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PRICE INSTABILITY IN INDIA'S ONION MARKETS

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Abstract
Price volatility of agricultural commodities is a critical factor in incomes received by farmers and needs to be addressed to ensure cultivators a stable and adequate price. The present paper examines the price behavior of onion in selected centres of Karnataka and Maharashtra, the two largest onion producing States in the country. The findings show high variability in prices across months, centres, and years. There are clear price movements with high and low prices in alternate years across centres in both states. In particular, there was a huge price crash in all centres across seasons in 2016-17. The intra-year coefficient of variation was high in kharif and late kharif season which corresponds to the peak harvesting season in both the States. There is a mechanism of Market Intervention Scheme (MIS) for procuring perishable commodities including onion. The scheme was implemented in Karnataka during 2016 but the intervention did not assure a floor price for onion. There is clearly a need for intervention to lower price volatility.

Introduction
Onion is an important vegetable crop in India and a culinary ingredient which adds taste and flavour to a wide range of food preparations. There is a steady demand for onions in India and abroad. Despite substantial production and trade opportunities, India suffers from very high volatility in onion price (Sudhir, 2004; Paul et al, 2015). Years of high onion prices are often followed by years of low onion prices that do not allow onion growers to recover their production costs (Deshmukh, 2015).Volatility has been attributed to multiple factors including hoarding of stocks in anticipation of a rise in price and high retailer markup (Sharma et al, 2011), imperfect markets including cartel, access to information, roads and other market infrastructure (Chengappa et al, 2012).

Volatility in prices of onion has a significant effect on both producers and consumers. There is no mechanism of administered price (such as minimum support price) for onion. There is, however, a Market Intervention Scheme (MIS) that is implemented on request from State government for procurement of agricultural and horticultural commodities, generally perishable in nature and not covered under the price support scheme. In recent years, we find that MIS has not been implemented in many States and has failed where the scheme was implemented (Rajkumar et al, 2008; DACFW, 2011-12). One of the major policy instruments to regulate onion export is Minimum Export Price (MEP) which is also a tool to curb inflation, thus contributing to domestic price stabilization. Imposition of higher MEP is expected to lower the domestic price. We shall not be examining export policy in this paper.

It is in this context of limited regulation and intervention, this article examines the degree of price volatility in onion in Karnataka and Maharashtra during 2013-14 to 2016-17.

Review of select studies on price volatility of onion in India

Chengappa et al (2012) examined competitiveness in the onion markets and found that in December 2010, onion prices increased where retailer markup over the wholesale market price was more than 150 per cent in almost all major markets. Collusion was observed among traders who would buy small lots from the market yards and pool the produce for sorting or grading at their packing houses and market different grades to different markets all over India.

Deshmukh (2015) in her study on monthly prices of Lasalgaon market from 1990-2011 observed that nearly 60 per cent of the supply came in the summer months of April and May, and fetched a low price. The price crisis of July 2013 was not a consequence of any production shortage, but due totraders who piled up huge stocks of onion from April and May arrivals at very low prices leading to price instability.

Paul et al (2015) analyzed structural break in price volatility of onion and found that price shocks occurred in the years 2007, 2010, 2011 and 2013, when onion prices went abnormally high and created high volatility in the markets. He also concluded that the prices in different markets moved together.

Raka and Chand (2017) pointed out that increase in onion productivity was one of the main reasons for rise in onion production. Imposition of higher MEP in November 2013, July 2014 and June 2015 led to lower wholesale prices.

Data and methodology

Maharashtra and Karnataka, the leading States in terms of production, are selected for the study and the main districts for onion production in these States are identified. The major producing districts in Maharashtra are Nashik and Ahmednagar, in terms of both area and production of onion. In Karnataka, the two most important districts for onion production are Gadag and Dharwad in terms of area sown, and Gadag and Chitradurga in terms of production. For this study, Nasik and Ahmednagar districts of Maharashtra and Gadag and Dharwad districts of Karnataka are selected based on area sown. Further, based on the arrival pattern of onion in 2017, two centres from selected districts of each State are selected for analysis of price data. Gadag and Hubli centres from Gadag and Dharwad districts of Karnataka respectively are selected. In Maharashtra, Newasa and Rahuri centres from Ahmednagar district and Lasalgaon and Pimpalgaon centres from Nasik district are selected for analysis of prices.

