



Research Article

WHY DO ONION PRICES IN INDIA BRING TEARS SO OFTEN?

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Abstract: Onion is a sensitive crop due to its skyrocketing prices and its demand is highly inelastic. This study depicts the issues faced by the farmers and consumers due to the price volatility of the onion. The time-series data on monthly arrivals and prices of selected markets were collected from January 2010 to November 2020 from the NHRDF database. The collected data was used for computing trend and seasonal index. The results showed a positive trend in prices of all the selected markets. Seasonal index for arrivals was maximum in Hubli Market during October (272.10), lowest in July (42.74), and for prices maximum in November (145.05) at Mumbai, lowest in May (51.37) at Indore. Prices and arrivals exhibited a positive relation in November month. Correlation analysis was carried out between Deviation in the rainfall and market arrivals for production centers. A negative and significant correlation was observed in Pimpalgaon and Hubli markets. The findings conclude that neither the farmers were not benefited by the hiked prices nor the consumers benefited during the low prices. The market intervention of the Government with a long-term approach will stabilize the price volatility of the onion.

Keywords: *Onion, Seasonality, Rainfall, Minimum Export Price, Price Volatility*

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Introduction

The brunt of varying onion prices has troubled people from all walks of life mainly producers, consumers and uncontrolled situations even led to the dissolution of the Government. Onion is the important export-oriented horticultural crop and India is the second-largest exporter next to China contributing 20 percent of the total world production [1]. India cultivated onion in the area of 1.25 million ha with a production of 23.26 million tonnes [2]. The major export destinations are Bangladesh, Malaysia, United Arab Emirates, Sri Lanka, Nepal. The major producing states of onion in India are Maharashtra, Karnataka, Madhya Pradesh, Rajasthan, Bihar, Gujarat, Andhra Pradesh, Tamil Nadu which occupies nearly 85 percent of the national production. Onion is grown in three seasons namely *Rabi* (70 percent), *Kharif* (20 percent), *Late Kharif* (10 percent) making it available all-round the year [3].

The livelihood of small and marginal farmers who were cultivating onion extensively as a single commercial crop was dreaded because of the production losses due to abnormal weather conditions and fluctuations in the prices which falls to 2-3 rupees per kilogram during the glut production. Even when the prices hiked due to the demand, producers have received nearly 40 percent share and the remaining were tapped by the wholesalers and retailers which confirmed that skyrocketed prices did not benefit the farmers. Because of poor storage facilities and improper logistic arrangements, post-harvest losses were around 13-15 percent at the farmgate production, 12-14 percent at the transportation and some during the storage resulted in the decline of supply and varying prices [4]. The looming prices of onion (328 percent increase) made consumers spend more and thereby causing food inflation of 14.1 percent in 2018 [5].

The specific objectives of the study are:

To analyze trend and seasonal variations in the major onion markets in India.

To examine the problems faced by the farmers and producers due to onion prices.

So, an analytical study is conducted to know about the pattern of arrivals and prices in the major markets that help to narrow down the fluctuations and the economic issues faced by the farmers and producers due to onion. Hence, the present study is designed to address the above problems and to find the solutions.

Material and Methods

The major production markets were Pimpalgaon, Indore, Hubli, and consumption markets were Bangalore, Delhi, Mumbai, and Chennai which contributed 30 percent of the nation's total arrivals. The monthly time series data on wholesale prices and arrivals of the major markets from January 2010 to November 2020 were obtained from the NHRDF website. The monthly rainfall data on Pimpalgaon (Maharashtra), Indore (Madhya Pradesh), and Hubli (Karnataka) was collected from INDIASTAT from January 2010 to April 2020. Minimum Export Prices were collected from the APEDA website.

Trend analysis

Over a long period, time series is likely to show the tendency to either increase or decrease over time. The ordinary least square method was used to calculate the trend in arrivals and prices by estimating the intercept (a) and slope coefficient (b) in the following linear functional form [6].

$$Y_t = a + bX_t + e_t$$

where Y_t = Trend value at time t

X_t = monthly arrivals or prices of onion at time t in the selected market

e_t = Random disturbance term

a = Intercept parameter

b = Slope parameter

The significance of the regression coefficient was tested using the student's 't' test [7].

Seasonal Index

The first step in estimating the seasonal index was to calculate 12-month moving averages for the monthly data on prices and arrivals by the following formula [6].

$$M1 = (Y1 + Y2 + Y3 + \dots + Y12) / 12$$

$$M2 = (Y2 + Y3 + Y4 + \dots + Y13) / 12$$

M1, M2...Mi is the centered moving averages

Y1, Y2,...Yn is the monthly arrivals or prices

The original series is divided by the centered moving average. This gives the first estimate of seasonal components (St). It is always expressed in terms of percentages. In this process, there is no moving average for the first six and last six months. The obtained values were arranged month-wise for each year. The average value of each month was calculated by adjusting their total to 1200 or averaged to 100. The seasonal index for each month is estimated and adjusted using the correction factor.

Adjusted Seasonal indices = Seasonal indices × correction factor

Correction factor = 1200 / Sum of seasonal indices

Price correlation

Pearson correlation coefficient was calculated to measure the extent of relationship between the deviation of rainfall and monthly arrivals in the selected production markets [8].

