ECONOMIC ANALYSIS OF MARKET ARRIVALS AND PRICES OF PADDY IN GADCHIROLI DISTRICT OF MAHARASHTRA

BY

KUMARE SANDIP TULSHIRAM

B. Sc. (Agriculture)

MASTER OF SCIENCE

IN

AGRICULTURE

(AGRICULTURAL ECONOMICS)

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF AGRICULTURE, PARBHANI

VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH

PARBHANI– 431 402 (M.S.) INDIA

2021

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A thesis submitted to

Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

In partial fulfilment of the requirement for the degree of

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2021

DECLARATION BY THE CANDIDATE

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

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Place: **Parbhani**
Date: 14/ 10/ **2021**

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Reg. No: 2019A/55M

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This is to certify that the thesis entitled, **"Economic Analysis of Market Arrivals and Prices of Paddy in Gadchiroli District of Maharashtra"** submitted by **Kumare Sandip Tulshiram, Reg. No.2019A/55M** in partial fulfillment of the requirements for the award of the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **Agricultural Economics** submitted to the Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani is a record of bonafide research work carried out by him under my guidance and supervision. The thesis or its any part has not previously formed the basis for the award of any degree, diploma or other similar title.

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(D. S. Perke)

CERTIFICATE - II

This is to certify that the thesis entitled, **"Economic Analysis of Market Arrivals and Prices of Paddy in Gadchiroli District of Maharashtra** submitted by **Kumare Sandip Tulshiram, Reg. No.2019A/55M** in partial fulfilment of the requirements for the award of the degree of **MASTER OF SCIENCE (Agriculture)** in the subject of **Agricultural Economics** submitted to the Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani has been approved by the Student's Advisory Committee after viva voce examination of the student in collaboration with the External Examiner.

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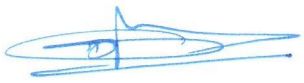

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W	URL: https://businessdocbox.com/Agriculture/84217910-Trends-in-arrival-and-prices-of-major-agricultural-commodities-in-apmc-satara-of-western-maharashtra.html Fetched: 7/23/2021 2:22:12 PM	3
SA	**VNM Krishi Vidyapeeth / Utkal Thesis.pdf** Document Utkal Thesis.pdf (D110632064) Submitted by: chavanrv74@gmail.com Receiver: chavanrv74.vnmkv@analysis.urkund.com	1
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SA	**Pooja Nautiyal.pdf** Document Pooja Nautiyal.pdf (D110301042)	1

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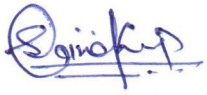

(Kumare Sandip Tulshiram)

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVATIONS USED

GDP	:	Gross Domestic Product
etc.	:	Et cetera
i.e.	:	That is
U.S.A.	:	United States of America
kcals	:	Kilo Calories
FAO	:	Food and Agriculture Organization
t/ha	:	Tonnes per hectare
ha	:	Hactare
kg/ha	:	Kilogram per hectare
APMC	:	Agricultural Produce Marketing Committee
Viz.	:	Namely
et al.	:	Et alia
qts.	:	Quintals
Rs.	:	Indian Rupees
<	:	More than
>	:	Less than
CGR	:	Compound Growth Rate
%	:	Percentage
MT	:	Metric Tonnes
BNARDA	:	Benue State Agricultural Development Programme
ENADEP	:	Enugu State Agricultural Development Programme
HHI	:	Herfindehl-Hirschman Index
TVECM	:	Threshold Vector Error Correction Model
agmarknet	:	Agricultural Marketing
^{0}	:	Degree
sq. kms.	:	Square kilometres
mm	:	Millimeter
SD	:	Standard Deviation
CV	:	Coefficient of Regression
N	:	Number of Observations

THESIS ABSTRACT

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1.	Title of the thesis	:	"Economic analysis of market arrivals and prices of paddy in Gadchiroli district of Maharashtra"
2.	Full name of the candidate	:	Kumare Sandip Tulshiram
3.	Full name of the Research Guide	:	Digambar Shivram Perke
4.	Department	:	Agricultural Economics
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6.	Degree to be awarded	:	M.Sc. (Agri.) in Agricultural Economics

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ABSTRACT

An economic analysis of arrivals and prices of paddy in Gadchiroli district of Maharashtra was undertaken with a view to examine pattern of markets arrivals and prices of paddy, relationship between arrivals and prices in selected markets and their integration. The whole chapter deals with the analysis of basic data collected from the two APMC's i. e. APMC Chamorshi and APMC Gadchiroli for fifteen years (2005-06 to 2019-20). The study will be useful to formulate economic policies and action based on the conclusions derived from the present investigation.

For analyzing the data various simple statistical tools viz, mean, frequencies, ratios, percentages and functional analysis such as market arrivals and prices, seasonal indices and bivariate correlation coefficient were used. The compound growth rates of arrivals and prices of paddy were worked out by for assessing the trend in arrivals and prices of paddy. Seasonal indices were worked out using simple average method. To judge variability in arrivals and prices coefficient of variation in arrivals and prices were estimated.

The study revealed that arrivals of paddy during the study period was highest in Chamorshi APMC followed by Gadchiroli APMC with compound growth rate of -2.18 per cent per annum and -4.59 per annum respectively. With respect to price, Chamorshi market witnessed positive and non-significant growth rate of 0.90 per cent per annum whereas Gadchiroli market witnessed positive and significant growth rate of 1.11 per cent per annum.

In Chamorshi APMC, the monthly seasonal indices of arrivals were highest in the month of January (172.27 per cent)followed by December (165.10 per cent) whereas lowest in the month of August (45.95 per cent) followed by July (60.03 per cent). With regard to Gadchiroli APMC, the monthly seasonal indices of arrivals were highest in month of January (195.54 per cent) followed by February (161.33 per cent) and lowest in the month of August (51.99 per cent) followed by October (58.51 per cent). With respect to price, In Chamorshi APMC, the monthly seasonal indices were highest in the month of July (111.62 per cent) followed by August (109.16 per cent) and lowest in the month of March (84.30 per cent) followed by April (90.03 per cent) and in Gadchiroli APMC, the highest monthly seasonal indices of prices were in the month of September (108.59 per cent) followed by October (106.51 per cent) and the lowest monthly seasonal indices were registered in the month of March (88.86 per cent) followed by January (93.74 per cent).

A strong and positive degree of association of prices was found between Chamorshi and Gadchiroli markets i.e. about 0.863. This was found to be highly significant at one per cent level of significance. This suggests that market information is easily transferred between the two markets resulting in easy transfer of price signals.

(**Keywords:** Paddy, Gadchiroli, arrivals, prices, seasonal indices, association, compound growth rate)

CHAPTER – I

INTRODUCTION

CHAPTER- I

INTRODUCTION

Agriculture is most vital sector of Indian economy. Indian agriculture sector accounts to 16.38 percent of India's gross domestic product (GDP) and provides employment to 41.49 percent of the countries workforce. About 68.84 percent of the population lives in rural areas. The chief occupation of the rural people is agriculture. Major industries of the country like textile industry, sugar industry, processing sector etc depends on agriculture sector for the raw materials. The diverse agro-climatic condition prevailing in the country enables the growth of wide variety of crops including cereals, pulses, fruits, vegetables, spices and condiments.

The importance of cereals lies in the fact that they had played the most important role in influencing human civilization by being the chiefcomponent of human diet. Cereals being the staple food act as the major source of energy, carbohydrates, proteins and fiber for the world population. The cereals that are most commonly cultivated around the globe are wheat, rice,wheat, maize, rye, oats, barley and sorghum. Among cereals, rice is undoubtedly one ofthe most consumed food grain in the world. 90 per cent of the rice produced in the world comes from Asian continent.

Rice being the most important cerealcrop of India, occupies one-fourth of the gross cropped area of the country. Rice being a tropical crop flourishes under hot and humid climate. In India, the crop is mainly cultivated as a Kharif crop in rainfed areas having heavy annual rainfall. India being the centre of rice cultivation had always prompted the growth of rice production in the country as it emphasize great role in Indian economy.

Rice (*Oryza sativa* L.*)* belongs to Poaceae family. Rice is a self-pollinated crop. A whole seed of rice is called paddy and holds one rice kernel. Outer layer of rice is called husk. The next layer is called rice bran and the innermost part is called rice kernel. The outer layer of the kernel is the pericarp which may be white or coloured. Rice form is a fibrous root system containing seminal, nodal and lateral roots. The culm or jointed stem of the rice consist of a series of nodes and internodes.

The two most important cultivated species of paddy are *Oryza sativa* and *Oryza glaberrima*. There are around 22 wild species of paddy grown in the continent of Asia, Africa and America. While Oryza sativa is grown in most parts of the Asian and American continent, *Oryza glaberrima*.is grown only in West Africa.

There are threeimportant sub species of paddy in the world i.e. Indica (long grain), Japonica (round grain) and Javanica (medium grain). Indica rice is mainly cultivated in the warm climate zone of Indo-China, India, Pakistan, Thailand, Brazil and Southern U.S.A., Japonica is typically grown in the cold climate zone of Northern China, Korea, Japan and California. The Javanica is cultivated in Indonesia only.

In India, paddy has been cultivated since ancient period. Rice is believed to have originated in southern parts of India and later had spread to northern parts. Another school of thought believes thatrice is a descendent of wild grass grown in the foothills of eastern Himalayas. Archaeologist had excavated the earliest remains of rice grain from the Indo-Gangetic plain. Andhra Pradesh is known as the rice bowl of India.

Rice is the staple food of 60 per cent of the world population. Apart from being a major food source rice plant plays other vital roles too.Rice bran contain 18-20 per cent edible oil. Paddy straw is used as manure, mulch, padding material as well as thatching material for huts. Husk is used as fuel and for making light weight bricks. Rice bran, paddy husk and stalk are used as fodder for cattle.It is also used for packing and ripening of fruits and agronomical products. Inferior qualityrice and broken rice are used as poultry feed. Snacks like murmura (parched rice), lahi (parched paddy) and poha (beaten rice) are prepared from rice. Rice grain have important place in ceremonies related to birth, marriage, funerals and other religious functions.

Nutrition Value

Rice is a comparatively good source of energy, carbohydrates, calcium, iron, thiamin, pantothenic acid, folate and vitamin E. It contains no vitamin E, vitamin C, vitamin Aand beta-carotene. Brown rice contains more dietary fiber than white rice. Rice bran is the most important source of fiber in rice.

Rice is extensivelyvalued as a health food as it contains soluble fiber called resistant starch which increases the butyrate content in gut. Gut health is boosted by Butyrate as it reduces inflammation, improves gut barrier function and reduces the risk of colon cancer. Rice is chiefly a high energy food. The calorie content of one cup of cooked rice varies from a high value of 241.8 kcals for medium and short grain white rice to a low value of 165.6 kcals for wild rice. Medium-grain brown rice gives an energy of 218.4 kcals while regular lengthy grain white rice provide 205.4 kcals, The major part of rice consists of carbohydrate in the form of starch, which constitutes about 72-75 percent of the total grain composition.

The protein content of rice is around 7 percent and fat content is 2 to 5 percent. The protein in rice is glutelin, which is also known as oryzenin. The nutritive value of rice protein (biological value = 80) is much higher than that of wheat (biological value = 60) maize (biological value = 50) or any other cereals. Paddy grain contains calcium and vitamin B. In rice most of the minerals are mainly situated in the pericarp. 4 percent phosphorus is estimated to be present on pericarp. Rice also contains some enzymes.

World Scenario

Rice is the world's second most important cereal crop. Nearly 496 million metric tons of milled rice was produced in the last harvesting year worldwide. By tradition, countries in Asian continent have the largest share in world rice production. According to the recent official data, China is the world's leading paddy producer with a production volumeof over 209 million metric tons in 2019, followed by India and Indonesia.

The major rice exporting nations are India, Thailand, and Vietnam. India had the highest export volume of rice worldwide, at 15.5 million metric tons in 2020-2021. Vietnam was the second largest rice exporter, with around 6.4 million metric tons of rice worldwide in that year. The largest rice importers were the Philippines and China. According to the United Nation's Food and Agriculture Organization, in 2019, one metric ton of U.S. California Medium Grain rice had an average export price of 850 U.S. dollars.

Total global consumption of milled rice totaled to approximately 496 million metric tons in 2019-2020. China consumed around 149 million metric tons of milled rice per year, and was considerably the world's leading rice consumer in that year. Following China, India is ranked second with 106.5 million metric tons of rice consumed in the same period.

Indian Scenario

Rice is the most important cereal food crop of India, occupying one-fourth of the gross cropped area of the country. India is the second-largest rice producer country in the world after China. According to the FAO, the rice production in India was 177.6 million metric tons in 2019-2020. Major rice-producing states in India are West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Odisha, Maharashtra, and Bihar. As the staple food crop, rice is cultivated comfortably in hot and humid climate. In the country, the crop is mainly grown as a Kharif crop in rainfed areas with heavy annual rainfall.