Price data in AGMARKNET are not reported regularly and uniformly for all districts, and as a result, there are large number of missing observations3. Data on area, production and productivity of the crop are collected from various reports of the Department of Agriculture Cooperation and Farmers Welfare (DACFW); daily and monthly wholesale prices are obtained from AGMARKNET, and the National Horticultural Research and Development Foundation

(NHRDF). For Karnataka, prices are also regularly reported in Agricultural Commodity Analysis Reports of the Fiscal Policy Institute.

Price volatility in different onion markets is measured by the Coefficient of Variation (CV) over four years, from 2013-14 to 2016-17. The daily wholesale price (modal price) is used to arrive at the respective yearly average to find out variation in prices across market centres. Modal price refers to the price at which most transactions occurred during the peak marketing period in a day. The unweighted average of the modal price is used to calculate the coefficients of variation.

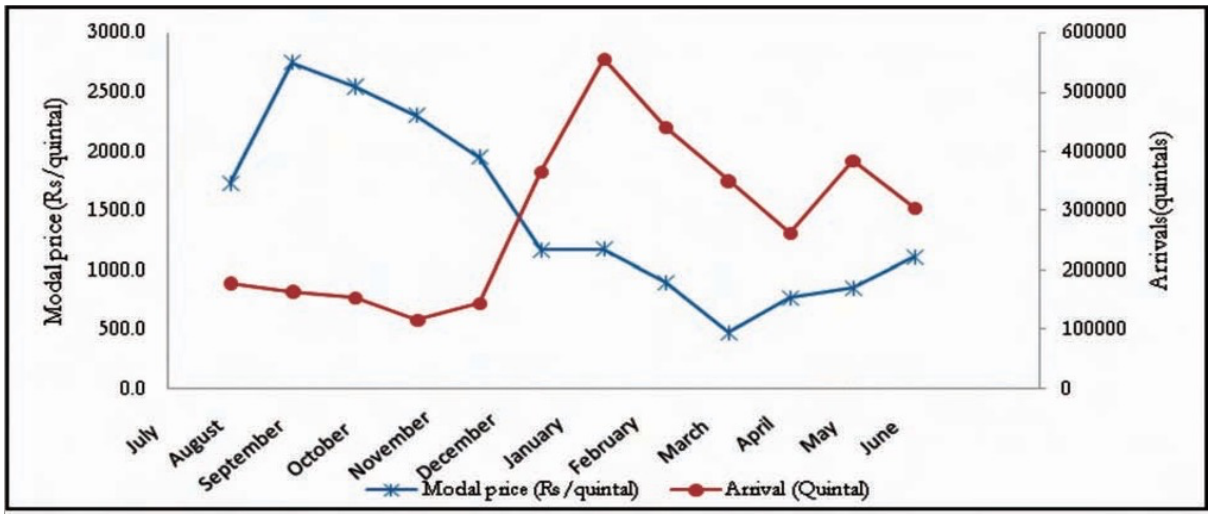
Results of price volatility

Onion production and market arrivals are concentrated in a few months and in some States but they are consumed throughout the country and throughout the year. Onion from Maharashtra is sent to Kerala, Tamil Nadu, West Bengal and Odisha. A large part of onion is distributed through the Azadpur market in Delhi. Bengaluru and Solapur are the most important onion markets in terms of secondary arrivals. The Nasik division of Maharashtra receives onion largely from direct producers. The Agricultural Primary Market Committee of Lasalgaon and Pimpalgaon are purely primary markets where the farmers bring onions in loose form in trucks/trolleys to sell them to onion traders. Lasalgoan is Asia's largest onion market and the onions from Lasalgaon are supplied to many places in India and also exported to many countries. We don't have evidence of inter-State trade relation between Maharashtra and Karnataka.

1.1 Month-wise arrival and prices of onion

Month-wise modal prices are calculated by taking a simple average of month-wise data from 2013-2014 to 2016-2017. Monthly arrival data are not available for the centres selected in Karnataka State. Hence, arrival data of the centres in Maharashtra are taken for further analysis.

