Trends and Seasonality in Arrivals and Prices of Soybean in APMC, Parbhani

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ABSTRACT

The research was based on the arrival and prices of soybean in APMC, Parbhani, which have the maximum number of arrivals in the selected APMC. The arrival and price data for soybean were collected monthly from the official records by APMC, Parbhani. Based on availability data, the latest 21 years of data from 2000 to 2020 were collected. For analyzing the trend in arrivals and prices of agricultural commodities the compound growth rates of chosen agricultural commodities arrivals and prices were calculated, we calculated seasonal indices using the simple average approach. It is believed that, with the increase in arrivals of agricultural commodity in the market, their prices come down and vice versa. In this study, annual compound growth rate of arrivals in case of soybean (-0.69) were found negative and annual compound growth rates of prices in the case of soybean (3.355) were positive growth rate. Arrivals were noticed highest during the month of November (216.15). The lowest indices of arrivals were noticed in the month of July (37.71). In case of price indices was noticed highest in the month of January (119.42), While lowest in June (88.58). The monthly arrivals and prices of soybean in Parbhani market shows great fluctuations and no any specific trend was observed. The government should look over all the APMC and fix a single price for the sale so that the arrivals will not accumulate in one APMC.

Keywords APMC, Arrivals, Prices, Seasonality indices.

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INTRODUCTION

Oil is extracted from oil seed crops, which ranges from 20% for soybeans to 40% for sunflowers (Sudhakarrao and Katkade 2016). Due to the expanding need for their advantageous vegetable oils for food, medicine, biofuels, and other oleochemical industrial uses, they have recently attracted more attention. Since ancient times, oilseed crops have served as the cornerstone of numerous agricultural economies and are crucial to global agricultural trade and business (Kachroo and Nazir 2021). They support the production of renewable energy and supply a sizeable amount of the world's edible oil. Due to the

increased interest, cultivation areas for oilseed crops expanded by 82%, while overall global production climbed by around 240%. India holds a significant position in IAE and is one of the top producers of oilseed crops worldwide. Next to the United States, China, and Brazil, India is the fourth-largest producer of oilseeds in the world. The oilseeds make up 10% of the value of agricultural commodities, 3% of the gross net product (GNP), and 13% of the gross crop area (GCA). India accounts for 20.8% of global region planted with oilseeds. It makes up around 10% of the world's production (Department of Agriculture and farmers welfare 2021).

The most common oilseed crops farmed worldwide are soybean, sunflower, peanut, and safflower. China is the country with the largest area under oilseeds in the world, followed by India, Nigeria, Sudan, the United States, Myanmar, Senegal, Argentina, and Indonesia. In the 2019–20 growing season, soybeans will cover 120.50 million ha, produce 333.67 million tones, and yield 354 kilo grams per hectare. Groundnut has an area production productivity of 4.83 million ha, 9.95 million tones, and 2063 kg per hectare in 2019–20. According to statist, the area production productivity of safflower in 2019–20 is 0.43 million ha, 0.2 million tones, and 465 kg per hectare (Deokate *et al.* 2020)

India is a significant producer of oilseeds and a buyer of edible oils. After the US, China, and Brazil, India has the fourth-largest vegetable oil economy in the world. The oilseed makes up 10% of the value of all agricultural commodities, 3% of the gross national product and 13% of the gross cropped area (Devi and Parmar 2020). Nine annual oilseed crops, including seven edible oilseeds (groundnut, rapeseed and mustard, soybean, sunflower, sesame, safflower, and niger) and two non-edible oilseeds, can be grown in the country due to its diverse agroecological conditions (FAO 2021).

Oilseeds cultivation is undertaken across the country in about 25.74 million ha area, 30.55 million tones production, 1187 kilogram per hectare productivity. The area production productivity of soybean in the year 2019-20 is 12.19 million ha, 11.23 million tonnes and 921 kilogram per hectare. Major soybean growing states in India are : Madhya Pradesh (58%), Maharashtra (30 %t), Rajasthan (6%), Karnataka, Uttar Pradesh, Andhra Pradesh, Chattisgarh and Gujarat. (Agricultural Statistics at a glance 2021).

One of the second top states in India for the production of oilseed crops is Maharashtra. In terms of both area and production, it plays a significant role in the oilseed crops raised in our nation. In the 2019 fiscal year, Maharashtra's contribution to the Indian economy from oilseeds is estimated to be 118 million rupees. In the 2019–20 growing season, soybean output productivity was 4.12 million ha, 4.83 million tones, and 1170 kg/ha. Major districts of Marathwada region growing oilseed crops are Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad, Parbhani. In this study we are analyzing the arrivals and prices of soybean in Parbhani APMC.

