P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 9; September 2024; Page No. 397-400

Received: 16-06-2024
Accepted: 24-07-2024

Indexed Journal
Peer Reviewed Journal

A study on arrivals and prices of major agricultural commodities at largest APMC in Chhattisgarh

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DOI: https://doi.org/10.33545/26180723.2024.v7.i9f.1075

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Abstract

The present study was conducted to examine the behaviour of arrivals and prices of selected agricultural commodities in Bhatapara APMC of Chhattisgarh. This study is based on the secondary data of 10 years from 2013-14 to 2022-23 which was collected from www.agmarknet.gov.in. For the analytical framework, the study utilized time series data to compute the trend and seasonal variations. The linear trend equation and exponential trend is used to study the trend in arrivals and prices and the ratio to moving average method is used to study the seasonal variations. During the study period, the pattern of trend in arrivals and prices was showing an increasing trend in arrivals of paddy while there was a decreasing trend in arrivals of wheat and lathyrus for the reference period (2013-14 to 2022-23). Prices of wheat and lathyrus also increased, while there was an increasing trend in the prices of paddy in the selected market but were found to be non-significant. Paddy arrivals were highest in December, November, and June, while wheat arrivals were highest in May, April, and March. Lathyrus arrivals were highest in March, April, and May, while December had the lowest. September had the highest paddy prices, while January had the highest wheat and lathyrus prices. The seasonal indices for these commodities peak in January.

Keywords: APMC, arrivals, prices, time series analysis, trend, seasonal indices

Introduction

India's agricultural sector is crucial for the survival of all cultures. The state Agricultural Produce Market Committee manages the marketing and trade of agricultural products in Chhattisgarh. After Chhattisgarh's creation, three mandis were established, resulting in 73 markets. However, a new mandi, Panjur, was established, and five markets were closed before sub-divisions were announced. As a result, there are now 118 subdivisions and 69 farm produce marketplaces operating. There are 69 APMCs in the state overall, but only five of them Bhatapara APMC, Kurud APMC, Kawardha APMC, Rajnandgaon APMC, and Nawapara APMC—were connected with e-NAM in the first phase.

The APMC Bhatapara is an agricultural produce market committee established by the state government to regulate the purchasing and selling of agricultural produce within a notified area. Its establishment is governed by Sections 3 and 4 of the Krishi Upaj Mandi Adhiniyam 1972. Farmers can make decisions on future production and sale patterns using market information on arrivals and pricing over time. The Agriculture Produce Market Committee (APMC) is responsible for selling crops in Chhattisgarh State, reducing exploitation and providing farmers with infrastructure. This facilitates easy disposal of produce and promotes fair trade. The APMC plays a crucial role in supporting India's agriculture industry, as agricultural arrivals and prices significantly impact the economy. Understanding how the regulated market functions in relation to agricultural commodity arrivals and prices is essential for understanding the impact of agriculture on the Indian economy.

Methodology

This study was done in Bhatapara APMC of Chhattisgarh: This study is based on the secondary data of 10 years from 2013-14 to 2022-23 which was collected from www.agmarknet.gov.in. For the analytical framework, the study utilized time series data to compute the trend and seasonal variations. The linear trend and exponential equation is used to study the trend in arrivals and prices and the ratio to moving average method is used to study the seasonal variations.

Time series analysis

Time series analysis was done to study the variations in monthly prices and arrivals of commodities Monthly prices and arrivals of commodities for the period of 10 years were used for this purpose. A time series is a complex mixture of four components namely, Trend (T), Seasonal (S), Cyclical (C) and Irregular (I) variations. These four types of movements are frequently found either separately or in combination in a time series. The relationship among these components is assumed to be additive or multiplicative, but the multiplicative model is the most commonly used method in economic analysis, which can be represented as

Yt = T x C x S x I

Where,
Yt= Original observation at time. T = Trend component.
C = Cyclical element. S = Seasonal variation. I = Irregular fluctuation

Estimation of trend in arrivals and prices
1. Linear trend
2. Exponential trend

The time series data pertaining to annual arrivals and prices of selected agricultural commodities covering the period of 10 years (2013-14 to 2022-23) were collected from APMC, Bhatapara. The following linear form of equation was used to estimate and examine the trend in market arrivals and prices of selected agricultural commodities. The long run trend in arrivals and prices of selected agricultural commodities were analyzed using the linear regression model of the type.