Figure 1:Monthly modal price and arrivals of onion in Lasalgaon, Maharashtra: 2013-14 to 2016-17

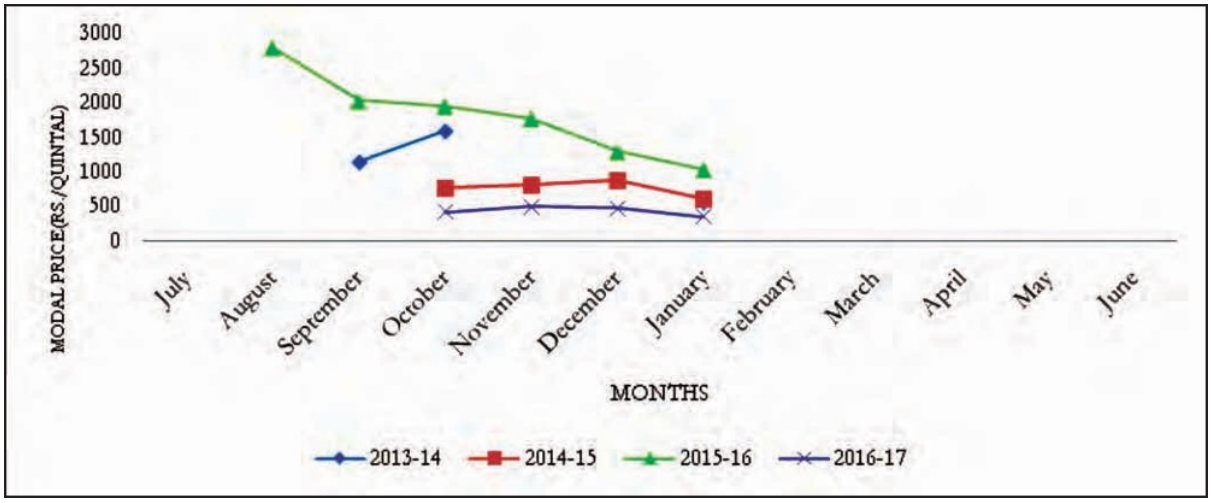


Source: National Horticultural Research and Development Foundation, 2018

The modal price of Lasalgaon market ranged from Rs 2600/quintal in August to nearly Rs 600/ quintal in March. Prices reach their peak during August when the kharif crop enters the market and continue at the same or slightly lower levels from September to October and then fall during December when the late kharif harvesting season starts. At the same time, arrivals are lower during the kharif and late kharif seasons. Pimpalgaon, at a distance of 33 km from Lasalgaon, also shows a similar pattern of monthly price movement during 2013-14 to 2016-17.

For the remaining markets, monthly modal prices for the agricultural years 2013-14 to 2016-17 are plotted in Figure 1 through Figure 7.

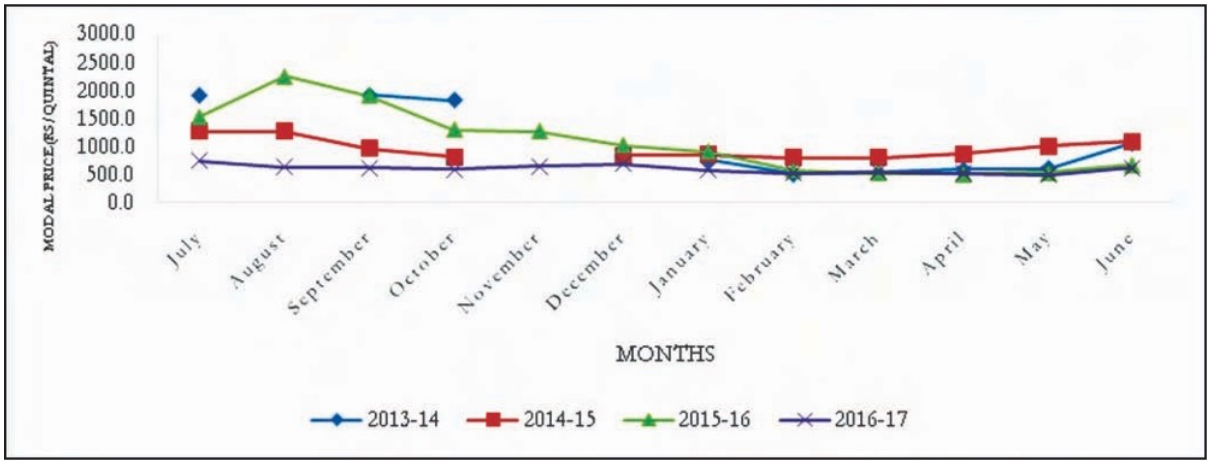
Figure 2: Modal price of onion in Gadag market centre, Karnataka: 2013-14 to 2016-17



Source: AGMARKNET, 2018

Figure 2 shows the monthly modal price of onion from agricultural years 2013-14 to 2016-17 in Gadag market. There is a clear difference in prices across years, with a tendency to fall in December. The highest prices are observed from July to August, 2015 and the lowest prices from October to December, 2016-17.