Maharashtra Scenario

Rice is the second main crop of Maharashtra and is cultivated over an area of 14.99 lakh hectares with an annual production of about 32.37 lakh tons. The state's average productivity is 2.01 t/ha, ranking the 13th in rice production in the country. The main rice growing region in Maharashtra are the Konkan region, Bhandara, Gondia, Chandrapur, Gadchiroli and part of Nagpur district in Vidarbha. The area, production and productivity of kharif rice in Gadchiroli district in 2019-20 is 1833.350 ha. 3157.514 tonnes and 1722.265 kg/ha, respectively.

Economic importance

Globally, rice is one of the most essential food crops in the world. Rice production total 600 million tonnes. 90 per cent of rice is produced in Asia alone. Only 6-7 per cent production is traded from area of production. Rice field covers 11 per cent of arable land.

Rice cultivation is the most significant economic activity on earth. Rice eaters and growers form the bulk of world's poor. Rice being the single primary activity of countryside people in the world was used to pay debts, wages, and rent.

Rice is the staple food for the largest group of people in the world and is the single major source of energy for poor.

Objectives of the study

1. To study trends in arrivals of paddy
2. To study trends in prices of paddy
3. To know peak and slack period in arrivals and prices of paddy
4. To study market integration of paddy markets of Gadchiroli districts

Hypothesis

1. There is variation in prices and arrivals of Paddy over time

Scope of the study

The study would be useful to identify the degree of effectiveness in different markets in terms of arrivals and prices of paddy. The study is selected with an intension to know the trends, seasonal variation in arrivals and prices in paddy.

It is observed that the seasonal price fluctuations are mostly caused due to poor storage facilities and inadequate market information. In agriculture, demands for agricultural commodities are rising thus the supply plays active role in defining the prices of goods.

Analysis of price and market arrivals over time is significant for formulating a complete agricultural price policy. Variations in market arrivals mostly contribute to the price variability of the produce. In order to device suitable ways and means for reducing price variations of agricultural commodities there is a need to have a thorough understanding of price behaviour over time and over space. Such an analysis is useful to farmers in order to decide the optimum time for disposing their produce to their best advantage.

Realizing the above mentioned facts, the present study entitled "Economic Analysis of Arrivals and Prices of Paddy in Gadchiroli district of Maharashtra" was conducted.

Limitation

The study is based on secondary data collected from two APMC namely Gadchiroli and Chamorshi in Gadchiroli district of Maharashtra. In order to minimize unfairness maximum efforts have been by the use of proper crosschecks. Further, the data collected for the study belong to specific geographical locality viz., two APMC's of Gadchiroli district of Maharashtra only. Hence, ample care should be taken while generalizing the results.

CHAPTER – II

REVIEW OF LITERATURE

CHAPTER–II

REVIEW OF LITERATURE

The obligation of the review of literature for the research worker is to evaluate what work (both theoretical and empirical) has so far been done in the field of current study, because it provides a basis to understand the problem and help in the proper analysis. In the interpretation this attempt has been made to review the work done in the field of "Economic Analysis of Market Arrivals and Prices of paddy in Gadchiroli district of Maharashtra." There are some of the important and suitable studies done so far as reviewed below**:**

1. Trends in arrivals of paddy
2. Trends in prices of paddy
3. Peak and slack period in arrivals and prices of paddy
4. Market integration of paddy markets of Gadchiroli districts

1.Trends in arrivals of paddy

Rajur *et al.* (2009) analyzed the trends in annual market arrivals and prices of chilli in Karnataka. An analysis of trend in arrivals and prices of chilli by orthogonal polynomial regression analysis presented that there was a marginal increasing trend in arrivals and prices over the years with mild ups and downs in the selected markets of Karnataka.

Singh *et al.* (2010) analyzed a study on behavior of arrivals and prices of green chilli in Amritsar and Patiala districts of Punjab. Trend analysis was used for analysis of collected data. The arrival and prices of major green chilli has increased over the period in most of the regulated markets, showing the scope for expansion of green chilli cultivation.

Andhalkar and Udmale (2011) conducted a study on arrival and prices of major pulses in selected APMC of Amravati district. This study was based on the secondary data on arrival and prices of selected major pulses in APMC, Amravati and Achalpur for the period of 15 years i.e. from 1994-95 up to 2008-09. Inter-year index number of pigeon pea and chickpea showed that the highest arrival as well as prices

variation occurred in Amravati APMC. In intra-year arrival index was found highest in case of pigeon pea and chickpea in the month of March and February to April.

Bhanumate (2011) examined a study on trend analysis of agricultural commodities in APMC Solapur. He studied on Solapur APMC for the year 1986-2006. He observed that the arrivals of the agriculture commodities have shown positive trends in principle market yard during the study period. It showed that the arrivals of rice recorded 7.22 per cent growth rate per annum, followed by wheat and sorghum with 4.23 and 3.34 per cent respectively. He observed that the arrivals of pigeon pea and green gram is seen decreasing during the study period. The rate of decrease in arrival of pigeon pea is relatively high when compared to the annual decrease in arrival of green gram. In the APMC Solapur, out of 13 agricultural commodities, five agricultural commodities proved positive performance during study period. But eight commodities are not proved positive performance.

Rahane and Bhosale (2011) examined the economic analysis of pulses in Dhule district. They observed decreasing trends in arrival and increasing trends in prices of pulses and the annual decline arrival in Tur, Mung, Udad and Gram was 10.86, 2.32, 6.19 and 3.10 per cent per annum, respectively.

Ramachandra and Pavitra (2012) conducted a study on analysis of sunflower arrivals and prices in Bellary market and Bagalkot market, of Karnataka, India. The secondary data was collected from APMC of respective market for 2008. They observed that in Bellary market arrivals was highest and it was found to increase every year by 3861.87qts.

Patel and Patel (2013) showed that the comparative analysis of performance of cumin and fennel marketing system in market at APMC, Unjha. The data on price and arrivals of cumin and fennel were collected from the APMC of Unjha. A trend and cyclic trend component were obtained for agricultural products cumin and fennel. A significant relationship between arrivals and prices was studies for both the agricultural products. Regression Analysis was done for forecasting future values of arrival and their relationship on prices in the agricultural commodities cumin and fennel at APMC.

Savitha and Kunnal (2016) studied the trend pattern of market arrivals and prices of paddy in Sindhanur and Sirguppa markets of Karnataka. The results showed that both the markets showed an increasing trend for both the arrival and prices during the entire study period and strong relationship existed between arrival and price in both the markets.

Thakare *et al.* (2017) evaluated the trend in arrivals and prices of commodities in APMC, Kolhapur and reported that the open auction method of sale was followed in the market and the analysis of trends in arrivals and prices revealed that arrivals of paddy was 1908.1 quintals in 2001- 02 that decreased up to 1118.7 quintals in 2005-06 and in the year 2011-12 arrivals increased upto 89869 quintals. In case of prices, variation is also same as pattern of arrivals *i.e.* in 2001-02 the prices was Rs. 443.95 and in 2005-06 it was Rs.631.25 and in 2011-12 it increased to Rs. 1216.67.

Navasare *et al*. (2018) showed that the study on "Growth Performance of arrivals and prices of Sorghum, Tur, Soybean, Chickpea and Bajra in Ahmednagar District, India". Four APMCs in Ahmednagar district were selected for the study and the result indicated that during the study period, all crops under study registered negative growth rates in arrival except Sorghum and Soybean crop and was statistically significant at 1 per cent and 5 per cent level of significance except Sorghum and Tur crop. Among all the crops,highest growth rates were noticed in soybean i.e. 161.82 per cent and lowest growth rate was noticed in Bajra i.e. -32.24 per cent per annum.

Shariff and Ramappa (2018) studied the trend in arrivals and prices of selected cereals in Mysore Region. The result showed that there were constant ups in the trend every year. During 2015-16, the percentage change in arrivals reached to 472.8 per cent which is 4.7 times more than that of the value that existed in the market in the year 2007-2008. The study remarked that after 2015-2016, the arrivals in the market would be comparatively low.

Gajbhiye *et al*. (2019) analysed the trend in arrivals of wheat in twelve regulated markets of Maharashtra that includes Amravati, Buldana, Nagpur, Aurangabad, Latur, Nanded, Osmanabad, Jalgaon, Ahmadnagar, Nashik, Sangli, and

Solapur market and reported that market arrivals was highest in Amravati market and it increased by 31587.79 qunitals per year at one per cent level of significance.

Sunandini *et al.* (2020) studied the objective of investigating the trends, pattern of growth and the extent of instability in area, production and productivity of rice crop in Andhra Pradesh state over a period of five and half decades from 1959-60 to 2013-14. During 1960s, 17 districts are under very low productivity group (<1500 kg/ha) and in 2010s 13 districts are under high productivity group (>3000 kg/ha). During the period 2014-19 in the divided Andhra Pradesh contribution of different productivity groups to the states paddy production was calculated and concluded that 3 districts under high productivity group (>6000kg/ha) contributed 52 per cent of the production.

Ritu *et al.* (2020) examined the trend in arrivals and prices of major food crops in Haryana. The results of linear trend estimation of arrivalsof rice and wheat showed that the value of 'b' was positive and significant which indicated that the arrivals had increased over the years in Haryana whereas in case of bajra and barley, negative 'b' value was obtained which indicated that arrivals has decreased over the years.

Satishkumar *et al*. (2020) evaluated the behaviour of market arrivals in Kalaburagi district of Karnataka. The results revealed that the market arrival was highest in the year 2013 with mean arrival of 36494.33 quintals and lowest in the year 2007 with mean arrival of 3668.17 quintals. The variation was highest in the year 2005 (175.32 per cent) and lowest in the year 2019 (30.99 per cent).

2. Trends in prices of paddy

Jayasree *et al.* (2011) studied the price behavior of pepper in Kochi markets. It revealed that pepper prices were subjected to high random variations. The random variations are minor fluctuations not attributable to specific events and were too small to merit individual consideration. These were due to random effects such as supply shocks on account of climate deviations, or market shocks on account of demand aberrations or high speculative factors.

Shendage (2011) examined the price behaviour major oilseeds in APMC Pune. The total arrivals of groundnut during year 2004-5 were 25,991quintals

which reached to 31,546 quintals 21.37 during the year recorded an increase of 2010-11.While the total arrivals of soybean, sunflower, and safflower percent during same period. The average price per quintal of oilseeds increased from 2004-05 to 2010-11, for groundnut it increased from Rs 1,304to 2,199, for soybean Rs 1360 and 1957. The annual compound growth rates of arrivals in the case of groundnut (7.99 percent), soybean (11.04 percent) were positive and highly significant at 1 percent level, indicating thereby, the prices of groundnut and soybean by 7.99 and 11.04 percent per annum respectively during the period under study.

Babu *et al.* (2012) analyzed trend in prices of small cardamom in India from 1995-2012. The period from January 1995 to November 2009 was marked by frequent ups and downs. However, the period from December 2009 was characterized by buoyant phase in cardamom prices.

Rao *et al*. (2014) evaluated the trend in market price of paddy in Guntur market and Andhra Pradesh market for twenty years from 1990-1991 to 2009-2010.The result showed that there was an annual increase of Rs. 44.52 per quintal in Andhra Pradesh market and Guntur market witnessed an increasing trend of Rs. 49.38 per quintal.

Naik *et al*. (2015) studied the trend in prices of chickpea in Western Maharashtra. The results showed that the linear and compound growth rates of prices of chickpea was positive and significant at 1 per cent level of probability and accounted to 11.88 and 7.71 per cent per annum respectively. The study concluded that the prices of chickpea at Barshi market increased rapidly over the time span of 11 years.

Vasudev (2015) evaluated the trend in price of rice in Andhra Pradesh. The results showed that price of rice witnessed a rising trend in price over the study period with monthly increase of Rs. 7.21 per quintal. Price trend showed that price of rice gradually increased from 1990 to 2002 and then showed a decline during 2000-2001 and started to rise steadily from 2004.

Dave and Tarpara (2016) examined the trend in yearly prices of major pulses in Gujarat state using linear model. The result indicated that a considerable amount of variation in the prices could be explained by the linear trend. The rate of

increase in price of pigeonpea in Karjan, Junagadh and Rajkot markets was 16.35, 19.75 and 13.75 per cent respectively. For chickpea, the annual rate of price increase was maximum i.e. 14.96 per cent in Dhandhuka market and lowest i.e. 12.06 per cent in Rajkot market. In case of green gram and black gram the rate of increase in price was highest at 18.93 per cent and 22.72 per cent in Gondal and Dahod markets, respectively. Thus in all four pulses, Dahod market for black gram observed the highest annual rate of increase while that of lower rate of increase was found in chickpea in Rajkot market. The study concluded that per year increase on an average during the study period was more than 12 per centfor all the four pulses.

Tripathi (2017) examined the causes of low growth in pulses production at the all-India level in terms of profitability of the farm business and the workings of the price policy. More precisely, it considers the effectiveness of price policy instruments in helping farmers gain sufficient income to promote investment, technology and productivity. The analysis shows that the agricultural price policy, which aims to provide a remunerative and stable price environment to farmers, has been largely irrelevant in the case of pulses. It also suggests a review of the criteria for fixing the minimum support price of pulses and making it sensitive to prevailing market prices.

