ECONOMIC ANALYSIS OF MARKET ARRIVALS AND PRICES OF TURMERIC IN HINGOLI DISTRICT OF MAHARASHTRA

BY

MUNDHE VISHNU NARAYAN

B.Sc. (Agriculture)

A thesis submitted to

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

in partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE
IN
AGRICULTURE
(AGRICULTURAL ECONOMICS)

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF AGRICULTURE, LATUR.

VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH,

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2022

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled, **"Economic Analysis of Market Arrivals and Prices of Turmeric in Hingoli District of Maharashtra"**, submitted by me is based on the actual work carried out by me under the guidance and supervision of **Dr. Jayshri Baburao Tawale** The extent of information derived from the existing literature have been duly cited and referenced. The exiting research work or its any part is not submitted anywhere else for the award of any degree or diploma.

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Place : Latur

Date : 30 /11 / 2022

Mundhe

(Mundhe Vishnu Narayan)

Reg. No: 2020A/58ML

CERTIFICATE - I

This is certified that the thesis entitled, **"Economic Analysis of Market Arrivals and Prices of Turmeric in Hingoli District of Maharashtra"** submitted by **Vishnu Narayan Mundhe, Reg. No. 2020A/58ML** in partial fulfillment of the requirement for the award of the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **Agricultural Economics** submitted to Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani is a record of bonafide research work carried out by him under my guidance and supervision. The thesis of its any part has not previously formed the basis for the award of any degree, diploma or other similar title.

Place : Latur

Date : 30 / 11 / 2022

(J.B. Tawale)

Research Guide &
Chairman Advisory Committee

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R.V. Chavan
External Examiner

(J.B. Tawale)
Research Guide & Chairman
Advisory Committee

(S. H. Kamble)
Member

(D. D. Suradkar)
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College of Agriculture
V.N.M.K.V., Parbhani

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College of Agriculture,
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No sentence, equation, diagram, table, paragraph or section has been copied verbatim from previous work unless it is duly cited and referenced. The work presented is original and own work of the researcher (i.e. there is no plagiarism). No ideas, process, results or words of other have been presented as researcher's own work.

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Today, here is smile on lips and the light of hope in my eyes, because my fortunate has changed for better. Behind this picture of propriety lies the hardwork, bondless love and firmless sacrifice of my respectful family members, my respected father **Shri. Narayan Waman Mundhe**, *mother* **Sou. Kasabai Narayan Mundhe,** *who have been inexhaustible source of inspiration throughout my life. I am very grateful my loving brothers* **Jagannath**, *Sisters* **Prayag** *and* **Ranjana** *and my dear wife* **Alka** *whose love and affection has brought the present work to fructification.*

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Mundhe

Mundhe Vishnu Narayan

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THESIS ABSTRACT

1.	Title of thesis	: Economic Analysis of Market Arrivals and Prices of Turmeric in Hingoli District of Maharashtra
2.	Full name of the candidate	: Mundhe Vishnu Narayan
3.	Full name of the Research Guide	: Tawale Jayshri Baburao
4.	Department	: Agricultural Economics
5.	College / University	: College of Agriculture, Latur
6.	Degree to be awarded	:M.sc. (Agriculture)

ABSTRACT

Hingoli district was selected for the present study. The APMCs of Hingoli, Vasmat and Jawala Bazar were selected on the basis of availability of time series data related to arrivals and prices. The crop turmeric was selected from the various other crop because of large area and production under turmeric and also on the basis of availability of continuous data. The required data were collected for the period 2006-2020 and divided into three periods like period I (2006-2010), period II (2011-2015) and period III (2016-2020).

A study of economic analysis of APMC arrivals and prices assumes special significance in developing economy like India. Seasonal fluctuations is well known feature of Agriculture and also of prices. The extend of fluctuation in APMC arrivals largely contribute to the price instability of Turmeric. The imperial knowledge of relation between arrivals and prices movements is required over a period of time. Such studies are useful to formulate marketing policies beneficial for consumers, producers and traders. To identify some directions about the degree of competitiveness in different APMCs for Turmeric. It helps the farmer to adopt suitable marketing strategies to maximize their net returns. The analytical tools like seasonal indices, coefficient of variation, standard deviation, mean, linear growth rate, compound growth rate and APMC integration were used.

The peak period of arrivals of turmeric was observed in the month of April and May. The lean period was recorded during the month of January to March in the selected APMCs. . The peak period of prices was in the month of December and January whereas the lean period of prices was found in February in all APMCs.

The high degree of price association between Hingoli and Vasmat APMC may be due to reason that they are nearby turmeric APMC's. Hence the price signal easily transferred between Vasmat and Hingoli APMC's. However, low positive relation was found between Vasmat and Jawala Bazar APMC, which can be attributed to the reason that there might be imperfection of APMC information between the APMC's.

The study leads to draw the conclusion that turmeric sold immediately after harvest showed more arrivals in the APMC. There is inverse relationship between arrivals and prices.

CHAPTER – I

INTRODUCTION

CHAPTER – I

INTRODUCTION

Turmeric has been a popular spice in India since ancient times. It is known as Indian saffron and is also known as *Haldi*. India is the world's top producer, consumer, and exporter of turmeric.

Turmeric's name may have originated in Middle English or early modern English as turmeryte or tarmarate. It could be of Latin origin, terra merita, which means "meritorious earth." Turmeric is a flowering plant of the ginger family Zingibaraceae with the generic name *Curcuma longa*. The turmeric processing business contributes significantly to the establishment of thousands of job opportunities around the country. India was the world's leading producer of turmeric. Maharashtra was second in overall turmeric production, followed by Tamil Nadu, Gujarat, and Orissa.

India has the biggest number of Curcuma species diversity, with roughly 40 to 45 species, Thailand has 30 to 40 species that are equivalent. There are numerous wild Curcuma species in other tropical Asian nations. Recent research has also revealed that the taxonomy of *Curcuma longa* is controversial, with only specimens from South India identifying as *Curcuma longa*. Other species and cultivars' phylogeny, relationships, intraspecific and interspecific variation, and even identification in other regions of the world must yet be established and proven. Multiple species advertised as "turmeric" in different parts of Asia have been determined to belong to several visually identical taxa with overlapping local names.

The rhizomes are used fresh or boiled in water and dried before being ground into a deep orange-yellow powder that is commonly used as a colouring and flavouring agent in many Asian cuisines, particularly curries, as well as for dyeing, thanks to the properties imparted by the main turmeric constituent, curcumin. Turmeric powder has an earthy, mustard-like scent and a warm, bitter, black pepper-like flavour. Curcumin is a brilliant yellow substance generated by the turmeric plant that has been approved as a food additive by the World Health Organization, the European Parliament, and the Food and Drug Administration of the United States. Although turmeric has long been used in Ayurvedic medicine, where it is also known

as haridra, there is no high-quality clinical evidence that it can be used to cure any condition.

Turmeric powder has a carbohydrate content of 60-70 percent, a water content of 6-13 percent, a protein content of 6-8 percent, a fat content of 5-10 percent, a dietary mineral content of 3-7 percent, a dietary fibre content of 2-7 percent, and a curcuminoids content of 1-6 percent. Turmeric's phytochemical components include diarylheptanoids, a family of curcuminoids that includes curcumin, desmethoxycurcumin, and bisdemethoxycurcumin. Curcumin makes up to to 3.14 percent of analysed commercial turmeric powder samples (the average was 1.51 percent); curry powder has substantially less (an average of 0.29 per cent). Turmeric contains 34 essential oils, the most important of which are turmerone, germacrone, atlantone, and zingiberene.

The global production of turmeric is around 11 lakh tonnes in year 2020. India dominates the world production scenario contributing 80 percent followed by China (8 percent), Myanmar (4 percent), Nigeria (3 percent) and Bangladesh (3 percent). Major turmeric importing countries from India are Bangladesh (15,888.88 tonnes), Iran (11,859.50 tonnes), Morocco (7,225.72 tonnes), USA (6,318.45 tonnes) and UAE (5,938.10 tonnes).

One of the crucial industries that supplies raw materials to many agro-based businesses is agriculture, which is significant in both developed and developing nations. India's GDP grew by 7.11 per cent between 2016 and 2017, and 17.9 per cent of India's GDP comes from the agricultural sector. Additionally, it works well as a remedy for unemployment and poverty.

In a nation like India that is primarily agricultural, prices play a significant role. Prices have a significant impact on an economy's stability, equity, and growth. The signal from the price mechanism helps producers decide what and how much should be produced using the resources at hand in order to maximise profits. The prices of agricultural goods vary or are unstable due to a high reliance on natural causes, which has an impact on farmers' income levels and the pace of agriculture. In the framework of policy tools used on prices to reduce swings, the inter-year (trend), cyclical, and seasonal changes in prices are more significant.

Commodity price behaviour has been the subject of numerous studies over years these investigations have focused mainly on the question of price instability and their effects in both developed and developing economies. Studies on speculation-induced instability, commodity export instability, and commodity stabilization programs have widely addressed the question of price instability (Labys, Badillo and Lesourd, 1998).

The present study was chosen with the intention of learning about market arrivals and prices, seasonal fluctuation, and market integration among the selected agricultural commodities markets. It was eventually discovered that market arrivals and prices have a greater impact on farmer profit because they have no idea when and how to sell their agricultural commodities in the market, that poor storage facilities and insufficient market information have an impact on seasonal price fluctuation. In agriculture, demand for agricultural commodities is growing, hence supply plays an active role in establishing product prices.

The seasonal arrivals increase and decrease of agricultural commodities have direct relationship with the price so, farmers need to learn, how, when and where to sell their commodities and also how to maintain commodities stock for better profit performance.

1.1 Importance of the study

The dried underground rhizome of turmeric, or *Curcuma longa*, is a member of the Zingiberaceae family, Native to China and India, A rhizomatous spice crop called turmeric is used to flavour and scent in a variety of foods. It is the main component of curry powder. It is helpful in a variety of industries, including the dye, pharmaceutical, and cosmetic industries. In India, it is employed in religious rituals and festivities. The turmeric rhizome has been utilised in both allopathic and ayurveda medical systems as a tonic, blood purifier, and antiseptic. The volatile oil turmerol (2.5-7.2) and the colouring substance "curcumin" (3-4) that are abundantly present in the turmeric rhizome. India is the leading country in the world for spices and enjoys monopoly in the production of spices due to favourable climatic conditions. India is known as "Home of spices" and "Spice bowl of world". India is the largest producer and consumer of turmeric in the world. Despite this, India has the largest share in world export.