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

Where, r = Correlation coefficient, n = No. of observations,

x = rainfall deviation, y = monthly arrivals in production market.

Results and Discussion

Trend Analysis

Trend denotes the direction of changes in the arrivals and prices over a period of time. From [Table-1], In the Pimpalgaon market, arrivals showed an increasing and significant trend with 915 tonnes per month. Except for Mumbai, arrivals in all the Consumption markets were significant and exhibited a negative trend due to the fluctuations in the arrivals. The demand for onion has been increasing over the years caused an increasing trend in the prices of all markets.

Table-1 Trend Analysis of Arrivals and Prices in selected onion markets (2010-2020)

Markets	Arrivals		Prices	
	Constant	T	Constant	T
Pimpalgaon	231324*	914.97*	899*	6.15*
Indore	158587*	354.19	815*	4.30*
Hubli	93851*	141.84	859*	3.01*
Bangalore	638335*	-1344.68*	1033*	6.45*
Delhi	340897*	-1377.96*	1086*	4.29*
Mumbai	233904*	39.82	1103*	6.82*
Chennai	129839*	-314.77*	1445*	10.31*

*Values significant at 1% level

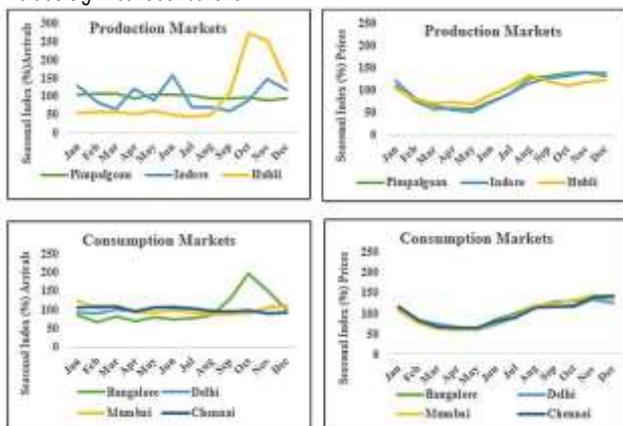


Fig-1 Seasonal indices for arrivals and prices of Production and Consumption Markets (2010-2020)

Seasonal Index

Onion is grown mostly in Rabi season at Pimpalgaon, one of the major markets in

Maharashtra. The harvested Rabi crop reached the market from March to May and the prices were lower during the corresponding months [Fig-1]. Kharif production of onion stimulated arrivals of Hubli from October to December with an increase in the price index. This was due to the export of onion to other countries because of the low shelf life of Kharif onion. Except for Bangalore, the arrivals were maximum during March to May in Consumption markets because harvested Rabi crop contributed 70 percent of the total onion production of the nation and prices were minimum during these periods. The arrival pattern of Bangalore was alike to Hubli as it was the production hub and prices were also high during the peak arrivals. From the above results, though there was a fluctuation in arrivals of the market, the prices followed a similar pattern among the markets. Hence, the price in the market was not influenced only by arrivals, but also by the prevailing prices and characteristics of onion like varieties, appearance, taste in other markets due to the movement of onion from one market to other markets [9].

Issues faced by the Farmers

Onion is highly sensitive to climatic factors. Whenever there was abnormal rainfall, the production got affected and farmers incurred huge losses and ended up with fewer market arrivals. Rainfall was negatively correlated in the selected production markets and significant at Pimpalgaon and Hubli with 17 percent and 18 percent respectively. The yield of onion was less in Pimpalgaon (Maharashtra) and Hubli (Karnataka), with deviation in the rainfall, resulted in reduced production and the market arrivals [10]. This indicated that added to abnormal rainfall, some other market factors were responsible for the arrivals and prices of onion.

Table-2 Correlation between Rainfall Deviation and monthly market arrivals

Correlation	Correlation Coefficient
Rainfall Deviation in Maharashtra and arrivals at Pimpalgaon	-0.1751* (-1.9806)
Rainfall Deviation in Madhya Pradesh and arrivals at Indore	-0.0955 (-1.0680)
Rainfall Deviation in Karnataka and arrivals at Hubli	-0.1803* (-2.0409)

Values in the parenthesis represent the t-value and * indicate significance at 5 percent

Nearly 20 percent of the losses were happened at the farm due to harvest injuries, rotten and undersized bulbs, drying, and packing [4,11]. Added to that 12-14 percent loss during transportation since onion is produced in some area and consumed all around the world. During the glut production, the onion was flooded in the markets which reduce the price to rupees 2-3 per kilogram [12]. The storage capacity of onion in Maharashtra was 3.90 million tonnes where the total production of the state was 6.52 million tonnes. Inadequate storage facilities forced the farmers to sell the produce at low prices [10]. The farmer's share in the consumer's price was only 33 percent [13]. The farmer's share in the hiked prices was low because of the tricky middlemen due to Speculation and Hoardings. Sometimes, the import of onion by the Government was not at the perfect time, which coincides with the domestic supply because of the harvested arrivals. The flooded onion arrivals in the market increase the supply and reduce the price. The small and marginal farmers who cultivated onion as a single season commercial crop were devastated by the high cost of production and incurred losses [14]. Hence, the livelihood of the farmers was severely affected due to the above situations.