Hile *et al*. (2017) studied the trend in prices of major agricultural commodities in APMC, Satara of Western Maharashtra. The price analyses revealed that price of jowar, wheat, soybean, Pigeon pea and chick pea increased over the entire period (2000-01 to 2011-12) while there was continuous fluctuation in the arrival of commodities. This study suggested that the jowar growers shall bring jowar for sell in the APMC, Satara during the month of November to January and the wheat growers shall bring wheat for the sell in the APMC, Satara during the month of March to May.

Virkar *et al.* (2017) studied the prevailing price fluctuation is one of the reasons for low returns to farmers which enhanced to study Analysis of price behaviour of wheatin selected APMCs in Nagpur district. The major objective of study was to examine interyear and intra-year variation in price behaviour of wheat in Nagpur district. Secondary data on arrival and prices of wheat for the period of 20 years i.e. from 1991-92 to 2010-11 were used. The data were collected from Umrer,

Kalmana, Saoner, Kalmeshwar and Katol APMCs of Nagpur district. The results indicated that in Nagpur district, over 20 years period, APMC Kalmana was found highest arrival of wheat i.e. 24611.33 qtls by comparing all APMC's of Nagpur district. In selected APMCs in Nagpur district, highest arrival was found in month of March, April and May i.e. post harvesting period and lowest was in October, November and January due to lean period. Inter-year, APMC Umrer was found highest arrival index number i.e. 1894.98 per cent in 2010-11 by comparing all APMCs in Nagpur district.

Verma *et al.* (2017) studied the trend in annual price of soyabean in selected markets of Southern Rajasthan. The results showed that yearly wholesale prices of soybean increased significantly in all the selected markets during the study period. The rate of compound growth ranged from 9.91 per cent to 10.08 per cent in the four selected markets. Annual wholesale prices of the crop observed significant exponential trend over time in all the selected markets.

Yadav *et al.* (2017) studied the trend in prices of gram in Rajasthan. The results revealed that trend values of prices in all the selected market were positive and significant at one per cent level of significance except for Kishangarh market where it was significant at 5 per cent level of significance. The coefficient of multiple determinations (R^2) indicated variation of 45 to 68 per cent in gram price was due to time factor.

Mittala *et al.* (2018) India is one of the largest producers as well as exporters of some major food commodities and is often criticized for its protectionist measures to curb transmission of price shocks from international markets. This paper examines if such policies are necessary to protect domestic consumers from price fluctuations and what are their implications on international prices. To understand this, in this paper we have examined the patterns, trends and volatility in domestic and international prices of rice and wheat and found that although both the international and domestic prices are volatile, the degree of volatility is higher in the international prices. The volatility in domestic prices is mainly due to internal productions hocks and is not influenced much by the international prices. This disconnect is attributed to domestic policy measures, such as market support to farmers and public stockholding of food grains for public distribution and price stabilization.

Verma *et al*. (2018) studied the trend in annual wholesale price of wheat in Western Uttar Pradesh. Four districts were selected for the study which includes Aligarh, Mathura, Meerut and Bulandshahr market. The results showed that the price of wheat increased significantly during the study period. The estimation of compound growth rates revealed that wholesale prices of wheat were significant in all the selected market and the value ranged from 5.50 per cent per annum in Meerut to 6.16 per cent annum in Aligarh market.

Dhende *et al*. (2020) studied the trend in price of wheat in Sangli APMC for a time period of 11 years from 2007-2008 to 2017-2018. The result revealed that CGR for prices was positive and highly significant at 1 per cent level of significance and increased rapidly by 5.13 per cent per annum during the study period.

3. Peak and slack period in arrivals and prices of paddy

Rao and Valvan (2005) conducted study on trends in arrivals and prices of Sorghum at regulated market of Maharashtra. For their study they selected Nagpur, Akola, Ahmednager, Pune, Solapur district respectively. They found that month wise market arrivals and prices of sorghum over period of 5 year (1998-99 to 2002-03). They worked out the seasonal indices in arrivals and prices of sorghum as well as pattern month wise arrivals throughout the year. They observed that arrivals are maximum in month of November (317.4) and December (215.9) at kharif sorghum market at Akola and Nagpur, also in Ahmednager maximum arrivals in the month of April (124.17) and May (120.9) and in Solapur which is dual market for sorghum grain recorded peakarrivals during of season month of November (134.65) and July (166.68) for the kharif and rabi varieties respectively.

Khunt *et al.* (2006) analyzed the seasonal indices of potatoes in Ahmedabad market of Gujarat from 1981-2000. The results showed that the highest seasonal indices of arrivals of potatoes were witnessed in the month of March while the lowest seasonal price indices of potatoes were observed in the month of March i.e. during the peak arrival period. The seasonal indices of prices which are related with the market arrival of potatoes were lower than the average from January to May and were higher than the average value from June to December.

Asmatoddin *et al.* (2009) conducted study on arrival and price behaviour of important oilseeds crops in Parbhani district. They observed area under oilseed crops was 25.59 lakh hectares and the production was 20.99 lakh metric tons. The price variations are common in agricultural commodity mainly because of seasonally in production and inter market arrivals. The study of arrivals and prices behaviour in APMC market Parbhani was carried out during the year 2004-05 to determine price index fluctuations for important oilseed crops. The monthly data collected of arrivals and prices for nine years (1996-97 to 2004-05) from the record of APMC, Parbhani. The result revealed that in soybean crop at the Parbhani market, more than 90% of the total arrivals occurred during October and December. The price index was highest in the month of July (115.46%), Sunflower, the arrival index was the highest in the month of May and June and the price index for May and June was comparatively higher than other month.

Vijayakumari (2009) in her study on economic analysis of maize price behaviour in Andhra Pradesh reported highest seasonal indices of maize prices during August month in both the markets mainly due to less arrivals of early sown crop. The analysis of variance indicated significant variation between months and non-significant variation between markets regarding pricing pattern in these two markets. The two markets are positively correlated regarding the movement of price signals. Between the two markets Nizamabad fetched marginally higher price over Karimnager, while among months, July followed by June and August are considered to be the best months for realizing good price for maize.

Gote *et al*. (2010) conducted study in Palanpur taluka in Banaskantha district of Gujarat state with the objective of knowing market arrivals and prices of groundnut. Purposive the requisite secondary data was collected from the record of the Agricultural Produce Market Committee (APMC) Palanpur market yard as secondary data for the period from 1995-96 to 2005-06. Generally, market arrivals and prices had showed no specific trend in movement. The correlation coefficient between monthly arrivals and prices was significant for the year 1996-1997. In Palanpur market, the level of market arrivals was low from February to May and higher from October to January. The total arrival of groundnut was highest in the year 2004 2005 for the Palanpur market.

Jadhav (2011) analyzed the secondary data on arrival and prices of soybean in APMC Achalpur, Amravati, Morshi and Daryapur for the period of 10 years i.e. 1900-00 upto 2008-09. Amongst all selected markets, arrival and price index was observed to increase in case of soybean compared to the base year. In all selected markets, monthly seasonal index of soybean was found to be the highest immediately after harvest. Whereas price index of soybean was found to be lower during peak arrival months and vice versa.

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 behavior and pattern of fluctuations in prices and arrivals of turmeric for the study in agriculture produce market committee's in Sangli district.

Kanungo (2015) conducted study on "Influence of Market Arrival on Price Formation of Turmeric in Kandhamal District of Odisha". The study revealed that turmeric starts entering into the market by March. The peak arrivals season is between March and April. A turmeric price was lower between January and June. This could be mainly attributed to supply pressure due to new crop arrivals. New crops arrivals of turmeric gradually increased 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.

Sharma *et al*. (2015) studied on seasonal price behaviour and market concentration of maize in Rajasthan. The paper investigated the price behaviour of maize and market concentration in Nimbahera market of Rajasthan. In view of this the present study was undertaken by collecting monthly wholesale prices of maize in major maize markets of Rajasthan for a period of 12 years (2002 to 2013). The seasonal price index provides a measure of the month to month variation in maize prices. Price of maize was found to be highest during off season and lowest during harvest season. Since maize is a Kharif crop, the arrivals were high during October to January. The higher seasonal indices of prices were observed during April to August during which the arrivals were found to be low.

Meera and Sharma (2016) the study was undertaken by collecting monthly wholesale prices of wheat in Sriganganagar district of Rajasthan .This study was based on the secondary data on arrival and prices of wheat in A.P.M.C., Sriganganagar, Sadulsahar, Gharsana, Anupgarh, Vijaynagar, Suratgarh, Gajsinghpur, Karanpur and Raisinghnagar for the period of 10 years i.e. from 2005 up to 2014. In the analysis all the selected markets showed positive trend in prices. The seasonal price index pro ides a measure of the month to month variation in wheat prices. Price of wheat was found to be highest during off season and lowest during harvest season. Since wheat is a rabi crop, the arrivals were high during March to May. The higher seasonal indices of prices were observed during December to February during which the arrivals were found to be low.

Gholap *et al.* (2016) studied on Economic analysis of arrival and price behaviour of rose and gerbera flowers in Gultekhadi market Pune. In India, floriculture is emerging as an important commercial crop. More specifically, they are being used as raw materials in the manufacture of essence, perfumes, medicines and confectioneries for direct consumption by the society. The data on arrivals and prices of flowercrop under study for the period of 10 years i.e. from 2005-14 was used. The data was collected from the records of Gultekhadi market Pune. The study indicated positive percentage change in prices of gerbera (+15.25%) and negative in prices of roses (-22.83). Maximum negative percentage change was observed in case of arrivals of gerbera. Co-efficient of variation of real prices was found to be lowest in gerbera.

Kumbhar and Amale (2016) studied the seasonal fluctuations in arrivals and prices of pigeonpea in Solapur market. The results showed that arrival reached its peak during the month of December to February and price was highest from July to December and reached its lowest in peak arrival period. The seasonal fluctuation showed that there was relationship between arrivals and prices of pigeonpea in Solapur market.

Singh *et al.* (2018) the present study is an attempt conducted to examine the market trends in arrivals and prices of pearl millet in Haryana. For that two main Markets were purposively selected in the vicinity of largest production areas of Pearl Millet. Last ten year records shows that Bhiwani is the largest Pearl Millet producing district followed by Mohindergarh district. Study findings that in Bhiwani

food grain market maximum arrival of Pearl Millet was observed in the peak period (September-December) followed by mid period (January-May) and minimum in lean period (June-August) and price are maximum in the lean period (June-August) followed by mid period (January-May) and minimum in peak period (September-December). The same trend was found in Mohindergarh district also. Seasonal indices analysis of arrivals and prices was showed that, major portion of pearl millet received in market during peak period and price were highest during the lean period.

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 Sangli market, the indices of arrivals was highest in the month of March i.e. 293.01 followed by April and May at 205.60 and 183.93, respectively and seasonal indices was lowest in October i.e. 22.13. In case of prices, the highest indices was 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 was more than the price of turmeric during the period of study in Sangli market.

Sahu (2018) analyzed the seasonal variation in arrival and price of paddy in Chattisgarh. The estimation of seasonal indices showed that the peak period for paddy arrival in the market was observed from the month of December to January while the slack period in arrival was observed from April to September.

4. Market integration of Paddy of Gadchiroli district

Kumawat and Kumar (2006) studied market integrated of rapeseed-mustard among nine selected markets of Rajashtan namely; Alwar, Bharatpur, Baran, Dholpur, Hanumannagar, Nagour, Shriganganagar, Sawaimadhopur and Tonk. Market integration was examined by computing price correlation between monthly wholesale prices. Price correlation was estimated at four points 1990-91, 1995-96, 2000-01 and 2003-04. The results revealed that almost all the selected markets were mutually integrated. However, the degree of integration varied from one market pair to another within and across the years. The degree of correlation was more than 0.90 in majority of the markets.

Thumar *et al.* (2006) examined the growth rates in area, production and productivity of garlic; variations in prices and volumes of its arrivals; degree of

market integration and acreage response to price and non price factors. Various analytical tools, viz. exponential function for compound growth rates, multiplicative time series model for price behaviour, correlation coefficients for market integration and Nerlovian lag models for acreage response have been used.

Yogisha and Vijaykumar (2006) conducted study on market integration for major agricultural commodities in Kolar district. The study was conducted during the year 2004-2005. To study time gap that exists between two markets with respect to prices, Koycks distributed lag model was employed due to suparity over correlation analysis. They observed that market integration concept explains the relationship between two markets that are spatially or temporally separated. The market integration for major agricultural commodities was studied by employing distributed lag model, which is superior over correlation analysis. Distributed lag results of potato prices revealed that the Chikkaballapur market took less than a day to transfer the price signals from Bangalore market, followed by Srinivaspur (3.48 days), Chintamani (13.03 days) and Kolar (16.18 days). In case of onion, Chikkaballapur took 1.38 days followed by Chintamani (4.38 days), Kolar (7.45 days) and Srinivaspur (7.93 days) to reflect the Bangalore onion prices. Kolar took 8.34 days to reflect Bangalore ragi prices and more number of days was observed in Srinivaspur market. In case of groundnut prices, Kolar took less than 6 days and it was highest (16.01 days) in Srinivaspur market.