Therefore we estimate growth trend in prices and arrivals of Soybean. Seasonal price variations resemble a cycle covered in the period of 12 month. The general pattern of seasonal variations in prices i.e. lower prices during the post-harvest months and higher prices during the pre-harvest or off season months is generally reported year after year. Therefore, it is necessary to study the fluctuations in the monthly average prices and arrivals of market, which help farmers to plan their sale in the period which will give them a better price for their produce. In estimated the fluctuations in market arrivals and prices of soybean and identified the peak and slack periods of arrivals (Sahoo and Singh 2017).

MATERIALS AND METHODS

The study was conducted for the period of 2000 to 2020 by collecting purely secondary data from the selected APMC markets. The markets are selected purposively on the basis of highest prices and arrivals from the major soybean growing states of India. The selected markets are APMC of Parbhani market of Maharashtra in India, respectively.

To examine the growth in the arrival and prices of soybean

For a period of 21 years, from 2000 to 2020, the

time series data on monthly arrivals and prices of the soybean were gathered from APMC, Parbhani. Using the exponential version of the following equation, the compound growth rates of arrivals and prices of the principal soybean commodities were calculated.

$$Y = ab^t$$

Where,

Y = Monthly arrivals/prices
a = Constant
b = Trend coefficient
t = Time period

Annual compound growth rate (CAGR) in percentage was calculated as,

$$CAGR = (\text{Antilog of } b^{-1}) \times 100$$

Seasonal indices in arrivals and prices of Soybean

Seasonal indicators are yearly variations in economic activity that consistently take place and have their origins in the year. Because these variations recur over the course of a year, they may be anticipated with high accuracy. The data must first be stripped of the effect of trends, cycles, and erratic variations before a statistical description of a seasonal variation pattern can be generated. A seasonal indices can be created as an indices to measure seasonal variance once these other components have been eliminated. Each month's seasonal indices were calculated. Therefore, seasonal fluctuations in a particular year are related to a unique seasonal indices. The percentage of their average was used to generate the seasonal indices. The simple average is used to determine the seasonal indicators.

$$SI \frac{Monthly\ arrivals\ or\ prices}{Average\ arrivals\ or\ prices} \times 100$$

RESULTS AND DISCUSSION

The average arrivals of Soybean was Maximum during December (19719.1q) and minimum during July (9454.86q), while the average prices of Soybean were continuously fluctuating ranging from (₹2039.6-2443.7) showing the highest during November (₹2443.7) and the lowest during March (₹2039.6)

Table 1. Monthly average arrivals and prices of soybean in APMC parbhani (2000-2020).

Months	Soybean Arrivals (q)	Prices (Rs)
January	14365.9	2191.571
February	18962.1	2091.667
March	18729.8	2039.619
April	19558.8	2055.595
May	11320.7	2351.619
June	11255.4	2303.381
July	9454.86	2340
August	11144	2199.143
September	11160	2463.81
October	12348.4	2213.524
November	17327.6	2443.714
December	19719.1	2255.619

Table 2. Compound annual growth rates of arrivals and prices of soybean in APMC, Parbhani (2000-2020).

Variables	Soybean Arrivals (q)	Prices (₹)
A	3.878	2.978
B	-0.0078	0.0312
T	-0.334	7.228
R^2	0.0058	0.7333
CAGR	-0.69	3.355*

