

Market arrivals and Price behavior of Wheat in Major markets of India

ABSTRACT

Behaviour of prices of agricultural commodities results from the basic characteristics of agricultural sector and farm products. This study is based on the secondary data of 15 years from 2007-08 to 2021-22 which was collected from www.agmarknet.gov.in. For the analytical framework, the linear trend equation was used to study the trend in arrivals and prices. During the study period, the pattern of trend in arrivals and prices was differed across the selected markets. All the selected market for wheat showed increasing trend in arrivals and prices over the years. The per annum increase in the arrivals of wheat in Lakhimpur market was the highest at 1884.86 quintals followed by Vidisha, Baran, Dewas, Kota and Agra markets at 1394.74, 942.65, 782.61, 389.19 and 56.53 quintals respectively. The quantum of increase in the arrivals of wheat might be due to the increased production in these regions. Increased productivity and arrivals was attributable to introduction of high yielding varieties, technological advancement, increased demand for wheat in the international market, prices lead to better productivity realization by farmers in the surrounding hinterlands of Lakhimpur, Vidisha, Baran and Dewas area and supplied to these markets. Market arrivals registered lowest quantum of increase in Agra and Kota markets. The lowest quantum of increase in arrivals of wheat might be due to increasing heat stress, other problems experienced by producers in production level and shift in cropping pattern of the farmers towards other commercial crops in those regions. Seasonal indices of arrivals and prices of wheat in selected markets revealed that when the arrivals of wheat to the market were high, the prices were found to be low i.e., March to June. Seasonal price indices of wheat indicate that the price realized by farmers was low during the post- harvest month. Hence, infrastructural facilities like warehouses and market extension services have to be strengthened for encouraging and bringing awareness among the farming community about the availability of warehouses and marketing credit to reap the better benefits.

Key words: Arrivals and prices, Time series analysis, Wheat crop, Seasonality.

I. INTRODUCTION

The entire world desperately requires a change of the global food system that will result in more nutritious food for everyone and a significant reduction in the environmental impact of agriculture. To assist the poorest people on earth, the major cereal grains must be at the centers of this new revolution. Over the past 50 years, groundbreaking research on our three most important cereal grains viz., maize, rice and wheat which has made a significant contribution to the world's food security.

Wheat is one of the oldest cultivated plants in the world and has always been one of the most important staples for many countries. The wheat grain has a high nutritional value. The wheat grain consists of approx. 70 per cent starch, 14 per cent protein, high-quality amino acids, unsaturated fatty acids, fibre, vitamins and minerals. Simultaneously, the high

nutritional value and very good storage properties have already made wheat indispensable for world nutrition in the past. Wheat-based raw materials, such as wheat starch and wheat proteins, are essential for modern food production. Bread and baked goods cover 20 per cent of our daily calorie consumption and contribute significantly to a balanced diet. We are fascinated by the idea that one of the oldest crops in the world can use new processing technologies to provide an important answer to new challenges. The natural ingredients of wheat improve quality and reduce resource consumption in the end-consumer product in a wide range of applications.

Prices determine what is supplied as well as how much is generated. The price framework is an excellent tool for communicating basic financial information and fostering proper decision-making by producers and buyers. Furthermore, price is the most crucial profit or loss aspect in an agricultural operation. Because crops are sown in one season and harvested in another, time is critical in an agricultural operation. This extended era of expansion has had a substantial impact on value assurance. As a result, the prices won throughout the showcasing period are of exceptional quality. Huge production and a large number of arrivals have a negative impact on costs, causing prices to fall. However, in a mixed economy, market forces are given a special weight, therefore this law may not be universally applicable. This market impact control system may seek to manage market supplies, utilization, or both, especially when products elicit a rapid response from merchants and customers, the effects of which are reflected in supply and value position. With this backdrop, the present paper highlighted market arrivals and price behaviour of wheat grain in major markets of India.