Kerur and Naik (2009) conducted study on market integration for selected commodities in selected markets of Karnataka. They reviewed the market information and dissemination system is one of the economic policies. They reported that market information network of APMC in state Karnataka through its website "Krishi Maratha Vahini the online." They selected markets of Karnataka for each selected commodity two markets are selected for jawar, Gulbarga and Raichur, groundnut Bagalkot and Raichur and cotton Ranebennur and Raichur. Data was collected from APMC of given selected markets. They study market integration by analytical techniques used are correlation coefficient, Ravalion model and Koyck distributed lag model, in results of the revelation market integration on model before improvement of market information system found that was no relationship in pricing of selected commodities between main market and local market due to both markets are main markets for those commodities.

Meena *et al.* (2011) conducted study on price behaviour and market integration of rapeseed-mustard in Alwar and Sri Ganganagar districts of Rajasthan to study the price behaviour of rapeseed, mustard and to analyse the nature of integration between major markets. Based on quantity of market arrivals four wholesale markets of Alwar and Sri Ganganagar districts were selected. The time series data on the arrivals and prices of rapeseed and mustard for the period of 1991-92 to 2007-08 were obtained from sources like, District Statistical Offices of Alwar and S Ganganagar districts and Directorate of Agriculture, Jaipur Simple linear trend analysis was used to study the trends in arrivals and prices of rapeseed-mustard TSC technique was used to analyse the seasonal pattern in arrivals and prices of rapeseed-mustard. The highest correlation coefficient was found to be 0.997 between Sri Gangga and Raisinghnagar followed by 0.964 between Alwar and Khairthal as well as 0.964 between Alwar and Raisinghnagar, 0.963 between Alwar and Sri Ganganagar and 0.949 between Khairthal and Sri Ganganagar. The least correlation coefficient was found to be 0.946 between Khairthal and Raisinghnagar. The highest integration of 1997 between Sri Ganganagar and Raisinghnagar market may be because of good communication and transportation facilities available and short distance in-between the markets.

Reddy *et al.* (2011) conducted study on integration of wholesale prices of groundnut complex. He studied that the co integration of wholesale prices of groundnut pod, oil and cake (groundnut Complex) in major markets of India. The study period was from May 1996 to January 2003. Month end wholesale price data have been for the study. There are four terminal markets namely Mumbai, Delhi, Chennai, and Calcutta. The major producing centers are Rajkot and Nandhal. They analyzed vertical co integration among pod oil and cake markets in the short and long run for testing of co-integration along supply chain. Only in few markets, prices of groundnut pods and groundnut oil are vertically integrated in long run, while in most markets wholesale prices of cake are not integrated either with groundnut pod or oil wholesale prices in long run. That too, the vertical integration is strong between wholesale prices of major producing centre and prices in major consuming centers Further low margins of processing sector confirms of vertical integration of groundnut pod and oil cake wholesale prices at least in groundnut producing center.

Manohar *et al.* (2012) conducted study on market integration and price behaviour in maize markets they collected monthly wholesale price data from

January, 2005 to 2009 of maize were used for study. They examine the degree of special integration in the regional maize markets of Rajasthan. The result that the correlation coefficient in monthly wholesale prices of maize between all the selected market pairs was positive and significantly different from zero. The value of correlation coefficients among prices of maize in most of market pairs ranged between 0.76 and 0.91 proving thereby that the selected markets were highly integrated. The maize prices in some markets moved independently of corresponding market which might be due to non-movement of produce from one market area to the other. In order to achieve the goal of integration, government should strengthen the market intelligence and communication within markets and also for better integration among the markets. Infrastructural facilities should be improved.

Naik and Somashekhar (2012) studied integration of sunflower markets in South Karnataka Market integration for sunflower was studied by employing zero order correlation analysis. The result of the analysis revealed that a very high degree of association was found between Chitradurga and Challkere markets (0.95) and a low degree of association of prices (0.87) was found between Davanagere and Mysore markets. Similar degree of association was found between Challkere and Mysore: (0.934) markets and also Challkere and Davanagere (0.89) Le prices in Challkere market influences the price of both Davanagere and Mysore markets, where as price in Davanagere market influences the price in Mysore and Gouribidhanur markets by 0.887 and 0.888 degree. Thus the competitive conditions prevailing in one market might have influenced the prices in other market in the same direction.

Reddy (2012) conducted study on price trend and integration of wholesale markets for onion in metro cities of India. Study reveals that there was high variability in the arrival of onion in the month of March and April in selected markets. Among the markets, the coefficient of variation in both arrivals and prices were found to be higher in Ahmedabad and Kolkata. The zero order correlation matrixes between two markets average wholesale prices of onion indicated the high integration among the selected markets except Ahmedabad with Mumbai market. This might be due to the movement of produce from one market area to another depending upon price prevailed in the markets. The competitive conditions prevailing in the selected markets might have influenced the movement of prices in the same direction. The

magnitude of regression coefficient revealed that an increase in market arrivals by a MT in a month led to an increase in prices by Rs.6.00/MT and Rs. 0.40/MT in Bangalore and Delhi markets respectively. On the contrary, prices of onion decreased in Ahmedabad (Rs 6.00). Mumbai (Rs. 2.00) and Kolkata (Rs. 2.00) markets with increase in arrivals by one MT in a month.

Sekhar (2012) analyzed 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 inter-regional movement restrictions, like gram and edible oils, appears well integrated. On the contrary, rice market, subject to the maximum inter-state movement restrictions, does not show integration at the national level. The broad implication of the study was that the markets can play a more effective role if supplemented with more open policy initiatives.

Sekhon *et al.* (2013) conducted study on market margins and spatial integration among different cabbage markets. It is concluded from the analysis that there exists high degree of co-integration between different markets. Though along run equilibrium relationship existed between all the studied markets in terms of weekly prices, the coefficient of price transmission elasticity varies from 0.62 to 1.29 which is significant. There also existed short run disequilibrium between some of market pairs with almost 14 percent to 65 percent of fluctuations usually getting corrected within a week. Greater integration in these markets may help farmers as well as consumer of the vegetables through better price signals resulted in to higher producers and consumer satisfaction, which reflect higher market efficiency and conduct.

Jalikatti *et al.* (2013) conducted study on price integration of onion in major markets of Northern Karnataka. The study was conducted during the year 2011-12 and was based on the secondary data. The markets for the study were selected based on the maximum quantity of arrivals of onion to the markets and the major markets of onion in Northern Karnataka are Hubli, Belgaum, Bijapur and Raichur. The price data pertaining to the study was collected from the respective APMC for a period of 15 years (1996-97 to 2010-11). Zero order correlation matrixes were employed to assess the extent of integration between the markets and respective price.

The study reveals that Hubli market would influence the prices in Belgaum market to a greater extent. This is mainly because Hubli is a major market for onion.

Ani, Dorothy Patience (2015) studied on Market Integration and Pricing Efficiency of Soybeans in Benue and Enugu States, Nigeria. The study analyzed market integration and pricing efficiency of soybeans in Benue and Enugu States, NigeriaA two-stage sampling technique was used to select 207 respondents. Secondary data comprising monthly retail prices (urban and rural) of soybeans from 1999 to 2013 was also collected BNARDA and ENADEP Descriptive statistics, regression, Herfindal Hirschman Index. Gini coefficients and Johansen Co-integration. Spatial price model, 1 test and correlation analysis were the analytical techniques used. It was found that soybeans marketing was dominated by married (80%), literate (91.3 %) males (63.3%), with a mean annual income of N474,370 The factors that determine the volume xviii of soybeans marketed include price of soybeans (-1.515), transfer and handling costs (0.345), education (0.157) and quantity of loan (0035). Although, soybeans market was characterized by many buyers and sellers with no barriers to entry and exit, the high value of HHI got for wholesalers and retailers (2.017.18 and 1.081.97) indicated high concentration of soybeans in the hands of few marketers. This was further supported by high inequalities in the distribution of sales among wholesalers and retailers respectively as evident in the values (0.84 and 0.81) of gini coefficients. Whereas few marketers (6.8%) had negative marketing margins, their mean was 20 40% Average net margin for Benue and Enugu soybeans marketers were calculated as N405.79 and N786.26, respectively which represented about 6.24% and 10% of the cost price.

BoChen *et al.* (2016) studied on Market Integration and Price Transmission in the World Rice Export Markets. This paper investigates market integration and asymmetric price transmission in the world rice export markets. Using monthly rice price from Thailand, Vietnam and United states, we employ the Johansen test and estimate the threshold vector error correction model (TVECM). Our main findings are that exports prices in the three countries are co-integrated, with Thailand and the United States the price leaders, and that the Vietnamese price adjusts faster to long-run equilibrium when it is above its equilibrium level with Thailand U.S prices, these result suggest marketing ration and competition rather than collusion are prevalent in world rice markets. Policy implications are also briefly discussed.

Ichaou Mounirou (2016) studied on Spatial Integrations and Maize's Prices Transmissions on Markets of Collines District in Benin: Debates Stakes and Perspectives. This paper supplies an analysis of chronological series application to examine the spatial integration of markets and maize's prices transmission. The results of cointegration tests indicate the existence of segmentation of six markets of maize. No long-term balance link appears between the six markets. Causality tests results reveal that the market of Glazoue plays the function of reference market in the network of the six studied markets of maize, because the values of previous prices are important for predicting the price of maize on all markets dependent of prices level in Glazoue. It is plausible that price suppon policies lead to positive changes which affect significantly the agricultural income. It is suitable to encourage the agricultural cooperatives: enhance training and information of traders and producers by local markets institutions is very necessary and essential to increase the sold maize's added value.

Devi *et al.* (2019) they analyzed price and arrivals pattern and market integration of major pulse crops i.e. gram and tur in Gujarat state. The secondary data on monthly wholesale prices and arrivals were collected from the website of agmarknet.gov.in of selected regulated markets for last ten years (2007 to 2016). The study has indicated that the inter-year price analysis shows upward trend of annual price indices and there was a significant increase in the price of gram and tur in all the selected markets with positive and statistically significant compound growth rate during the study period.

CHAPTER – III

METHODOLOGY

CHAPTER- III

METHODOLOGY

An effort has been made in this chapter to define the methods, sources of data collection and the different statistical tools used for testing the objectives of current study. An empirical study on the market arrivals and prices of Paddy will be helpful to the farmers, consumers, traders and policy makers to take more knowledgeable marketing decisions.

This chapter describes the methodological framework used in the study. More specifically, this chapter contracts with the methods of data collection and the analytical tools used.

3.1 SALIENT FEATURES OF GADCHIROLI DISTRICT

3.1.1 Location and Geographical data

Gadchiroli district lies between 19^0 to 21^0 North latitude and 80^0 to 81^0 East longitudes. It has common border on north with Bhandara, Gondia and Chandrapur district on the west, Rajnandgaon and Bastar district of Chattisgarh to the east and Karimnagar, Bhopalpalli and Adilabad district of Telangana to the south.

Gadchiroli is situated at 667 meters above the mean sea level. River Godavari, Pranhita Wainganga, Gadhavi, Khobragadi, Sati, Kathani and Pohar are the major river of Gadchiroli. The total area of Gadchiroli district is 14,412 sq. kms. which is about 4.68 % of the total area of Maharashtra state.

3.1.2 Soil

The soils of Gadchiroli district are of various types. Each type covering a well-defined tract which displays cropping pattern of totally different level. The soils occurring in Wardha and Wainganga valley are generally most fertile. The predominant soils cover in the district is clay, clay gravel, sandy loam, deep black soil, reddish and yellowish brown soils on hill slopes, brown and gray soils of plains and laterite and lateritic soil. The soil condition is favourable for the cultivation of cereals like rice, wheat and maize.

3.1.3 Climate

The climate of the district is characterized by hot summer, a well distributed rainfall during the southwest monsoon and general dryness accept during rainy season. The minimum temperature of the district is ranges between 12 ^{0}C to 14.6 ^{0}C and maximum temperature ranges between 40 ^{0}C to 42.1 ^{0}C. The normal annual rainfall over the district varies from about 1300 mm to 1700 mm. The average relative humidity remains around is 59 percent.

3.1.4 Selection of area

In Gadchiroli district, the main agricultural crop is paddy and has maximum area under cultivation of paddy.

3.1.5 Selection of market

Gadchiroli district was selected for the present study. In Gadchiroli district, there are total 5 Agricultural Produce Market Committee's (APMC). And data were collected from two APMC's that is APMC Gadchiroli and APMC Chamorshi.

3.1.6Selection of commodity

Economic analysis of market arrivals and prices of paddy in Gadchiroli district of Maharashtra was taken for the present study. Paddy was selected, as it is one of the major crops grown in Gadchiroli district. Paddy as the basic constituent, the demand for the paddy has increased not in the metropolitan areas but in the countryside areas also.

Although great production growth and trade opportunities, the country grieves from very high volatility in Paddy production. The instability being a matter of concern in national as well as international markets. It is important to understand the nature of instability in paddy prices.

