Trend and seasonal analysis of wheat in selected market of Sriganganagar district

Meera[1] and Hemant Sharma[2]

[1]*Department of Agricultural Economics, Swami Keshwanand Rajasthan Agricultural University, Bikaner, India*
[2]*Department of Agro Economic Research Centre, Sardar Patel University, Anand, Gujarat*

ABSTRACT

In view of this the present study was undertaken by collecting monthly wholesale prices of wheat in Sriganganagar district of Rajasthan .This study was based on the secondary data on arrival and prices of wheat in A.P.M.C., Sriganganagar, Sadulsahar, Gharsana, Anupgarh, Vijaynagar, Suratgarh,Gajsinghpur,Karanpur and Raisinghnagar for the period of 10 years i.e. from 2005 upto 2014. In the analysis all the selected markets showed positive trend in prices. The seasonal price index pro ides a measure of the month to month variation in wheat prices. Price of wheat was found to be highest during off season and lowest during harvest season. Since wheat is a rabi crop, the arrivals were high during March to May. The higher seasonal indices of prices were observed during December to February during which the arrivals were found to be low.

Keywords: Price, seasonal, wheat, market arrivals, trend

Prices are highly volatile in nature and never remain constant. Prices of different groups of commodities never move in the same direction or with the same speed. Hence, they affect the future of individual group and as well as the whole economy in several ways.

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Prices of the crop are an important variable for boosting the production in addition to the availability of better seeds and use of modern technology. Higher degrees of fluctuations were observed in prices of wheat during last 10 years. Price variation in the magnitude higher than the desired level affect the production of crops adversely; so there is a need to keep a watch on movement of prices of wheat for deriving suitable agricultural price policy for increasing their production continuously. The study of price behaviour and knowledge of changes in prices over time and space guides the planners in deriving the appropriate price regulation measures for the creation of better marketing facilities.

Address for correspondence

Meera: Department of Agricultural Economics, Swami Keshwanand Rajasthan Agricultural University, Bikaner, India

E-mail: meetverma15@gmail.com

Prices of agricultural crops also fluctuate in various months and seasons of the year. The behaviour of wheat crops has no exception to this phenomenon. Seasonal behaviour of wheat production and their demand being almost equally distributed during year result in a high degree of variation in prices over time and months/seasons during the year.

Analysis of price and market arrivals over time is important for formulating a sound agricultural price policy. Fluctuations in market arrivals largely contribute to the price instability of the produce. In order to device appropriate ways and means for reducing price fluctuations of agricultural commodities, there is a need to have a thorough understanding of price behaviour over time and over space. Such an analysis is also useful to farmers in order to decide the optimum time for disposing off their produce to their best advantage. It has been noticed that when major portion of the produce reaches the market during the peak seasons, the prices generally will be low which depress the farmer's income to a great extent. Proper planning in disposing of the produce by the farmer alone can considerably increase their income without incurring much additional cost.

In view of many policy changes at the international, national and state level, it is imperative to study the influence of agricultural sector exclusively on marketing and price behaviour. The likely impact of WTO regime on marketing of agricultural products and fluctuation of prices becomes utmost important, since it has bearing on farmer's income and ultimately on the standard of living.

Therefore, looking to the importance of wheat for the producers as well as consumers in terms of marketing and price behaviour, the present study has been under taken with some specific objectives i.e. (i) to study the trends in arrivals and prices of wheat in selected market of Sriganganagar district, and (ii) to analyze the seasonal price behaviour of wheat crop in the selected market of Sriganganagar district.

Database and Methodology

Sriganganagar district was purposely selected for the study, which contributes proportional share in the production of wheat to the state. To study the trends and seasonal variation in arrival and prices of wheat, nine markets were selected from the district. The data pertaining to the study were collected from 2005 to 2014. To study the trends and seasonal variation in the arrival and prices, time series analysis was considered, where analysis of seasonal factor was performed using ratio moving average. The technique employed is the briefly explained. To examine the trend of arrivals and prices nature of wheat in Sriganganagar district, regression analysis was fitted. The following functional form was used:

$$Y_t = a + bt + E_t$$

Where,

  Y_t = Time series yearly data of arrivals or prices

  a = Intercept

  b = Regression coefficient

  t = Time period in years 1,2 ,…..20

  E_t = Random error

For Seasonal analysis ratio to moving average method is used to substantiate the objectives and it is the most widely used method of measuring seasonal variations. The logical reasoning behind this method follows from the fact that 12 months moving average can be considered to represent the influence of cycle and trend $C \times T$. If the actual value for any month is divided by the 12 month moving average centered to that month, presumably cycle and trend are removed. This may be represented by the expression: $[(T \times S \times C \times I)/ T \times C] = S \times I$. Where, T = Trend, S = Seasonal Component, C = Cyclical Components, I = Irregular Components.

