalyanpur Red Round | Chandrashekhar Azad University of Agriculture and Technology, Kanpur, Uttar Pradesh | Rabi |
| Agrifound light Red | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Agatti Kharif and Rabi |
| Hissar-2 | Haryana Agricultural University, Hisar, Haryana | Rabi |
| Panjab Red Round | Punjab Agricultural University, Ludhiana, Punjab | Rabi |
| Arka Pragati | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| N-53 | Department of Agriculture, Maharashtra | Kharif |
| Basavant-780 | Mahatma Phule Agricultural University, Rahuri, Maharashtra | Kharif |
| Udaipur-101 | Rajasthan Agricultural University, Udaipur, Rajasthan | Rabi |
| Udaipur-103 | Rajasthan Agricultural University, Udaipur, Rajasthan | Rabi |
| Phule Samarth | Mahatma Phule Agricultural University, Rahuri, Maharashtra | Agatti Kharif |
| N.H.R.D.F.- Red | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Rabi |
| N.H.R.D.F.- Red-2 | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Rabi |
| N.H.R.D.F.- Red-3 | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Agatti Kharif and Rabi |
| N.H.R.D.F.- Red-4 | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Agatti Kharif and Rabi |
| N.H.R.D.F.- Fursangi | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Agatti Kharif and Rabi |
| H.O.S-1 | Haryana Agricultural University, Hisar, Haryana | Rabi |
| Panjab Naroya (P.V.R.-5) | Punjab Agricultural University, Ludhiana, Punjab | Rabi |
| Arka Bhim | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Arka Akshaya | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| V L-3 | Vivekanand Mountain Agricultural Research, Almora, Uttarakhand | Rabi |
| V L-63 | Vivekanand Mountain Agricultural Research, | Rabi |

| | | |
|---|---|---|
| | Almora, Uttarakhand | |
| Bhima Raj | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Kharif |
| Bhima Red | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Kharif |
| Bhima Super | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Kharif and Agatti Kharif |
| Bhima Sakti | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Late kharif and rabi |
| Bhima Kiran | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Rabi |
| Bhima Dark Red | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Rabi |
| Rajasthan Onion-1 (R.O.-1) | Rajasthan Agricultural Research Institute, Durgapura, Rajasthan | Rabi |
| Aprita | Rajasthan Agricultural Research Institute, Durgapura, Rajasthan | Rabi |
| R.O.-252 | Rajasthan Agricultural Research Institute, Durgapura, Rajasthan | Rabi |
| Selection-126 | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Selection-131 | Indian Institute of Agricultural Research, New Delhi | Rabi |
| L-102 | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Pusa Ridhhi | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Pusa soumya | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Hissar onion-4 | Haryana Agricultural University, Hisar, Haryana | Rabi |
| **Yellow Onion** | | |
| Early Greno | Indian Institute of Agricultural Research, New Delhi | Kharif and Rabi |
| Spanish Brown | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Phule Suvarna | Mahatma Phule Agricultural University, Rahuri, Maharashtra | Late Kharif and Rabi |
| Arka Sona | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Arka Pitambar | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| **White Onion** | | |
| Pusa White Round | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Pusa White Flat | Indian Institute of Agricultural Research, New Delhi | Rabi |
| Panjab-48 | Punjab Agricultural University, Ludhiana, Punjab | Rabi |
| Panjab White | Punjab Agricultural University, Ludhiana, Punjab | Rabi |
| Udaipur-102 | Rajasthan Agricultural University, Udaipur, Rajasthan | Rabi |
| N-257-9-1 | Department of Agriculture, Maharashtra | Rabi |
| Phule White | Mahatma Phule Agricultural University, Rahuri, Maharashtra | Rabi |
| Agrifound White | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Late Kharif and Rabi |
| P.K.B. White | Punjab Rao Deshmukh Agricultural University, | Rabi |