3.2 Collection of data

The present study was based on secondary source of data. The data for arrivals and prices will be compiled from two Agricultural Produce Market Committee's (APMC).

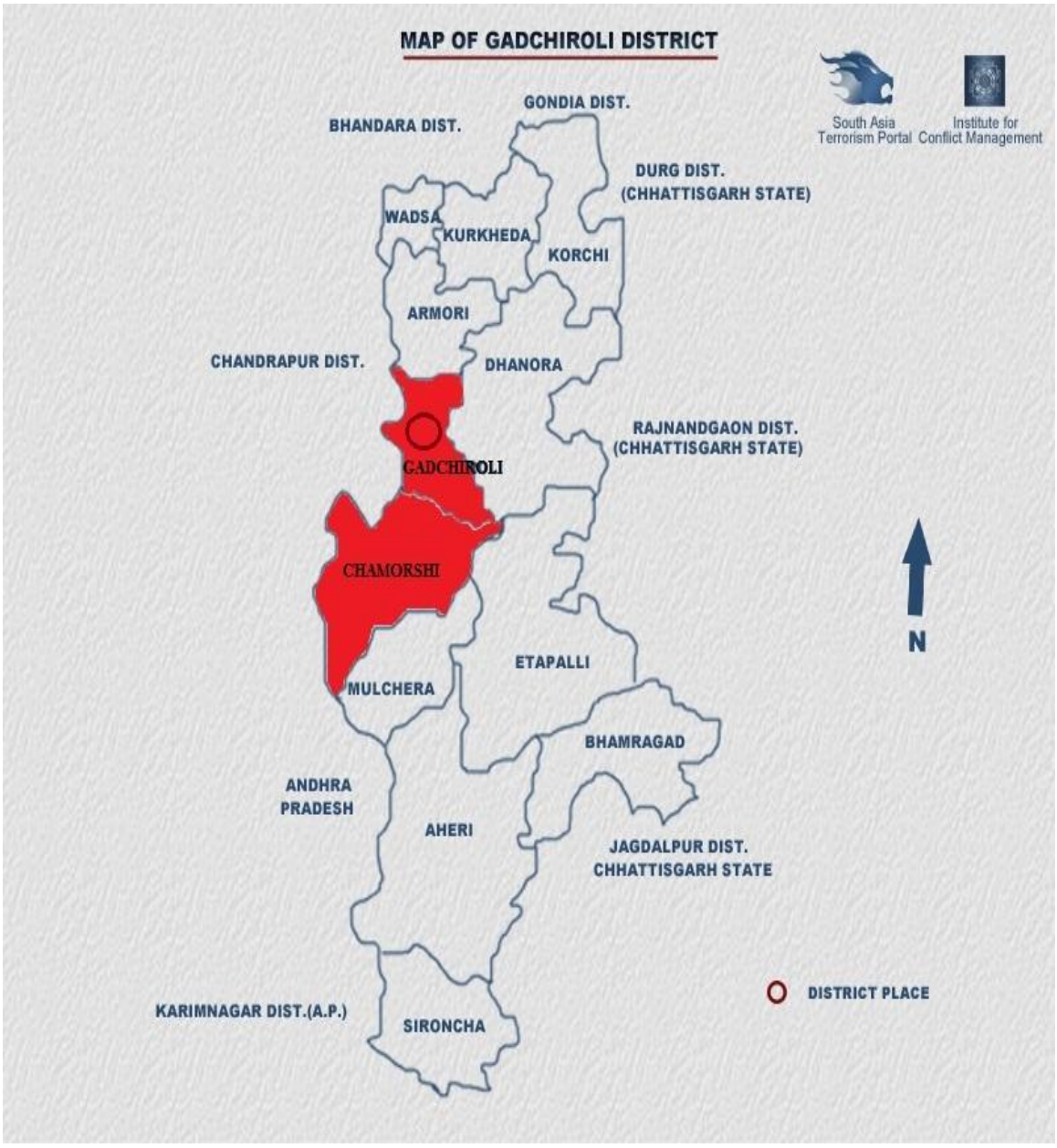

Fig. 3.1: Map of selected markets of Gadchiroli district

3.3 Period of study

Data were collected from 2005-2006 to 2019-2020 which include 15 years of data regarding market arrivals and prices.

3.4 Analysis of data

Data will be analyzed by using simple tabular analytical tools such as mean, frequencies, ratios, percentages etc. Apart from this, functional analysis will also be used for computation such as market arrivals and prices, seasonal indices and bivariate correlation coefficient.

3.4.1 Functional analysis

Functional analysis such as trend in market arrivals and prices, seasonal indices, Standard deviation, coefficient of variation, growth rate and bivariate correlation coefficient was worked out to derive precise conclusion from the study. The procedure involved in the analysis is explained in the following sections.

3.4.1.1 Trends in market arrival and prices

The following form of equation was used to estimate and examine the trends in market arrivals and prices.

$$\mathbf{Y = ab^t}$$

Where,

Y = Monthly arrivals/prices

a = Constant

b = Trend coefficient

t = Time period

Annual compound growth rate (CGR) in percentage was calculated as,

$$\mathbf{CGR\ (\%) = (Antilog\ of\ b - 1) \times 100}$$

3.4.1.2 Peak and slack period in arrivals and prices

To examine the peak and slack period, monthly seasonal indices was worked out by using simple average method.

$$\textbf{Seasonal Indices} = \frac{Xi}{\bar{x}} \times 100$$

Where,

Xi = monthly average for 15 years

x□= mean of 12 month, average

3.4.1.3 Standard deviation

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

$$\textbf{SD} = \sqrt{\frac{\Sigma_{I=1}^{n} (X_i - \bar{X}_i)^2}{n}}$$

Where,

Xi = arrivals/ prices

X□ = Mean of arrivals/ prices

N = number of years/ months

3.4.1.4 Coefficient of Variation

Coefficient of variation is the "Percentage variation in the mean as the standard deviation being stated as the total variation in the mean". The coefficient of variation of each market was worked out by comparing the variability present in market arrivals and prices.

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

Where,

SD = Standard deviation

Mean = Arithmetic mean

C.V. = Coefficient of Variation

3.4.1.5Market Integration

Market integration was worked out by estimating bivariate correlation coefficient (r) between price changes in the selected market. [Acharya and Agarwal (1994)]

$$R = \frac{\Sigma (P_{11}-P_1)(P_{21}-P_2)}{\sqrt{(\Sigma(P_{11}-P_1)^2(P_{21}-P_2)^2)}}$$

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

CHAPTER – IV

RESULTS AND DISCUSSION

CHAPTER - IV

RESULT AND DISCUSSION

This chapter is devoted to express the results obtained from the present study. The whole chapter deals with the analysis of basic data collected from the two APMC's i. e. APMC Chamorshi and APMC Gadchiroli for Fifteen years (2005-06 to 2019-20). The data has been processed and tabulated in the light of the objectives of the study. The chapter also focuses on the results of the study found after analysis. The study was intended to study the arrivals of paddy and their respective prices trend in selected market as well as the seasonal indices of the arrivals and prices. Finally, considering attention on cited objectives analysis has been done as mentioned below:

4.1 Trends in arrival and price of paddy

4.2 Seasonal indices of arrivals and prices of Paddy

4.3 Market integration in Chamorshi and Gadchiroli market

4.1 Trends in arrival and price of Paddy

The monthly arrivals and prices data of paddy for 15 years (2005-06 to 2019-20) was collected from APMC Chamorshi and APMC Gadchiroli and was further analysed for the present study. The compound growth rates (CGR) of arrivals and prices of paddy per annum from 2006-2020 were estimated by fitting exponential type of equation and the results have been presented in Table 4.1.

Table 4.1: Marketwise Compound Growth Rate of arrivals of Paddy

Particulars	Chamorshi	Gadchiroli
a	8.69	7.69
b	-0.022	-0.047
R^2	0.036	0.163
t- value	-0.61	-1.39
CGR	-2.18	-4.59

It is observed from table 4.1 that with respect to arrivals, both Chamorshi and Gadchiroli APMCs witnessed negative growth during the study period. Among both the markets, Chamorshi APMC showed negative compound growth rate of -2.18 per cent whereas Gadchiroli market showed a negative compound growth rate of -4.59 per cent. Both were found to be statistically significant.

Table 4.2: Marketwise Compound Growth Rate of prices of Paddy

Particulars	Chamorshi	Gadchiroli
a	7.45	7.33
b	0.009	0.011
R^2	0.16	0.55
t- value	1.38	3.49
CGR	0.90	1.11***

(*** denotes significance at 1 per cent level of significance)

The results in Table 4.2 shows that price in Gadchiroli APMC witnessed comparatively higher compound growth rate of 1.11 per cent per annum over the period of time which was statistically significant at one per cent level of significance. In Chamorshi APMC, positive compound growth rate of 0.90 per cent per annum was witnessed.

4.2 Seasonal Indices of Arrivals and Prices of Paddy

To examine the peak and slack period of paddy in the selected APMCs, monthly seasonal indices was worked out by using simple average method for the period 2005-2006 to 2019-2020 and the results obtained are presented in given sub headings.

4.2.1 Seasonal indices of arrivals of Paddy

It is revealed from table 4.3 that monthly seasonal indices of arrivals of Paddy were highest in the month of January and December. In Chamorshi APMC, monthly seasonal indices were found to be highest in the month of January (172.27 per cent) followed by the month of December (165.10 per cent) while monthly seasonal indices of arrivals were observed to be lowest in the month of August (45.95 per cent) followed by the month of July (60.03 per cent).

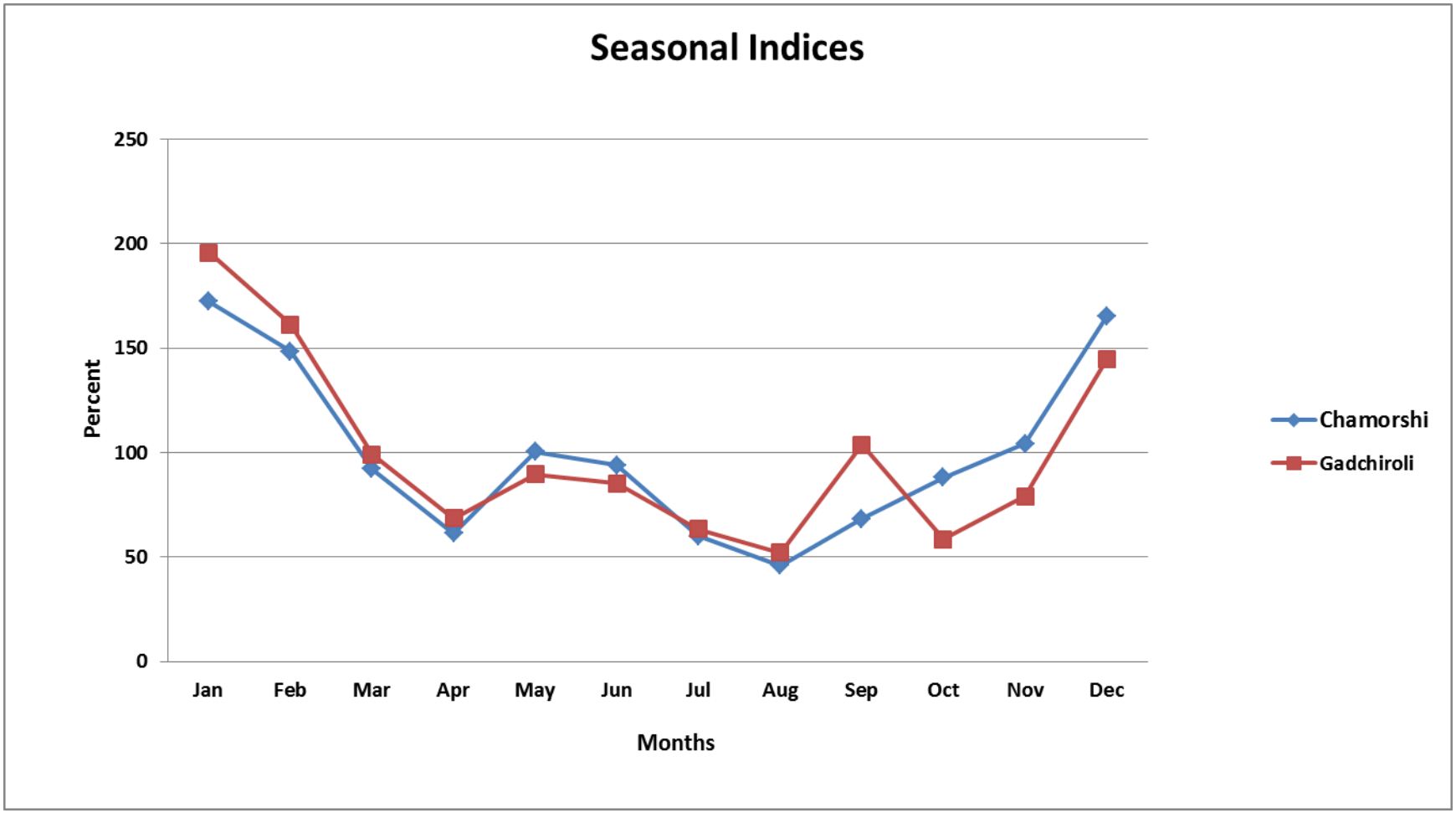

Fig. 4.1 Graphical representation of Seasonal indices of arrivals of Paddy in Chamorshi and Gadchiroli market

In Gadchiroli APMC, the seasonal monthly indices of arrivals of Paddy were recorded to be highest in the month of January (195.54 per cent) followed by the month of February (161.33 per cent) whereas the monthly seasonal indices were observed to be lowest in the month of August (51.99 per cent) followed by the month of October (58.51 per cent).

