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Market Arrivals and Price Behaviour of Some Selected Crops: A Study from Major Markets of Assam

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ABSTRACT

Background: Spices and vegetables are important components of our daily food routine. Prices for these crops fluctuate based on the demand and supply of the crops. The study was undertaken to examine the market arrivals and their variability with the changes in price for the selected spices and vegetable crops (Chilly, Ginger, Potato and Tomato) from the major markets (Barpeta, Jorhat, Kamrup and Nalbari) of Assam.

Methods: The primary data of agricultural market intelligence unit (AMIU), Assam agricultural university, Jorhat was utilized for this study. The secondary data were collected from various published sources about the area, production and productivity of the selected crops from 2001-02 to 2020-2021. Compound growth rate analysis, coefficient of variation and correlation coefficient were calculated to analyse the collected data.

Result: The findings reflected that Chilly, Ginger and Potato crops have the highest variability in the arrival to the markets of the Barpeta district. While, Chilly and Potato reflected the lowest variability in the markets of Jorhat. From the point of price variability, it was observed that the highest price variability in chilly was observed for the markets of Kamurp, while for ginger, it was observed in the markets of Jorhat.

Key words: Growth, Market arrival, Price behaviour, Variability, Vegetable and spices.

INTRODUCTION

India is such a country where approximately 58 per cent of the population brings their livelihood from the agricultural sector. Agriculture remains the primary source of the Indian economy and is crucial to the country's socioeconomic development (Mahesh *et al.*, 2023). One of the most important activities in the Indian economy is agriculture. India is blessed with diverse agro-climatic conditions which encourage farmers to go for cultivation of different types of crops (Singh *et al.,* 2021). The state of Assam is blessed with the abundance of nature which is in the sub-tropical zone. The soil quality of the state is very fertile and good for horticultural crops. Among all the states of India, Assam produces the highest ginger (Gogoi, 2020) and among the NER states Assam accounts for highest area under Potato cultivation (Yadav and Srivastava, 2014). With the implementation of various schemes by the Assam government in horticultural crops, particularly vegetables, productivity increased to 18,457 kg over 11,384 kg/ha in 2015-16. The area under vegetables in the state increased from 265.299 (000 ha) in 2012 to 306.235 (000 ha) 2022 (CEICdata.com, 2023). High commission rates of middlemen and fluctuating market prices sometimes create problems for vegetable growers (Mandla *et al.*, 2022).

In the changing economic environment characterized by liberalization, privatization and globalization, market information and intelligence are crucial to enable farmers and other stakeholders to make informed decisions about what to grow, when and where to sell, how to sell and store. According to FAO, recent years have seen an increased interest in the provision of market information. The agricultural market plays an important role in connecting growers to the consumption and distribution centres. Wholesale markets are the main markets which facilitate the formation of prices for different vegetables as per the market demand Based on the different distribution channel adopted by the vegetable growers their margins are different (Milford *et al.,* 2021). Due to the perishable nature of the vegetables price fluctuates based on supply and demand (Reddy, 2018). It also depends upon the

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seasonality of production and marketing of the product. Vegetables are seasonal and perishable in nature for that price fluctuates month to month (Saha *et al.,* 2020). These fluctuations ultimately affect the vegetable growers. Market information on commodity arrivals and prices of different vegetables are important for small and marginal farmers to plan suitable and remunerative crop for their farm. Considering the above facts, the present study was proposed to study the market arrival and price behaviour of the selected crops in the wholesale markets with correlation analysis to assess the relationship between price and arrivals.

MATERIALS AND METHODS

The study utilized the primary data collected under Agricultural Market Intelligence Unit (AMIU), Assam Agricultural University. The secondary data were collected from various published sources about the area, production and productivity of the selected crops for the year 2001-02 to 2020-2021. Two spices and two vegetable crops were selected for the study *i.e* chilly, ginger, potato and tomato. Crop selection was done as per the availability of the crop throughout the season and availability of the market data for the study. Further, all these four crops are used by every households of the state on daily basis. Selected four districts for the study were Barpeta, Jorhat, Kamrup and Nalbari. All the market data were collected from the major wholesale markets of the selected districts. Market selection was also done on the basis of flow of the commodity to the market and the availability of data throughout the year.

Compound annual growth rate analysis was done to know the growth in area, production and productivity of the selected crops in Assam.

CAGR was calculated with the formula:

$$Y = ab^t$$

Where,

Y= Dependent variable (area/production/productivity of the crop).

a = Intercept.

b = Slope.

t = Time variable in years taking the value of 1, 2, 3,..., n.