Thus, the ratio to the moving average represents irregular and seasonal influences. If the ratios for each worked over a period of years are then averaged most random influenced will usually be eliminated hence in effect: $[(S \times I) / I] = S$. Hence this method is used to measuring seasonal variations of wheat in Sriganganagar.

Results and Discussion

Trend represents the general direction of change in arrivals and prices over a period of time. Trend

component is affected by changes in demand such as change in population, income, habits, customs, establishment of processing industries, *etc.* Price trend is also affected by adjustment in supply arising out of development of cold storage and marketing facilities, production technology and market arrivals over long period. The estimated parameters for trend value for arrivals (A) and prices (P) of wheat crops for different markets *viz.*, Sriganganagar, Sadulsahar, Gharsana, Anupgarh, Vijaynagar, Suratgarh, Gajsinghpur, Karanpur and Raisinghnagar are given in Table 1. A positive trend in arrival was observed in Sriganganagar, Gharsana, Raisinghnagar and Karanpur markets for wheat, whereas negative trend was observed in Anupgarh, Padampur, Sadulshahar, Vijaynagar and Suratgarh market. All the selected markets showed positive trend in prices.

The seasonal indices of market arrivals and prices of wheat in the selected markets are present in Table 2 and 3. Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals and prices of wheat. The results revealed the existence of seasonality in all the markets. Higher indices of market arrivals of wheat were noticed immediately after harvest

in the selected markets Arrivals reached peak during April (444.06) in Sriganganagar which decrease to 11.04 in November and relatively shoot up in March. In Anupgarh market the peak was found in April (553.13) followed by March (310.89). Gharsana market showed lowest arrivals in February (6.98) while it peaked during March (373.96). Padampur market witnessed the lowest arrivals in November (18.62) and highest during April (526.16). Arrivals reached a peak during May (507.40) in Raisinghnagar market while they were the lowest in February (11.08). Highest arrivals of Wheat in Sadulshahar market was observed during April month (566.81) and the second highest was observed during May (256.43) which decreased to 71.51 in July. Arrivals were between in 59.57 to 16.97 during other months. The higher market arrival indices in Karanpur were observed (more than 100) during the months of April to June and highest was observed in April (421.60). In the remaining months it was between 19.55 to 49.16. Arrivals reached peak during April (382.47) in Suratgarh market and decreased to 111.66 in July. The higher market arrival indices were observed (more than 100) in the months of April to July and lower arrival indices was found during December (13.09).

Table 1: Trend equations of wheat arrival and price in selected markets

Market	Trend equations for Markets	
	Arrivals (Y=a+bt)	Price (Y=a+bt)
Sriganganagar	A= 162645 + 235.287*t	P= 727.927 + 7.06745*t
Anupgarh	A= 42163.2 − 323.852*t	P= 704.886 + 7.16126*t
Gharsana	A= 3907.09 + 35.9189*t	P= 715.34 + 6.91904*t
Padampur	A= 8329.0 − 35.6171*t	P= 710.104 + 7.24029*t
Raisinghnagar	A= 10516.6 + 8.47450*t	P= 699.271+ 7.18340*t
Sadulshahar	A= 15455.4 − 53.8931*t	P= 695.291+ 7.12604*t
Karanpur	A= 3388.33 + 82.8848*t	P= 713.648 + 6.93419*t
Vijaynagar	A= 32441.6 − 300.871*t	P= 714.746 + 7.00503*t
Suratgarh	A=6040 − 5.07256*t	P= 693.107 + 7.40993*t

The market from March to June was glutted with wheat produce because mostly the farmers sold their produce immediately after harvest. The higher market arrivals were found (more than 100) to be prominent in the months of April to June a in the selected

markets viz., Sriganganagar, Anupgarh, Gharsana, Padampur, karanpur, Vijaynagar and Suratgarh Market. Raisinghnagar and Sadulshahar market noticed relatively higher arrivals during April and May.