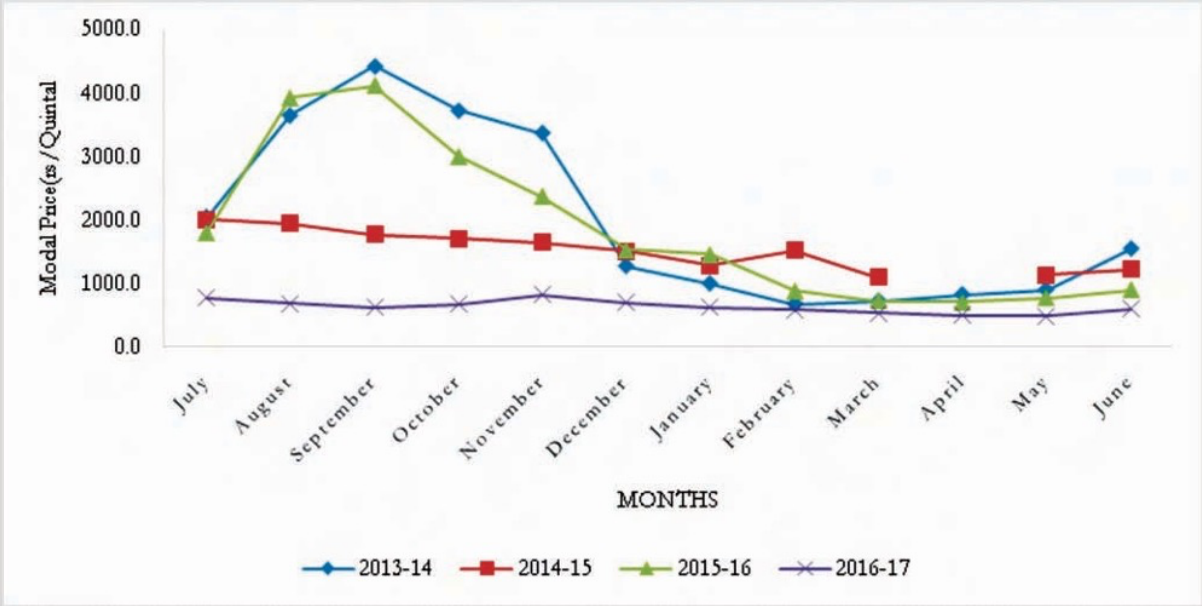
Figure 3: Modal price of onion in Hubli, Karnataka:2013-14 to 2016-17



Source: AGMARKNET, 2018

Figure 3 shows the monthly modal price of onion from agricultural years 2013-14 to 2016-17 in Hubli market. The prices gradually increase from July in most years and fall after October. The highest prices are seen during August, 2015 and the lowest during February- May, 2017. However, in Karnataka, prices in Hubli are distinctly lower than Gadag, by as much as Rs 1000 per quintal especially during January- May, 2015-16 and 2016-17.

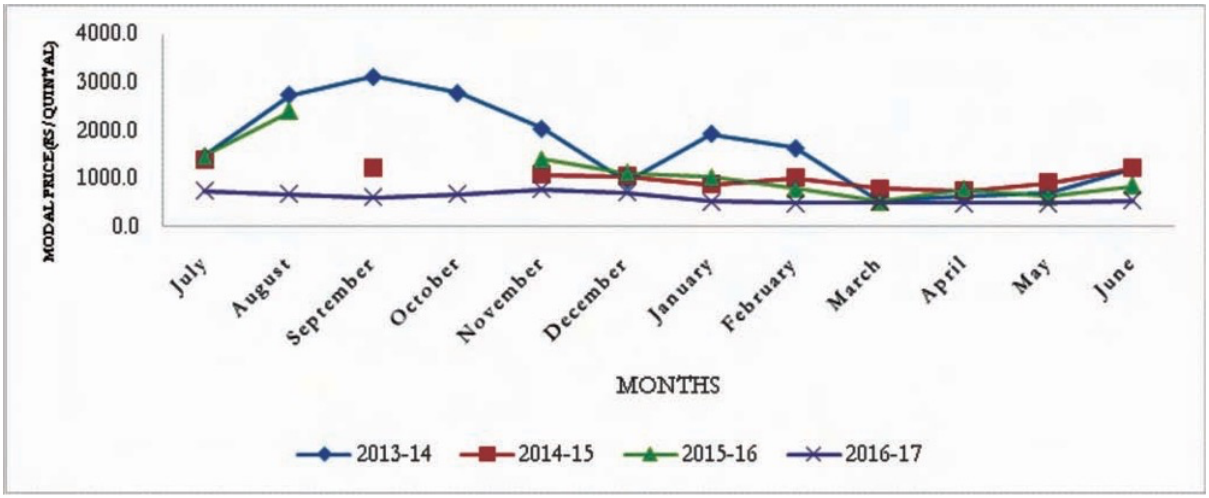
Figure 4: Modal price of onion in Newasa, Ahmednagar, Maharashtra: 2013-14 to 2016-17