The total area under turmeric in India is about 186 thousand hectare while total production of turmeric is 943 thousand million tons for year 2019-20 (Agricoop.nic.in) India has an acreage of 2.84 lakh hectares under turmeric with production of turmeric with 11.06 lakh tonnes (NHB, 2020-21 2nd Advance Estimates). The major producing states of turmeric in India are Telangana, Karnataka, Tamil Nadu, Andhra Pradesh and West Bengal. The highest acreage contribution of turmeric is from Telangana about 19.5 per cent followed by Odisha (11.3 per cent), Karnataka (10.9 per cent), Tamil Nadu (9.5 per cent), Andhra Pradesh (7.2 per cent) and West Bengal (7.2 per cent). The major trading hubs of Turmeric in India are mainly Nizamabad (Telangana), Duggirala (Andhra Pradesh), Sangli (Maharashtra) and Salem, Erode, Dharmapuri and Coimbatore (Tamil Nadu). The major turmeric growing region in Maharashtra is Sangli, Hingoli, Basmat and Nanded. Sangli is also called "turmeric city of Maharashtra".

1.2 Hypothesis

There is variation in prices and arrivals of turmeric over time.

1.3 Scope for the present study

A study would be helpful to pinpoint some guidelines on the level of turmeric competition in various markets with regard to arrivals and prices. The purpose of the study is to identify patterns and seasonal variations in prices and arrivals of turmeric. It has been noted that insufficient market knowledge and inadequate storage facilities are the main causes of seasonal price changes. Agricultural commodities are in higher demand than ever and this supply actively influences how much things cost.

Agricultural marketing is crucial not just for promoting production and consumption, but also for speeding economic development. An effective marketing system increases farmers' revenue and expands product markets by bringing them to outlying areas of the country. The study of price and market arrivals through time is essential for developing appropriate agricultural price policy. Fluctuations in market arrivals contribute significantly to cause price volatility. To devise effective methods and means of decreasing price variations in agricultural commodities, a full understanding of pricing behaviour over time and space is required. Such an analysis is useful to farmers in order to decide the optimum time for disposing their produce to

their best realizing the above mentioned facts, the present study entitled "Trends in Arrivals and Prices of Turmeric in Major Markets of Hingoli district." The study was carried out with the following objectives.

1.4 Objectives

1. To study trends in prices of turmeric
2. To know peak and slack period in arrivals and prices of turmeric
3. To study the market integration of turmeric markets in Hingoli district

1.5 Limitation

1. The source of the data may not provide sufficient supporting material to allow the researcher to judge the quality of research.

CHAPTER –II

REVIEW OF LITERATURE

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REVIEW OF LITERATURE

The evaluation of previous research work connected to the subject under investigation by diverse research workers is required not only for a clear comprehension of the idea but also for comprehending the related methodological and analytical concerns. It also provides an opportunity to improve upon research work deficiencies. As a result, the current chapter has been dedicated to explaining the reviews of important literature in a concise manner. The existing literature on the manufacturing and marketing of turmeric has been abstracted and organised under the following headings, with the study's aims in mind.

- To study trends in prices of turmeric
- To know peak and slack period in arrivals and prices of turmeric
- To study the market integration of turmeric markets in Hingoli district

2.1 Trends in prices of turmeric.

Kumar *et al*. (2001) analysed the arrivals and prices of selected agricultural commodities in Anakapalle regulated market of Andhra Pradesh for the period from 1981-82 to 1995-96. The study concluded that, in general, arrivals showed mixed trend, whereas, prices showed an increasing trend for the selected commodities in the market. There existed an inverse relationship between seasonal indices of arrivals and prices of selected commodities. Therefore, the policy implication lies in encouraging the farmers to dispose off their produce at the opportune time to get good remunerative prices.

Angeles and Hosamani (2006), studied on the impact globalisation on Turmeric trade and production. India is the monopoly supplier of turmeric to the world, which contributes more than 90 per cent of the turmeric trade. The production and export performance of turmeric in India were examined using secondary data for the period from 1983-84 to 1997-98 and exponential form of growth function was used for the analysis. The growth in export of turmeric was significant in total quantity, total value and unit value, because of the high demand coupled with

inflation. For the assessment of direction of trade the Markov chain model were used, the data regarding country wise export of turmeric was used and the results showed that pervious export share retention for Indian turmeric was high in UK (42.99 per cent) and countries pooled under the others category (58.77per cent). The countries such as USA, Iran, Japan and UAE were not stable importers of Indian turmeric. The plans for export may be oriented towards these two and also plans should be formulated for stabilizing the export to other countries. The foregoing analysis of the rate of growth in export and direction of trade of turmeric in India revealed that the growth of turmeric export is satisfactory and the direction of trade gave warning. The entire three hypotheses used for testing the growth, price integration and direction of trade were found true and hence accepted. The outcome implies that more importance should be given to the research and development pertaining to the quality of turmeric. Looking into the importance of international demand, export earnings and domestic needs government should increase and stabilize its outlay of funds for turmeric under the spice development programs. Government should be more conscious regarding the policies pertaining to the above aspects and also WTO implications to protect our farmers and to maintain our monopoly in international markets. Appropriate export promotion strategies and policies have to be evolved to maintain the market share of Indian turmeric. If these problems are taken care then there is a vast scope to increase the export of turmeric in future.

Manjunath. (2015) The present study entitled “An Analysis of Price Behaviour of Turmeric in Guntur District of Andhra Pradesh” was conducted with the specific objectives 1) To study the trends, seasonal, cyclical and irregular variations in market prices and arrivals of turmeric in Duggirala market in Andhra Pradesh. 2) To analyze the impact of arrivals on prices of turmeric in Duggirala market of Andhra Pradesh. 3) To study the export and domestic competitiveness of turmeric. 4) To forecast the future prices of turmeric in Duggirala market of Andhra Pradesh.

Kale *et al*. (2018) in their study on Dynamics of Arrivals and Prices Behaviour of Turmeric in Sangli District of Maharashtra, India found that for the Sangli market, the indices of arrivals were noticed highest in the month of March i.e. 293.01 followed by April and May and it was 205.60 and 183.93, respectively and seasonal indices were lowest in October i.e. 22.13. In case of prices, the highest indices were noticed in the month of October i.e.121.20 and lowest in the month of March i.e.

88.59.The fluctuations in arrivals were more than the price of turmeric during the period of study in Sangli market.

Pallavi. *et al* (2018) analysed Prices of Agricultural commodity fluctuates time to time, in Sangli turmeric is one of the major crop grown, the prices of Turmeric are inversely related with arrivals. After harvesting arrivals are more in AMPC and prices are less. Seasonal indices and growth rate are used for study purpose.

Melda (2018) conducted study on price level changes in Tamil Nadu. The study analyzed that, Turmeric crop duration is generally 7-9 months depending on the variety. It gives a competitive edge to India over others. In this regard the present study has been undertaken to get an idea about the production of turmeric in Tamil Nadu with the help of published data the area, production and productivity of turmeric in Tamil Nadu have been analyzed. The average Turmeric prices are gradually rising from Rs.118.15 per kg in 2015. The average Turmeric prices are gradually rising from Rs. 120.87 per kg in 2016. The average Turmeric prices are gradually rising from Rs. 118.60 per kg in 2017. Trend analysis is used for analyze the price level changes of turmeric product.

Rudresh (2019) Turmeric arrivals and price trend analysis in chamarajanagar district of Karnataka is aimed to study the correlation of arrivals and prices. Facilitated market wise arrivals, price trend comparison and seasonality study. Secondary data of month wise, market wise Turmeric arrivals (Quintals) and price trends (Rs/Quintal) are collected from 2004 to 2018 from all the three markets of the district such as Chamarajanagar, Gundlupet and kollegal. District total and weighted average model prices are worked out, analyzed and interpreted in the report. The results revealed that the gradual increase in the arrivals from 2004 to 2009 and noticed fluctuation in the year wise arrivals due to prices, which will influence the sowing and arrivals of consecutive year in addition to rainfall and other productivity influencing factors. Prices are highly fluctuating due to supply, demand and other market dynamics. Highest arrivals were noticed in 2012 i.e. 171915 quintals and noticed comparatively lower model price in 2012 (Compared from 2010 to 2018) due to increased supply and steady demand. Prices are higher in 2010 and influenced the sowing area in the consecutive years. Year wise model prices are positively correlated by 56%, 34% und 84% respectively with year, arrivals and maximum price and

negatively correlated by 0.6% with minimum prices may be due to lower quality arrivals which fetches lower prices. Seasonal arrivals will start from February and noticed up to June and gradual reduction in the arrivals is noticed from July onwards. Model prices are traded low in June month due to increased arrivals and marginal arrival increase is noticed in November since farmers tend to sell the old stock with the new crop arrival expectation from January of consecutive year and Monthly arrivals and prices are negatively correlated by 13% and witnessing the supply and demand dynamics and prices are reducing due to increased arrivals. Farmers are recommended to diversify the cropping pattern for consistent and high net returns and to avoid the distress sales at the peak arrival time and immediate cash requirement can be met by taking loan by banks against stock deposits at central and state warehouse corporations

Dhende *et. al*. (2020), The present study was conducted to access the trends in arrivals and prices of selected agricultural commodities in APMC, Sangli. The trends in arrival and prices of selected agricultural commodities were worked out by using exponential form of equation. The trends in arrival and prices for selected commodities in APMC Sangli during 2007-2008 to 2017-2018 were depicted. The result indicates that, significant increase in arrivals of gram, turmeric and raisins whereas; significant decrease in arrivals of soybean was noticed in the APMC, Sangli during study period (2007-08 to 2017-18).The prices of all commodities were found to be significantly increased over entire period of study.