In logarithmic form

$$\ln y = \ln a + t \ln b$$

$$CAGR\ (r) = (\text{Anti log of } b - 1) \times 100$$

The significance of 'r' was tested by working out t-value.

$$t = b/SE(b)$$

Variability analysis

Coefficient of variation was calculated to know the variability in quantity arrival of the crop in the market and the price variability reflected for that.

$$CV = \frac{SD}{Mean} \times 100$$

Where,

CV= Coefficient of variation.

SD= Standard deviation of quantity arrival/ Price of the crop.

Mean = Average of quantity arrival/ Price of the crop.

Correlation coefficient

Correlation coefficient was analyzed to know the relationship between quantity arrival and price of the crop.

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

RESULTS AND DISCUSSION

Growth of area, production and yield of potato, tomato, chilli and ginger from 2001-02 to 2020-21

Table 1 shows the growth rates of area, production and yield of Potato, Tomato, Chilli and Ginger from the year 2001-02 to 2020-21. It was observed from the Table that the compound annual growth rates of area under the four crops were found to be positive and significant. This positive trend in the growth of these crops has a significant impact on Assam's economy (Bhuyan *et al*., 2023).

Potato (2.28%) was recorded for the highest growth in area under the crop, followed by chilli (2.13%), tomato (1.73%) and ginger (0.02%) respectively. Potato is one of the most important and widely cultivated vegetable crops of Assam and ranks fourth in terms of acreage under individual crop in the state, as stated by Borah *et al.* (2016). Growth rates of production of all the four crops were recorded as positive and significant throughout the period. While the yield growth was positive for only three crops, *i.e* potato (0.18%), chilli (2.78%) and ginger (2.34%). The yield of the tomato crop recorded a significant negative growth (-0.15%) for the entire period. It may be due to the non-incorporation of new high-yielding varieties for the cultivation of the crop by the farmers. By developing suitable tomato varieties as per the climate and soil conditions of Assam and by creating awareness about the new varieties among the farmers, yield improvement can be made possible in the long term.

Variability in quantity arrival and price of the potato crop for the year 2022

Potato is a highly demanded vegetable crop in the markets of Assam. Table 2 represents the variability in quantity arrival and the price of the crop for the major wholesale markets

Table 1: Growth of area, production and yield of potato, tomato, chilli and ginger from 2001-02 to 2020-21.

Crops	Area	Production	Yield
Potato	2.28***	2.46***	0.18*
Tomato	1.73***	1.57***	-0.15*
Chilli	2.13***	4.95***	2.78***
Ginger	0.02*	2.38***	2.34***

Area in '000 hectare, production in '000 tonnes and yield in Kg/ hectare; *Significant at 10%, **Significant at 5 % and *** Significant at 1%.

of selected four districts. It was observed from the Table that the highest (71.75 %) variability in quantity arrival was observed for the Barpeta district and the lowest (21.09%) was for the Jorhat district. A similar result was observed for the Barpeta and Jorhat markets by Baruah *et al.* (2023).

The analysis on price variability for the crop in the four districts markets represented that Barpeta district recorded highest variability in price, along with the variability in the arrival of the crop. Nalbari district recorded the lowest variability (24.10%) in price among all other districts. A significant negative relationship between quantity arrival and price for the Potato crop was observed for the markets of the Nalbari district only. On the other hand, the other three district markets were recorded for positive correlation between the quantity of arrivals and the price of the crop which was at the same time found significant at a five per cent level. As the demand for the crop is very high so correlation coefficient reflected a positive relationship for most of the markets. Fig 1 (A, B, C, D) represent a clear picture of the quantity arrival of potatoes and the changes in price throughout the year. For the Potato crop price change was less as compared to the arrival of the crop. A similar result was observed in the study conducted in West Bengal by Bera *et al*. (2017).

Variability in quantity arrival and price of the tomato crop for the year 2022

Table 3 represents the variability in quantity arrivals and price of the Tomato crop for the major wholesale markets under selected four districts of Assam. The study reflected

Table 2: Variability in quantity arrival (Q.A) and price of the potato crop for the year 2022.

Particulars	Barpeta		Jorhat		Kamrup		Nalbari	
	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)
CV (%)	34.74	71.75	26.76	21.09	28.81	38.97	24.10	25.45
Correlation coefficient (r)	0.41**		0.29**		0.62**		-0.01**	

**Significant at 5% level.

Table 3: Variability in quantity arrival (Q.A) and price of the tomato crop in the selected markets of assam for the year 2022.