Source: AGMARKNET, 2018

Figure 4 shows the monthly modal price of onion for the agricultural years 2013-14 to 2016-17 in Newasa market of Ahmednagar, Maharashtra. The highest prices are observed from July to December, 2013 and low prices after February in the same year.

Figure 5: Modal price of onion in Rahuri, Ahmednagar, Maharashtra:2013-14 to 2016-17

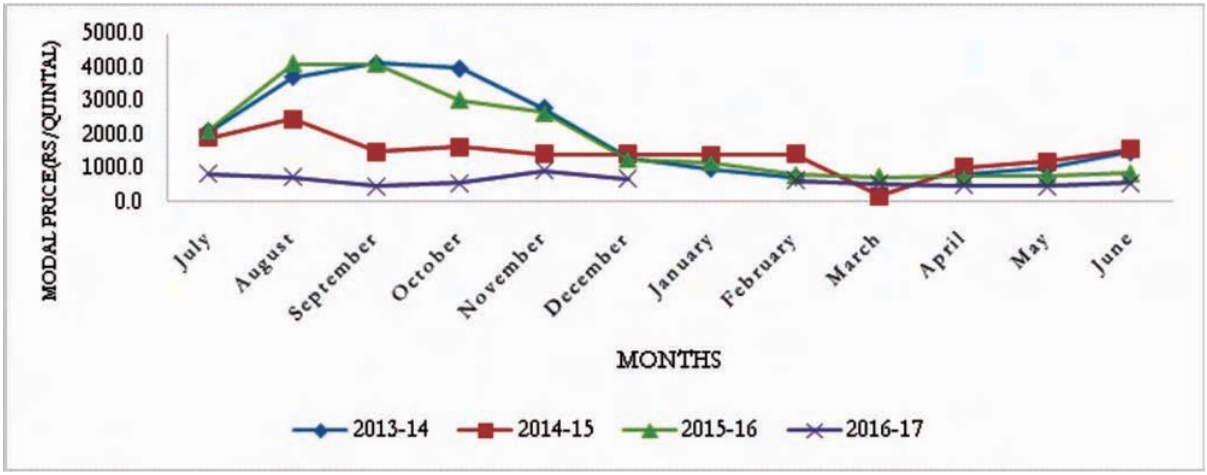


Source: AGMARKNET, 2018

Figure 5 shows the monthly modal price of onion for the agricultural years 2013-14 to 2016-17 in Rahuri market of Ahmednagar district of Maharashtra. As observed in other markets, the highest prices are observed from July to December, 2013, and the lowest prices from December, 2016 to June, 2017. There was a drop in prices during December, 2013 and then a sudden increase in prices during the months of January and February, 2014 and again a drop in prices during March, 2014. In short, 2013-14 was a year of high volatility.

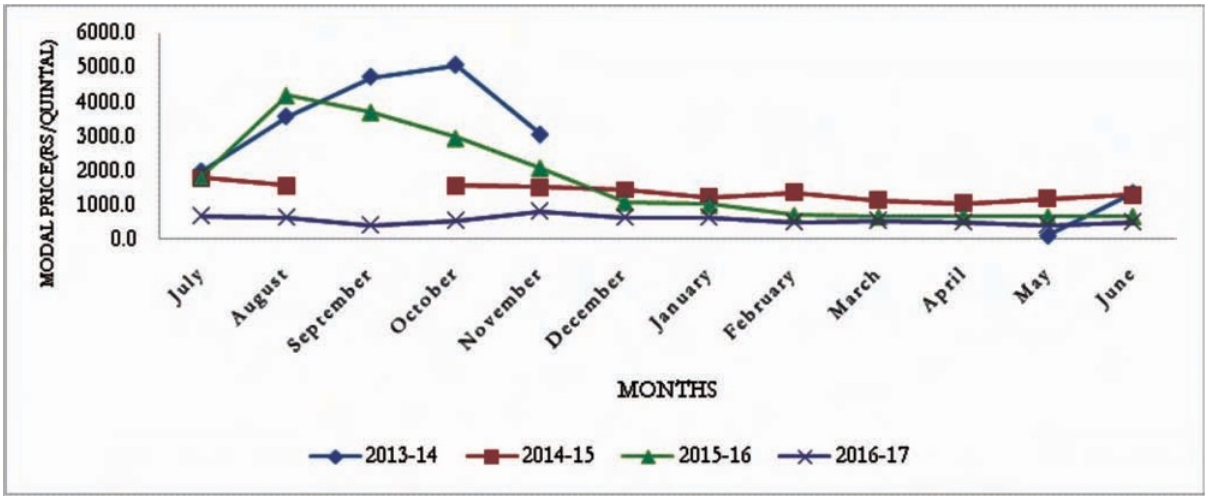
Figure 6 shows the monthly modal price of onion for the agricultural years 2013-14 to 2016-17 in Lasalgaon market. In Lasalgaon market, variations occur in alternate years, particularly in the July- December months.