Dhok *et al*. (2020) Present study was conducted to access the socio- economic characteristics of turmeric growers and seasonal indices of turmeric in Sangali district of Maharashtra. Multistage sampling design was used. From Sangali district, six villages from Miraj and Palus tehsil were selected randomly. The information pertaining to the objective was collected from 60 samples of turmeric growers from selected villages. Data pertaining to agricultural year 2015-16. Percentage, average, standard deviation were used to access socio-economic condition of the respondents, while coefficient variation was used to test the stated hypothesis. Result revealed that, the average age of respondents was 44.83 years. In respect to education level score found was 2.6. Average family size of turmeric respondents was 5.5. Average livestock holding with respect to milch animal and bullock pair of selected farmers were 2.75 and 0.73 respectively. Average occupational level score was 1.45. Average

size of holding of sweet orange growers was 2.62 ha of which net sown area were 2.41 ha. The average double cropped area was 1.07 ha. The cropping intensity was found 144.40 per cent. The average area under turmeric was 1.30 ha. The seasonal indices of monthly arrivals and prices of turmeric showed the extent of fluctuations in the arrivals and prices from month to month.

Reddy *et. al*. (2021), studied on the economic analysis of prices and arrivals of Turmeric in Duggirala market of Andhra Pradesh. Turmeric is an important spice grown in India since ancient times. It is also known for its medicinal value and used as an antiseptic since ancient times. India is apparently the largest consumer, producer and exporter of turmeric in the world. Turmeric is the third largest spice produced in India and largely concentrated in Telangana, Andhra Pradesh, Tamil Nadu, Karnataka etc. In this paper, an attempt has been made to study the arrivals and prices of turmeric in Duggirala market in Andhra Pradesh based on the secondary data during the period 2004-2019. The seasonal variations in the arrivals and prices were studied by seasonal indices with the help of ratio to moving average method. For the arrivals of turmeric in Duggirala market, seasonal indices were recorded maximum (206.44) during the month of May and minimum (50.32) in the month of October and prices were lowest (89.39) in the month of March and the highest (107 and 107.27) in November and December, respectively. The present study revealed that the power and cubic models were selected as the best fitted nonlinear models for prices and arrivals of turmeric in Duggirala market. Turmeric market price and arrivals in Duggirala Market for the year 2020 is estimated as INR 6827 quintal-1 and 82207 quintals-1, respectively.

2.2 To know the peak and slack period in arrival and prices of turmeric

Phulpagar (1998) studied economics of production and marketing of turmeric in Parbhani district of Maharashtra. Peak periods for arrivals in Parbhani market were April, May, June and July. There was significant negative relationship between month wise arrivals and prices of turmeric in Parbhani market.

Prasad *et al*. (1998) analysed the seasonal indices of arrivals and prices of turmeric in Guntur market for the period 1980-81 to 1995-96, indicated that the indices of arrivals were higher while the price indices were on lower side for both bulbs and fingers during the post-harvest month of March, April, May and June. They

opined that due to the shortage of proper storage facilities at the farmer level in that area, the growers were forced to dispose of their produce immediately after harvest which results in a lower price.

Alemaychu and Atteri (2002) studied the price behaviour of ginger and garlic in Delhi Wholesale Market. Result observed that, the highest index of ginger arrivals was observed in month of January. Arrivals of ginger were below the average in the month of April to September. The ginger arrival in Delhi Wholesale Market is normally heavy during the months from October to February and minimum in the month of May to July. The ginger wholesale prices start increasing from the month of March onwards and reach the peak in the month of April.

Madan (2008) analysed the cyclical behaviour of turmeric prices in India to identify the long term business cycle behaviour, indicated the existence of both long and short term cycles in turmeric prices. Analysis of price data for Alleppey turmeric in Cochin market revealed the existence of six years cycle. The results of the seasonal index showed that, the price in Cochin market alone 11 was ruling high during the harvesting season. This was because of the strong storage/holding behaviour of the farmer.

Mane *et al*. (2011) observed that there was inverse relationship between arrivals and prices of turmeric in Sangli market. The price of turmeric assumes great significance for producers as well as consumers point of view. It is said that prices are mirror of economy of the country. In their study examined the behaviour and pattern of fluctuations in prices and arrivals of turmeric for the study in agriculture produce market committee's in Sangli district.

Jaswante (2012) presented an article entitled "Economics of turmeric prices with respect to time series". This paper describes the implementation of the time Series to study the trend of five year prices of turmeric. The nature of data shows fluctuation in the prices. It shows its Cyclical Nature and Seasonal variation usually by observing the large data. To identify the force or components at work, the net effect of whose interaction is exhibited by the variation of a turmeric prices also study the variation of prices due to cyclical nature and seasonal variation of data. Use the Least Square method for finding the trend. So, in total it is a five year cycle. Three

year's prices go up and two years prices go down. It can be utilized by farmers for sowing purpose. So, that economically they will be benefitted.

Shukla and Rai (2014) This study has been undertaken with the twin objectives of examining the variability pattern of market arrivals and prices of selected crops (Turmeric, Garlic and onion) in selected markets (Lucknow and Kanpur) of Uttar Pradesh and analysing the relationship between market arrivals and prices. The study is based on market arrivals and wholesale prices of selected crops collected from Rajya Krishi Utapadan Mandi Parishad, 14 Lucknow (U.P.), Krishi Utapadan Mandi Samiti, Lucknow and Krishi Utapadan Mandi Samiti, Kanpur for the period 2001- 2010. The study has shown that the extent of variability in market arrival of onion was lower in Lucknow market but higher in Kanpur market Its prices variability was lower in Kanpur market and higher in Lucknow market In case of garlic, the variability in market arrivals and prices was lower in Kanpur market but higher in Lucknow market In case of turmeric, the variability in market arrivals and prices was lower in Lucknow market but higher in Kanpur market The study has confirmed the negative relationship between market arrivals prices of onion, garlic and turmeric over the years in all two markets. However, across different months, there have been several instances of positive relationship between market arrivals and prices in Lucknow and Kanpur market.10.3. To study the market integration in different markets in Hingoli district.

Kanungo (2015) conducted study on "Influence of Market Arrival on Price Formation of Turmeric in Kandhamal District of Odisha". Study revealed that turmeric is harvested when leaves turn yellow and start drying up. The crop-harvesting season starts between end of January and March in India. It starts entering into the market by March. The peak arrivals season is between March and April. Turmeric prices will be lower between January and June. This could be mainly attributed to supply pressure due to new crop arrivals. New crops arrivals of turmeric gradually increases from January onwards and peaks in the month of March. The market arrival has a great impact on price formation. This impact is explained by an inverse relationship between market arrival and price. It is a well known fact that the agriculturist particularly the small and marginal farmers and tenant cultivators have a weak bargaining strength and very low retention power. They cannot sustain withholding the surplus stock even for a week after harvesting. Many reasons are

attributed for this distress sale such as lack of storage, low level of pecuniary income, a disrupted income flow, current social obligation, and indebtedness to the unauthorized money lenders or village mahajanas, proper infrastructure, lack of all weather transport and inadequate market information.

Karthick (2015) analysed price of tomatoes and ginger in Giwa market, Kaduna State to identify seasonal price patterns and their expected changes over time. The analytical approach in this study was based on the price multiplicative model. The study based preliminary on secondary data collected from NAERLS weekly commodity prices during period 2011- 2015. The study found that the Grand Seasonal Index (GSI) showed a deviation from hundred, suggesting seasonality exists in the market for both commodities. The trend and variability of the seasonal index were also calculated and it revealed that the grand seasonal indexes of the commodities in the market were highly variable and this indicates minimal incentives for the rural farmers and marketers of ginger and tomato. Further the result indicated that tomato has the highest volatility than ginger in the market. Declining trends were obtained for majority of the months in both tomato and ginger marketing an indication of principle of supply and demand. The feasibility for storage were 20.71% and 21.44% for tomato and ginger respectively, implying that the producers/marketers of both tomato and ginger will make highest returns if they stored and sold to other (urban/international) markets during periods of high prices rather than selling at the rural market during harvests. Consequently, marketing of ginger and tomato in terms of better prices in these markets is less favourable. Hence recommendation of the implementation of seasonable price stability by the government. In addition, there is need to boost production, activate value chain, collecting and disseminating market information

2.3. To study the market integration in different market in Hingoli district.

Angel (2001) studied the extent of market integration among the important turmeric markets in south India viz. Erode, Cochin, Sangli and Duggrala; he revealed that the wholesale prices were correlated for four markets from South Indian states. In case of Erode market almost all the markets were having same coefficient of correlation which was ranging between0.87 to 0.88. In case of Cochin, Sangli had high correlation of coefficient which was 0.97 followed by Duggrala (0.94) and Erode

(0.87). In case of Duggrala market Sangli had the highest correlation coefficient of 0.99 followed by Cochin (0.94) and Erode (0.87). Thus Sangli market was concerned which has the highest correlation coefficient of 0.99 with Duggrala, followed by Cochin (0.97) and Erode (0.88).

Varmani and Mittal (2006), the paper tests the methodology proposed by Bradford and Lawrence (2004) on the consumer prices of goods in major states across India. This is then repeated using consumer price data at two points in time (1994 and 2004), allowing an assessment of whether Indian markets have integrated over time. Market integration is also tested for individual commodities across markets. The annual consumer prices for commodities were compiled from the Labour Bureau series of average monthly consumer prices of commodities for Industrial workers across 70 constituent centres in 18 states and monthly data was compiled from the Indian Labour Journal, a monthly publication from Labour Bureau, Ministry of Labour Government of India. Authors are thankful to Labour Bureau, Shimla for providing data on consumer prices at the disaggregated level.

Jayasree *et al.* (2010) studied the integration of domestic markets (Kochi) and international market New York for Pepper by using the cointegration technique. The results showed that the co-integration equation was found significant at one percent level, indicating that two series were highly integrated, which indicative of mutual influence was extended by the markets on each other. This was understandable because Kochi has been a reference market for spices in general and pepper in particular, while New York is the largest commercial centre in the world.

Suleiman A. (2010) The frequent price variations of chilli-pepper and ginger which are complementary commodities in confectionary, culinary and medicinal industries are of major concern to producers, traders and consumers. Hence, this study carried out spatial price analysis using time series price (1990 to 1998) data of the commodities covering six markets sampled purposively based on availability of time series data and economic importance of the commodities in the markets. The markets were sampled from two agro-ecological zones of Northern Nigeria namely Northern Guinea Savannah and Sudan Savannah. The data series were deseasonalized, deflated and then analysed using correlation coefficient (r). Coefficient of multiple determination (r^2) was also estimated. Results shows that price of chili-pepper in the

respective rural and urban markets of Kaduna, Borno and Niger States correlated with 0.93 (P=0.05), 0.64 (P=0.05) and 0.99 (P=0.01) coefficients. Estimated coefficient of multiple determination shows that 86.49%, 40.96% and 98.01% of the variations in prices of urban markets in the respective States were explained by the variations in their corresponding rural markets thus, signifying existence of trade relationships between the markets. The urban markets in Borno and Niger also integrated moderately with a correlation coefficient of 0.71 (P=0.05), while those in Kaduna and Niger have strong trade relationship (r=0.95, (P=0.01). This study established existence of ginger trade relationships between the markets studied. The study recommends that farmers and traders interested in profitable storage of chilli-pepper should take into consideration the variation in price of ginger in addition to monitoring price variation of chillies before determining periods of sales and vice versa. Key words: Markets, Integration and Price variations.