Particulars	Barpeta		Jorhat		Kamrup		Nalbari	
	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)
CV (%)	46.28	67.96	32.52	27.33	38.00	74.00	36.32	61.98
Correlation coefficient (r)	0.06**		0.366		0.49**		-0.72**	

**Significant at 5% level.

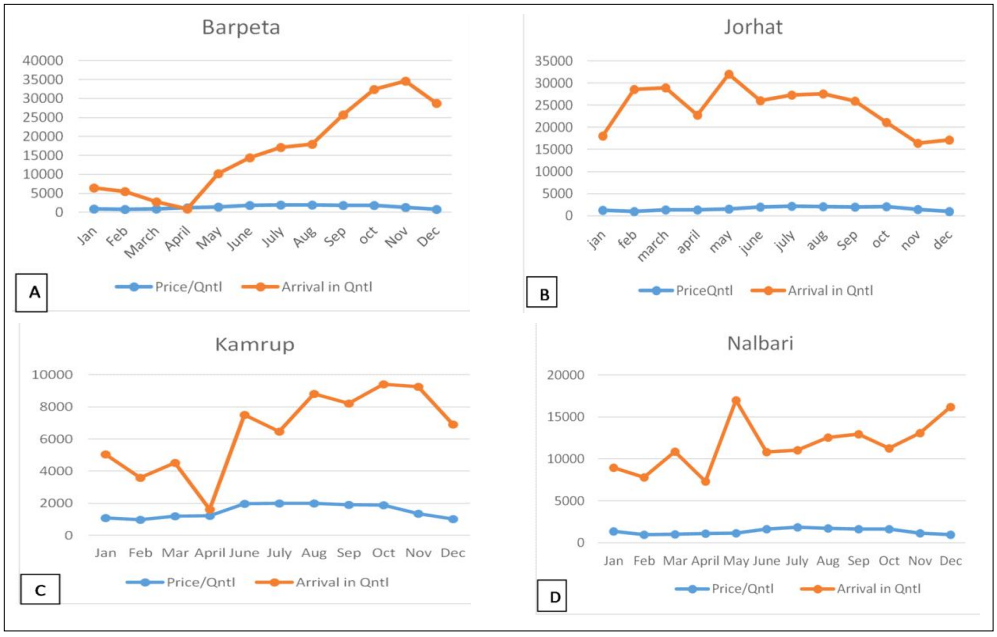


Fig 1: A, B, C, D represent the quantity arrival and price of the potato crop for Barpeta, Jorhat, Kamrup and Nalbari markets respectively for the year 2022.

that the highest variability in quantity arrivals was observed for the Kamrup district (74.00%) and the lowest was observed for the Jorhat district (27.33%). On the other hand, the variability in price was found highest for the Barpeta district (46.28 %) and lowest for the Jorhat district (32.52 %). The correlation coefficient analysis revealed a significant negative correlation between quantity arrivals and the price of the crop in Nalbari district (-0.72). The other three districts represented a positive correlation between the arrival of the crop and the price. Barpeta and Kamrup districts represented a significant positive relationship between quantity arrivals and price of Tomato. Fig 2 (A, B, C, D) represented the commodity arrivals and price fluctuations of the Tomato crop for Barpeta, Jorhat, Kamrup and Nalbari districts. It was observed that for Nalbari district quantity arrivals were less as compared to other districts, for that price was high for most of the months in the year. The price of Tomato started to increase from April until October, but from November price declines, as in winter arrivals of tomato increases due to the harvesting time (Laxkar *et al.,* 2022).

Variability in quantity arrivals and price of chilli for the year 2022

Table 4 represented the variability in quantity arrivals and price of the chilli crop in the four selected districts of Assam. The arrivals of vegetables in the market affect their prices to a large extent (Choudary *et al*, 2019). The study reflected that the highest variability in quantity arrivals was observed for Barpeta district (115.35%). On the other hand, lowest variability (27.43%) was observed for Jorhat district. The variability in price for the crop was found highest (36.28%) for Kamrup district and lowest was observed for Barpeta district (31.89%). The correlation coefficient indicated a significant negative relationship for quantity arrival and price of the chilli crop for Nalbari districts, but for Barpeta district the relationship was negative but not significant. While, Jorhat and Kamrup districts recorded positive correlation between quantity arrivals and price of Chilli. Fig 3 (A, B, C, D) represented the clear picture of the price fluctuations with the arrival of the crop in different times of the entire year. It is clear from the graph that with the increase in the market