II. OBJECTIVE OF THE STUDY

- To analyze the market arrivals and price behaviour of wheat grain in major markets of India.

III. METHODOLOGY

The secondary data pertaining to the study of temporal and seasonal fluctuations in arrivals and prices of wheat, monthly data were collected for the selected markets from AGMARKNET website for a period of last 15 years (2008-2022). Depending upon the highest area under wheat and consistency of monthly arrivals data, Uttar Pradesh, Madhya Pradesh and Rajasthan states were selected for the completion of the specific objectives of the study. Punjab and Haryana states were not included for the study. Because, monthly arrivals data were not available throughout the study period. Selection of markets for the study was done on the basis of maximum quantity of arrivals for different markets in selected states. For the selection of markets, data were collected from www.agmarknet.gov.in for each state and average wheat arrivals during the last three years of the study (2019-2021) were calculated.

In the second stage, looking into the average arrivals in different markets and also based on the availability of data, two major markets were selected from each selected state. Thus, the six major markets selected for the study were Lakhimpur and Agra markets from Uttar Pradesh, Vidisha and Dewas markets from Madhya Pradesh and Kota and Baran markets from Rajasthan states.

3.1 Trend equation:

Trend equations were computed by running the regression between the yearly average price 'Y' and the time 't'. Thereby fitted equations were as follows.

$$\text{Regression equation, } Y = a + b_t + e$$

Where,

Y = Yearly average price

t = Time period in years (T=1, 2,.....,17)

a = Intercept

b = Regression coefficient

e = Error term

With the help of this trend equation, estimated Y values for the yearly average price were found out. These estimated values from the regression equation were used to fit the trend line.

3.2 Seasonal variation:

$$\text{Seasonal indices} = \frac{\text{Monthly average}}{\text{Average of all monthly averages}} \times 100$$

IV. RESULTS AND DISCUSSION

4.1 Trends in arrivals and prices of wheat in major markets of India (2008-2022)

The trend component was computed to ascertain the long run movement of market arrivals and prices of wheat in main markets of major wheat producing states, viz., Lakhimpur and Agra (Uttar Pradesh), Vidisha and Dewas (Madhya Pradesh), Kota and Baran markets (Rajasthan). The linear trend was computed in order to analyze the long run movement of arrivals and prices of wheat in Lakhimpur, Agra, Vidisha, Dewas, Kota and Baran markets and the results have been given in the Table 1. The results revealed that overtime the arrivals of wheat had increased in all the selected markets. The per annum increase in the arrivals of wheat in Lakhimpur market was the highest at 1884.86 quintals followed by Vidisha, Baran, Dewas, Kota and Agra markets at 1394.74, 942.65, 782.61, 389.19 and 56.53 quintals respectively. However, the annual increase was significant only in Lakhimpur, Vidisha and Baran markets. The results also revealed that overtime the prices of wheat had increased in all the selected markets. The per annum increase in the prices of wheat in Vidisha market was the highest at 76.47 rupees per quintal followed by Agra, Baran, Lakhimpur, Dewas and Kota markets at 75.86, 75.17, 74.97, 72.05 and 68.50 rupees per quintal respectively. The annual increase was significant in all the selected markets at 1 percent level of probability.

Two markets in each of the chosen states for wheat crop were subjected for in depth analysis. Linear trend analysis for price of wheat indicated a positive trend in the selected markets. The prices of wheat has increased in the selected markets, but the extent of increase in prices varied from market to market. The results revealed from Table 1 that increasing trend in prices and arrivals in all the selected markets. Vidisha market (₹ 76.47/qtl) registered the highest increasing trend in prices of wheat. Over the years, the annual incremental change

in prices ranged from ₹ 68.50 to ₹ 76.47 per quintal, with lowest annual incremental in prices in Kota market (₹ 68.50/qtl). The increasing trend in prices of the selected markets was mainly attributed to the increasing in the time value of money over the years which has reflected in higher prices of wheat. No other factors were found responsible for the incremental changes in the prices of wheat in the markets considered for the study.