Sekhar *et al.* (2012) analysed the market integration of selected agricultural commodities in India by employing co-integration technique, the results of the study indicated that the commodity markets that do not face inter-state or interregional movement restrictions, like gram and edible oils, appear well integrated. On the contrary, rice market, subject to the maximum inter-state movement restrictions, does not show integration at the national level. The 18broad implication of the study was that the markets can play a more effective role if supplemented with more open policy initiatives.

Shireesha. *et al*. (2016) A study on integration of turmeric in India. This paper tested the extent of co-integration of prices of turmeric among major markets in India by using Johansen test, examined the causality by Granger Causality test and also captured the speed of adjustment to deviations in long run equilibrium in turmeric markets by using Vector Error Correction Model (VECM). The data used in the cointegration analysis consisted of monthly prices of five selected turmeric markets for the period from 2001 to 2014. The data were made stationary by employing Augmented Dickey Fuller (ADF) test. Out of five markets, three markets were cointegrated. The results of VECM showed that all the markets except Kadapa market attained short run equilibrium relationship as indicated by the level of significance and the rapid speed of adjustment. The causality test revealed the mutual influence of prices for the selected markets significant at 5 per cent level of significance.

Sussela and Chandrasekaran (2016), this paper examines the relationship between domestic market prices and also the relationship between domestic to international market prices for Turmeric. The long run price relationship is important for the policy makers to formulate domestic policies and negotiating trade policies at the international level. The 3 largest trading centers of Turmeric were chosen at domestic level i.e. Erode, Duggirala and Sangli. The monthly price data of domestic markets are obtained from different sources i.e., Regulated market- Duggirala, DEMIC- TNAU, AGMARKNET for the period from Feb. 2003 to Nov. 2014. The monthly data of international market price for Turmeric for the period from April 2009 to Nov 2014 was obtained from Spices Board Website. ADF test, Johansen's co-integration test and Granger Causality tests were used to examine the performance of Turmeric markets at domestic and international level. The results showed that Erode market is the market leader both at domestic and international level as it influences Duggirala and Sangli and international markets. The prices are determined in the above markets due to the market intelligence functions performed by the AGMARKNET and Spices Board through electronic and print media on daily basis to benefit the gross root level producers and consumers to enhance transparency in the marketing systeme.

Thomas *et al* (2017), integration of market prices of commodities across various markets is one of the stated objectives of many agricultural marketing reforms undertaken in the country. Well integrated and efficient agricultural markets can allocate resources optimally and remove inefficiencies along the product value chain, thereby directly affect farmer producer welfare. This study takes an analytical look at the impact of a slew of agricultural market reforms policies focusing on Agricultural Produce Market Committee acts starting from 2002-03. The study analyses the marketing of spices, one of the most tradable commodities with a market oriented production system. The effect of major market reforms in improving the efficiency of wholesale spice markets through reduction in market segmentation is examined using data on monthly price dispersion of major spices across wholesale markets in the country. The study finds that the magnitude of reduction in market segmentation in response to the market reforms is low and varies across domestically traded spice commodities. The persistence of high degree of price dispersion in spice markets creates a significant price wedge between producer prices and consumer prices

resulting in higher cost for both farmers and consumers alike. The study highlights the need for strengthening and pursuing the reform agenda for agricultural markets to create a unified market for agricultural commodities in the country.

CHAPTER – III

METHODOLOGY

CHAPTER-III

METHDOLOGY

Agricultural marketing in India is characterised by swings in market arrivals and prices. Indian farmers typically sell their produce in the market as soon as the crop is harvested, resulting in a price drop due to a glut of goods arriving in the market. Seasonal changes in agricultural commodity pricing are more common, and the benefits of these fluctuations have mostly been reaped by middlemen. Furthermore, people involved in marketing would be more likely to favour farmers if they provided such information; with this view in mind the present work was undertaken with following methodology.

3.1. SALIENT FEATURE OF STUDY AREA

3.1.1. Location & Geographical Area

Hingoli is situated at the northern part of Marathwada in Maharashtra. The district came into existence by division of Parbhani district on 1st May, 1999. Hingoli district lies between 19.05 to 20.05 North Latitude and 76.30 to 77.30 East longitudes. There are five Talukas in Hingoli district. According to the census, there are 707 villages for the purpose of Rural Development. The main crop grown in the district is turmeric. Hingoli district stretches over an area of 4526 Sq. Km which is about 1.60 per cent of total area of Maharashtra state area and has a population of 11,77,345 of which 15.60 per cent were urban (as of 2011). One of twelve Jyotirlinga shrines, the Aundha Nagnath is located in Hingoli district. The Kayadhu and Purna rivers bound the major part of the district. Hingoli district is situated on a Godavari basin. It has common border on North with Washim and Buldhana, due East Yawatmal and Nanded due south Nanded and Parbhani, due east Parbhani and Jalana.

3.1.2. Climate and Rainfall

In Hingoli district, monsoon starts from the month of June and ends in September. In the remaining period the weather is very dry. The average rainfall in the district is 895 mm. The maximum temperature of the district is 42.6^{o} C and minimum temperatures are 10.6^{o}C.

3.1.3. Soil

In Hingoli district soil is derived from basaltic lava flows. Thickness of the soil cover is less in northern and western parts where ground elevation are higher and consequently soil regur, gravels, murum are transported down to lower region through gravity, water or winds. Soil in central southern and eastern region of the district near the banks of Penganga and purna rivers is thicker.

3.1.4. Forest Area

Total area covered by forest is about 290.81 Sq. Km within the district.

3.1.5. River

Purna, Painganga & Kayadhu Rivers are in the District.

A) Painganga River : Painganga River is the main river in the district. It flows in the northen region of the district. The river passes through Sengaon and Kalamnuri talukas.

B) Purna River: Purna River flows from Southern part of Sengaon. It flows further south from Aundha and Basmat talukas.

C) Kayadhu River: This is also main river and flows through Sengaon, Hingoli, Aundha Nagnath and Kalamnuri. It meets further to Painganga River in Nanded district.

3.1.6. Population

The study area comprise of 711 village of Hingoli District. The total population of the Hingoli District is 1,177,345 accommodating in household 228,271 within average household size of approx. 5 members per family. The males in Hingoli District 51.50 per cent and female constitute 48.50 per cent. The gender ratio of the study area is 942per thousand male. The average literacy of Hingoli District is 67.16 per cent as per Census of India, 2011The male literacy is 74.31 per cent with respect male population and female literacy is 59.57 per cent.

3.1.7. Agriculture

Subtropical crops are cultivate in this area like soybean, red gram, green gram, jowar and in winter season wheat and chickpea are cultivated in this area large amount of area under the Food grains and turmeric crop.

Fig 3.1 SELECTED APMC'S OF HINGOLI DISTRICT

3.2. Sampling design Selection of District

In the first stage, the Hingoli district was purposely selected for present study based on highest area under Turmeric crop.

3.2.1. Selection of market

Hingoli, Vasmat and Jawala are three major agriculture produce market committees, in the district and hence purposively selected.

3.2.2. Collection of data

The required data was collected from the selected market committees from the published sources such as annual reports and maintained records of APMC.

3.2.3. Period of Study

The required data related to market arrivals and prices of selected crops were collected for the period 2006 to 2020.

Period of Data: Period I = 2006-2010
Period II = 2011-2015
Period III = 2016-2020

3.3. Analysis of Data

Data were analyzed by using simple tabular analytical tools such as mean,frequencies, ratios, percentages etc. to arrive at a meaningful conclusion.

3.3.1. Functional analysis

After information compilation purposeful analysis such as market arrival and prices, seasonal indices, Standard Deviation (SD) and Coefficient of Variation (CV) was computed.

3.3.1.1. Trends in market arrival and prices of Turmeric

The following forms of equation were used to examine and examine the trends in market arrival and prices.

$M = a + bt$……equation 1

$P = c + dt$…….equation 2

Where,

M = Monthly market arrival of food grains in quintals.

P = Price of food grains in rupees per quintals.

a = Intercepts

b = Regration coefficient (rate of change in monthly market Arrivals for a unitChange in the time (dp/dt).

t = Time variable in years.

c = Intercept.

d = Regression coefficient (dp/dt)

Second objective, that is to know the seasonal fluctuation/seasonal indices arrivals and prices of Turmeric.

3.3.1.2. Seasonal indices

To examine the peak and slack period monthly seasonal indices were worked out by simple average methods,

$$\text{Seasonal indices} = \frac{Xi}{\overline{X}} \times 100$$

Xi = Monthly average of 20 years

X = The mean of 12 month average

3.3.1.3. Standard deviation

Standard deviation is the measure of dispersion. This measure of dispersion were calculated by squaring the deviation of each observation from the mean, adding the squares and dividing by number of observation (n) and extracting the square root.

$$SD = \sqrt{\frac{\sum_{I=1}^{n} (Xi - \overline{X})^2}{n}}$$

Xi = Arrivals / prices

$\overline{X}$ = Mean of arrivals / prices

n = Number of years / months

3.3.1.4. Coefficient of variance

Coefficient of variation is a measure of relative variability. It is the ratio of standard deviation to the mean (average). The coefficient of variation of each market arrivals and prices, was worked out by comparing the variability present in market arrivals and prices.

$$C.V = \frac{SD}{Mean} \times 100$$

Where,

SD = Standard deviation.

Mean = Arithmetic mean.

CV = Coefficient of variation.

3.3.1.5. Growth Rate

The linear average growth rate per year and compound annual growth

Rate were worked out by following formulae,

a) Linear growth rate

Over initial year = b/x × 100

Where,

b = Estimate of growth parameter

x = Base year arrival/prices

b) Linear growth rate

Over average = b/x × 100

Where,

b = Estimate of growth parameter

x = Arithmetic mean of arrivals and prices

Compound growth rate (CGR) will be estimated by using the formula

CGR = Anti-log (B-1) ×100.