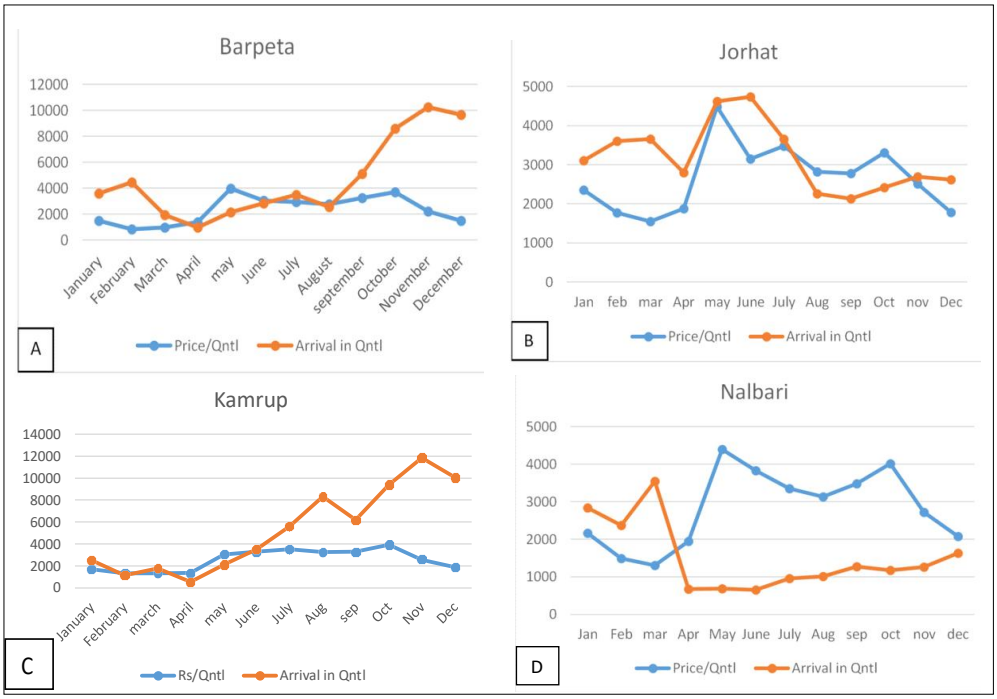


Fig 2: A, B, C, D represent the quantity arrival and price of the Tomato crop for Barpeta, Jorhat, Kamrup and Nalbari markets respectively for the year 2022.

Table 4: Variability in quantity arrival (Q.A) and price of the chilli crop for the year 2022.

Particulars	Barpeta		Jorhat		Kamrup		Nalbari	
	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)
CV (%)	31.89	115.35	35.07	27.43	36.28	41.10	34.30	27.91
Correlation coefficient (r)	-0.49		0.46**		0.23**		-0.27**	

**Significant at 5% level.

Table 5: Variability in quantity arrival (Q.A) and price of the ginger crop for the year 2022.

Particulars	Barpeta		Jorhat		Kamrup		Nalbari	
	Price (Rs/qtl)	Q. A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)	Price (Rs/qtl)	Q.A (Qlt)
CV (%)	12.17	108.06	18.93	23.06	10.54	45.65	15.68	22.15
Correlation coefficient (r)	0.75**	-0.11**	0.35**	0.21**				

**Significant at 5% level.

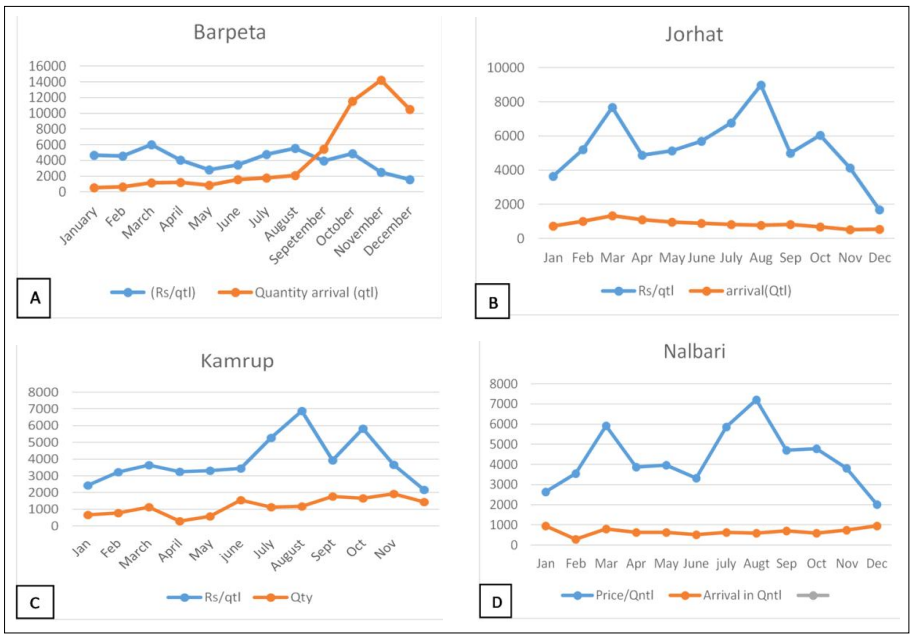


Fig 3: A, B, C, D represent the quantity arrival and price of the Chilly crop for Barpeta, Jorhat, Kamrup and Nalbari market respectively for the year 2022.