Figure 6: Modal price of onion in Lasalgaon, Nasik, Maharashtra:2013-14 to 2016-17



Source: AGMARKNET, 2018

Figure 7: Modal price of onion in Pimpalgaon, Nasik, Maharashtra:2013-14 to 2016-17



Source: AGMARKNET, 2018

Figure 7 shows the monthly modal price of onion for the agricultural years 2013-14 to 2016-17 in Pimpalgaon market. The highest price is observed in the month of October, 2013with a big drop during May, 2014. Variations are similar in Lasalgaon and Pimpalgaon markets over the years 2013-14 to 2016-17. This suggests that prices in these two markets move together.

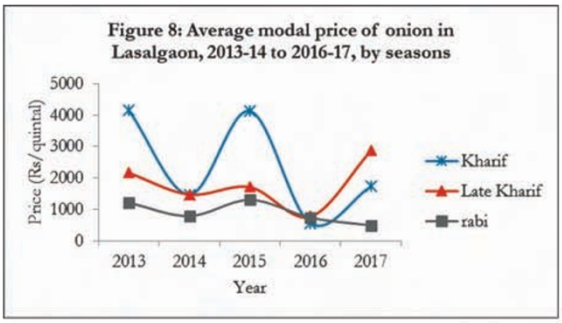
They are at a distance of only 33 km. The movement of prices in Maharashtra shows that price increases usually occur from June to November, which is the non-harvest season in Maharashtra and then fall from December and reach their lowest level during the months of April to June. The range of prices is however large, from Rs. 6000/quintal in Pimpalgaon in October, 2013 to Rs. 165/quintal in Lasalgaonin March, 2016.

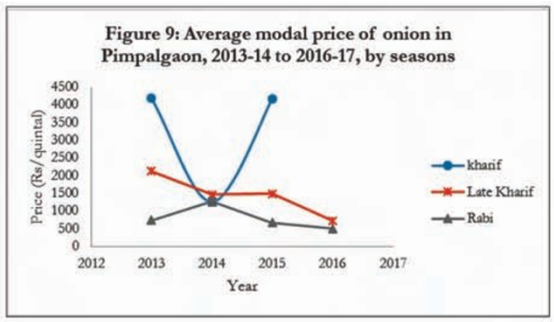
The movement of onion price across years in Karnataka and Maharashtra shows two prominent features – (1) prices reached at their peak in the year 2013-14 in Maharashtra and 2015-16 in Karnataka; and (2) average monthly prices reached lowest in 2016-17 in both States.

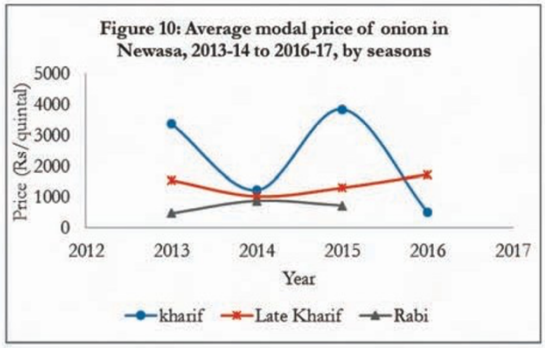
The price rise in the year 2013-14 in Maharashtra and 2015-16 in Karnataka do not seem to be a consequence of reduction in production. In fact, onion production in Maharashtra was 5.82 MMT in 2011-12, 4.66 MMT in 2012-13 and 5.86 MMT in 2013-14.