For calculation of CGR the data was collected from 2006 to 2019-20. Further this period is grouped into three group's viz. Period I (2006-2010), Period II (2011-2015) and Period III (2016-2020).

3.3.1.6. Market integration

The common methodology used for testing market integration involves estimation of bivariate correlation coefficient (r) between price changes in different selected market. [Acharya and Agarwal (1994)].

$$r = \frac{\sum (P_{11} - P_1)(P_{21} - P_2)}{\sqrt{\left(\sum (P_{11} - P_1)^2 (P_{21} - P_2)^2\right)}}$$

Where,

r = Simple correlation coefficient.

P_{11} = Price of the commodity in first market.

P_{21} = Price of the commodity in second market.

P_1 =Mean of prices in first market.

P_2 = Mean of the prices in second market.

3.4. Area of study

The present study was conducted in Hingoli district of Maharashtra state

CHAPTER – IV

RESULTS AND DISCUSSION

CHAPTER – IV

RESULTS AND DISCUSSION

A seasonal fluctuation is a well- known features of agriculture and also of prices. Knowledge of the size of seasonal swings of regional differences will arm on against misleading interpretations which is likely to be interpreted as prices taking a downward trend vice-versa. To safeguard against such misleading, interpretations, knowledge of the pattern and extent of seasonal swings in prices is essential. The collected data on APMC arrivals and prices were analysed with the help of suitable statistical tools computed the seasonal indices peak period, relationship between arrivals and prices and APMC integration of turmeric from the selected APMC's of Hingoli, Vasmat and Jawala Bazar. APMC findings emerged are presented in detail and discussed in this chapter. In this chapter, the result of study are presented in the following sections,

4.1 To study trends in prices of turmeric

4.2 To know peak and slack period in arrivals and prices of turmeric

4.3 To study the Market integration of turmeric in different market of Hingoli District

4.1 Mean, Standard deviation and Coefficient of variation

The monthly indices give the general trend and distribution of arrivals. However, it does not indicate the quantum of the total arrivals in APMC. Hence monthly mean, standard deviation (SD) and coefficient of variation (CV) for arrivals and prices of turmeric were calculated and discussed in this section.

4.1 MARKETWISE MONTHLY VARIATION OF ARRIVALS OF TURMERIC

Market/ Months		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Average
HINGOLI	Mean	4731.6	3142.93	2302.13	11904.93	17448.2	13020.53	6882.26	7701	11235.66	5163.06	6070	5474.26	7923.05
	S.D	5386.17	3618.14	2879.67	10921.12	12659.7	9984.34	4765.74	4445.35	8833.28	4780.34	6017.79	5133.95	6618.8
	C.V. (%)	113.83	115.11	125.08	91.73	72.55	76.68	69.24	57.72	78.61	92.58	99.13	93.783	90.5
VASMAT	Mean	7294.46	6286.8	8175.86	15575.53	17468.73	15233.07	12395.4	9808.2	10455.33	9867.53	12296	10153.07	11250.83
	S.D	5403.8	4996.3	8067.3	10023.8	15036.64	18128.14	9621.41	9531.26	11115.91	7245.43	8856.08	5932.11	9496.52
	C.V. (%)	74.08	79.4	98.67	64.3	86.07	119	77.6	97.17	106.3	73.42	72.02	58.42	83.88
JAWALA BAZAR	Mean	164.93	48.73	94.6	176.86	194.2	265.8	210.86	113	110.33	211.46	389.06	297.06	189.75
	S.D	161.76	44.74	72.44	197.23	256.62	188.05	130.74	93.15	106.76	222.92	146.27	200.36	151.75
	C.V. (%)	98.08	91.8	76.57	111.51	132.14	70.74	62	82.38	96.77	105.4	37.59	67.4	86.04

4.1.1 APMC wise monthly variation of arrivals of turmeric

The mean of arrivals of turmeric in different APMC's along with its standard deviation, coefficient of variation were calculated and presented in table 4.1. It showed that, mean arrivals of turmeric during study was highest in the month of May i.e. 17468.73 quintals and 17448.2 quintals in Vasmat and Hingoli APMC, respectively whereas Jawala Bazar APMC shows highest arrival in the month of November which was 389.06 quintals. The mean arrivals of turmeric were minimum for Hingoli APMC in the month of March i.e. 2302.13 quintals. Jawala Bazar and Vasmat APMC shows minimum arrival in the month of February which was 48.73 quintals and 6286.8 quintals respectively.

The average variability in arrivals of turmeric was 90.5, 83.88 and 86.04 in Hingoli, Vasmat and Jawala Bazar, respectively at an overall level. The maximum variability observed in the month of March i.e. 125.08 per cent and minimum variability observed in the month of August i.e. 57.72 per cent in Hingoli APMC. In Vasmat APMC maximum variability was found in the month of June i.e. 119 per cent whereas minimum variability observed in the month of December i.e. 58.42 per cent. In Jawala Bazar APMC maximum variability observed in the month of May i.e. 132.14 per cent and minimum variability in the month of November i.e. 37.59 per cent among all selected APMC's. It showed that, peak period of arrivals observed from April to July, highest arrivals observed in month of May whereas lowest arrivals in the month of February.

4.2. MARKETWISE MONTHLY VARIATION OF PRICES OF TURMERIC

Market/ Months		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Average
HINGOLI	Mean	6031.77	5501.58	5818.53	5858.41	6058.65	5649.47	5881.17	5726.67	5415.01	5523.08	5708.466	5852.225	5752.08
	S.D	3464.233	2610.011	2853.845	2892.64	3040.581	2879.501	2835.59	2342.17	2114.86	2378.39	2796.10	2777.84	2748.81
	C.V. (%)	57.436	47.44	49.047	49.375	50.18	50.96	48.214	40.89	39.055	43.062	48.98	47.46	47.67
VASMAT	Mean	6258.93	5889.44	6060.34	6235.19	6183.74	5968.65	6160.59	5961.08	5681.89	5678.63	6093.85	6240.23	6034.38
	S.D	3355.89	2861.7	2997.79	3090.12	3067.58	2880.32	2861.68	2340.73	2094.55	2424.22	2787.04	2813.23	2797.904
	C.V. (%)	53.61	48.59	49.46	49.55	49.6	48.25	46.45	39.26	36.86	42.69	45.73	45.08	46.26083
JAWALA BAZAR	Mean	5934.99	5473.46	5372.39	5831.24	6017.22	5710.04	5847.25	5651.02	5388.14	5506.39	5701.92	5832.00	5688.838
	S.D	3417.48	2584.91	2515.86	2893.65	3088.98	2905.06	2828.81	2293.44	2108.34	2367.85	2784.80	2784.81	2714.499
	C.V. (%)	57.58	47.22	46.82	49.62	51.33	50.87	48.37	40.58	39.12	43.00	48.83	47.75	47.59083

4.1.2 APMC wise monthly variation of prices of turmeric

Mean, SD and CV of prices of turmeric were estimated and given in table 4.2. In the study it was observed that, mean of per quintal prices were highest in the month of January and April which was Rs.6258.93 /qtl and Rs.6235.19 /qtl respectively in Vasmat APMC. In Jawala Bazar APMC it was Rs.6017.22/qtl in month of May.

In Hingoli APMC it was higher in May and January i.e. Rs.6058.65/qtl, Rs.6031.77/qtl respectively. With respect to the lower price received per quintal, in the month of March and September which was Rs.5372.39/qtl, Rs.5388.14/qtl respectively in Jawala Bazar APMC, and it was lowest in month of September Rs.5415.01/qtl in Hingoli APMC. In vasmat it was lowest in month of September and octomber which was Rs.5681.89/qtl, Rs.5688.63/qtl respectively.

The mean of variability in prices of turmeric was 47.67, 46.26 and 47.59 per cent in Hingoli, Vasmat and Jawala Bazar, respectively at an overall level. The maximum variability was observed in the month of January i.e. 57.43, 53.61 and 57.58 per cent in Hingoli, Vasmat and Jawala Bazar APMC, respectively. The minimum variability was observed in the month of September i.e. 39.05 per cent, 36.86 per cent and 39.12 per cent in Hingoli, Vasmat and Jawala Bazar APMC, respectively.

4.3 MARKETWISE PERFORMANCE OF ARRIVALS OF TURMERIC

Particular	HINGOLI			VASMAT			JAWALA BAZAR		
	I	II	III	I	II	III	I	II	III
A	8.583	7.576	9.176	9.625	8.836	8.94	4.074	5.52	5.840
B	0.893	1.44	1.094	0.856	1.05	1.225	1.334	0.922	0.838
R^2	0.242	0.652	0.48	0.547	0.125	0.398	0.569	0.244	0.857
t	-0.112	0.364	0.090	-0.155	0.048	0.203	0.288	-0.08	-0.175
CGR	-10.66	43.99	9.437	-14.4034	5.019	22.531	33.49	-7.72	-16.11

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-2020

* Significant at 5% level of significance

**Significant at 1% level of significance

4.2. Annual changes in arrival and prices of Turmeric

4.2.1. Turmeric arrivals

Yearly growth rate (Compound) was calculated with respect to turmeric arrivals for all the APMC's and the same are presented in table 4.3. Vasmat and Hingoli APMC's showed positive growth rates in period II and III which was significant at 5% level of significance. Whereas Jawala bazar APMC showed negative Growth rate which was non-significant during period II and III. During period-I Jawala bazar APMC showed Positive Growth rates which were significant at 5% level of significance Hingoli APMC had highest growth rate of 43.99 per cent among selected APMC's. Annual compound growth rate of turmeric were highest in period II in Hingoli, Period III in Vasmat i.e. 43.99, 22.53 per cent respectively.

4.2.2. Turmeric prices

The compound growth rate of prices of turmeric in different APMC were estimated and presented in table 4.4. Table revealed that, all the APMC's showed positive growth rate for Period I and period II and it was significant at 1% level of significance. Whereas all Hingoli, Vasmat, Jawala Bazar APMC showed negative growth rate in Period I i.e. -11.60, -12.12, -10.9 respectively. The highest growth rate observed in Hingoli APMC with 58.81 per cent in period I and the lowest growth rate was observed in Vasmat APMC which was 0.11 per cent in Period II.

