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Seasonal variation of arrivals and prices of *Kharif* sorghum in Beed district of Maharashtra state

¹Vishakha A Chopade, ²Digamber S Perke, ³Tukaram B Mundhe, ¹Prafulla L Solanke and ¹Krishna N Garad

¹M.Sc. Scholar, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

²Associate Dean and Principal, College of Agriculture, Dharashiv, VNMKV, Parbhani, Maharashtra, India

³Teaching Associate, Department of Agricultural Economics, VNMKV, Parbhani, Maharashtra, India

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Corresponding Author: Vishakha A Chopade

Abstract

Cereals have been considered as the principal component of human dietary source as almost half of the daily calorie absorption is derived from its consumption. It is important cereal crop following rice, wheat, maize and barley that serves as staple food. A major revolution has been introduced by Ministry of Agriculture and Farmers Welfare under a sub mission of National Food Security Mission to deliberately promote sorghum, bajra and ragi through Public Distribution System (PDS) across the country to improve nutrient content in dietary mass and suggested that instead of calling them coarse grains, they should be positioned as “Nutri-cereals”. To study worked on seasonal variation in arrivals and prices of Kharif Sorghum. The data was collected from Beed district APMCs i.e. Beed, Dharur and Parli markets. The study period from 2001 to 2020 i.e. 20 years and in the year 2020 from January to December month wise i.e. 1 year., Seasonal index can be calculated in index form as a measure of seasonal variation by using simple average method. There was a much variation observed in annually and monthly seasonal indices of prices and greater fluctuation observed in arrivals of Kharif Sorghum in markets. In annually seasonal indices of selected markets the range of arrivals of Kharif Sorghum indices increasing and decreasing with ranging for selected APMC's from 8.5 per cent to 342.4 per cent. In various months of the year 2020, the arrivals indices ranged from 52.4 per cent to 310.86 per cent.

Keywords: Seasonal variation, APMC, index, arrivals and Prices

Introduction

Cereals have been considered as the principal component of human dietary source as almost half of the daily calorie absorption is derived from its consumption. Sorghum (*Sorghum bicolor* (L). Moench) belonging to the family Poaceae is the fifth most important cereal crop following rice, wheat, maize and barley that serves as staple food for in addition 500 million people across the globe and also as a fodder crop. A major revolution has been introduced by Ministry of Agriculture and Farmers Welfare under a sub mission of National Food Security Mission to deliberately promote sorghum, bajra and ragi through Public Distribution System (PDS) across the country to improve nutrient content in dietary mass and suggested that instead of calling them coarse grains, they should be positioned as “Nutri-cereals”. Looking into the importance of nutri-cereals, there is a need to popularize the health benefit of these crops through effective and sustainable awareness programmed and encouraging more research works to develop high yielding varieties with longer shelf life. And also it's use of the manufacturing of ethanol, grain alcohol, starch, glue, and paper and in industries for packing, synthesis of organic compounds, health, pharmacological diagnosis, and usefulness products, among others. According to Economic Survey of Maharashtra, sorghum

was widely produced at 381000 million tonnes in 2020 to 21 and will be again in 2021 to 22. One of the major sorghum-producing states in India is Maharashtra. In 2020 to 2021, it was grown over an area of 379000 hectares. The sorghum growing major districts in Maharashtra are Solapur, Ahmednagar, Pune Sangli, Satara, Osmanabad, Beed, Parbhani, Aurangabad, Nanded etc. The District Statistic Board of Beed has reported that the cultivation area for Kharif Sorghum in 2020 to 21 will be 7194 hectares. The total amount of Kharif Sorghum produced in the Beed district in 2020 to 21 was 34.60 metric tonnes, and productivity was 481 kg per hectare.

This study worked on the peak and slack period in arrivals and prices of Kharif Sorghum. Farmers in India are price conscious and in such case the study of seasonal variation of arrivals and price assumes primary focus. The market arrival variation is a major factor in the volatility of agricultural prices. To narrow the gap between market arrivals, it is necessary to comprehend the price behavior of various agricultural commodities and the responsiveness of market arrival to price movement.