| | | |
|---|---|---|
| | Akola, Maharashtra | |
| Gujarat White Onion | Gujarat Agricultural University, Junagadh, Gujarat | Rabi |
| Arka Svadista | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Bhima Sweta | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Kharif and Rabi |
| Bhima Subhra | Onion and Garlic Research Directorate, Rajgurunagar, Pune, Maharashtra | Kharif and Late Kharif |
| **Small Onion** | | |
| Agrifound Rose | National Horticulture Research and Development Establishment, Nashik, Maharashtra | Kharif, Agatti Kharif, Rabi |
| Arka Bindu | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Arka Visvas | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| **Multiplier Onion** | | |
| C.O.-1 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| C.O.-2 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| C.O.-3 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| C.O.-4 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| C.O.-5 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| M.D.U.-1 | Tamil Nadu Agricultural University, Coimbatutur, Tamilnadu | Kharif and Rabi |
| Agrifound Red | N.H.R.D.F., Nasik, Maharastra | Kharif and Rabi |
| Arka Ujjaval | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| **Hybred Onion** | | |
| Arka Kirtiman | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Arka Lalima | Indian Institute of Horticultural Research, Bangalore, Karnataka | Rabi |
| Mercedes | Semenys Pvt Ltd | Late Kharif Rabi |
| Kangar | Semenys Pvt Ltd | Late Kharif Rabi |
| Kolina | Semenys Pvt Ltd | Late Kharif Rabi |
| Ex keiliver | Semenys Pvt Ltd | Late Kharif Rabi |
| Lusifer | Bezozhil Pvt. Ltd., Jalna, Maharashtra | Rabi |
| Kistal | Nunhemshem Limited | Rabi |

# Annexure II: Lean and Peak Seasons-Onion Cultivation

| Sr. No | Seasons | Time of sowing | Time of Transplanting | Time of Harvesting |
|---|---|---|---|---|
| 1. | **Maharashtra and some parts of Gujarat** | | | |
| | 1. Early Kharif | May-June | July-August | September-December |
| | 2. Kharif | August-September | September-October | January-March |
| | 3. Rabi | October -November | December-January | April-May |
| 2. | **Tamil Nadu/Karnataka/A.P.** | | | |
| | 1. Early Kharif | March-April | April-May | July-August |
| | 2. Kharif | May-June | July-August | October -November |
| | 3. Rabi | September-October | November-December | March-April |
| 3. | **Rajasthan/Haryana/Punjab/Uttar Pradesh and Bihar** | | | |
| | 1. Kharif | May-June | July-August | November-December |
| | 2. Rabi | October -November | December- January | May-June |
| 4. | **West Bengal and Orissa** | | | |
| | 1. Kharif | June- July | August-September | November-December |
| | 2. Late Kharif | August-September | October-December | February-March |
| 5. | **Hills** | | | |
| | 1. Rabi | September-October | October -November | June-July |
| | 2. Summer | November-December | February-March | August-September |

## Lean and Peak Seasons

| State | Jan | Feb | Mar | Apr | May | Jun | July | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maharashtra | Lean season | Lean season | Lean season | Peak season | Peak season | Lean season | | | | Lean season | Peak season | Lean season |
| Gujarat | Lean season | Peak season | Lean season | Lean season | Lean season | Lean season | | | | Lean season | Peak season | Lean season |
| Bihar | | Lean season | Peak season | Lean season | | | | | | | | |
| Karnataka | Lean season | | | | | | | Lean season | Lean season | Peak season | Peak season | Peak season |
| andhra Pradesh | | | Lean season | Peak season | Peak season | Lean season | | Lean season | Peak season | Peak season | Peak season | Lean season |
| Madhya Pradesh | | | | Lean season | Peak season | Lean season | Lean season | | | | | |
| Rajasthan | | | Lean season | Peak season | Lean season | Lean season | | | | | Lean season | Lean season |
| Haryana | | | Lean season | Peak season | Lean season | Lean season | | | | | Lean season | Lean season |
| Uttar Pradesh | | Lean season | Peak season | Peak season | Peak season | Lean season | | | | | Lean season | Lean season |

## Annexure III: Storage Structures (Medha) in Gujarat

# Annexure IV: Marketing of Onion in Gujarat

## Annexure V: Onion Cold Storage at APMC Mahuva


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07/03/2017

**While enjoying the taste of inexpensive and delicious onion, let's understand the pain of a farmer.**

**-The truth about cheap and costly onion**

Known as the *"Kastoori"* (Musk) of the poor, onion is now not limited to the plates of the poor but and is being used to cook tasty dishes in the middle and upper class families. It is abundantly used in the restaurants enhance the taste.