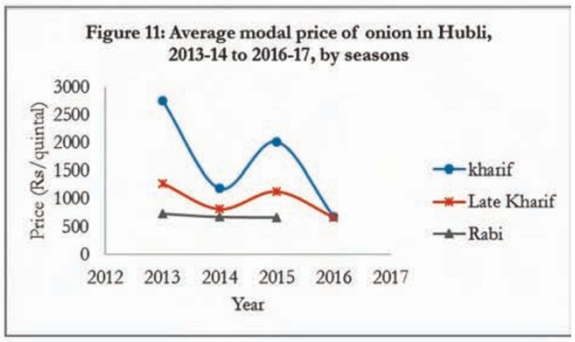
Variation across seasons

Average seasonal price of onion was studied in various markets from agricultural years 2013-14 to 2016-17 and is plotted in Figure 8 through Figure 11. Firstly, all centres of Karnataka and Maharashtra have alternate years with high price in kharif season ranging from Rs. 517/quintal in Pimpalgaon during 2016-17 to Rs. 4100/quintal in Pimpalgaon during 2013-14. Secondly, in 2016- 17, there was a huge price crash in all centres across seasons, but this crash in price of onion was not uniformly spread across centres and seasons. Thirdly, the lowest variation across years is observed in rabi season across all centres in both States.









Source: Author's own calculation

1.1 Variation within Centres

Firstly, the intra-year CV (Table 1) shows that the degree of variation is high in all years and all centres (20 per cent or more). The CV is very high in 2013-14 and 2015-16 in all centres of Maharashtra and in Hubli centre of Karnataka. This also corresponds to the years of peak price.

Table 1: Intra year coefficient of variation in onion prices in selected centres of Karnataka and Maharashtra: 2013-14 to 2016-17
(in per cent)

Year	Karnataka		Maharashtra			
	Gadag, Gadag Market	Dharwad, Hubli Market	Ahmednagar		Nasik	
			Newasa	Rahuri	Lasalgaon	Pimpalgaon
2013-14	38.2	54.4	66.2	52.0	60.6	63.3
2014-15	12.7	16.6	19.5	19.1	36.2	15.6
2015-16	31.2	51.0	64.1	47.5	67.2	73.1
2016-17	13.1	11.8	15.5	17.8	23.5	20.0

Source: Authors' own calculations.

Table 2: Across month coefficient of variation in onion prices of Karnataka and Maharashtra:2013-14 to 2016-17
(in per cent)

Months	Karnataka		Maharashtra			
	Gadag	Dharwad	Ahmednagar		Nasik	
	Gadag	Hubli (Amaragol)	Newasa (Ghodegaon)	Rahuri	Lasalgaon	Pimpalgaon
July		30.8	31.5	24.2	30.6	34.0
August	0.0	47.9	51.7	46.3	48.0	58.1
September	27.7	42.4	58.4	65.3	63.5	62.9
October	51.8	41.7	51.5	0.0	56.6	67.3
November	52.6	31.9	45.6	35.3	40.8	44.2
December	37.9	16.1	27.0	15.9	25.0	31.8
January	38.4	16.4	29.1	25.9	14.7	23.9
February		19.2	39.9	27.2	34.0	44.5
March		19.0	26.9	21.1	49.1	33.4
April		23.7	19.5	16.6	24.6	30.2
May		30.6	28.4	21.6	32.3	66.2
June		24.7	33.4	29.1	38.2	38.9

Source: Authors' own calculation

Secondly, looking at coefficients of variation (CV) across calendar years for a month within each centre, large variation is observed in prices during kharif season starting from August to November in Karnataka which corresponds to the peak harvesting months in Karnataka (Table

2). In Maharashtra, CV ranged from 15 per cent (Lasalgaon) to 68 per cent (Pimpalgaon) and the maximum variation was observed from September to November (late kharif) which corresponds to the peak harvesting season.

Market Intervention Scheme (MIS)

The Department of Agriculture, Cooperation and Farmers' Welfare implements the MIS for procurement of agricultural and horticultural commodities which are perishable in nature and are not covered under the Price Support Scheme. The objective of intervention is to protect the growers of these commodities from making distress sales in the event of a bumper crop during the peak arrival period when prices tend to fall below cost of production. The condition for MIS is that there should be at least a 10 percent increase in production or a 10 percent decrease in the ruling market price over the previous normal year. The scheme is implemented at the request of a State government which is ready to bear 50 percent of the loss (25 percent in the case of North-Eastern States), if any, incurred on implementation. The extent of total loss is to be shared on a 50:50 basis between the Union and the State Government and is restricted to 25 percent of the total procurement value, which includes cost of the commodity procured plus permitted overhead expenses. Under the scheme, in accordance with MIS guidelines, a pre-determined quantity at the fixed Market Intervention Price (MIP) is procured by agencies designated by the State government for a fixed period or until the prices are stabilized above the MIP, whichever is earlier. The area of operation is restricted to the concerned State (DACFW, 2011-12, 2016-17, 2017-18). The crops included are onion, potato, chillies, cumin, coriander, fenugreek, garlic, sunflower, ajwain caraway, turmeric, cluster bean and tomato. National Agricultural Cooperative Marketing Federation of India Ltd (NAFED)is the centralized nodal agency designated for market intervention operations (Deepa, 2005; Rajkumar et al, 2008). Details of MIS implemented for onion in India are given in Table 3.

