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# To Study the Seasonal Price Behaviour of Major *Kharif* Pulse Crops in Rajasthan

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**ABSTRACT**

The study based on time series data on arrivals and prices of major *kharif* crops. The time series data of arrivals and wholesale prices of selected *kharif* pulse crops were collected for 10 years (January 2008 to December 2017) in selected Krishi Upaj Mandi Samiti of Rajasthan. The study based on secondary data collected from different sources i.e. viz., AGMARK and NAFED and Krishi Upaj Mandi Samities. Three districts of Rajasthan state i.e., Bundi, Ajmer and pratapgarh were selected purposively. One Krishi Upaj Mandi Samiti from each district were selected, based on maximum tri-annum average [2015- 16 to 2017-18] arrivals and prices of major *kharif* pulse crops in the market. Seasonal Index of arrivals and prices of selected pulse crops were worked out by ratio to moving average method. The study revealed that there was inverse relationship between price and arrivals of black gram, green gram and pigeon pea in the KUMS, Bundi, Kekari and Pratapgarh of Rajasthan. It might be due to distress sale, lack of storage facilities and overdue burden of the farmers.

**Keywords**: Price behaviour, Seasonal arrivals index, Prices analysis, Seasonal price index, Pulses

Production of pulses are one of the important segments of Indian agriculture after cereals and oilseeds. The pulses comprise Chickpea, Pigeon pea, Lentil, Green gram bean, Black gram bean and Field pea. These pulses are an important commodity group of crops that provide high quality protein with complementing cereal proteins for pre-dominantly substantial population of the country. Pulses are popularly known as "Poor man's meat" and "rich man's vegetable" as a result of being a major source of proteins, vitamins and minerals especially for vegetarian diets in India (Singh *et al.* 2016).

Among the pulses, chickpea and pigeon are the important crops accounting for 50 per cent of pulse area and 60 per cent of total production. Madhya Pradesh, Uttar Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka, Bihar, Chattisgarh, Gujarath and Tamil Nadu. Pulses are grown in *Kharif* and *Rabi* seasons. Chickpea, drypea, lentil and lathyrus are known as *Rabi* pulses. The *Kharif*

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pulses contribute about 40 per cent of the world pulse production. *Kharif* pulses contribute 45 per cent of the total area and about 35 per cent of production. (Anonymous, 2018)

India is known to be the largest producer (25.23 million tones), consumer (23-24 million tones) and importer (5-6 million tones) of pulses in the world (Anonymous, 2018). It secured the top position in area and production with 35 per cent and 29 per cent in the world respectively. India plays a significant role in the world pulse market. In India food grains occupy 65 per cent of total gross cropped area comprising cereals in 50 per cent and pulses in about 15 per cent. Within pulses, black gram occupies 3 per cent area followed by pigeon pea 2 per cent and green gram 2 per cent. Other pulses cover about 3 per cent of gross cropped area. Under individual crop category, Pigeon pea with 17 per cent production share in total *kharif* pulses is the highest contributor followed by black gram more than 13 per cent and green gram 8 per cent. The total area coverage and production of *kharif* pulses during 2017-18 has been 138 Lha and 90 Lt, respectively. Madhya Pradesh occupied the first rank in production with more than 25 per cent production followed by Rajasthan and Maharashtra with 16 per cent each and Karnataka at 11per cent. (Anonymous,2018).

In India, Madhya Pradesh secured first position in area with 6600 thousand hectare followed by Rajasthan, Maharashtra, Karnataka and Uttar Pradesh with 5907.62, 4002.23, 3556.66 and 2991 thousand hectare, respectively. In production Rajasthan secured first rank with 4497.13 thousand tones followed by Madhya Pradesh, Maharashtra, Uttar Pradesh and Karnataka with 4108.41, 3736, 2447.32 and 2155.89 thousand tones, respectively(Anonymous, 2019).

Pulses have historically exhibited seasonal price movements that are tied to the seasonal nature of the crop cycle. Crop prices in the spot and future markets are usually the lowest near harvesting due to supply pressure. Conversely, they are usually the highest by the end of the marketing season when supplies are less abundant. Seasonal price patterns can be used as a guide for developing a marketing plan when they are examined along with supply and demand information. Plans can be made about selling a portion of the crop produce in spot market or future market. Price analysis is the study of past price movements and the supply and demand factors associated with them. Price analysis, thus, explains how and why prices have behaved in a particular manner. It also explains whether there is consistency in the price behavior of commodities over time and space.