Methodology

This study was based on secondary data. The data was collected from Beed district APMCs i.e. Beed, Dharur and

Parli markets. The study period from 2001 to 2020 i.e. 20 years and in the year 2020 from January to December month wise i.e. 1 year. The selection of the markets was based on the quantity of arrivals of Kharif Sorghum among the markets of Beed district of Maharashtra state. The data were analyzed with simple statistical tools for fulfilling set seasonal indices of Kharif Sorghum in Beed district. Seasonal indices of selected markets the range of arrivals of Kharif Sorghum indices increasing and decreasing with ranging for selected APMC's. Seasonal indices are those periodic movements in business activity which occur regularly over period of time and have their origin in the year it self. Since such variations repeats during a period of twelve months, it can be predicted fairly and with higher accuracy level. To obtain a statistical description of a pattern of seasonal variation it is desirable to first free the data from the effects of cycles and irregular variations. Once these other components have been eliminated, seasonal index can be calculated in index form as a measure of seasonal variation. Thus specific seasonal index refers to the seasonal changes during a particular year. To examine the peak and slack period, monthly seasonal indices was worked out by using simple average method.

$$\text{Seasonal Indices} = \frac{X_i}{\bar{X}} \times 100$$

Where,

X_i = monthly average for 1 years

$\bar{X}$ = mean of 12-month, average

Results and Discussion

Seasonal indices are those irregular fluctuations in economic activity that happen every year or month. The results of the computation of the annual seasonal indices of Kharif Sorghum arrivals and prices in Beed, Dharur, and Parli APMC's are shown in Table 1.

The seasonal indices showed that the arrivals of Kharif Sorghum in the Beed markets were highest in the year of 2002 to 03 (261.9 per cent), followed by the year 2003 to 04 (159.2 per cent), 2001 to 02 (154.0 per cent), and 2004 to 05 (152.9 per cent). While 2015 to 16 had the lowest indices (08.5 per cent), were followed by the years 2014 to 15 (11.2 per cent) and 2016 to 17 (17.2 per cent), respectively. The highest seasonal indices of Kharif Sorghum arrivals in Dharur APMC were recorded in the years 2001 to 02 (342.4 per cent) followed by 2006 to 07 (255.3 per cent) and in the remaining year 2002 to 03 (195.0 per cent), 2003 to 04 (149.0 per cent) and 2004 to 05 (141.6 per cent). From 2000 to 01 to 2007 to 08 (more than 100 per cent above), the seasonal indices of Kharif Sorghum arrivals were at its highest. The lowest indices of arrivals of Kharif Sorghum were observed in the year 2012 to 13 (15.7 per cent), followed by 2018 to 19 (16.0 per cent) and 2019 to 20 (21.3 per cent). The maximum proportion of Kharif Sorghum arrivals in Parli APMC was reported in the years 2002 to 03 (185.7 per cent) followed by 2006 to 07 (181.4 per cent). The years 2011 to 12 had the lowest indices of Kharif Sorghum arrivals (33.1 per cent), followed by 2018 to 19 (52.1 per cent) and 2019 to 20 (51.6 per cent). The results indicated that there was seasonal fluctuation in the Kharif Sorghum arrivals in the Beed, Dharur, and Parli markets. Seasonal indices of 2000 to 01 and 2019 to 20 i.e., 8.5 per

cent to 261 per cent, 15.7 per cent to 342.4 per cent, and 33.1 to 185.7 per cent in the Beed, Dharur, and Parli markets between 2000 to 01 and 2019 to 20, respectively.