4.4 MARKETWISE GROWTH OF PRICES OF TURMERIC

Particular	HINGOLI			VASMAT			JAWALA BAZAR		
	I	II	III	I	II	III	I	II	III
A	6.852	8.475	9.121	6.86	8.6	9.173	6.865	8.475	9.095
B	1.588	1.067	0.883	1.58	1.05	0.878	1.573	1.066	0.891
R^2	0.920	0.150	0.911	0.91	0.11	0.962	0.927	0.138	0.894
t	0.462	0.065	-0.123	0.46	0.05	-0.129	0.453	0.064	-0.12
CGR	58.81	6.767	-11.60	58.71	0.11	-12.12	57.32	6.614	-10.9

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-2020

* Significant at 5% level of significance

**Significant at 1% level of significance

4.5 MARKETWISE MONTHLY SEASONAL ARRIVALS OF TURMERIC

Markets/ Months	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC	Total
HINGOLI	167.44	252.09	344.16	66.55	45.4	60.85	115.12	102.88	70.51	153.45	130.52	144.73	1653.75
VASMAT	154.23	178.95	137.61	72.23	64.4	73.85	90.76	114.70	107.60	114.01	91.49	110.81	1310.71
JAWALA BAZAR	115.04	389.36	200.58	107.28	97.70	71.38	89.98	167.82	171.97	89.73	48.77	63.87	1613.53

4.3. Seasonal indices of arrivals and prices

The seasonal indices express the monthly percentage in given APMC. Seasonal indices of turmeric in different selected APMC's were calculated for the period 2006-2020 and presented in this section.

4.3.1. APMC wise monthly seasonal arrivals of turmeric

The seasonal arrivals of turmeric are computed and presented in table 4.5. It is observed from the table that, in Vasmat APMC, monthly indices of arrivals were highest in month of February (178.95%) followed by January (154.23%), whereas lowest seasonal indices of arrivals were during May and June months. In Hingoli APMC the seasonal indices of arrivals were highest in the month of March (344.16%) followed by Feb (252.09%) and Jan (167.44%) whereas lowest seasonal indices of arrivals observed in the month of May (45.4 %). The highest seasonal indices of arrivals were registered in the month of Feb (389.36%) followed by March (200.58%), whereas, lowest seasonal indices of arrivals observed in the month of Nov (48.77 %). in Jawala Bazar APMC.

4.6 MARKETWISE MONTHLY SEASONAL PRICES OF TURMERIC

Markets/ Months	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC	Total
HINGOLI	95.36	104.55	98.85	98.18	94.94	101.81	97.8	100.44	106.22	104.14	100.76	98.28	1201
VASMAT	96.41	102.46	99.57	96.77	97.58	101.1	97.95	101.22	106.2	106.26	99.02	96.7	1201
JAWALA BAZAR	95.85	103.93	105.89	97.55	94.54	99.62	97.29	100.66	105.58	103.31	99.77	97.54	1201