Issues faced by Consumers

From [Fig-2], the actual prices of onion hiked during 2010, 2013, 2015, 2017, 2019, 2020 than the average prices in all the markets. The prices increased to 80-100 rupees per kg in the consumption markets during 2019 and 2020 due to the abnormal monsoon. This skyrocketing price leads to food inflation and cripples the poor people whose expenditure would increase within the limited income [15]. The variation in the average retail prices of onion was 115 percent when compared to the last five-year average [16] and the price mark up by traders and retailers of onion in consumption markets were 20 and 50 percent respectively [13]. The export of onion during the December and January month caused the demand in the country that increased the domestic prices which eventually banged the consumer. The export price, Wholesale price, and the export ban (1 indicates ban, 0 indicates no ban) were plotted in the [Fig-3]. Whenever the demand for onion in the market raises due to supply shocks, then Government intervenes to increase the Minimum Export Price and even export ban on onion to stabilize the domestic prices.

From the above graph, though export has been banned, the Wholesale Prices of onion were not minimized suddenly to stabilize the prices. The onions were imported from Turkey, Egypt, and other countries and the prices of these onions were equal to the retail price due to the landing cost, transportation cost and handling. The onions imported were not preferred by Indians because of the undesirable colour, size, thick peels, and less pungency [17,18].

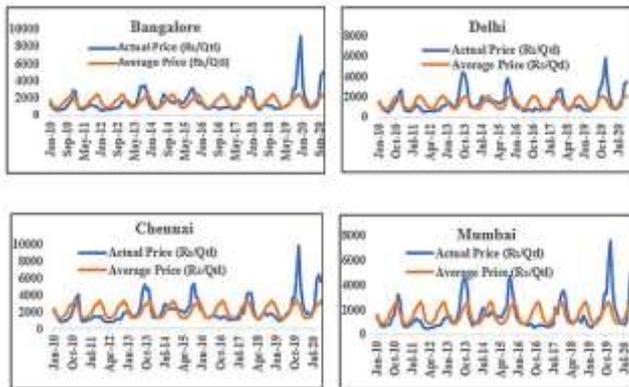


Fig-2 Graph on Actual and Average Prices of Consumption Markets (2010-2020)

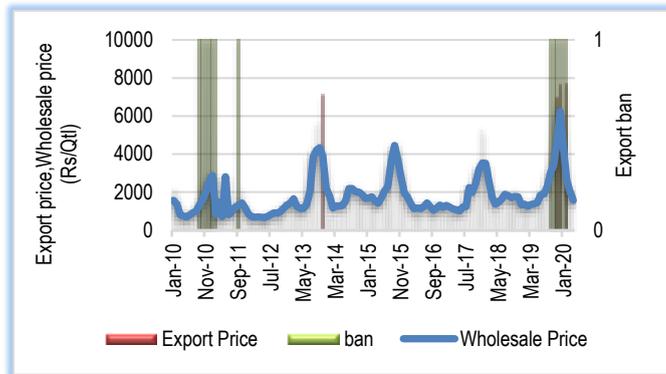


Fig-3 Graph on export prices, Wholesale price and export ban on onion

From the above findings, onion farmers got affected by the unusual rainfall. Due to the lack of storage facilities and proper logistic arrangements, the farmers were forced to sell their produce at low prices to the wholesalers. The intermediaries use this abnormal weather factor as a key to increase the price exorbitantly and sell to the consumers. Since there is no substitute for the onion, the consumers are forced to buy the product even at 150 rupees per kg. Sometimes the action of the government may also hit both the producers and consumers during the export and import of onion. The imposition of a ban during the peak arrival time and importing during the onion flooded with the markets does not help the farmers in realizing the better prices. The imported onions do not match the Indian consumer's taste, size and pungency which makes it purposeless. On the whole, neither the farmers were not benefited by the hiked prices nor the consumers benefited during the low prices. It's the middlemen who enjoy the farmer's hard work and the consumer tears.

Policy Suggestions

Onion is an essential commodity included in people's diets. Climate is one of the important factors that influence onion production. Hence, weather forecasting, resistant onion varieties with proper cultivation practices increase the production. Farmers shall be provided the base price during the market failure to sustain their livelihood. Stocking of onion during the glut production and distributing them during demand helps the farmers and consumers to sell or buy onion at a reasonable price. So, the construction of storage godowns near the production and consumption markets and improved logistics arrangements prevent the losses of onion. Speculation and hoardings by middlemen are strictly checked to stabilize the prices. The government can form a long-term plan from weather forecasting to the imposition of a ban, in advance which will help the producers and consumers.

Application of the Research: The research findings will help the Government to

frame policies that will help the farmers and consumers due to the price fluctuations in Onion.

Research Category: Agricultural Economics

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Study area / Sample Collection: Indian Onion Markets, Secondary Data

Cultivar / Variety / Breed name: Onion

Conflict of Interest: None declared

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