Y= a+bx+e model 1

Where,
Y= arrivals/ price over a period of time
a = Intercept
b = Slope or Trend coefficient x = Time period
e= error term

As shown in the equation was assumed to be the dependent variable while, x was taken as an independent variable.
The exponential trend analysis were worked out using the exponential growth function of the the following form

$Y=ab^x e$ model 2

Where,
Y = Dependent variable
a = Intercept or constant
b = Regression / Trend coefficient x = Number of years
e = Error term

The compound growth rate was estimated by using the semi –logarithmic from of the equation (2) as below

log Y = log a + t log b

Then the per cent compound growth rate (g) was computed using:

r = (Antilog of log b – 1) × 100

Where,
r= Compound rate of increase per annum

Estimation of Seasonal Indices of Monthly Data
To measure the seasonal variations in prices and arrivals, seasonal indices were calculated employing twelve months ratio to moving average method. The seasonal indices were calculated by adopting the following steps. In the first step, 12 months moving total were generated. These totals were divided by 12 to compute 12 months moving average. Then a series of centered moving averages were worked out. For calculating the seasonal indices, 10 years data was considered.

Results and Discussion
Trend in arrivals of selected agricultural commodities in APMC Bhatapara
The linear trend was computed in order to ascertain the long-run movement of market arrivals of selected agricultural commodities**.** The pattern of arrivals and prices of paddy, wheat and lathyrus for the period from 2013-14 to 2022-23 is computed and the results are presented in table 1. In long-run, there was an increase in the arrival of paddy (3.20). Whereas decreasing in wheat arrival (-0.308) and lathyrus (-3.895). Annual decrease in arrivals of both wheat and lathyrus was found to be statistically non-significant. Further it was found that in both wheat and lathyrus 0.3 per cent and 18.4 per cent of change in arrivals, respectively and was governed by the independent variable, time, as indicated by 0.003 and 0.184, R^2 value.

Table 1: Trend in arrivals of selected agricultural commodities in APMC Bhatapara

Commodities	Form of equation	Equation	R2
Paddy (in lakh qtls)	Linear form	Y=3.20x+26.92	0.724***
Wheat (in ‘000 qtls)	Linear form	Y=-0.308x+42.64	0.003NS
Lathyrus (in ‘000 qtls)	Linear form	Y=-3.895x+87.20	0.184NS

*** indicates significance of value at p=0.01, NS=non-significant

Trend in prices of selected agricultural commodities in APMC Bhatapara
There was an increasing trend in the prices of paddy in the selected market but were found to be non-significant. Whereas an increasing trend in prices of wheat and lathyrus were found to be (Rs.0.074 in ‘000/q) and (Rs.0.183 in ‘000/q) respectively and were found to be significant at 1 percent and 5 per cent respectively. In both wheat and lathyrus prices contribution of time to change in prices was 67 per cent and 52.1 per cent respectively.

Table 2: Trend in prices of selected agricultural commodities in APMC Bhatapara (in Rs.’000/q)

Commodities	Form of equation	Equation	R2
Paddy	Linear form	Y=0.007x+1.915	0.012NS
Wheat	Linear form	Y=0.074x+1.368	0.67***
Lathyrus	Linear form	Y=0.183x+2.011	0.521**

*** and ** indicates significance of value at p=0.01 and p=0.05, respectively NS=non- significant

Estimation of compound rate of increase in annual arrivals and annual average prices

Table 3 revealed that the Compound annual growth rate of annual arrival of paddy was 7.02 pe cent found to be positively significant, whereas 0.47 per cent growth in prices of paddy and it was found to be positively non-significant. However, in wheat arrival was -0.62 per cent it was negative and non-significant while prices was observed to be positive and significant with growth rate 4.10 per cent. In case of lathyrus the growth rate of arrival is -6.82 per cent it was found to be negative and non-significant while growth rate of prices was 6.75 per cent it was positive and significant. The above result was calculated for year 2013-14 to 2022-23.