Pulses possess more or less uniform price trend overtime due to seasonality in nature. The price behaviour of the pulses are based on the traditional theory of supply and demand conditions. Due to seasonal behaviour of agriculture, it is viewed that during peak arrivals, the prices would be low and vice versa. However, the demand is spread throughout the year. In these circumstances, the validity of the determination of price of pulses based on aggregate demand and supply conditions at a given time is uncertain. In fact, this results in a hazardous situation leading to an imperfect pricing system, in which either final consumer or final producer or both would be adversely affected.

Generally, arrivals are more in the post-harvesting season in the producing areas and lesser in the other seasons. Its market arrivals and prices exhibit a seasonal pattern. The season based production causes fluctuations in prices from one season to the other. The fluctuation in prices causes wide variation in the income of pulses growers from season to season and year to year. The study was selected to see the seasonal price behavior of last decade because nobody did study in this period. This study help the policymakers and government for planning and implementing of policy issues as related to pulse production and marketing.

## MATERIALS AND METHODS

The study based on time series data on arrivals and prices of major *kharif* crops. The study based on secondary data collected from different sources i.e. *viz*., Directorate of Economics and Statistics, Ministry of Agriculture, Indiastat.com, AGMARK and NAFED and Krishi Upaj Mandi Samities. The time series data of arrivals and wholesale prices of *rabi* pulse crops were collected for 10 years (January 2008 to December 2017) in selected Krishi Upaj Mandi Samiti of Rajasthan. Three districts of Rajasthan state i.e., Bundi, Ajmer and Pratapgarh were selected purposively. One Krishi Upaj Mandi Samiti from each district were selected, based on

maximum tri-annum average [2015- 16 to 2017-18] arrivals and prices of major kharif pulse crops in the market. Seasonal Index of arrivals and prices of selected pulse crops were worked by ratio to moving average method. The study was restricted to major kharif pulse crops i.e. black gram, green gram and pigeon pea.

**Seasonal Price Behavior:** For determining the seasonal price and arrivals behaviour, the monthly data on arrivals and prices were used.

**Computation of Seasonal price Indices:** This was calculated from the original (monthly wholesale price) data using seasonal indices. There are four methods viz., ratio to trend, the ratio to moving average, simple average and link relative methods to calculate seasonal indices. There is a continuous refinement in using these methods. Long ago, the method of link relatives was the most prominent method for computing the seasonal indices but now a days, it is not. The method of ratio to moving average has some advantages over others. For example, in the ratio to trend method, it is impossible to separate the cyclical component from seasonal component. The seasonal indices computed by this method contains cyclical component also. But in case of method of ratio to moving average, this problem does not arise. Therefore, the ratio to moving average method was employed in the study to compute the seasonal price indices.

**Step I:** The centered 12 months moving average was computed from the original data. These centered 12 months moving average data contain the trend and cyclical component.

**Step II:** Divide the original data by the centered moving average.

$$Y = TSCI$$

$$\frac{Y}{MA} = \frac{TCSI}{TC} = SI$$

**Step III:** The irregular component was eliminated by averaging the data for each month over the years that we will get in step II. After averaging the data and multiplied it by hundred, the resultant was seasonal index for each month.

**Step IV:** The sum of seasonal indices should be 1200. If it is greater or less than 1200 then it was adjusted by using a correction factor i.e.

$$K = \frac{1200}{S}$$

Where,

$K$ = Correction factor

$S$ = Sum of seasonal indices

## RESULTS AND DISCUSSION

**Seasonal Index of Black gram:** Black gram is a *kharif* crop in Rajasthan. Seasonal indices of arrivals and prices of black gram are depicted in Table 1 and Fig. 1. It was revealed from the table and figure that KUMS, Bundi witnessed the lowest arrivals indices during the month of July (89.85%) and highest in the month of November (109.14%). During the study period, more than 100 arrival index of black gram was recorded from November to May months with peak arrival index in the month of November in KUMs, Bundi. The highest seasonal price index of black gram was found in the month of July (199.42%) and lowest in the month of November (78.98%). The seasonal price index of black gram in the KUMS, Bundi was more than 100 during the period of June to January except November month.

Thus, it could be observed from the table that there was contrary relationship between price and arrivals of black gram in the KUMS, Bundi. It might be due to lack of storage facility with farmers in the Rajasthan. Similar findings were reported by (Prakesh *et al.* 1995) in arrivals and prices of Urdbean in Uttar Pradesh.