SEASONAL INDICES OF HINGOLI APMC

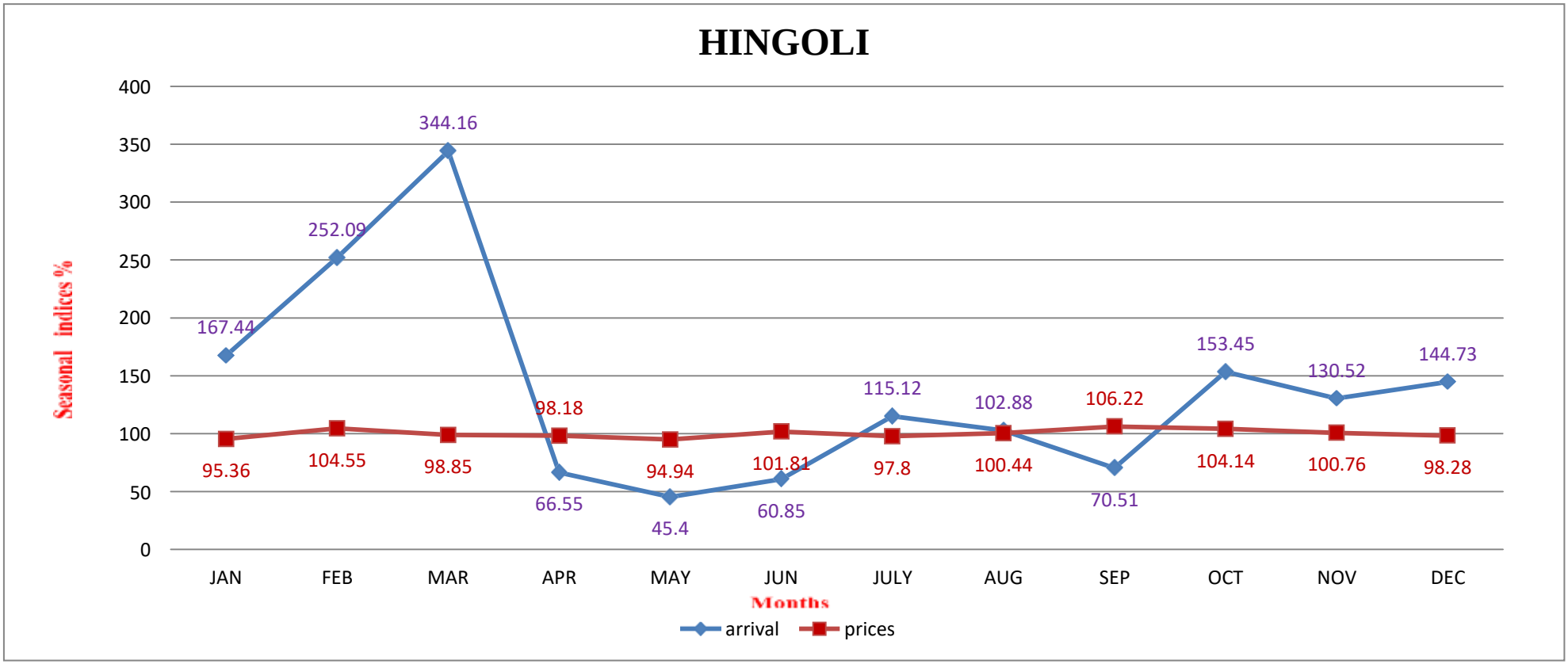

Fig. 4.1 Seasonal indices of arrivals and prices of Turmeric in Hingoli APMC

SEASONAL INDICES OF VASMAT APMC

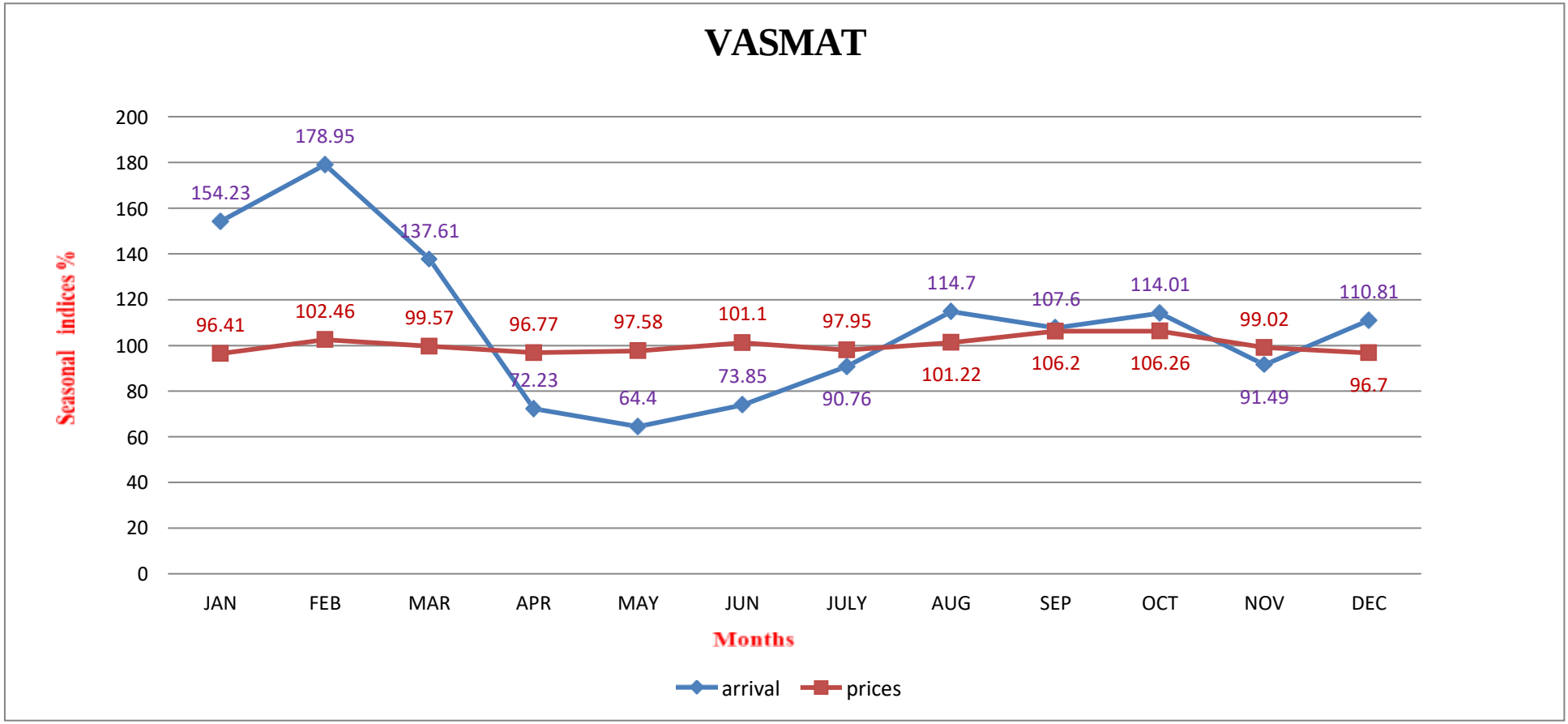

Fig. 4.2 Seasonal indices of arrivals and prices of Turmeric in Vasmat APMC

SEASONAL INDICES OF JAWALA BAZAR APMC

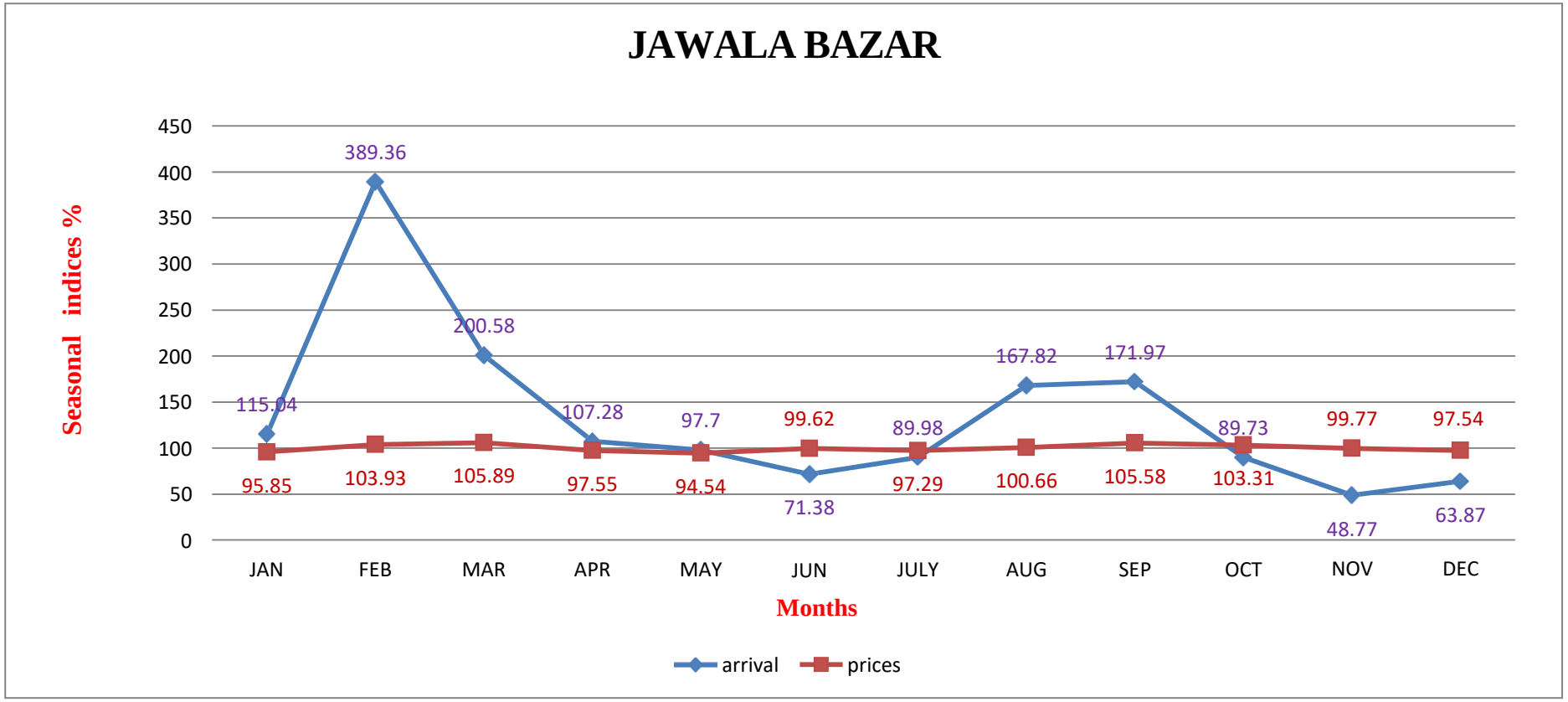

Fig. 4.3 Seasonal indices of arrivals and prices of Turmeric in Jawala Bazar APMC

4.3.2 APMC wise monthly seasonal prices of turmeric

The seasonal prices of turmeric are computed and presented in table 4.6. It is observed from the table that, monthly indices of prices were highest in the month of September in Hingoli, Jawala Bazar and Vasmat APMC which were 106.22 %, 105.58 % and 106.26%, respectively. Lowest seasonal indices of prices were observed during the month of May viz. 94.54% and 94.94% in Jawala Bazar and Hingoli APMC, respectively. Seasonal indices of prices were lowest in the month of January (96.41%) in Vasmat APMC among all selected APMC's.

4.7. MARKETWISE MARKET INTEGRATION OF TURMERIC

APMC	Correlation coefficient	Hingoli	Vasmat	Jawala Bazar
Hingoli	Pearson Correlation Sig. (2-tailed)N	1		
Vasmat	Pearson Correlation Sig. (2-tailed)N	0.90014	1	
Jawala Bazar	Pearson Correlation Sig. (2-tailed)N	0.818726	0.786453	1

** Correlation is significant at the 0.01 level (2-tailed).

4.3.3 APMC wise monthly APMC integration of turmeric

Pearson correlation analysis of turmeric prices between the APMC's is presented in the table 4.7. The relationship between two APMC's which are spatially integrated are indicated by APMC integration. Spatial integration is one of the most important indicator of efficient functioning of APMC. The nearby located APMC's have high degree of association for prices. APMC's located at different places shows wide differences among the prices in different APMC's. The result revealed that, there is high degree of association between Hingoli and Vasmat APMC i.e. 0.90014 which was found highly significant at 0.01 per cent level of significance and a low

degree of association of prices was found between Vasmat and Jawala Bazar APMC i.e. 0.786453 and association was found to be statistically significant at 0.01 per cent level of significance in all selected APMC's; a high degree of association for prices was found between one APMC with that of another APMC's and the association were found to be statistically significant at 0.01 per cent level of significance. The high degree of price association between Hingoli and Vasmat APMC may be due to the reason that they are nearby turmeric APMC's. Hence the price signal easily transferred between Vasmat and Hingoli APMC's. However, low positive relation was found between Vasmat and Jawala Bazar APMC, which can be attributed to the reason that there might be imperfection of APMC information between the APMC's.

CHAPTER – V

SUMMARY AND CONCLUSION

CHAPTER – V

SUMMARY AND CONCLUSIONS

INTRODUCTION

An economic analysis of arrivals and prices of turmeric in Hingoli District undertaken with a view to examine pattern of markets arrivals and prices of turmeric, trends and relationship between arrivals and prices at different markets and market integration among all market. The study will be useful to formulate economic policies and action to be taken on the findings of the study. It is also beneficial for consumer, producer, trader, research worker and to the Government. To verify trends, fluctuations and relation between market arrivals and prices on empirical study was carried out in Hingoli, Vasmat and Jawala Bazar APMC markets with the following specified objectives.

OBJECTIVES

5.1 To study trends in prices of turmeric

5.2 To know peak and slack period in arrivals and prices of turmeric

5.3 To study the market integration of turmeric in different markets in Hingoli District

Review of literature related to past studies carried out by the different research worker were collected from published and unpublished sources pertaining to the objective of study and presented under following subheads.

- To study trends in prices of turmeric
- To know peak and slack period in arrivals and prices of turmeric
- To study the market integration of turmeric in different markets of Hingoli District

The markets of Hingoli, Vasmat and Jawala Bazar were selected on the basis of availability of time series data related to arrivals and prices. The crop turmeric were selected from the various other crop because of large area and production under turmeric and also on the basis of availability of continuous data. The data were collected on market arrivals and prices of turmeric from selected APMC's from the published and unpublished annual reports and maintained records of respective APMC's. The required data were collected for the period 2006-2020 and divided into

three periods like period I (2006-2010), period II (2011-2015) and period III (2016-2020). Collected data were analysed with the help of simple statistical tools such as mean, frequency, percentage, etc. The functional analysis such as seasonal indices, correlation coefficient, SD, growth rate, CV etc. were computed by well known analytical procedure. The results of statistical analysis of turmeric in selected markets are summarized as follows.

5.1 Trends in prices of turmeric

In the study it was observed that, per quintal highest prices were prevailing in the month of January and April with value of ₹.6258.93 /qtl in Vasmat market and ₹. 6235.19 /qtl in Jawala Bazar market respectively. In Hingoli market it was higher in May and Jan which was ₹.6058.65/qtl and ₹.6031.77/qtl, respectively. With respective to the lower price received per quintal, it was observed in the month of March which was ₹.5372.39/qtl in Jawala Bazar, In Vasmat lowest in month of Sept i.e. ₹.5681.89 /qtl and it was lowest in month of September ₹.5415.01/qtl in Hingoli market. The highest CV were observed in month of January 57.58 (per cent) in Jawala Bazar market followed by 57.43(per cent) in Hingoli market and 53.61(per cent) in Vasmat and Lowest CV was in the month of September 36.86 (per cent) in Vasmat market.

5.2. Growth Arrivals

Vasmat and Hingoli APMC's showed positive growth rates in period II and III which was significant at 5 per cent level of significance. Whereas Jawala bazar APMC showed negative Growth rates which was non-significant during period II and III. During period-I Jawala bazar APMC showed Positive Growth rates which was significant at 5 per cent level of significance. Hingoli APMC had highest growth rate of 43.99 per cent among selected APMC's. Annual compound growth rate of turmeric were highest in period II in Hingoli, Period III in Vasmat i.e. 43.99, 22.53 respectively.

5.3. Growth prices

All the markets showed positive growth rates in period I and II and negative growth rate in III i.e. Vasmat (-12.12 per cent) and Jawala Bazar (-10.9 per cent) markets. The highest growth rate observed in Hingoli market with 58.81 per cent. The lowest growth rate was observed in vasmat market which was 0.11 per cent.

5.4. Seasonal arrivals

The monthly indices of arrivals were highest in month of March (344.16 %) in Hingoli Market whereas lowest arrivals observed in the month of May (45.4 %) in Hingoli market. Seasonal indices of arrivals was highest in the month of Feb (389.36 %) in Jawala Bazar market. The peak period of arrivals of turmeric were observed in the month of April and May. The lean period were recorded during the month of Feb and March in the selected markets.

5.5. Seasonal prices

The monthly indices of prices were highest in the month of September (106.26 %) in Vasmat market and (106.22 %) in Hingoli market. Lowest prices were during January (95.36 %) in Hingoli market. The peak period of prices was in the month of December and January whereas the lean period of prices was found in April and May.

5.6. Market integration for Prices

The results revealed that, there is high degree of association between Hingoli and Vasmat APMC i.e. 0.90014 which was found highly significant at 0.01 per cent level of significance and a low degree of association of prices i.e. was found between Vasmat and Jawala Bazar APMC i.e. 0.786453 and association was found to be statistically significant at 0.01 per cent level of significance in all selected APMC's; a high degree of association for prices was found between one APMC with that of another APMC's and the association were found to be statistically significant at 0.01 per cent level of significance.