This *Kastoori* has been the cause of the grief of the farmers for the last on and half years. The farmers are crying not because chopping the onions but because of the low prices that the farmers are getting since January – 2016. The onions which were stored during the monsoon and ate by the people of country during previous July 2016 and November 2016 have made the farmers incur a loss of Rs. 10 per kg. (Rs. 200 per twenty kg). While the amount of loss for the onions consumed from December 2016 to March 2017 is Rs. 5 per kg.

The farmer has incurred a loss of Rs. 5 per kg in the new crop which has been reaped from Gujarat and Maharashtra from January 2017 and which is consumed by the country presently. This issue has been raised in front of the government by the Farmer leaders several times but they are still unheard. The supply of onion for the daily requirement of 35-40 thousand tonne is available in the country. Prises rise and fall with the demand. There government does not have any proper arrangement to help the farmers who are affected by the falling prices. I this way, the farmer's economic condition deteriorates as the prices go low. Consequently, the farmers do not saw onion for the next year and the production decreases resulting in a prise rise. Hence, people suffer. Prises literally sore as there is no mechanism to check the prise rise. Farmers lament that when the prises rise to Rs. 80 per kg, the media reach to the food market and by showing the onions remind the house-views of their imbalanced budget and hence remind of a great misery. The media also shows the people that the prise rise is due to the hoarders and black marketers. According to the opinion of media, if these very people are responsible, they have been cast away from the country resulting in such low prices of onion. And if they do not return, the prices of onion will never sore in future. The opposition is always eager to blame the government and the truth never reaches to the public. Whichever may be the ruling party, the measures to stop the hike and dip of the prices are never effective. The media compete to prove the government wrong in this matter. None has the time to find the root of the problem. The TV channels go to the food market when the prises are Rs. 80 per kg but they would never go to the market yard when the prises are Rs. 80 per 20 kg in wholesale.

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Through this article, we want to reveal the truth in front of the people that the prise changes of onion are dependent on demand and supply. No middlemen or hoarders (those who stock the onions are not hoarders but are stockists) are responsible. If it is so then where have been these people for last one and half years that we are eating such inexpensive onion? It is necessary for the people to understand that the condition of onion is completely different from that of the other food products. Same is not the case with onion as we store wheat, pearl millet, potato, gram or garlic. In case of other products, the storage cost and weight loss is minimal. They can be stored in the storage houses and cold storages of other states and cities of the country. Whereas onion is stored in only 6 to 7 states and his storage is limited to certain regions of a state, e.g., onion is stored in 5 to 7 talukas of Gujarat but everyone needs onion. Wheat, pearl millet, pulses or rice can be stored in any store-house of any city and can be made available people of respective cities when needed. Potatoes are, however, produced in certain and in limited areas; they can be stored in any cold storage in any corner of the country and can be available in any city at any time.