**Table 1:** Seasonal indices of monthly arrivals and prices of Black gram crop in KUMS, Bundi (2008-2017) (Arrivals and Price in Index)

| Sl. No. | Month | Arrivals | Price |
|---|---|---|---|
| 1 | January | 103.59 | 103.59 |
| 2 | February | 108.53 | 91.97 |
| 3 | March | 107.55 | 86.96 |
| 4 | April | 101.69 | 98.68 |
| 5 | May | 106.15 | 83.71 |
| 6 | June | 99.17 | 101.39 |
| 7 | July | 89.85 | 119.42 |

| | | | |
|---|---|---|---|
| 8 | August | 93.59 | 107.42 |
| 9 | September | 91.62 | 114.91 |
| 10 | October | 85.43 | 111.55 |
| 11 | November | 109.14 | 78.98 |
| 12 | December | 103.68 | 101.42 |
| **Total** | | **1200** | **1200** |

**Source:** Author's own commutation from compiled time series data.

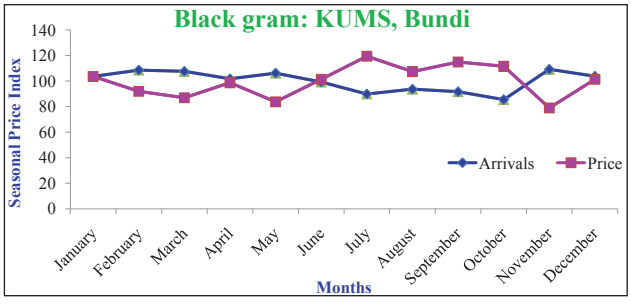


**Fig. 1:** Seasonal price index of monthly arrivals and prices of Black gram in KUMS, Bundi (2008-2017)

**Seasonal Index of Green gram:** Like black gram, green gram is also cultivated in *kharif* season in Rajasthan, however, in some part of Rajasthan, it is also grown in *kharif* season. The seasonal indices of arrivals and prices of green gram are depicted by the Table 2 and Fig. 2. It was observed from the table and figure that KUMS, Kekari witnessed for the highest arrival index of green gram during the month of January (112.13%) and the lowest during month of June (85.64%). The KUMS, Kekari also reported more than 100 arrivals indices of green gram from November to April with peak arrivals in January.

In the KUMS, Kekari, the highest and lowest seasonal price index of green gram was found in the month of June (117.05%) and January (88.56%), respectively. During the study period, the KUMS, Kekari showed more than 100 seasonal price index from May to September months. At the same time, the peak level of seasonal price index in KUMS, Kekari was recorded in the month of June. It could be concluded from the analysis that arrivals and price of green gram were represented negative association with price in KUMS, Kekari. It might be due to lack of storage facility of farmers in Rajasthan. Similar results were found by Basvaraja (1993) of major crops in Bijapur district of Karnataka.

**Table 2:** Seasonal indices of monthly arrivals and prices of Green gram crop in KUMS, Kekari (2008-2017) (Arrivals and Price in Index)

| Sl. No. | Month | Arrivals | Price |
|---|---|---|---|
| 1 | January | 112.13 | 88.56 |
| 2 | February | 108.80 | 90.03 |
| 3 | March | 110.78 | 89.07 |
| 4 | April | 103.07 | 93.07 |
| 5 | May | 97.55 | 101.75 |
| 6 | June | 85.64 | 117.05 |
| 7 | July | 89.75 | 110.80 |
| 8 | August | 87.88 | 113.56 |
| 9 | September | 86.96 | 111.47 |
| 10 | October | 98.82 | 96.85 |
| 11 | November | 109.92 | 93.04 |
| 12 | December | 108.70 | 94.75 |
| **Total** | | **1200** | **1200** |