The pattern of market prices showed slight differences

among the selected markets. The price index in Sriganganagar market was the highest in the month of February (103.59) and relatively higher during the months of November, December, January and March. Anupgarh market witnessed peak price during March (106.66). The indices in other months varied from 95.18 to 102.66. A peak of 104.26 in index was observed during February in Gharsana market followed by December (103.13) and January (102.38). However, the price index of other months was between in 96.63 to 100.87. Padampur market witnessed highest price index of 104.03 in February month. Majority of the months have price index between in 101.01 to 102.14 during peak period and lower price index was noticed in May (95.42). The market prices of wheat in Raisinghnagar found to be the highest in February (103.55). The lowest index was seen in May (96.37). Price index was between in 97.40 to 103.40 during other period. Sadulshahar market witnessed higher price indices of 105.89 during March month. Price indices were more than 100 in the months of November to March. Lower indices was observed during May (95.51). Price indices reached maximum during January months (104.83) in Karanpur market and it was least in the month of April (95.24). Price indices were between in 96.95 to 103.26 during in other months. Price indices was higher during February (105.72) and March (103.03) in Vijaynagar market. Least price indices were observed during April month (92.94). Suratgarh witnessed higher price indices during December (104.21). Least price indices was observed during May month (95.05). The price indices were between in 95.47 to 103.33 in other months. The fluctuation in the monthly indices of wheat arrivals was more than the monthly indices of prices in selected market during the study period.

The price indices of wheat were found the highest in the month of November to May and the lowest in March to June in the selected market. The price indices in selected market were more than 100 during the months of November to march. Thus, it can be concluded that the arrivals of wheat has negative relation with the price. Similar results were found by Basvaraja (1993).

Thus, to analyse the arrival pattern of wheat during different months of the year and their impact on price, seasonal indices were computed adopting 12 months moving averages. Wheat crop were sown in the month of November- December. It comes to harvest during March- April. Higher indices (more than 100) of market arrivals of wheat were noticed immediately after the harvest (March-April) in selected markets. Thus the majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices. The results are in line with Nadaf (2002).

The price movement also demonstrates significant seasonal fluctuations in the selected markets. As a short term fluctuations, one will notice a general finding that the price is low when the arrivals were large and the price being high when the arrivals were low. Thus, the values of higher price indices (more than 100) were found in the months of October- February probably due to very low arrivals, while that of the lowest price indices were found during post harvest months (March-May) in selected market.

The extents of seasonal price variation were determined by using different measures of intra year price variations. The three methods to measure the intra year price variations used in this study were the intra-year price rise (IPR), coefficient of average seasonal price variation (ASPV) and the coefficient of variation (CV).