Table 4.3: Marketwise monthly seasonal indices of arrivals of Paddy

Month	Chamorshi	Gadchiroli
January	172.27	195.54
February	148.31	161.33
March	92.22	99.02
April	61.26	68.59
May	100.45	89.49
June	93.96	85.17
July	60.03	63.26
August	45.95	51.99
September	68.28	103.67
October	88.00	58.51
November	104.18	78.96
December	165.10	144.48

4.2.2 Seasonal indices of prices of Paddy

The seasonal indices of prices of paddy were computed month-wise and the results obtained are presented in table 4.4. In Chamorshi APMC, the monthly indices of prices were highest in the month of July (111.62 per cent) followed by August (109.16 per cent) and were found to be lowest in the month of March (84.30 per cent) followed by April (90.03 per cent).

Similarly, In Gadchiroli APMC, the monthly seasonal indices of prices of paddy were found to be highest in the month of September (108.59 per cent) followed by the month of October (106.51 per cent) whereas the monthly seasonal indices of prices were lowest in the month of March (88.86 per cent) followed by January (93.74 per cent).

Table 4.4: Marketwise monthly seasonal indices of prices of Paddy

Market/Month	Chamorshi	Gadchiroli
January	99.70	93.74
February	96.45	95.42
March	84.30	88.86
April	90.03	97.92
May	93.90	101.33
June	108.19	101.86
July	111.62	100.00
August	109.16	102.66
September	105.32	108.59
October	105.11	106.51
November	101.60	102.14
December	94.61	100.97

4.2.3 Mean, Standard Deviation and Coefficient of Variation

To examine the trend and pattern of arrivals and prices of paddy in Chamorshi and Gadchiroli APMCs, month-wise Mean, Standard Deviation and Coefficient of Variation (CV) were worked out and the results are presented under the following sub-heads.

4.2.3 (a) Marketwise monthly Mean, Standard Deviation and Coefficient of Variation of arrivals of Paddy

The mean, Standard Deviation and Coefficient of Variation of monthly arrivals of Paddy in Chamorshi APMC and Gadchiroli APMC during the study period were worked out and the results are presented in table 4.5.

The result shows that during the period of study, Chamorshi APMC witnessed highest mean arrivals in the month of January (9568.27 quintals) while lowest arrivals were recorded in the month of August (2552.02 quintals). Standard Deviation was found to be highest in the month of January (5854.10) whereas it was lowest in the month of August (1766.42). Chamorshi market observed maximum variation in the month of June with the coefficient of variation at 82.53 per cent while

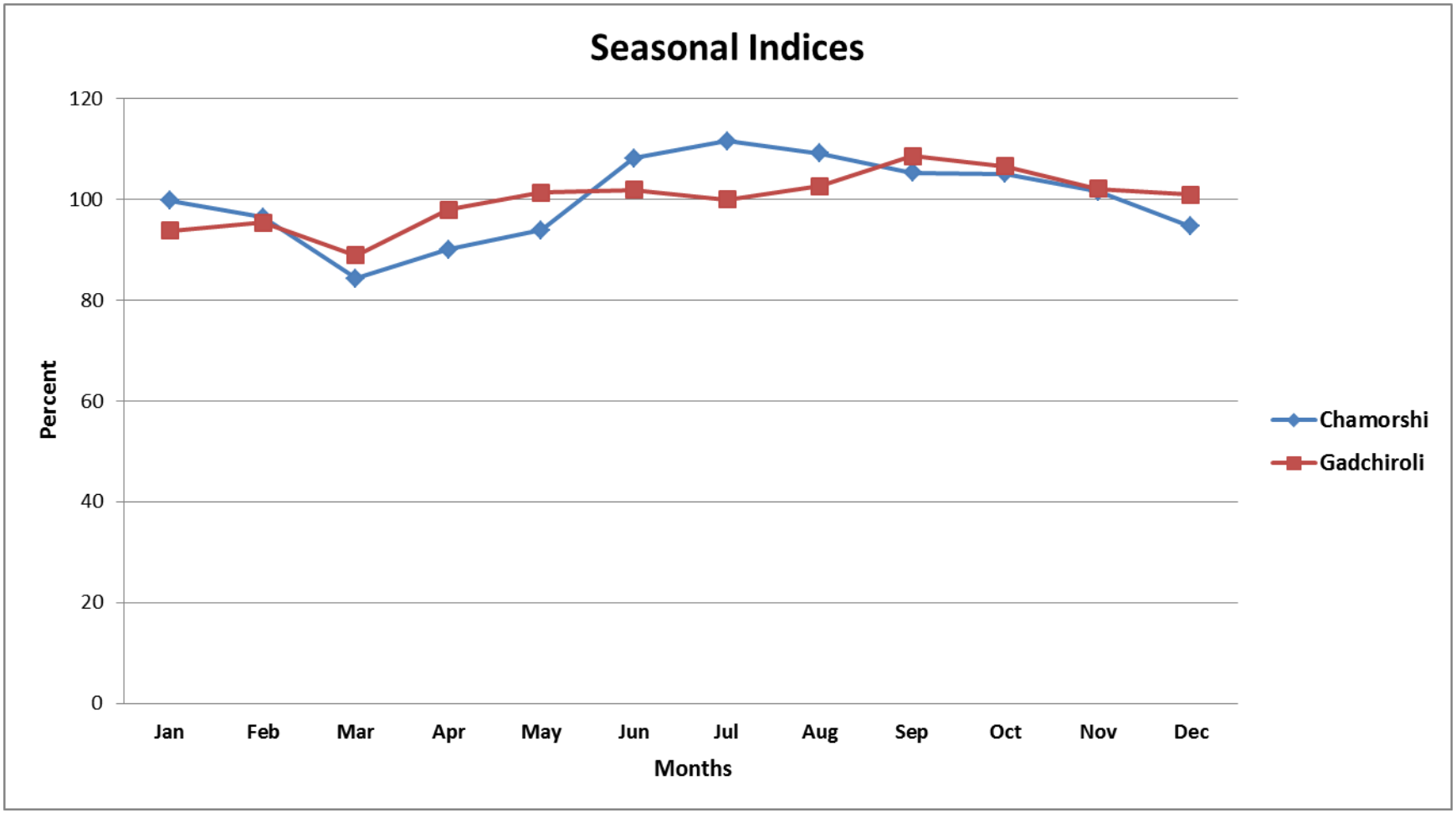

Fig. 4.2 Graphical representation of Seasonal indices of prices of Paddy in Chamorshi and Gadchiroli market

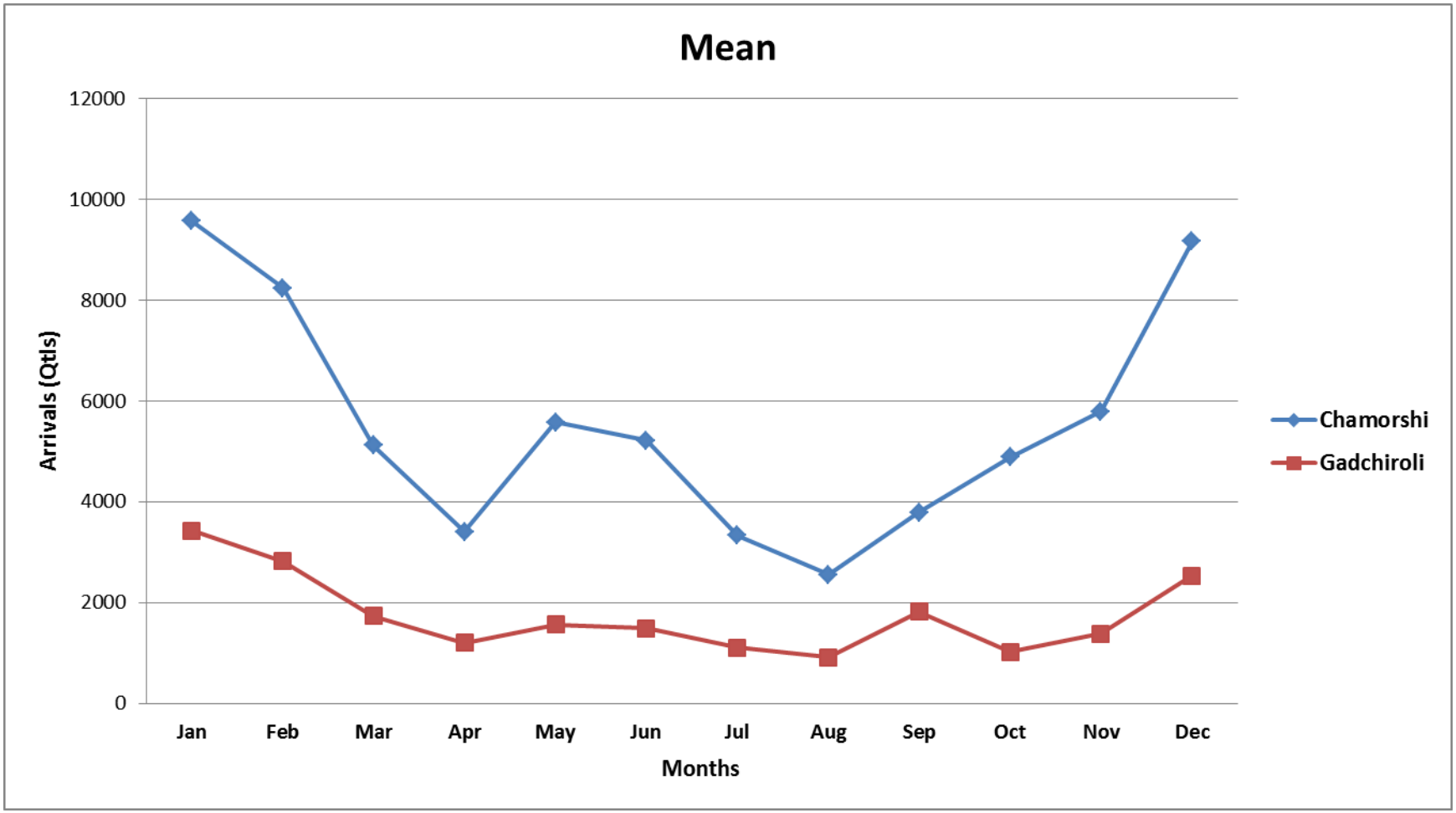

Fig. 4.3 Graphical representation of Mean of arrivals of Paddy in Chamorshi and Gadchiroli market

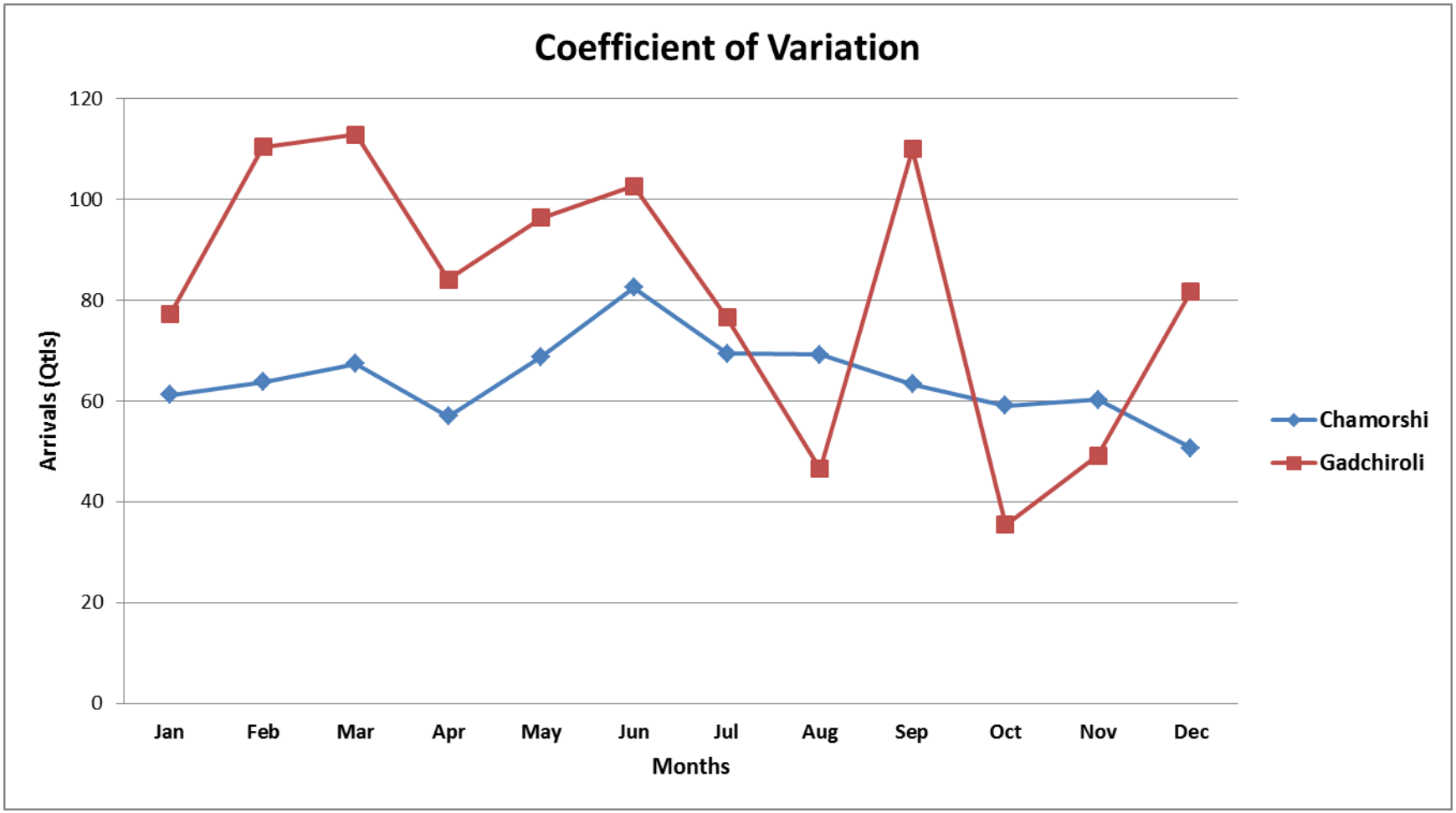

Fig. 4.4 Graphical representation of Coefficient of variation of arrivals of Paddy in Chamorshi and Gadchiroli market

lowest variation was observed in the month of December with coefficient of variation at 50.68 per cent.