as showed in Table 1 and also depicted in graphical form in Fig 1 and 2. The arrivals of soyabean were negative and non-significant. While, that of prices were positive and significant at 5% level of significance as shown in Table 2. The results seen were in parallel with Shrote 2021.
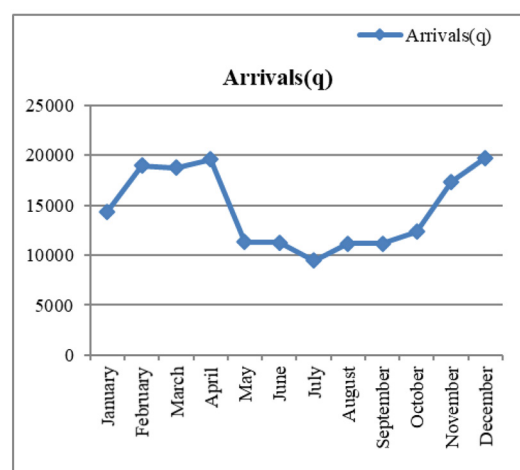
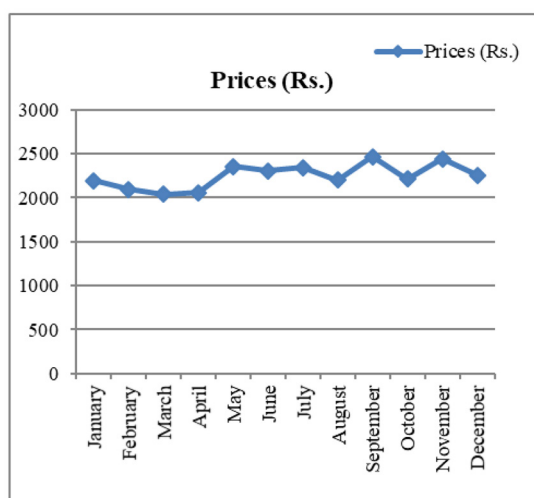**Fig. 1.** Average arrivals of soybean.
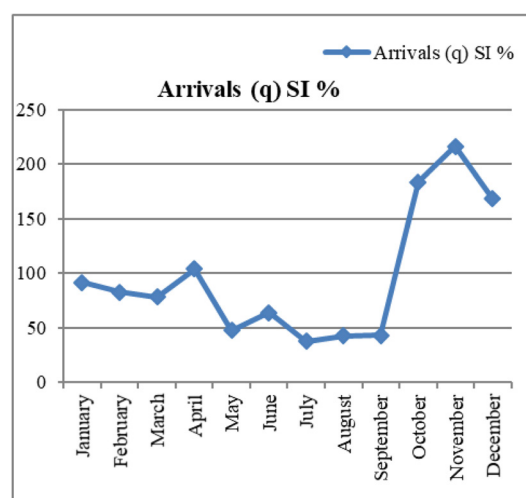
Fig. 2. Average prices of soybean.

Fig. 3. Seasonal indices of arrivals.

The maximum indices of Soybean arrivals were found in the month of November (216.15%) and minimum in month of July (37.71%). Whereas, prices indices showed highest in January (116.4%) and lowest in March (88.23%) and the fluctuating between 88 to 98% and then there was increasing trend depicting (108.7%) in November and (101.8%) in December. The harvesting period of soybean is generally November, which coincides with higher magnitude of arrivals indices (216.15%) the price indices were also high during November. Whereas, during the post-harvest period the indices of arrivals were fluctuating and price indices were also irregular showing increasing
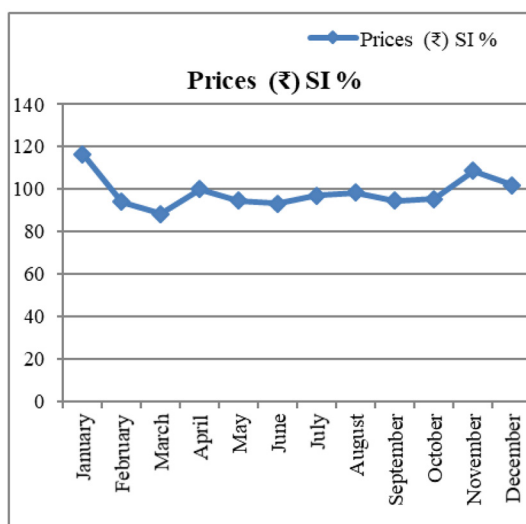
Table 3. Seasonal indices of arrivals and prices of Soybean in APMC, Parbhani (2000-2020).

Months	Soybean	
	Arrivals (q) SI (%)	Prices (₹) SI (%)
January	91.5429	116.422
February	82.6405	93.9502
March	78.0489	88.2311
April	103.835	99.8845
May	47.5593	94.6125
June	63.9898	93.3411
July	37.7113	97.0641
August	42.4862	98.3422
September	43.2818	94.7078
October	183.472	95.311
November	216.158	108.738
December	168.381	101.873

Fig. 4. Seasonal indices of prices.

and decreasing trend simultaneously as shown in Table 3 and also depicted in graphical form in Fig. 3 and 4. The results seen were in parallel with Sahoo and Singh 2017.

CONCLUSION

From the above discussion concluded that Price and arrival fluctuations are very significant. Prices are cheap during peak season due to a high post-harvest arrival rate, but during the offseason they are high-

er due to scarcity and a lack of storage facilities. There, we can see that arrivals and pricing have an inverse relationship. The government should make sure that every day access to accurate and reliable information regarding prices and arrivals in various markets is guaranteed. Since market information is crucial for connecting distant markets, the flow of market information must be accelerated. It will assist in enhancing marketing effectiveness. For the flow of price information, a solid information network infrastructure needs to be strengthened. The storage facilities need to be improved.

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