With a view to ascertain the difference in the magnitude of the seasonal variations in the wheat, the analysis was carried out in terms of IPR, ASPV and C.V. For this purpose, the magnitude of fluctuations in seasonal indices of wheat was measured with the help of the coefficient of average seasonal price index variation. The results obtained are presented in Table 4.
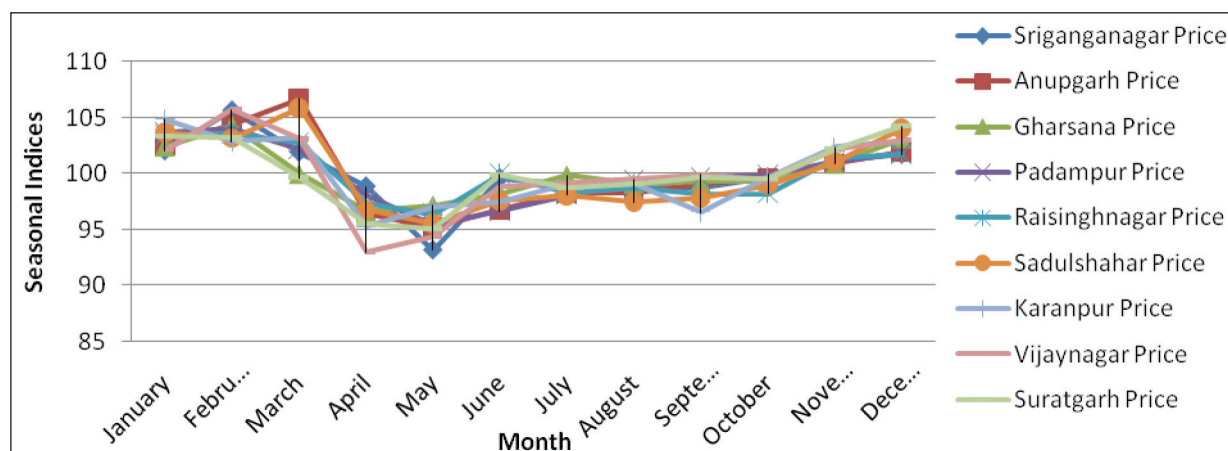
Fig. 1: Seasonal indices of monthly prices of wheat in selected market of Sriganganagar district (2005 to 2014)
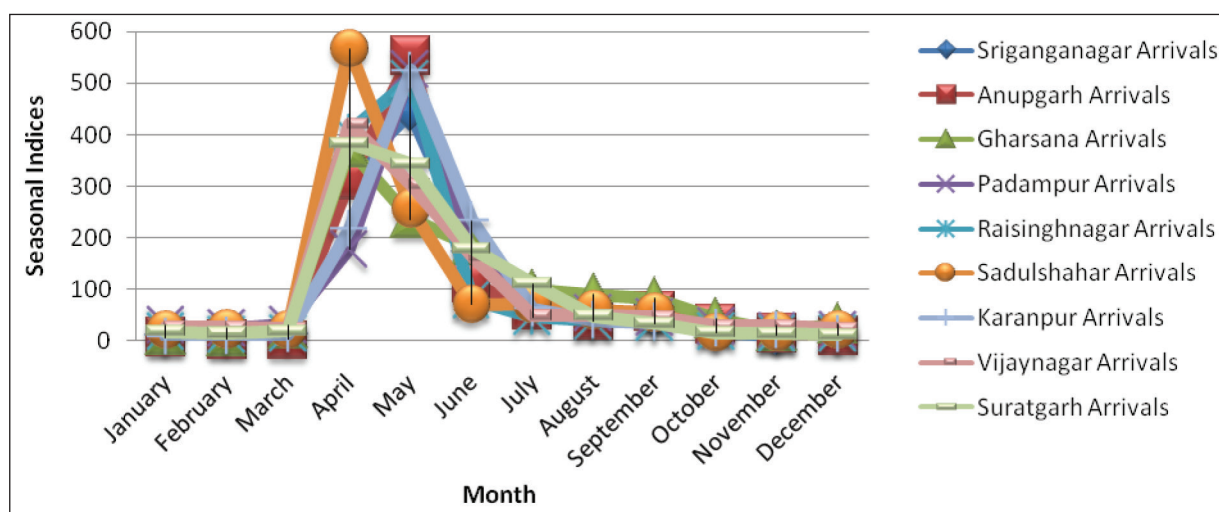

Fig. 2: Seasonal indices of monthly Arrivals of wheat in selected market of Sriganganagar district (2005 to 2014)

The difference between lowest and highest intra-year price rise ranged between 7.18 per cent in Raisinghnagar market to 12.44 per cent in Sriganganagar market for wheat. The highest coefficient of average seasonal price variation (ASPV) was recorded in Sriganganagar (12.35 %) and lowest in Gharsana market (7.74 %). Maximum value of the coefficient of variation for wheat was observed in Suratgarh (23.97 %) market, followed by Raisinghnagar (23.58%),

Table 2: Seasonal indices of monthly arrivals and prices of wheat in selected market of Sriganganagar district (2005 to 2014)

Period	Sriganganagar		Anupgarh		Gharsana		Padampur		Raisinghnagar	
	Arrivals	Price	Arrivals	Price	Arrivals	Price	Arrivals	Price	Arrivals	Price
January	11.79	102.00	6.33	102.47	10.56	102.38	29.84	103.71	17.47	103.40
February	11.33	105.59	3.37	104.41	6.98	104.26	24.32	104.03	11.08	103.55
March	12.99	101.86	1.29	106.66	21.15	99.95	30.83	102.14	14.27	102.80
April	323.81	98.83	310.89	96.39	373.96	96.63	177.64	98.07	404.05	97.40
May	444.06	93.15	553.13	95.18	236.46	97.13	526.16	95.42	507.40	96.37
June	171.95	99.56	112.08	96.82	185.34	98.17	166.28	96.66	78.42	99.95
July	75.27	99.08	58.93	98.28	99.09	99.81	78.81	98.11	47.01	98.33
August	59.83	98.76	38.78	98.26	90.28	99.09	54.10	99.42	37.98	98.72
September	47.49	98.70	57.86	99.14	82.58	99.27	44.72	99.70	35.38	98.23
October	17.85	99.64	31.80	99.53	42.53	99.32	27.96	99.92	18.22	98.17
November	11.04	101.15	14.89	100.88	18.34	100.87	18.62	101.01	14.27	101.42
December	12.60	101.68	10.66	101.97	32.72	103.13	20.74	101.82	14.45	101.67
TOTAL	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00