Table 4.5: Marketwise monthly Mean, SD and CV of Arrivals of Paddy

Market/ Month	Chamorshi			Gadchiroli		
	Mean (qtl)	SD	CV (%)	Mean (qtl)	SD	CV (%)
January	9568.27	5854.10	61.18	3420.13	2642.23	77.26
February	8237.60	5255.1	63.80	2821.80	3113.90	110.35
March	5122.33	3448.88	67.33	1732	1954.39	112.84
April	3402.43	1938.66	56.98	1199.67	1009.12	84.12
May	5579.24	3837.32	68.788	1565.20	1508.21	96.36
June	5218.74	4306.96	82.53	1489.80	1528.93	102.63
July	3334.31	2314.66	69.42	1106.43	846.93	76.55
August	2552.02	1766.42	69.22	909.33	423.13	46.53
September	3792.33	2400.32	63.29	1813.33	1993.81	109.95
October	4887.48	2889.52	59.12	1023.40	362.70	35.44
November	5786.47	3488.75	60.29	1381.10	678.41	49.12
December	9169.91	4647.54	50.68	2527.10	2066.94	81.79

In Gadchiroli APMC, the mean arrivals were found to be highest in the month of January with mean arrivals of 3420.13 quintals while lowest arrivals were observed in the month of October with 1023.40 quintals. The standard deviation was found to be highest in the month of February (3113.90) whereas lowest in the month of October (362.70). Coefficient of variation of Paddy arrivals were highest in the month of March (112.84 per cent) whereas lowest was in the month of October (35.44 per cent).

4.2.3 (b) Marketwise monthly Mean, Standard Deviation and Coefficient of Variation of prices of Paddy

Prices of paddy in terms of per quintal in Chamorshi market and Gadchiroli market were compiled and mean, standard deviation and coefficient of variation were estimated and the results are presented in Table 4.6.

Table 4.6: Marketwise monthly Mean, SD and CV of Prices of Paddy

Market/ Month	Chamorshi			Gadchiroli		
	Mean (Rs/qtl)	SD	CV (%)	Mean (Rs/qtl)	SD	CV (%)
January	1827.43	716.04	39.18	1543.58	559.40	36.24
February	1767.77	622.41	35.21	1571.20	545.16	34.70
March	1545.15	536.95	34.75	1463.08	586.44	40.08
April	1650.16	512.38	31.05	1612.28	541.67	33.60
May	1721.06	558.72	32.46	1668.41	579.44	34.73
June	1982.91	525.20	26.4	1677.13	559.24	33.35
July	2045.95	552.71	27.01	1646.59	499.79	30.35
August	2000.82	511.64	25.57	1690.40	508.58	30.09
September	1930.42	505.56	26.19	1788.05	558.17	31.22
October	1926.54	548.13	28.45	1753.84	566.54	32.30
November	1862.29	553.25	29.79	1681.78	535.27	31.83
December	1734.08	746.11	43.04	1662.58	559.56	33.66

Chamorshi APMC recorded highest mean price in the month of July (Rs.2045.95/quintal) whereas lowest mean price in the month of March (Rs.1545.15/quintal). The standard deviation indicated that the highest standard deviation was recorded in the month of December (746.11) and the lowest standard deviation in the month of September (505.56).The highest variation was witnessed in the month of December (43.04 per cent) whereas lowest variation in the month of August (25.57per cent).

Gadchiroli APMC recorded highest and lowest mean price in the month of September (Rs. 1788.05/quintal) and March (Rs.1463.08/quintal), respectively. Standard deviation was found to be highest and lowest in the month of March (586.44) and July (499.79), respectively. The Coefficient of Variation was found to be maximum in the month of March (40.08 per cent) and minimum in the month of August (30.09 per cent). Hence, the hypothesis i.e. there is variation in prices and arrivals of Paddy over time is accepted.

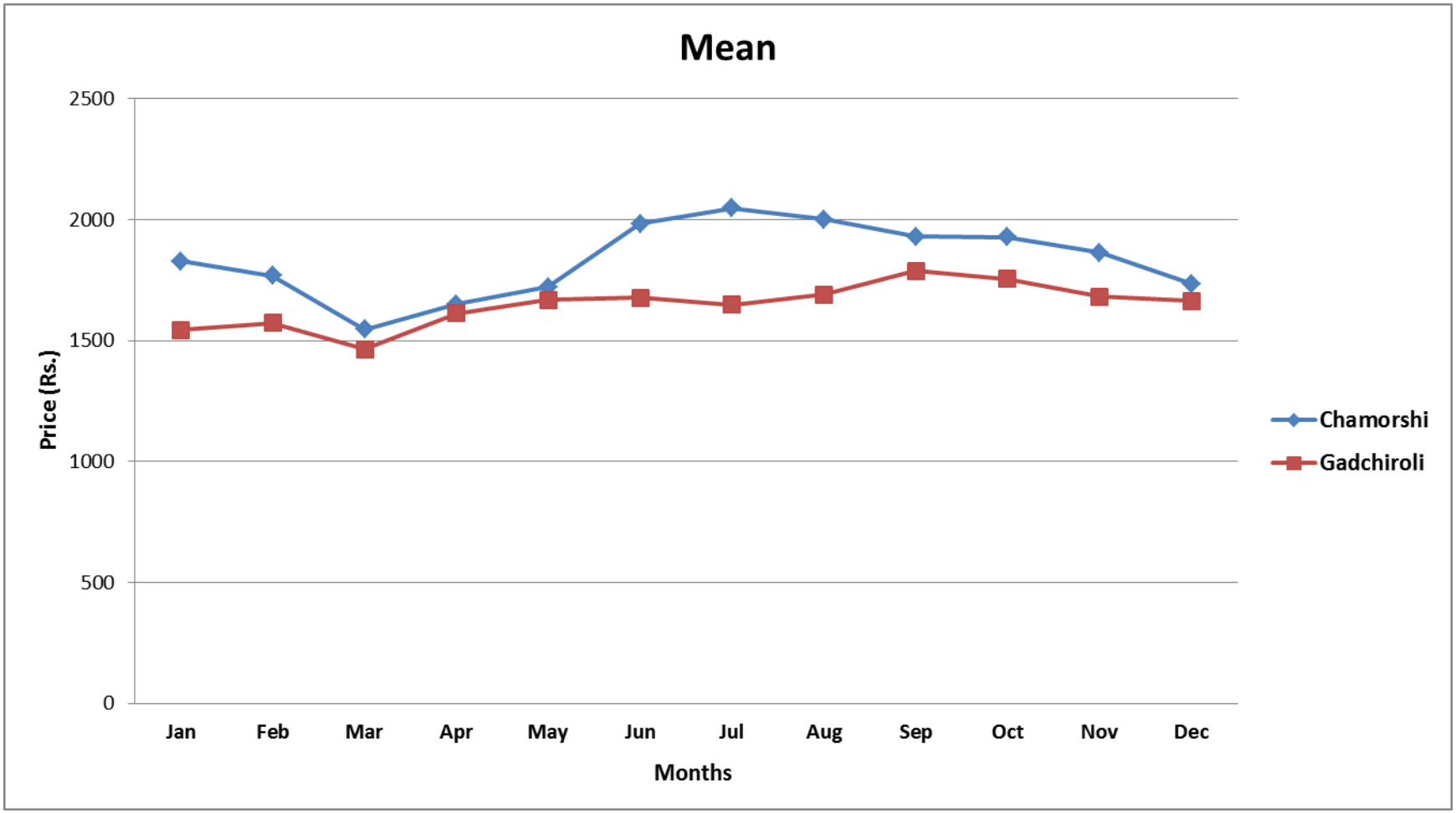

Fig. 4.5 Graphical representation of Mean of prices of Paddy in Chamorshi and Gadchiroli market

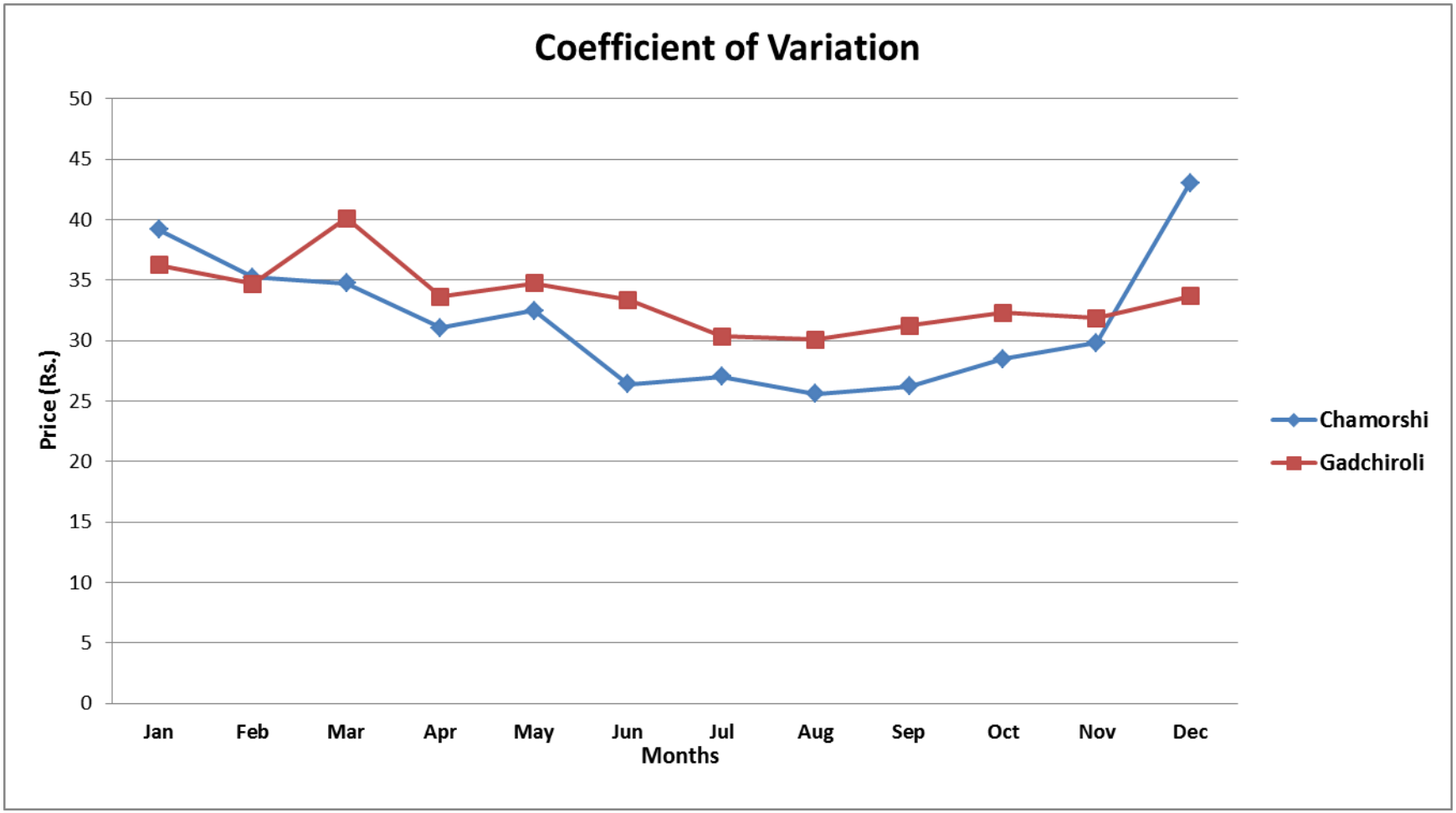

Fig. 4.6 Graphical representation of Coefficient of variation of prices of Paddy in Chamorshi and Gadchiroli market

4.3 Market Integration

4.3.1 Descriptive Statistics of Paddy price data:

Descriptive Statistics expresses the basic features of data taken into consideration by providing concise information about the variables taken into consideration. It helps in analysis of quantitative data virtually by using simple graphics. The descriptive statistics of monthly price of Paddy in Chamorshi and Gadchiroli APMC for fifteen years are presented in table 4.7.