There is no weight-loss in the abovementioned things. This is not the case with onion. The onion, reaped during certain period (in May) , from certain region and of certain type, can be stored. It can only be stored in the godowns of certain design. Thus it cannot be stored like any regular thing and by any regular merchant. it cannot be stored in a cold storage. It can be stored in a natural environment in a container whose bottom and sides are made of bamboo. This is costly. Thus, only certain types of onions sawn in certain areas and on certain time can be stored in certain godowns. Moreover, the onion must be replaced every month at a cost of Rs. 5 per 20 kg. The stored onion reduces by time. Hence, if stored for five months, it loses 40 to 50% weight. Therefore, the onion stored in May at a cost prise of Rs. 150 per kg attains a cost price of Rs. 400 per 20 kg in September- October. In this way, without any significant change, the cost prise increases by more than twice. This does not happen in case of other crops. People must know this truth. Because, they wonder that the prices are doubled in three to four months. Quite obviously, they feel that all this is because of the hoarding. But the truth is different. In my opinion, those who store onion actually serve the nation. The country does not get onions directly from the fields. We get it from the storage. For these four months, the government is unable store this huge amount (40 to 50 lac tonne) of onion and if the government does store, it stores he onion at a risk of losing the investment entirely (as it happened in last monsoon). They are, indeed, serving the nation. If they do not take such a risk, how would we get onion in the monsoon? The basic difference in the storage of onion and that of the other crops is that you can store the other things for so long as you want and can sell when you get a good price. However, it is not the case for onion. Once it starts rotting, you have to sell it at any price and at any time (during 1 and 5 months). No matter whether you incur loss and even if you think that the prices would rise after some time, you cannot hold the onion. The onion does not last for more than 5 to 6 months and whichever is left has already become halved and has to be sold at any price. You have to sell it at Rs. 60 per 20 kg even if your cost price is Rs. 600. (which happened during the last monsoon.) Secondly, the shelf life of the onion ripped during January and April is only 15 days. It has to be used. Therefore, the prise rise of onion has nothing to do with the exports of onion during January and April.

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The prise rise generally takes place from August to November. The reasons are (1) the amount of onion stored is less, (2) the amount stored is enough but the new crop is yet to be reaped (3) the stored onion has been used up and the rain damages the crop. If the damage is greater and the stored onion is used up then it is obvious that the price of onion trades in triple figure (more than 100).

There is a great difference in the wholesale and retail prices of onion because there is a big weight loss in retail selling and the rotten onions have to be thrown away. If the wages of the people associated in the retail selling of the onion are considered, the difference in the prices is obvious. If someone thinks that the retailers are black marketing, I have a very helpful advice for them that if there is a great amount of profits, hen these people themselves can do this business. The wholesaler gives the onion on credit. The investment in the retailing is only a weighing scale, weights, a cart and some place in the market to sell the onions. The place is available for free. Those who want to earn a great deal of profit may do this work. There is no need to get any license, TIN and sales tax number, to invest any funds. It is a good work to do rather than abusing the retailers.

The purpose of this article is to draw the attention of the government and people to the current grave condition of farmers. I want to put the facts in front of the people. The farmer affected by the low price of the onion may not wish to saw onion again. This may lead to a price hike. If it happens, we must be prepared to eat expensive onions, we must not think of committing suicide. We should let his this right be rested to the farmers. The costly onion may add an annual load of Rs. 1000 to 1500 in the budget but the cheap onion will ruin the family of a farmer completely. I request you to recall the pain of the family of a farmer while enjoying tasty and cheap onion. The government can still do a lot and it should do. Such are the sentiments of the farmer society and me.

Dt.07/03/2017,

Mahuva.

Ghanshyambhai Patel

Chairman,

APMC MAHUVA

KISAN DEVO BHAVA

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**Date: 05/09/2017**

**To,**
**Shri Narendrabhai Modi,**
**Honorable Prime Minister of India,**
**New Delhi,**

**Sub: To Implement the Policy regarding the 'Minimum Export Price' (M.E.P) for the export of the Dehydrated White Onion.**

**Respected Sir,**

Jay Kisan,

Kindly accept our earnest greetings.

Sir, we would like to bring to your esteemed attention the dilemma of farmers involved in production of white onions due to very low price offered to farmers for their crop that is further exported by white onion processors.

The region of Saurashtra leads in the national production of White Onions with contribution of about 90 - 95% of that produce is dehydrated and exported. Consequently the Industry of Dehydration of White onions have been deployed in Saurashtra, mainly in the region of Mahuva taluka of Bhavnagar district. Out of total 150 dehydration units of the Saurashtra, 125 are operating in Mahuva. 25 new units are planned for the next season. Likewise 30 cold storages have been commissioned to support these dehydration units. 20 of such cold storages will be coming up shortly. The dehydration industry is thriving in the Saurashtra belt with the support of Government. Mahuva has established its name on the global map due to its key strategic location for white onion dehydration industry, paving way for procurement of precious foreign exchange in the country.