Table 3: Seasonal indices of monthly arrivals and prices of wheat in selected market of Sriganganagar district (2005 to 2014)

Period	Sadulshahar		Karanpur		Vijaynagar		Suratgarh	
	Arrivals	Price	Arrivals	Price	Arrivals	Price	Arrivals	Price
January	21.87	103.67	8.54	104.83	28.35	102.09	19.25	103.33
February	22.38	103.15	9.40	102.86	26.65	105.72	15.95	103.21
March	21.69	105.89	12.53	103.26	24.75	103.03	19.60	99.64
April	566.81	96.73	216.44	95.24	421.60	92.94	382.47	95.47
May	256.43	95.51	524.68	96.95	304.54	94.29	343.30	95.05
June	70.00	97.56	233.49	97.40	163.36	98.86	179.29	99.87
July	71.51	98.07	62.55	99.03	49.16	99.13	111.66	98.75
August	59.57	97.46	39.64	99.04	49.20	99.53	48.98	99.05
September	54.57	97.85	36.59	96.54	47.56	99.89	34.39	99.68
October	16.97	99.02	24.03	99.64	29.55	99.39	16.71	99.55
November	17.30	101.08	19.55	102.35	29.87	102.19	15.32	102.20
December	20.91	104.02	12.57	102.88	25.42	102.95	13.09	104.21
Total	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00

Table 4: Coefficients of average seasonal price variation

Market	Magnitude of variation (%)		
	IPR	ASPV	C.V. for price
Sriganganagar	12.44	12.35	22.59
Anupgarh	9.23	9.07	23.35
Gharsana	7.63	7.74	22.81
Padampur	8.62	8.67	23.34
Raisinghnagar	7.18	7.09	23.58
Sadulshahar	10.38	10.20	23.28
Karanpur	7.87	7.86	22.54
Vijaynagar	10.09	10.22	22.70
Suratgarh	9.16	8.98	23.97

Padampur (23.34%) and Sadulshahar (23.28%) and minimum in Karanpur (22.54%) followed by Viajaynagar (22.70%) markets. Wheat crop observed relatively more stability in the selected market. As the coefficient of variation increased, the degree of stability of prices decreased. The variability in fresh arrivals, stock of the products in market and the demand affects the price to a great extent. Keeping such variations in demand in view, the growers can obtain better prices by matching supply to the market requirements during the period of high seasonal price index.

Conclusion

Trend represents the general direction of change in arrivals and prices over a period of time. Trend component is affected by changes in demand such as change in population, income, habits, customs, establishment of processing industries, *etc.* All the selected markets showed positive trend in pricesWheat crops were sown in the month of November- December.

It comes to harvest during March- April. Higher indices (more than 100) of market arrivals of wheat were noticed immediately after the harvest (March-April) in selected markets. Thus, the majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices. Wheat crop observed relatively more stability in the selected market. As the coefficient of variation increased,

the degree of stability of prices decreased. The variability in fresh arrivals, stock of the products in market and the demand affects the price to a great extent.

The seasonal indices of arrivals indicated the heavy arrivals of wheat during harvesting period. So the Agricultural Produce Market Committee (APMC's) should come forward to provide necessary storage facilities and other infrastructural facilities at village level in order to avoid market glut.

The impact of market arrivals on prices has been found to be negative in the selected markets. In the light of such finding if fluctuations in market arrivals are regulated through market extension, the risk of fluctuations in prices can be minimized.

It is know that wheat arrivals into the market are more immediately after the harvest which leads to the distress sale. Hence, it requires avail of credit facilities to the farmers so that they can meet their requirements to that period and sale their produce whenever the market prices reaches peak

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