The arrivals were found to be increasing in all the selected markets, but quantum of increase in arrivals varied from one market to another market. The per annum increase in the arrivals of wheat in Lakhimpur market was the highest at 1884.86 quintals followed by Vidisha, Baran, Dewas, Kota and Agra markets at 1394.74, 942.65, 782.61, 389.19 and 56.53 quintals respectively. The quantum of increase in the arrivals of wheat might be due to the increased production in these regions. Increased productivity and arrivals was attributable to introduction of high yielding varieties, technological advancement, increased demand for wheat in the international market, prices lead to better productivity realization by farmers in the surrounding hinterlands of Lakhimpur, Vidisha, Baran and Dewas area and supplied to these markets. Table 1 also depicted that market arrivals registered lowest quantum of increase in Agra and Kota markets. The lowest quantum of increase in arrivals of wheat might be due to increasing heat stress, other problems experienced by producers in production level and shift in cropping pattern of the farmers towards other commercial crops in those regions. Similar study was carried out by Gohain et al., (2019) where they analyzed the trends in market arrivals and prices of major agricultural commodities (wheat, paddy, maize and cotton) in the markets of Punjab which resulted in increasing trend of arrivals of paddy, wheat and maize over time whereas arrivals of cotton exhibited a declining trend over time.

Table 1 Trends in arrivals and prices of wheat in major markets of India (2008-2022)

State	Market	Arrivals (qtl)	Prices (₹/qtl)
		Equation	Equation
Uttar Pradesh	Lakhimpur	$Y = -2902.33 + 1884.86^{**}t$	$Y = 898.19 + 74.97^{**}t$
	Agra	$Y = 23282.17 + 56.53t$	$Y = 942.59 + 75.86^{**}t$

Madhya Pradesh	Vidisha	$Y = 1742.89 + 1394.74^{**}t$	$Y = 1241.78 + 76.47^{**}t$
	Dewas	$Y = 11410.24 + 782.61t$	$Y = 1050.05 + 72.05^{**}t$
Rajasthan	Kota	$Y = 19603.33 + 389.19t$	$Y = 1045.45 + 68.50^{**}t$
	Baran	$Y = 4006.95 + 942.65^{**}t$	$Y = 960.35 + 75.17^{**}t$

Note: **Significant at 1 per cent probability level

*Significant at 5 per cent probability level

4.2 Seasonal indices of arrivals and prices of wheat in major markets of India (2008-2022)

Seasonal variations were the similar patterns that occur at specific regular intervals every year and have their origin within the year. The factors that affect the extent of seasonality in prices comprised the degree of perishability of the commodity and seasonality in consumption, the extent of seasonal concentration in production, the cost and storage infrastructure available to farmers or traders and restrictions on storage. So, it was necessary for organizations to identify and measure seasonal variations within their market to help them to plan for the better prices. Market arrivals have a huge impact on price formation, as arrivals start increasing the prices will decrease and vice versa. The ratio to trend method was used to compute the seasonality in arrivals and prices of wheat in all the selected major markets of India for the monthly time series data for years 2008 to 2022. The results of the same were presented in Table 2 and were also graphically presented in Fig. 1 and Fig. 2.