In this context we would like to draw your kind attention towards the fact that prices of white onions were opened at Rs. 200/- per 20 kg. at the beginning of the previous season i.e. January 2017. The price gradually got reduced to Rs. 60/- further decreasing to Rs. 20/- (Per 20 kg.) from the month of February 2017 to the subsequent 5 months and the entire crop has been sold at these rates. As a result the farmers growing white onions have suffered huge

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losses running in crores of rupees during these 5 months. On an average such farmers have suffered a setback of Rs. 5/- per kg. against which the state government has declared compensation of Rs. 1/- per kg. which obviously is inadequate to compensate for the monetary loss. Currently the procedure of remittance of this compensation is going on.

Sir, in this regard we request an **implementation of Minimum Export Price Policy** for the export of these products so as to insulate these farmers from erratic price plummeting.

While pondering over the above suggestion it will be worthwhile to delve in the reasons associated with losses of the farmers. It would be interesting to note that price reduction of dehydrated white onions was not triggered by any external factor, viz price reduction by countries of export or reduction in demand of the supply. USA produces 50% of total world supply that is domestically consumed hence it does not participate in the supply scenario. With total contribution of 25% of world's production India is the second largest producer of dehydrated white onions. China and Egypt jointly supply 15% of the total demand. The other countries supply remaining 10%. So the major part of the supply comes from India.

This already establishes India in a monopoly situation. But the irony is, although being the principal exporter of the dehydrated white onions into the world, our prices are the lowest. During the previous season of January 2017 where the export price of Egypt was set at around US$ 2100/ton, our prices were merely at US$ 1400/ton. These differences were not due to inferior quality but due to the lower price offered by our exporters.

The countries importing our consignments enter into a yearly contract once a year in January and get the supply throughout the year on prices decided upon at that time. The prices offered by our exporters in January 2017 were based on the assumed costs of the white onions i.e. Rs. 150/- (per 20 kg). In subsequent months between February and April they reduced the prices to US$ 900/ton due to their ongoing internal business competition.
Obviously the advantage of this conflict was taken by importing countries resulting in reduction of the prices of onions ranging from Rs. 20/- to Rs. 50/-.
Hence this internal conflict of the exporters took a toll on the income of the farmers affecting their situation drastically.

Sir, in order to avoid such situation in future and to safeguard the farmers from this unhealthy competition among the exporters we duly propose the implementation of Policy of Minimum Export Price into the Dehydrated White Onions.

The Price of Minimum Export Price in the Product of Fresh Onion (Raw Onion) was effective till December 2015. Thereafter it has withdrawn. White onions are only used for the dehydration so the increase in their support price will not affect their consumption by people and will also be beneficial to the farmers.
Hence we once again humbly request that the Minimum Export Price for the Dehydrated White Onions needs to be decided after due analysis at the earliest with a provision to revise the same as per the situations.

Following Points needs to be considered while deciding on 'Minimum Export Price' (MEP)

1. White onions are mainly used in Dehydration and for export purposes so any increase in its price will not affect the common consumer while it will be beneficial to the farmers. The white onions are not used in our Daily staples for the Food Consumption.

2. The Government is providing subsidy of Crores of rupees along with relief into the interest rates to the farmers and industrialist to earn the foreign exchange. If the benefit of such step is not reaching ultimately to the farmers, it becomes imperative for the government to take suitable steps.

3. No other Country can supply the required quantity giving us an upper hand to implement the policy of Minimum Export Price (M.E.P) and demand the same. The move will be equally advantageous for the farmers and Industrialists alike.

4. The Minimum export Price (M.E.P) should be decided by considering the cost to the farmers and rational profit on the same.

5. Presently we are enjoying Monopoly situations in the International market. This route of implementation of Minimum Export Price (M.E.P) is the most suitable way of doubling the Farmers Income.

We look forward towards a concrete step towards implementation of Minimum Export Price for the benefits of the farmers, safeguarding their interests.

Thanks and Regards,

(Ghanshyambhai Patel)
Chairman,
APMC, Mahuva

**CC to:**

1. **Shri Suresh Prabhu**
   Hon. Minister of Commerce and Industry
   Government of India
   Delhi.