Table 3: Estimation of compound rate of annual arrivals and prices of selected agricultural commodities in APMC, Bhatapara during 2013-14 to 2022-23

Commodities	Particulars	Estimates of β	Compound growth rate (%)	R2
Paddy	Arrivals	1.07	7.02***	0.76
	Prices	1.00	0.47NS	0.01
Wheat	Arrivals	0.99	-0.62NS	0.002
	Prices	1.04	4.10***	0.69
Lathyrus	Arrivals	0.93	-6.82NS	0.23
	Prices	1.06	6.75**	0.50

*** and ** indicates significance of value at p=0.01 and p=0.05, respectively NS=non- significant

Seasonal indices of arrivals of selected agricultural commodities in APMC Bhatapara

The table 4: revealed that maximum seasonal indices of paddy arrivals were found in the month of December (130.66) and November (122.83) respectively and minimum in the month of April (63.35). However, in case of wheat the maximum seasonal indices of wheat arrivals were found in the month of April (337.33) and May (180.42) respectively and minimum in the month of January (16.26). While maximum seasonal indices of lathyrus arrivals were found in the month of March (281.41) and April (228.38) respectively and minimum in the month of December (30.30).

Seasonal indices of prices of selected agricultural commodities in APMC Bhatapara

The table 4: revealed that the seasonal indices regarding paddy prices revealed that the price index for the month of September (105.81) was highest followed by November (103.56) and August (102.95). The price index was lowest in the month of January (93.79). However, in case of wheat the seasonal indices regarding prices revealed that the price index for the month of January (104.39) was highest followed by November (103.58) and February (103.28). The price index was lowest in the month of April (93.52). While the seasonal indices regarding Lathyrus prices revealed that the price index for the month of January (107.12) was highest followed by December (105.09) and February (105.02). The price index was lowest in the month of June (92.26).

Table 4: Seasonal indices of arrivals and prices of paddy, wheat and Lathyrus in APMC, Bhatapara. (2013-14 to 2022-23) (In Percent)

Months	Paddy		Wheat		Lathyrus	
	Arrivals	Prices	Arrivals	Prices	Arrivals	Prices
April	63.35	98.64	337.33	93.52	228.38	96.87
May	115.41	100.16	180.42	96.43	156.75	94.55
June	121.41	100.13	132.46	96.58	87.32	92.26
July	95.88	99.98	111.29	100.52	69.66	94.74
August	82.32	102.95	63.38	100.70	76.99	102.98
September	96.74	105.81	58.54	100.75	54.75	103.34
October	114.25	102.43	64.82	101.04	71.41	101.85
November	122.83	103.56	24.15	103.58	41.88	103.30
December	130.66	97.75	27.58	101.72	30.30	105.09
January	94.77	93.79	16.26	104.39	44.18	107.12
February	85.92	97.95	17.04	103.28	56.92	105.02
March	76.47	96.78	166.68	97.45	281.41	92.82
Total	1200	1200	1200	1200	1200	1200