CONCLUSIONS

The presented and discussed analysis leads to draw the following conclusions :

Among the selected markets, coefficient of variation was highest in month of March in Jawala Bazar market. The lowest CV was found in month of November in Jawala Bazar market. It is seen that highest arrivals of Turmeric in May and April which is treated as peak period of arrivals. The lean period were observed during the month of February and March. In the study it was observed that per quintal highest prices were prevailing in the month of January and December in all selected markets. With respective to prices received per quintal were lower in the month of February in Vasmat, Hingoli and Jawala Bazar market, respectively. Growth rates were non-significant during period-III. Hingoli market had highest growth rate of 58.81 per cent among selected markets. All markets showed positive relationship between arrivals and prices in turmeric markets. The peak period of arrivals of Turmeric were observed in the month of April and May in all selected markets, whereas lean period were recorded during the month of February and March. The peak period of prices was in the month December and January. The lean period of prices was found in the month of February in all selected markets. The high degree of price association between Jawala Bazar and Vasmat market may be due to reason that they are nearby Turmeric markets. Hence the price signal easily transferred between Vasmat and Jawala Bazar markets. However, low positive relation was found between Vasmat and Hingoli market, which can be attributed to the reason that there might be imperfection of market information between the markets.

LITERATURE CITED

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Alemaychu, M. & Atteri, B.R. (2002). Price behaviour of ginger and garlic in Delhi Wholesale Market. *Indian Journal of Agricultural Marketing*. 16(1), 45-49.

Angles, S., (2001) Production and export of turmeric in South India – An economic analysis, M. Sc. (Agri) Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India)

Dhendhe, A.A., Suryawanshi, R.R., Patil, R.A. & Shinde H.R. (2020). Trends in arrivals and prices of selected agricultural commodities in APMC, Sangli. *International Journal of Chemical Studies.* 8(6), 2676-2678.

Dhok, A.A., Perke, D.S. & Karanjalkar, A.P. (2020). Socioeconomic study and seasonal indices of Turmeric in Sangli District of Maharashtra. *The Pharma Innovation Journal.* 9(11), 44-44.

Jaswante, N.W. (2012) Economics of Turmeric Prices With Respect to Time Series. *Indian Streams Research Journal*, 2(1), 203.

Jayasree, K., Swapnam Surendran., Satheesh Babu, K. & Thomas,J.K. (2010). Global competitiveness and market integration of Indian pepper. *Indian Journal of Arecanut*, 12(1), 3-6.

Kale (2018). Dynamics of Arrivals and Prices Behaviour of Turmeric in Sangli District of Maharashtra, India. *International Journal of Current Microbiology and Applied Sciences,* 6(2), 2275-2278.

Madan, M.S. (2008) changing scenario of turmeric production and marketing. Agric. Situ. India, 66(4): 193-210

Mane, U. S., Changule,R. B., Kolekar ,P. L.& Gharge, S.H. (2011). An economic analysis of turmeric arrivals and price behaviour in Sangli district of Maharashtra. *International Journal of Commerce and Business Management,* 4 (2), 224-227.

Manjunath, U. (2015). An analysis of price behaviour of turmeric in Guntur district of Andhra Pradesh. Ph. D.Thesis. Acharya N G Ranga University, Guntur Andhra Pradesh.

Melda, A., (2018). A study on prices changes of Turmeric in Tamil Nadu. *International Journal of Emerging Technologies in Engineering Research.* 6(1), 79-81.

Nitin W. Jaswante (2012). Economics of turmeric prices with respect to time series. *International Journal of Current Microbiology and Applied Sciences,* 14(6).

Pallavi, L.K. & Reshma, S.,(2018). Price behaviour of turmeric in Sangli APMC. *Research Square.* 1, 1-7.

Phulpagar, S. M. (1998). Economics of production and marketing of turmeric in Parbhani district of Maharashtra. Unpublished M.Sc. (Agri.) thesis submitted to Marathwada Agricultural University, Parbhani.

Ravikumar, K. N., Raju, V. T. & Shreelakshmi, K. (2001). Determinants of prices of agricultural commodities in the regulated markets of Andhra Pradesh. *Agril. Market*.43 (1), 19-22.

Reddy, G.R., Reddy, M.C., Sneha, K.S., Gita, B.M. & Ramesh, D. (2021). Economic Analysis of Prices and Arrivals of Turmeric in Duggirala Market of Andhra Pradesh. *International Journal of Economic Plants.* 8(1), 019-024

Rudresh, H.R., (2019). Turmeric marketing: Arrivals and Price Trend analysis-Chamarajnagar District of Karnataka. *Journal of Emerging Technologies and Innovation Research.* 6(6), 235-241.

Sekhar, C. S. (2012). Agricultural market integration in India : an analysis of select commodities. *Food Policy*, 37(3), 309-322

Shireesha, M., Bhavanidevi, I., Vani, N., Naidu, M.G. & Prasad, S.V.(2016) A study on integration of turmeric crop in india. *International Journal of Agricultural And Statistical Sciences* 12(1), 159-164.

Shukla & Rai (2014). Examining the variability pattern of market arrivals and prices of selected crops (Onion, Garlic and Turmeric) in selected markets (Lucknow and Kanpur) of Uttar Pradesh. *Indian Journal of Agricultural Marketing*.26(2).

Suseela, K. & Chandrasekaran, M. (2016). Domestic and International Market Intergration in Turmeric. *An International Research Journal*. *ISSN*: 2277-4297, 83-93.

Thomas L., Rajeev, P. & Sanil, P. C (2017). Impact of Market Reforms on Price Integration: A study of wholesale spice markets in India, Economic Affairs, 62(3),427-433.

Virmani, A. & Mittal, S. (2006). Domestic Market Integration. *Indian Council for Research on International Economic Relations.* 9(12), 1-27.

APPENDIX

Table 1. Linear Growth Rate of Arrivals of Turmeric (Over the base)

Particular	Hingoli			Vasmat			Jawala Bazar		
	Period I	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**
A	5462.63	1532.77	9282.33	13599.72	7013.00	4951.60	63.28	240.78	310.58
B	-475.96	1772.47	1200.63	-1244.93	371.32	3603.02	31.36	-12.96	-33.53
R^2	0.45	0.61	0.52	0.56	0.10	0.46	0.51	0.20	0.89
t	-0.87	2.17*	1.82	-1.97	0.58	1.60	1.78	-0.86	-4.98
LGR	-14.58	99.82	9.54	-10.58	5.75	43.36	62.51	-6.90	-13.17

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-2020

*Significant at 5% level of significance

**Significant at 1% level of significance

Table 2. Linear Growth Rate of Prices of Turmeric (Over the base)

Particular	Hingoli			Vasmat			Jawala Bazar		
	Period I	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**
A	-1918.28	4863.47	8802.81	-1927.22	5535.33	9170.16	-1687.19	4878.40	8615.74
B	2250.66	378.42	-792.99	2265.38	348.16	-838.58	2126.43	365.18	-738.41
R^2	0.83	0.16	0.89	0.83	0.12	0.97	0.84	0.14	0.87
t	3.77**	0.75	-4.97	3.77**	0.64	-10.29	3.99**	0.71	-4.57
LGR	114.19	5.44	-9.42	113.82	4.51	-9.99	109.52	5.21	-8.91

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-20

*Significant at 5% level of significance

**Significant at 1% level of significance

Table 3. Linear Growth Rate of Arrivals of Turmeric (Over the Average)

Particular	Hingoli			Vasmat			Jawala Bazar		
	Period I	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**
A	5462.63	1532.77	9282.33	13599.72	7013.00	4951.60	63.28	240.78	310.58
B	-475.96	1772.47	1200.63	-1244.93	371.32	3603.02	31.36	-12.96	-33.53
R^2	0.45	0.61	0.52	0.56	0.10	0.46	0.51	0.20	0.89
t	-0.87	2.17*	1.82	-1.97	0.58	1.60	1.78	-0.86	-4.98
LGR	-11.80	25.87	9.32	-12.62	4.57	22.86	19.93	-6.42	-15.96

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-2020

*Significant at 5% level of significance

**Significant at 1% level of significance

Table 4. Linear Growth Rate of Prices of Turmeric (Over the Average)

Particular	Hingoli			Vasmat			Jawala Bazar		
	Period I	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**	**Period I**	**Period II**	**Period III**
A	-1918.28	4863.47	8802.81	-1927.22	5535.33	9170.16	-1687.19	4878.40	8615.74
B	2250.66	378.42	-792.99	2265.38	348.16	-838.58	2126.43	365.18	-738.41
R^2	0.83	0.16	0.89	0.83	0.12	0.97	0.84	0.14	0.87
t	3.77*	0.75	-4.97	3.77*	0.64	-10.29	3.99*	0.71	-4.57
LGR	46.56	6.31	-12.34	46.53	5.29	-12.60	45.32	6.11	-11.54

Period I = 2006-2010

Period II = 2011-2015

Period III = 2016-2020

*Significant at 5% level of significance

**Significant at 1% level of significance

CURRICULAM VITAE

CURRICULUM VITAE

Full name of candidate	**: Mundhe Vishnu Narayan**
Date of Birth	: 01/05/1997
Nationality	: Indian
Permanent address	: At. keli Post. Adgaon Tq. Aundha Nagnath Dist. Hingoli
Mobile No	: 9545641426
Email id	: vishnumunde1597@gmail.com
Title of the thesis	: Economic Analysis of Market Arrivals and Prices of Turmeric in Hingoli District of Maharashtra

Academic qualification

Course/ Degree	Name of the college/ institute	University/ Board	Year of passing	Percentage (%)/ CGPA	Class/ Grade
SSC	Dnyanganga Secondory School,Salana	Aurangabad	2013	69.40	Second
HSC	Late S. R. Musale Junior College, Hingoli	Aurangabad	2015	64.77	Second
B. Sc. (Agri.)	M.G.M. Nanasaheb Kadam College of Agriculture, Aurangabad	V.N.M.K.V. Parbhani	2019	71.20	Second

Place : Latur.

Date : 30/11/2022

Mundhe

(Vishnu Narayan Mundhe)

Reg. No. 2020A/58ML