**Source:** Author's own commutation from compiled time series data.

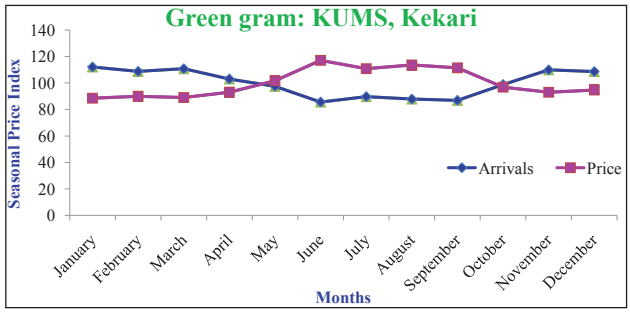


**Fig. 2:** Seasonal price index of monthly arrivals and prices of Green gram in KUMS, Kekari (2008-2017)

**Seasonal Index of Pigeon pea:** The seasonal indices of arrivals and prices of Pigeon pea in KUMS, Pratapgarh are presented in the Table 3 and figure 3. It was revealed from the table and figure that highest seasonal arrival index (115.09%) of pigeon pea was recorded in the month of February in KUMS Pratapgarh and the smallest during the month of July (81.64%). During October to March months, the KUMS, Pratapgarh showed more than 100 arrivals indices of pigeon pea and less than 100 from April to September. Higher arrival indices of pigeon pea were noticed immediately after harvest in the selected market.

During the same study period, the value of highest

price index for pigeon pea was recorded during in the month of July (115.87%) and lowest price index in the month of February (81.89%) in the KUMS Pratapguarh. The price index of pigeon pea in selected market was more than 100 during the month of May to September and less than 100 during October to April months.

Therefore, it could be notified from the table that there was inverse relationship between price and arrivals of pigeon pea in the KUMS, Pratapgarh. It might be due to distress sale made by pigeon pea growers in the KUMS Pratapgarh. Similar findings were reported by Choudhary and Pawar (2010) in arrivals and prices of pigeon pea from 1985-86 to 2004 -05 in Latur market of Maharashtra.

**Table 3:** Seasonal indices of monthly arrivals and prices of Pigeon pea crop in KUMS, Pratapgarh (2008-2017) (Arrivals and Price in Index)

| Sl. No. | Month | Arrivals | Price |
|---|---|---|---|
| 1 | January | 109.92 | 88.71 |
| 2 | February | 115.09 | 81.89 |
| 3 | March | 110.53 | 88.89 |
| 4 | April | 99.81 | 99.40 |
| 5 | May | 88.93 | 111.97 |
| 6 | Jun | 89.70 | 115.50 |
| 7 | July | 81.64 | 115.87 |
| 8 | August | 85.14 | 115.14 |
| 9 | September | 97.66 | 100.96 |
| 10 | October | 106.21 | 94.55 |
| 11 | November | 106.35 | 95.83 |
| 12 | December | 109.03 | 91.30 |
| **Total** | | **1200** | **1200** |

**Source:** Author's own commutation from compiled time series data.

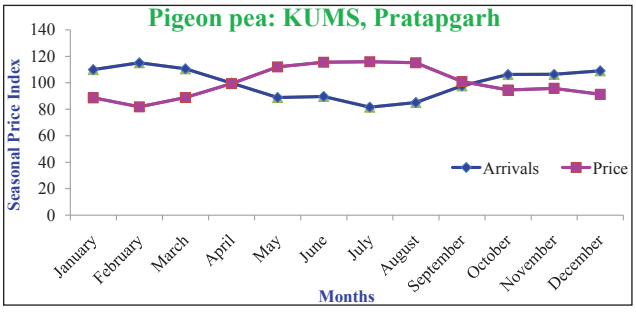


**Fig. 3:** Seasonal price index of monthly arrivals and prices of Pigeon pea in KUMS, Pratapgarh (2008-2017)

## CONCLUSION

Therefore, it could be analyzed that the highest and lowest arrivals of black gram was observed during the month of November (109.14%) and July (88.85%) in Krishi Upaj Mandi Samiti, Bundi of Rajasthan. The highest and lowest prices of black gram was reported in the month of July and November at the rate of 199.42 and 78.98 per cent, respectively. The highest and lowest arrivals of green gram was observed during the month of January and June in KUMS, Kekari of Rajasthan with the magnitude of 112.13 and 85.64 per cent respectively. The highest and lowest prices of green gram was reported in the month of June and January at the rate of 117.05 and 88.56 per cent, respectively. The highest and lowest arrivals of pigeon pea was observed during the month of February and July in KUMS, pratapgarh of Rajasthan with the magnitude of 115.09 and 81.64 per cent respectively. The highest and lowest prices of pigeon pea was reported in the month of July and February at the rate of 115.87 and 81.89 per cent, respectively. There was inverse relationship between price and arrivals of black gram, green gram and pigeon pea in the KUMS, Bundi, Kekari and Pratapgarh, respectively. It might be due to distress sale, lack of storage facilities and overdue burden of the farmers.

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