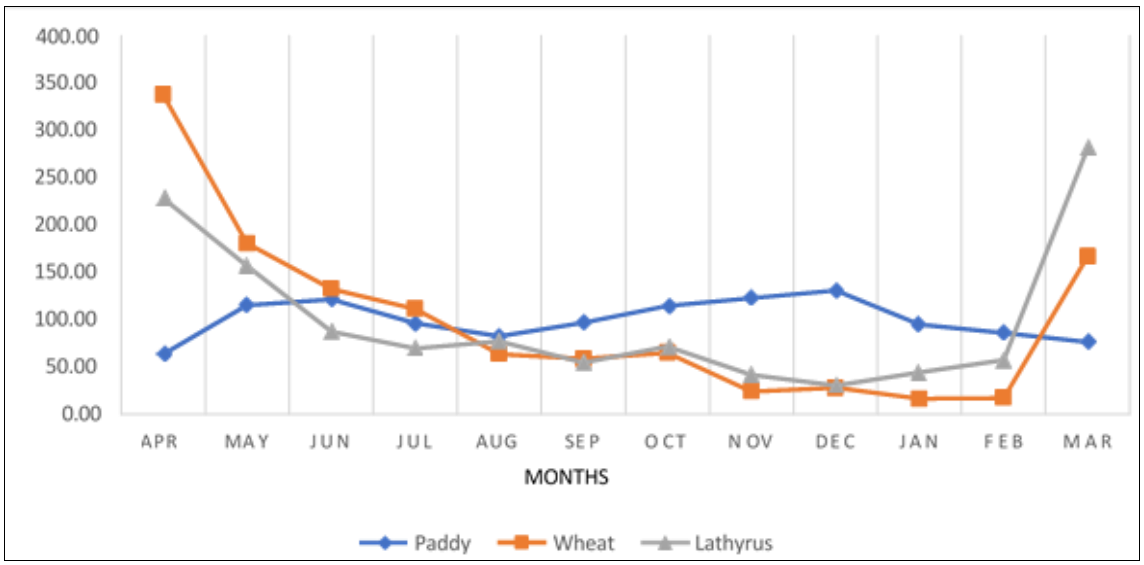

Fig 1: Seasonal indices of arrivals of selected agricultural commodities in APMC Bhatapara

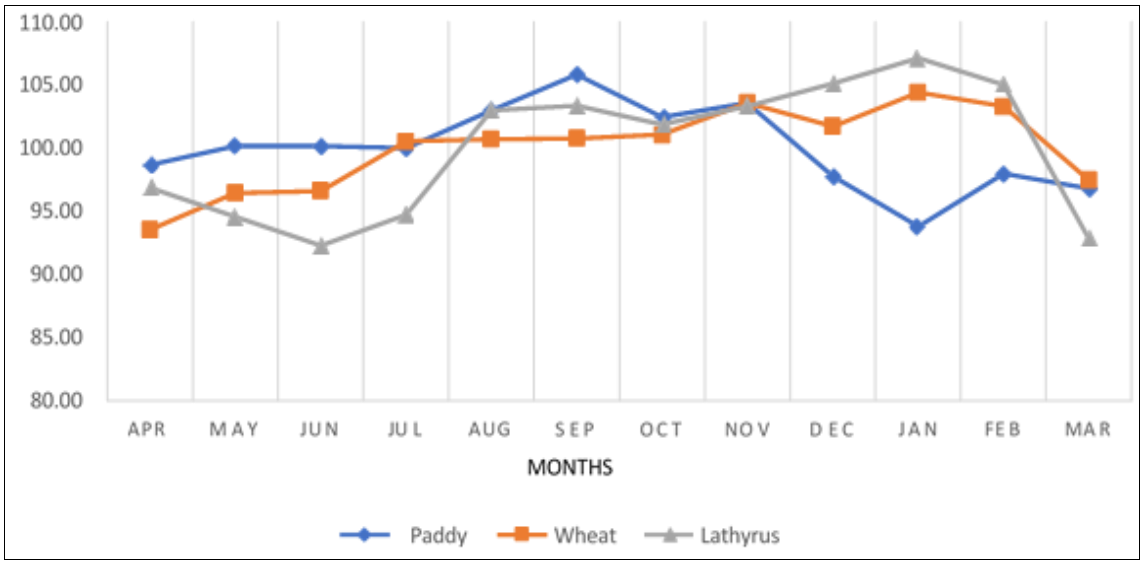

Fig 2: Seasonal indices of prices of selected agricultural commodities in APMC Bhatapara

Conclusion

The present study was conducted in market arrivals and prices of selected agricultural commodities in APMC Bhatapara, the study revealed that the Paddy arrivals displayed a increasing trend over the years but paddy prices were showing decreasing trend over the years. Wheat arrivals were showing decreasing trend over the years but wheat prices were showing increasing trend over the years and Lathyrus arrivals displayed decreasing but lathyrus prices were showing increasing trends over the years. Seasonal indices of Paddy arrivals are highest in December, November, and June, with the lowest in April. Wheat arrivals are highest in May, April, and March, while January has the lowest. Lathyrus arrivals peak in March, April, and May, while December has the lowest. September has the highest paddy prices, while January has the highest wheat and lathyrus prices. The seasonal indices for wheat and lathyrus prices peak in January.

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