According to the table, Beed APMC recorded the highest percentage of Kharif Sorghum prices in the years 2019 to 20 (192.5 per cent) followed by 2018 to 19 (189.9 per cent), 2011 to 12 (155.2 per cent), and 2013 to 14 (141.4 per cent). The year 2000 to 01 had the lowest seasonal indices of prices (24.0 per cent), followed by 2001 to 02 (32.6 per cent), 2002 to 03 (41.7 per cent), and 2005 to 06 (46.7 per cent). The highest seasonal indices of Kharif Sorghum prices in Dharur, APMC, were recorded in the years 2019 to 20 (234.9 per cent) followed by 2018 to 19 (207.7 per cent), 2016 to 17 (165.7 per cent) and 2015 to 16 (157.8 per cent). The years 2002 to 08 saw reduced cost than the years 2011 to 2015, while the years 2001 to 02 recorded the lowest indices of Kharif Sorghum prices (27.1 per cent). The highest seasonal prices indices for Kharif Sorghum in Parli APMC were observed in the years 2019 to 20 (246.9 per cent), followed by 2018 to 19 (233.8 per cent), with prices rising since 2011. The lowest indices of Kharif Sorghum prices were observed 2000 to 01 (32.0 per cent) followed by 2001 to 02 (32.9 per cent), respectively. The finding shows that there was seasonality in the pricing of Kharif Sorghum in the markets of Beed, Dharur, and Parli. It had been demonstrated that the market's prices for Kharif sorghum have fluctuated between dropping and increasing over the years, from 2001 to 2020, with price indices ranging from 24.0 per cent to 246.9 per cent for all three APMC's. During the period of Covid pandemic the prices of Kharif Sorghum was too high, due to very less arrivals in 2019 to 20.

The monthly seasonal indices of market arrivals and prices of Kharif Sorghum in the selected Beed, Dharur, and Parli markets were presented in Table 2.

Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals of Kharif Sorghum. In comparison to the other two market places, the Parli market had the maximum arrivals of Kharif Sorghum. It was observed that in Beed APMC monthly indices of arrivals were highest in November (178.44 per cent) followed by December (171.53 per cent), October (130.80 per cent), January (123.12 per cent) and February (100.92 per cent) in range between July to September arrivals are medium. Whereas lowest seasonal indices observed in August (16.48 per cent) followed by July (35.01 per cent). Seasonal indices of Kharif Sorghum arrivals in Dharur APMC began to highest in the month of November (225.76 per cent) followed by January (200.00 per cent), December (162.12 per cent) and October (104.55 per cent). Whereas lowest seasonal indices observed in the month of May (36.36 per cent), September (48.48 per cent), and August (53.03 per cent). The arrivals in June and July are quite same. APMC of Parli has its seasonal indices of Kharif Sorghum arrivals which started getting its highest arrivals in the month of November (310.86 per cent) followed by January (233.97 per cent), October (182.34 per cent) and December (172.77 per cent). Whereas the lowest arrivals were during August (16.29 per cent) followed by July (19.07 per cent) and September (22.89 per cent). The range of arrival indices were 16.29 per cent to 310.86 per cent during different months of the year 2020. It is also showed that, peak period of arrivals of selected APMC's were

maximum in the month of October to January.

The seasonal indices of market prices of Kharif Sorghum in the selected markets are present in Table 3.4. Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in prices of Kharif Sorghum. It reveals that the seasonal prices indices of Kharif Sorghum went on fluctuating throughout the year. The market of the Beed district showed that the seasonal price indices was highest in the month of January (124.32 per cent) followed by February (112.89 per cent), March (107.01 per cent) and April (102.50 per cent). Whereas lowest seasonal indices observed in July (88.05 per cent) followed by November (90.56 per cent) and October (90.56 per cent). The month of August to November in between prices gives the similar range of Kharif Sorghum. Hence, the months from August to November reported their lowest price indices while the months of January to March saw their highest price indices. In the Dharur market, was shown that price indices were highest from January to March and lowest from April to December. It is observed that seasonal indices of prices were highest in February (135.36 per cent) followed by January (121.46 per cent), March (116.43 per cent) and April (100.52 per cent), respectively. Whereas lowest seasonal indices of prices observed in September (75.39 per cent) followed by October (88.05 per cent) and August (91.30 per cent). The prices variation of Kharif sorghum for the peak season and slack season in the selected markets does not appear significantly due to rainfed conditions. The monthly pricing indices were found to be lowest in the peak arrival months of May to December and highest in the months of January to April in Parli APMC. It was observed that in month of February (138.14 per cent) followed by January (122.18 per cent), March (105.50 per cent) and April (102.91 per cent). Whereas lowest prices were during September (80.53 per cent), followed by October (86.33 per cent) and November (90.61 per cent). The price range was

similar and higher in the month January to April and similar but lower range in the month May to August. Prices fluctuated according to seasonal indices, peaked from January to April and slacked from May to December months. Due to sufficient space and rainfed circumstances, the cost of Kharif Sorghum for the peak and slack seasons in the market did not differ much. Surywanshi and Gawade (2011) found that similar result i.e. The pricing analysis of several grains at APMC, Kolhapur, paddy arrival indices were lowest. The seasonal price indices, which range from 98.52 to 102.11 percent, that showed smaller variation in price variation.