Table 4.7: Descriptive Statistics of Price data of Paddy markets

Markets	N	Mean	SD	CV (%)
Chamorshi	180	1832.88	580.02	31.65
Gadchiroli	180	1646.58	540.14	32.80

The results concluded that among the selected markets, maximum mean price was recorded in Chamorshi market with Rs.1832.88 per quintal and in Gadchiroli market mean price was recorded to be Rs. 1646.58 per quintal. Standard deviation in Chamorshi market was found to be 580.02 and 540.14 in Gadchiroli market, respectively. The coefficient of variation of paddy in Chamorshi market and Gadchiroli market was found to be 31.65 per cent and 32.80 per cent, respectively.

4.3.2 Pearson correlation analysis

Market integration between Chamorshi and Gadchiroli markets were worked out by using Pearson Correlation for paddy prices and the results are presented in table 4.8.

The results reported that a strong and positive degree of association of prices was found between Chamorshi and Gadchiroli markets i.e. about 0.863 which was statistically significant at one per cent level of significance. Transparency in price signal among both the markets resulted in strong integration among the selected markets.

Table 4.8: Estimation of Correlation Coefficient for prices of Paddy between Gadchiroli and Chamorshi markets in Maharashtra

Markets		Chamorshi	Gadchiroli
	Sig. (2-tailed)	0.0001	0.0001
Chamorshi	N	180	180
	Pearson Correlation	1	0.863
	Sig. (2-tailed)	0.0001	0.0001
Gadchiroli	N	180	180
	Pearson Correlation	0.863	1

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

CHAPTER – V

SUMMARY AND CONCLUSIONS

CHAPTER-V

SUMMARY AND CONCLUSIONS

An economic analysis of arrivals and prices of paddy in Gadchiroli district of Maharashtra was undertaken with a view to examine pattern of markets arrivals and prices of paddy, relationship between arrivals and prices in selected markets and their integration. The study will be useful to formulate economic policies and action based on the conclusionsderived from the present investigation. To verify the fluctuations and relationship between market arrivals and prices, empirical study was carried out in Chamorshi APMC and Gadchiroli APMC markets with the following specified objectives

5.1 To study trends in arrivals of paddy

5.2 To study trends in prices of paddy

5.3 To know peak and slack period in arrivals and prices of paddy

5.4 To study the market integration of paddy markets in Gadchiroli district of Maharashtra

The present study on arrivals and prices of paddy in Gadchiroli district of Maharashtra was worked out for a periodof 15 years from 2005-2006 to 2019-2020.Paddy waspurposively selected for the studyowing to the large area and production under paddy cultivation. The secondary data pertaining to prices and arrivals of paddy were collected from selected Agriculture Produce Market Committee's (APMC), .i e. Chamorshi APMC and Gadchiroli APMCon the basis of availability of time series data related to arrivals and pricesfrom the published and unpublished annual reports and maintained records of respective APMC's. For analyzing the data various simple statistical tools viz, mean, frequencies, ratios, percentages and functional analysis such as market arrivals and prices, seasonal indices and bivariate correlation coefficient were used.The compound growth rates of arrivals and prices of paddy were worked out by for assessing the trend in arrivals and prices of paddy. Seasonal indices were worked out using simple average method. To judge variability in arrivals and prices coefficient of variation in arrivals and prices were estimated. The important findings of the present study are summarized under the following subheads.

5.1 Trends in arrivals of paddy

Arrivals of paddy duringthe study period was highest in Chamorshi APMC followed by Gadchiroli APMC with compound growth rate of -2.18per cent per annum and -4.59 per annum respectively.

Chamorshi APMC showed highest arrivals in the month of January which was 9568.27quintals and the lowest arrivals was in the month of August i.e. 2552.02 quintals. Coefficient of variation were found to be highest the month of June (82.53 per cent) and lowest in the month of December (50.68 per cent).

Gadchiroli APMC shows highest arrivals in the month of January (3420.13quintals) and lowest in the month of August (909.33 quintals). Coefficient of variation were worked out to be highest in March (112.84 per cent) and lowest coefficient of variation was found in the month of October (35.44 per cent).

5.2 Trends in prices of paddy

Trend analysis of prices of paddy in Chamorshi market witnessedpositive and non-significant growth rate of 0.90 per cent per annum whereas Gadchiroli market witnessed positive and significant growth rate of 1.11 per cent per annum.

In Chamorshi APMC, the study showed that per quintal price of paddy was highest in the month of July (Rs. 2045.95/quintal) and lowest in the month of March (Rs.1545.15/quintal).The standard deviation indicated that the highest standard deviation was recorded in the month of December (746.11) and the lowest standard deviation in the month of September (505.56).The highest coefficient of variation was registered in the month of December (43.04 per cent) and the lowest in the month of August (25.57per cent) respectively.

In Gadchiroli APMC, the study showed that per quintal highest price of paddy was prevailing in the month of September (Rs. 1788.05/quintal) and the lowest price in the month of March (Rs. 1463.08/quintal). The Standard deviation was observed to be maximum in the month of March (586.44) while minimum in the month of July (499.79). The highest coefficient of variation of price was witnessed in

the month of March (40.08 per cent) and the lowest coefficient of variation of price was in the month of August (30.09 per cent).

5.3 Peak and slack period in arrivals and prices of paddy

5.3.1 Seasonal indices for arrivals

The monthly seasonal indices of arrivals were highest in month of January (172.27 per cent) followed by December (165.10 per cent) in Chamorshi APMC whereas lowest in the month of August (45.95 per cent) followed by July (60.03 per cent).

With regard to Gadchiroli APMC, the monthly seasonal indices of arrivals were highest in month of January (195.54 per cent) followed by February (161.33 per cent) and lowest in the month of August (51.99 per cent) followed by October (58.51 per cent).

5.3.2 Seasonal indices for prices

In Chamorshi APMC, the monthly seasonal indices of prices were highest in the month of July (111.62 per cent) followed by August (109.16 per cent) and lowest in the month of March (84.30 per cent) followed by April (90.03 per cent).

In Gadchiroli APMC, the highest monthly seasonal indices of prices were in the month of September (108.59 per cent) followed by October (106.51 per cent) and the lowest monthly seasonal indices were registered in the month of March (88.86 per cent) followed by January (93.74 per cent).

5.4 Market integration of paddy

The analysis of Pearson Correlation of paddy prices between Chamorshi and Gadchiroli markets was worked out and the results revealed that a strong and positive degree of association of prices was found between Chamorshi and Gadchiroli markets i.e. about 0.863. This was found to be highly significant at one per cent level of significance. This suggests that market information is easily transferred between the two markets resulting in easy transfer of price signals.

Conclusions:

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

1. Analysis of the growth rate of arrivals of paddy in Chamorshi market recorded negative and compound growth rate of -2.18 per cent per annum whereas Gadchiroli market observed a non-significant growth of -4.59 per cent per annum.
2. Analysis of the growth rate of prices of paddy in Chamorshi market observed positive growth rate of 0.90 per cent whereas Gadchiroli market, positive and significant growth rate of 1.11 per cent.
3. The highest mean arrivals of paddy were in the month of January (9568.27) quintals and the lowest arrivals was in the month of August (2552.02) quintals in Chamorshi market.
4. The highest mean arrivals were in the month of January (3420.13 quintals) whereas the lowest arrivals were recorded in the month of October with 1023.40 quintals in Gadchiroli market.
5. The highest mean price per quintal in the month of July (Rs. 2045.95/quintal) whereas lowest mean price per quintal in the month of March (Rs. 1545.15/quintal) in Chamorshi market.
6. The highest mean price per quintal in the month of September (Rs. 1788.05/quintal) and the lowest mean price per quintal in the month of March (Rs. 1463.08/quintal) in Gadchiroli market.
7. The strong and positive degree of association of prices was found between Chamorshi and Gadchiroli markets i.e. about 0.863.

Policy Implications:

1. Paddy farmers showed are made aware about the peak period in paddy prices so that they can make better decision making and receive comparatively higher price.
2. Use of improved modern technology in paddy cultivation will result in better production which will have a direct impact on the paddy arrivals.
3. Proper care should be taken up during transportation.
4. Market information should be properly transferred to the farmers.

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APPENDIX

APPENDIX

Table 1: Marketwise Compound Growth Rate of arrivals of Paddy

Particulars	Chamorshi	Gadchiroli
a	8.69	7.69
b	-0.022	-0.047
R^2	0.036	0.163
t- value	-0.61	-1.39
CGR	-2.18	-4.59

Table 2: Marketwise Compound Growth Rate of prices of Paddy

Particulars	Chamorshi	Gadchiroli
a	7.45	7.33
b	0.009	0.011
R^2	0.16	0.55
t- value	1.38	3.49
CGR	0.90	1.11***

(*** denotes significance at 1 per cent level of significance)

Table 3: Marketwise monthly seasonal indices of arrivals of Paddy

Month	Chamorshi	Gadchiroli
January	172.27	195.54
February	148.31	161.33
March	92.22	99.02
April	61.26	68.59
May	100.45	89.49
June	93.96	85.17
July	60.03	63.26
August	45.95	51.99
September	68.28	103.67
October	88.00	58.51
November	104.18	78.96
December	165.10	144.48

Table 4: Marketwise monthly seasonal indices of prices of Paddy

Market/Month	Chamorshi	Gadchiroli
January	99.70	93.74
February	96.45	95.42
March	84.30	88.86
April	90.03	97.92
May	93.90	101.33
June	108.19	101.86
July	111.62	100.00
August	109.16	102.66
September	105.32	108.59
October	105.11	106.51
November	101.60	102.14
December	94.61	100.97

Table 5: Marketwise monthly Mean, SD and CV of Arrivals of Paddy

Market/ Month	Chamorshi			Gadchiroli		
	Mean (qtl)	SD	CV (%)	Mean (qtl)	SD	CV (%)
January	9568.27	5854.10	61.18	3420.13	2642.23	77.26
February	8237.60	5255.1	63.80	2821.80	3113.90	110.35
March	5122.33	3448.88	67.33	1732	1954.39	112.84
April	3402.43	1938.66	56.98	1199.67	1009.12	84.12
May	5579.24	3837.32	68.788	1565.20	1508.21	96.36
June	5218.74	4306.96	82.53	1489.80	1528.93	102.63
July	3334.31	2314.66	69.42	1106.43	846.93	76.55
August	2552.02	1766.42	69.22	909.33	423.13	46.53
September	3792.33	2400.32	63.29	1813.33	1993.81	109.95
October	4887.48	2889.52	59.12	1023.40	362.70	35.44
November	5786.47	3488.75	60.29	1381.10	678.41	49.12
December	9169.91	4647.54	50.68	2527.10	2066.94	81.79

Table 6: Marketwise monthly Mean, SD and CV of Prices of Paddy

Market/ Month	Chamorshi			Gadchiroli		
	Mean (Rs/qtl)	SD	CV (%)	Mean (Rs/qtl)	SD	CV (%)
January	1827.43	716.04	39.18	1543.58	559.40	36.24
February	1767.77	622.41	35.21	1571.20	545.16	34.70
March	1545.15	536.95	34.75	1463.08	586.44	40.08
April	1650.16	512.38	31.05	1612.28	541.67	33.60
May	1721.06	558.72	32.46	1668.41	579.44	34.73
June	1982.91	525.20	26.4	1677.13	559.24	33.35
July	2045.95	552.71	27.01	1646.59	499.79	30.35
August	2000.82	511.64	25.57	1690.40	508.58	30.09
September	1930.42	505.56	26.19	1788.05	558.17	31.22
October	1926.54	548.13	28.45	1753.84	566.54	32.30
November	1862.29	553.25	29.79	1681.78	535.27	31.83
December	1734.08	746.11	43.04	1662.58	559.56	33.66

Table 7: Estimation of Correlation Coefficient for prices of Paddy between ChamorshiandGadchirolimarkets in Maharashtra

Markets		Chamorshi	Gadchiroli
	Sig. (2-tailed)	0.0001	0.0001
Chamorshi	N	180	180
	Pearson Correlation	1	0.863
	Sig. (2-tailed)	0.0001	0.0001
Gadchiroli	N	180	180
	Pearson Correlation	0.863	1

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

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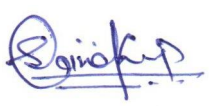

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