The seasonal arrival indices in Lakhimpur market were relatively high during the months of April to June with highest being in the month of May (295.68). In Lakhimpur market, arrival remained low during August to February and the lowest being in the month of February (45.52). The seasonal arrival indices in Agra market were relatively high during the months of May to August with highest being in the month of May (138.30). In Agra market, arrival remained low during October to March and the lowest being in the month of February (71.99). The arrival indices of wheat in Vidisha market was found to be the highest in the month of April with an index of 486.44 followed by May (300.15) and the lowest in the month of February (31.18). The arrival indices of wheat in Dewas market were found to be the highest in the month of March with an index of 352.84 followed by April (217.72) and the lowest in the month of January (24.65). In Kota market the highest arrivals were observed during April with an index of 408.59 followed by May (245.06) and the lowest in February (27.32). Similarly, in Baran market, the highest arrivals were observed during April with an index value of 477.62 followed by May (237.86) and the lowest in February (14.26). Amongst all the markets, the highest seasonal variation in arrivals of wheat was observed in Vidisha market with seasonal indices of monthly arrival varied from 31.18 to 486.44. In Agra market monthly arrivals varied from lowest indices at 71.99 to the highest indices at 138.30. Thus,

arrivals of wheat had not shown a unique seasonal pattern in selected markets and it varied from market to market.

In all the markets, the prices were found to be not fluctuating significantly during the year. The highest and lowest seasonal indices for prices were found in Dewas market during the month of November (106.23 per cent) and April (95.16 per cent) among the selected markets. Lakhimpur market and Agra market (Both from Uttar Pradesh) showed peak seasonal indices of prices of wheat during December month (103.70 and 105.18 per cent, respectively). Although, the lowest seasonal indices of prices of wheat were observed during the month of April and July (96.81 and 96.85 per cent, respectively). The prices of wheat in Vidisha market and Dewas market (both from Madhya Pradesh) were found to be highest during the month of November with seasonal indices of 103.40 and 106.23 per cent, respectively and the lowest prices were found during May and April months (98.42 and 95.16 per cent, respectively). Kota market and Baran markets had (both from Rajasthan) showed peak seasonal indices of prices of wheat during November month (105.47 and 105.72 per cent, respectively). Similarly, the lowest seasonal indices of prices of wheat were observed during the month of June and April (96.16 and 96.23 per cent, respectively). Overall, the seasonal price indices revealed a clear pattern that it confirmed to a significant inverse relationship with the pattern of market arrivals a commonly observed relationship in most of the agricultural commodities.

To ascertain the pattern of price variations in wheat during different months of the year, seasonal indices were computed and the results of seasonal indices of prices and arrivals were presented in Table 2. It is observed that the prices of wheat (range 95.16 to 106.23) were not fluctuating much within the year across the months. These kind of behaviour of prices might be attributable to the nature of arrivals to the market. The higher seasonal indices of prices were observed during the months where the arrivals were found to be low i.e., during November to February. When the arrivals of wheat to the market were high, the prices were found to be low i.e., during March to June. The variation in prices (as indicated by seasonal indices) may be due to the nature of production of wheat, availability of storage facilities and processing facilities. Immediate cash requirement by the farmers also compelled them to go for sale immediately after harvest though the prices were ruling low in the respective months.

The combine study of seasonal variation of arrivals and prices indicated that existence of a minimum price at the time of maximum arrivals in the market and vice versa. Hence, arrivals should be regulated in such a way, which would benefit the producers as well as consumers. To analyze the arrivals pattern of wheat during different months of the year, seasonal indices were computed and seasonal variations were observed in arrivals of wheat in the selected markets. Table 2 depicted that due to seasonality in production, arrivals of wheat were not uniform throughout the year in the selected markets. It was more in the peak season of production and lesser in lean season of the year. The seasonal indices exhibited that, there was mild variation in the seasonal pattern in different markets. In the Lakhimpur, Vidisha, Dewas, Kota and Baran markets, the quantity of arrivals were found to be high during March to June, but in Agra market it was higher during May to July. It might be attributable to the fact that majority of farmers planned wheat production in late rabi season in anticipation of getting better remunerative prices for the commodity during these months. Moreover, to some

extent arrivals were also from neighboring hinter lands and also from other states. Agreement between farmers and private processing units in these areas might lead to shift in cropping pattern of wheat in this region. The seasonal pattern on market arrivals was the result of inadequacy of storage and warehousing facilities and inability of the farmers to withhold stocks in storage in anticipation of better prices, which not only made them to incur additional cost on storage, but also made them to bear the risk of storage losses and price uncertainty.