Table 3: MIS for onion implemented in India during the year 2010-11, 2016-17 and 2017-18

Year	Duration	Commodity	Market Intervention price (Rs/MT)	Sanctioned quantity (MTs)	State
2010-11		Onion	6000	54000	Karnataka
2016-17	1/12/2016 to 30/12/2016	Onion	7070	50000	Telangana
	1/11/2016 to 30/11/2016	Onion	6240	100000	Karnataka
2017-18	9/6/2017 to 8/7/2017	Onion	5867	651000	Madhya Pradesh
	27/06/2017 to 26/7/2017	Onion	3650	20000	Rajasthan

Source: DACFW Annual Reports

What is remarkable is that despite high price volatility, MIS for onion was implemented only twice viz. 2010-11 and 2016-17 in Karnataka. Karnataka has evolved an MIS called Floor Price

Scheme (FPS) for agricultural and horticultural commodities with a revolving fund of Rs 100 crores, which aims at procuring farm produce during times of price crash (Rajkumar et al, 2008). The revolving fund is mobilized by equal contributions from the State government and market committees. Every year, Union Government is requested to contribute funds to the revolving fund under the MIS (Deepa, 2005). The Karnataka State Agricultural Marketing Board (KSAMB) manages the fund (Krishimaratavahini, 2018). The floor price scheme is operated in co-ordination with the MSP scheme for such commodities, which are covered under MSP of Government of India.

To examine the price behavior in the year when MIS was implemented in Karnataka, minimum, maximum and modal wholesale prices for November, 2016 are plotted in Figure 12.

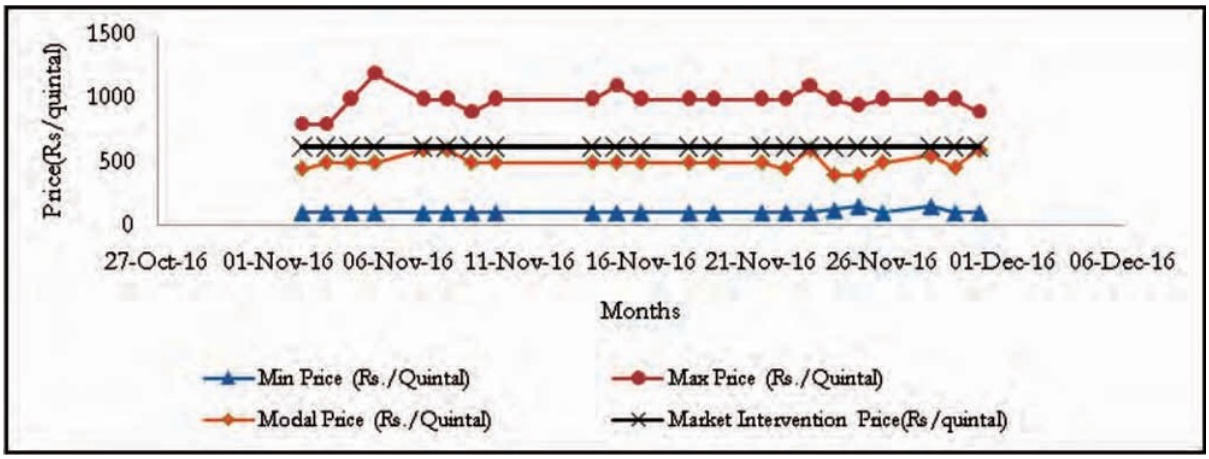


Figure 12: Wholesale and market intervention price of onion in Gadag, Karnataka, during November, 2016

Source: AGMARKNET, 2018

The market intervention price introduced in Karnataka during the year 2016-17 was Rs. 624/ quintal. The modal price was lower than the MIP in Gadag during the peak harvesting months of November, the period when MIS was implemented. Thus, the intervention did not assure a floor price for onion.