Table 1: Marketwise seasonal indices of arrivals and prices of Kharif Sorghum (Per cent)

Sr. No.	Years	Arrivals			Prices		
		Beed	Dharur	Parli	Beed	Dharur	Parli
1	2000-2001	152.5	100.9	174.8	24	35.1	32
2	2001-2002	154	342.4	180.9	32.6	27.1	32.9
3	2002-2003	261.9	195	185.7	41.7	43.9	43.9
4	2003-2004	159.2	149	137.3	56.9	43.6	43.5
5	2004-2005	152.9	141.6	117.1	52.6	41.5	45.2
6	2005-2006	151.8	120.2	106	46.7	46.5	49.3
7	2006-2007	140.8	255.3	181.4	83.3	62.8	55.8
8	2007-2008	112.7	156.4	100.4	74.5	59.6	87.9
9	2008-2009	138.4	72.4	107.4	65.7	70.2	70.6
10	2009-2010	103.7	61	93.2	88.8	77.8	106.4
11	2010-2011	97.5	93.4	94.1	106.4	87	99.2
12	2011-2012	67.2	38.2	33.1	155.2	125.8	114.2
13	2012-2013	53.4	15.7	53.1	117.5	119.7	114.2
14	2013-2014	47.3	66.3	73.1	141.4	121.2	125
15	2014-2015	11.2	35.8	68.3	139.7	133.5	132.6
16	2015-2016	8.5	40.3	85	132.1	157.8	130.1
17	2016-2017	17.2	52	52.8	140.2	165.7	127.5
18	2017-2018	56.5	26.6	52.5	118.3	138.5	109
19	2018-2019	56.9	16	52.1	189.9	207.7	233.8
20	2019-2020	56.5	21.3	51.6	192.5	234.9	246.9

Table 2: Monthly seasonal indices of arrivals and prices of Kharif sorghum (Per cent)

Sr. No.	Months	Arrivals			Prices		
		Beed	Dharur	Parli	Beed	Dharur	Parli
1	January	123.12	200	234	124.3	121.5	122.2
2	February	100.92	98.48	100.5	112.9	135.4	138.1
3	March	98.87	71.21	50.86	107	116.4	105.5
4	April	99.72	68.18	52.4	102.5	100.5	102.9
5	May	84.7	36.36	38.81	99.91	94.65	93.91
6	June	97.08	66.67	46.36	98.35	97.58	96.31
7	July	35.01	65.15	19.07	88.05	92.14	91.77
8	August	16.48	53.03	16.29	92.11	91.3	94.8
9	September	63.35	48.48	22.89	91.34	75.39	80.53
10	October	130.8	104.6	182.3	90.56	88.87	86.33
11	November	178.44	225.8	310.9	90.73	92.06	90.61
12	December	171.53	162.1	172.8	102.2	94.23	97.03

Conclusion

There was a much variation observed in annually and monthly seasonal indices of prices and greater fluctuation observed in arrivals of Kharif Sorghum in markets. In annually seasonal indices of selected markets the range of arrivals of Kharif Sorghum indices increasing and decreasing with ranging for selected APMC's from 8.5 per cent to 342.4 per cent.

In various months of the year 2020, the arrivals indices ranged from 52.4 per cent to 310.86 per cent.

In annually seasonal indices of selected markets the range of prices of Kharif Sorghum indices increasing and decreasing with ranging for selected APMC's 24.0 per cent to 246.9 per cent.

In various months of the year 2020, the prices indices ranged from 75.39 per cent to 138.14 per cent.

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