Table 2 Seasonal indices of arrivals and prices of wheat in major markets of India (2008-2022)

(Per cent)

States	Uttar Pradesh				Madhya Pradesh				Rajasthan			
Markets	Lakhimpur		Agra		Vidisha		Dewas		Kota		Baran	
Months	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices
January	46.42	99.85	78.82	99.94	34.68	99.60	24.65	103.27	34.17	101.05	18.76	100.51
February	45.52	101.68	71.99	101.81	31.18	96.54	74.42	98.82	27.32	99.82	14.26	98.44
March	47.18	102.05	86.25	99.78	94.88	100.01	352.84	95.61	94.36	99.83	172.23	97.75
April	222.20	96.81	99.55	97.23	486.44	98.87	217.72	95.16	408.59	96.77	477.62	96.23
May	295.68	97.83	138.30	97.31	300.15	98.42	175.41	96.12	245.06	97.05	237.86	97.22
June	155.15	98.19	130.93	97.68	63.07	99.22	84.61	96.69	112.04	96.16	105.33	96.64
July	73.64	97.07	111.64	96.85	31.07	99.01	59.46	99.22	53.03	97.73	35.56	99.22
August	62.16	98.12	105.39	99.45	25.81	98.71	45.24	101.00	39.34	99.75	23.70	100.90
September	60.35	99.76	99.32	100.52	29.81	101.91	45.15	101.01	48.37	99.93	30.62	100.65
October	60.26	101.72	92.21	100.66	29.54	101.01	33.94	101.45	47.79	101.30	26.82	101.67
November	67.76	103.21	91.74	103.58	35.92	103.40	39.01	106.23	44.53	105.47	27.35	105.72
December	63.68	103.70	93.85	105.18	37.43	103.31	47.53	105.43	45.39	105.14	29.90	105.03