2. **Shri Radha Mohan Singh**
   Hon. Minister of Agriculture & Farmers Welfare
   Government of India
   Delhi.

3. **Shri Mansukhbhai Mandavia**
   Hon. Minister (State)
   Chemical and Fertilizer Department
   Government of India
   Delhi.

**Note**: We have passed resolution regarding the presentation of this matter to the state government at the meeting dated 15/7/2017 of the APMC, Mahuva. Subsequently the meeting of the chairmen of the 15 APMC of the Onion Producing Belt had been held at Gondal on 12/8/2017. The resolution has been seconded after due deliberations. All the Members of the Legislator Assembly from the Saurashtra Region have been informed regarding this and are requested to present the same at higher levels.

# ALL INDIA VEGETABLE DEHYDRATED MANUFACTURER DEVELOPMENT ASSOCIATION

AIVDMDA
Reg. No. F/2837/BHAVNAGAR



Date: 31/10/2017

To,

G Seetharam Reddy, CSS
Advisor (Trade)
Govt. ofindia
Ministry of Agriculture and Farmers Welfare
Room No.- 188-A, KrishiBhawan,
New Delhi - 110001

**Subject: To implement M.E.P. (Minimum Export Price) of dehydrated onions, thus permanently safeguarding the onion dehydration industry that is 100% export oriented and brings in foreign exchange for the country, as well as ensuring fair and sustainable price to farmers for their produce.**

With reference to above subject, Mahuva region in Bhavnagar district of Gujarat is known round the globe for its white onion dehydration industry. Mahuva region boasts of 100+ onion dehydration unitsresponsible for 80,000 tons of produce annually, making up to 80% of total Indian production. These white onions are primarily used for dehydration purposes, with the majority of them getting exported out of the country, and hence, their prices are highly dependent on the global market.Providing financial benefits to onion growing farmers, the state and the central government provides subsidies and lower interest rates to the dehydration industries.

In January 2017, the international price of dehydrated white onions was about 1400 USD, determining about Rs. 9 per kg of white onions at the APMC Market Yard. However, as the demand increased, the exporters started decreasing the price of processed onions, making it fall to a shocking low of 900 USD in April-May,

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resulting in huge losses to both, the exporters and processors. It reduced the price by Rs. 2-3 per kg adversely affecting the farmers, given that the cost price of onions for farmers falls to about Rs. 7 per kg at the APMC Market Yard.

The heavy losses faced by processers, exporters and farmers are due to the internal unhealthy competition between exporters, an issue that has actively been taken advantage of by foreign importers. No other dehydration onion processing country has decreased their prices.

There is a huge international demand for Indian dehydrated onions, with India fulfilling about 30% of the total demand. Egypt, another dehydrated onions producing country, sells them at a much higher rate than India. USA produces almost 50% of total global production but consumes most domestically and only exports surplus, if any. The global demand for Indian dehydrated onions has increased in the last 5 years and already reached about 70,000 tons today. Given the current trends, it is expected to increase exponentially in the future as well.

We are today in the position to determine our export prices for dehydrated onions. There is no chance at all of any other country affecting our exports and fulfilling the gap. To sustain this industry, we need to implement Minimum Export Price (M.E.P.) at the earliest. For the farmers to at least break even at the mentioned cost price of Rs. 7 per kg, a minimum M.E.P. of 1300 USD needs to be implemented. The M.E.P. can then further be reviewed and revised year on year, benefiting all involved through sustainable prices in the near future.

On these lines, it is also important to note following factors:

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1.) The implementation of M.E.P. does not aversely Indian exports by any measure whatsoever.

2.) India enjoys a sort of monopoly in the global dehydrated onion market, making it imperative for us to take benefit of it.

3.) The quality and demand of Indian dehydrated onions is much better than those of countries like China.

4.) There is no alternative to the global demand that Indian dehydrated onions fulfill, giving us the upper hand.

5.) The reducing prices due to internal competition are inducing farmers to stay away from growing onions, making it a failing opportunity.

6.) The rise of white onion prices are not going to affect the public in general as they are not preferred for domestic consumption. So even if the M.E.P. were to gradually increase, it will not be of much concern.