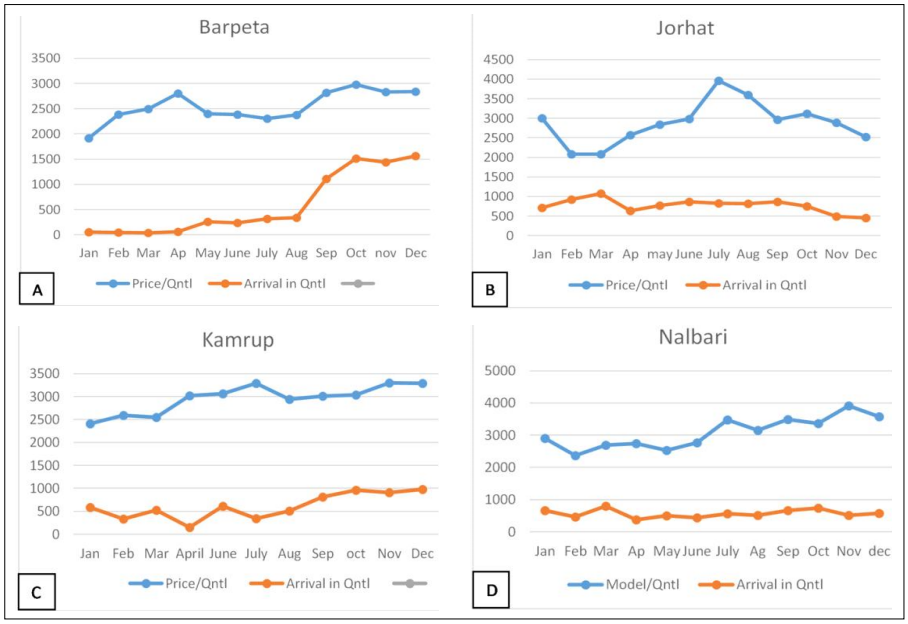


Fig 4: A, B, C, D represent the quantity arrival and price of the Ginger crop for Barpeta, Jorhat, Kamrup and Nalbari market respectively for the year 2022.

flow, price of Chilli goes down. It means commodity flow is as per the market demand of the crop.

Variability in quantity arrivals and price of the ginger crop for the year 2022

Variability in quantity arrival and price of the ginger crop was represented in Table 5. From the table it reflected that variability in quantity arrivals was found highest (103.81%) for Barpeta district while lowest (22.15%) was observed for Nalbari district. On the other hand, variability on the price of the crop was found highest (18.93%) for Jorhat district and lowest (10.54%) was observed for Kamrup district. Correlation coefficient was recorded negative for quantity arrivals and price of the ginger crop in Jorhat district with a statistical significance. While other three markets reflected significant positive relationship for quantity arrival and price of the crop. Fig 4 (A, B, C, D) represented the quantity arrivals and the changes of the price of the ginger crops in the four districts of Assam. As the ginger is the highly demanded crop and the commodity flow was very less as compared to demand so price was almost found high throughout the year. Off-season vegetable flow may also fetch higher prices and cause positive relationship with the arrival of the commodity (Kumar *et al*., 2005).

CONCLUSION

The study on market arrival and price behaviour of the four crops (Potato, Tomato, Chilli and Ginger) reflected that the area and production of all four crops were found positive and significant. While in yield growth analysis only the Tomato crop represented a significant negative growth throughout the years. The analysis for the variability in quantity arrival and price reflected that Barpeta district recorded the highest variability in quantity arrival for most of the crops (Potato, Chilli and Ginger) throughout the year. While, Jorhat district recorded for lowest variability in quantity arrival in almost all the crops in that respective year. The correlation analysis represented that the quantity arrival and price of the crop were found negative and significant for most of the crops in Nalbari districts. It indicated that the flow of the commodity and demand of the consumers for those crops were almost same for the markets of Nalbari district. While for the other districts positive relationship was more for quantity arrival and price of the crop.

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Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this article. No funding or sponsorship influenced the design of the study, data collection, analysis, decision to publish or preparation of the manuscript.

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