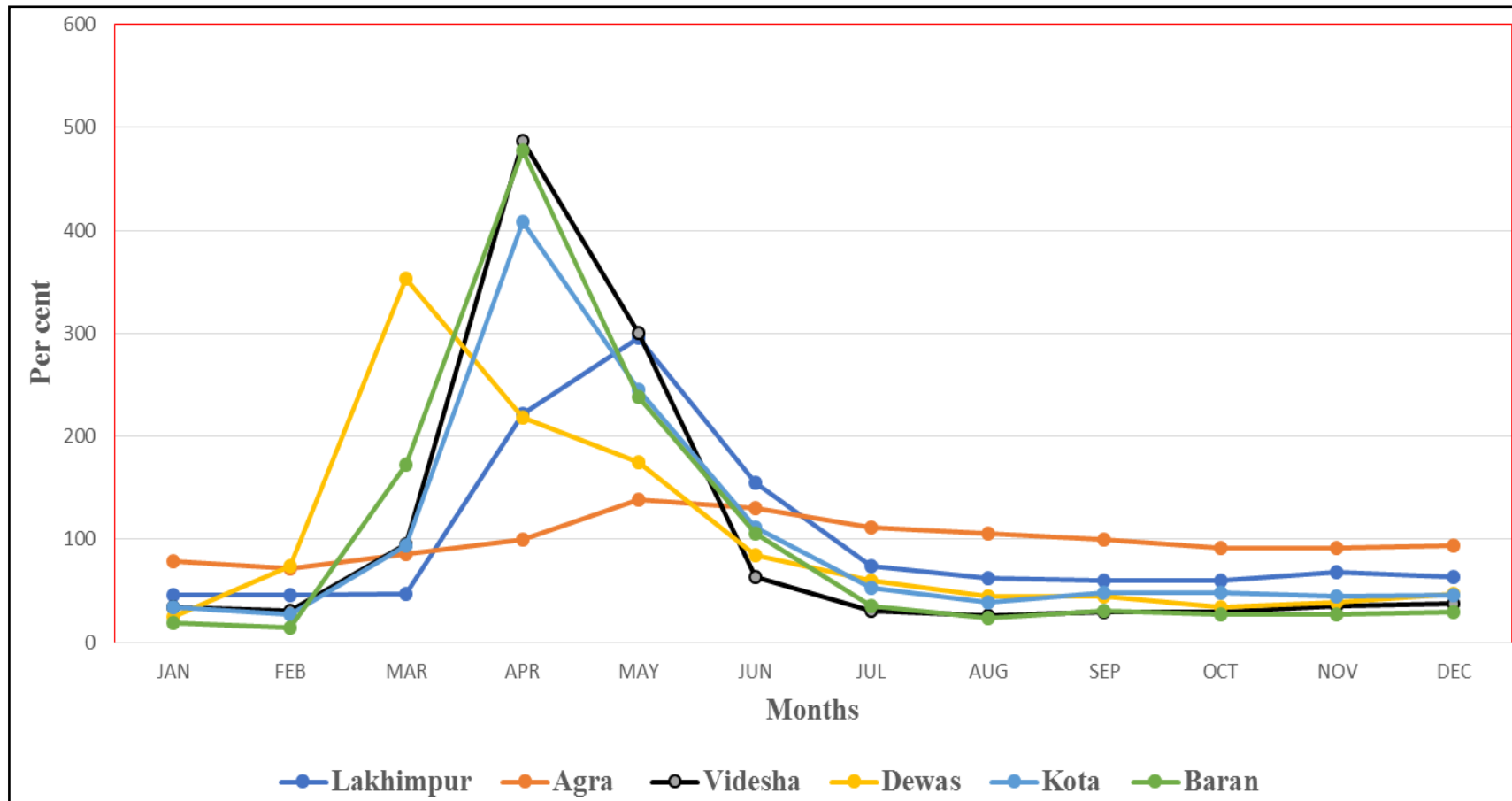


Fig 1. Seasonal Indices of Arrivals of wheat in selected markets

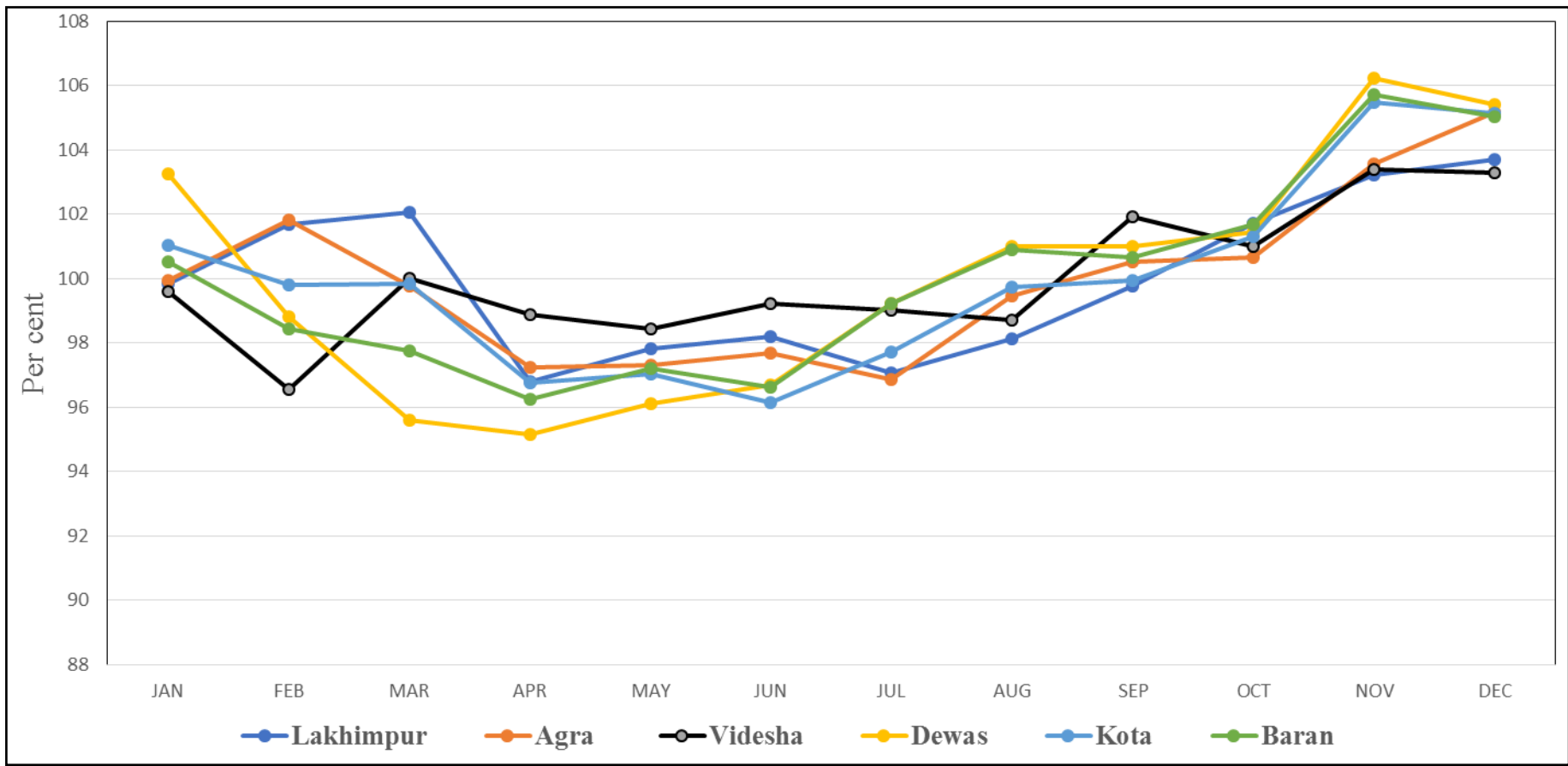


Fig 2. Seasonal Indices of Prices of wheat in selected markets

V. CONCLUSIONS

The present study was conducted in market arrivals and prices of wheat in main markets of major wheat producing states, viz., Lakhimpur and Agra (Uttar Pradesh), Vidisha and Dewas (Madhya Pradesh), Kota and Baran markets (Rajasthan). The present study in Uttar Pradesh state concluded that in Lakhimpur and Agra market, the highest arrivals and lowest prices of wheat were in the month of May and April, respectively for both the markets. In case of Madhya Pradesh state concluded that in Vidisha and Dewas market, the highest arrivals of wheat were in the month of April and March, respectively whereas the lowest prices of wheat were in the month of February and April, respectively. Rajasthan state concluded that in Kota and Baran market, the highest arrivals of wheat were in the month of April for both the markets whereas the lowest prices of wheat were in the month of June and April, respectively. The pattern of trend in arrivals and prices was differed across the selected markets. All the selected market for wheat showed increasing trend in arrivals and prices over the years. The increasing trend in arrivals and prices varied from one market to other market. The highest per annum increase in arrivals was registered in Lakhimpur market whereas highest per annum prices was recorded in Vidisha market. With respect to arrivals of wheat, there is presence of seasonality within a year in selected markets. Seasonal indices of arrivals and prices of wheat in selected markets revealed that when the arrivals of wheat to the market were high, the prices were found to be low i.e., March to June. Seasonal price indices of wheat indicate that the price realized by farmers was low during the post- harvest month. Hence, infrastructural facilities like warehouses and market extension services have to be strengthened for encouraging and bringing awareness among the farming community about the availability of warehouses and marketing credit to reap the better benefits.

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