7.) It has become necessary to implement the M.E.P immediately that becomes a permanent protection for the 100% export-oriented onion dehydration industry, which is responsible in bringing in a lot of foreign exchange for the country. It shall also play a vital role in safeguarding the farmers' interest, thus making it a beneficial idea to evaluate M.E.P. year on year and increase it, if necessary.

8.) While finalizing the M.E.P. of white dehydrated onions, it will be essential to have advisors and members of our association present, as it would require international market intelligence, which we are ready to share in full confidence.


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# ALL INDIA VEGETABLE DEHYDRATED MANUFACTURER DEVELOPMENT ASSOCIATION

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We shall await an optimistic response to take this forward at the earliest.

Yours sincerely,

Manojbhai Ram
President

AIVDMDA PRESIDENT Mahuva-364290

**cc.:**
Vijay Rajmohan, CSS
Director,
Govt. of India
Ministry of Agriculture and Farmers Welfare
New Delhi

Ghanshyambhai Patel
Chairman,
APMCMahuva


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## Annexure VII

### Comments on the Draft Report received from

Agricultural Development and Rural Transformation Centre,
Institute for Social and Economic Change, Bengaluru, Karnataka

| Comments on draft report | | |
|---|---|---|
| **1.** | Title of report | "Price Volatility and Major Issues in Demand and Supply Management of Onion in Gujarat" |
| **2.** | Date of receipt of the Draft report | February 22, 2019 |
| **3.** | Date of dispatch of the comments | February 28, 2019 |
| 4. | Chapter-wise comments. | |

**Introduction:**

- Section 1.1 highlights emerging issues of price volatility due to shift in the cropping pattern from food grains to horticultural crops. This section could be integrated with section 2.2 to bring focus of the study on the issues of price volatility.
- The theme of sections 1.3 and 1.4 appears to be quite relevant to chapter 3. These could be shifted to 3rd chapter. The authors, instead, may think of preparing a case for highlighting the importance of Gujarat in onion supply chain/economy and role played or potentials of the state in reducing price volatility in onion.

**Methodology**

- Market integration is not the focus of the study, but major issues in supply chain management of onion. It is advised to move section on market integration in prices to chapter 3 as appendix or could be integrated within section 3.7.

**Results and discussion**

- In chapter 3, authors highlighted the trends and patterns of area, production and yield of Gujarat *vis a vis* India. It is however,

important to mention the fact how far changes in area, production and yield causes instability in area, production and yield of onion at all India level. The graphical representation of Indices of area, production and yield of the State *vis a vis* at all India APY could be used to highlight the points.

- Section 3.3 shows break in the area and production since 2003-04, reasons for such significant shift is not state. Moreover, figures for 1998-99 for such significant jump in the area have no explanation. In fact, area under onion during 1998-99 does not change significantly.
- The growth rate of area, production and yield for the period of 1987-88 to 2016-17 is influenced by lower base of 1987-88. Year 1990-91 could be fairly good choice to avoid inflated rate of growths.
- While discussing the demand (consumption) and supply, authors may highlight whether Gujarat is Surplus or Deficit State.
- Among the selected markets for analysis of arrivals and price volatility, nature of markets has not been specified (whether consumption of production). It would be a good addition in the analysis if authors bring the link between market integration between consumption and production market in the state or key markets from other states having trade linkages.

5. **General comments.** The executive summary and chapter on summary and conclusions overlap as both have more or less the same contents. The chapter 6 rather represents findings and policy implications. It is, therefore, suggested to shorten the chapter particularly sections 6.1 and 6.13. It would be also good addition to work if authors reorganize their policy suggestions keeping short, medium- and long-term goals/targets for policy interventions.

**6. Overall view on acceptability of report**

- Accepted for submission to the MoA & FW after revision.

## Annexure VIII

**Action taken by the authors based on the comments received from the Coordinator of the study.**

- All the comments made by the Coordinator of the study have been addressed at the appropriate places in the final report.

S. S. Kalamkar


**Agro-Economic Research Centre**

For the states of Gujarat and Rajasthan

*(Ministry of Agriculture and Farmers Welfare, Govt. of India)*

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