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Market arrivals and price volatility of select agricultural commodities in India: A statistical analysis

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Abstract
Commodity prices are generally low during season due to market arrivals, sometimes, resulting in distress sale by farmers. The differences in season and off season prices provide information on the extent one can take contracts in derivative trading. A study of seasonality is likely to provide the basis for growers and traders the information on the price fluctuations during season and off season. The Indian commodities market has attracted the policy makers, researcher and academicians to analyze different issue relating to the functioning of commodity markets.

An attempt is made in this paper to examine the existence of seasonality in select agri-commodities. More specifically, the present study is intended to address and to explore the existence of seasonality in select agri-commodities contributing to price risk to producers and traders. It is observed from the analysis that the prices of select commodities indicate that commodity average prices per quintal is gradually increasing over the period of study for all the commodities. The increase in prices are substantial in case of Guar Seeds, Channa, Turmeric and Barley. The existence of seasonality or other-wise is analysed with the help of market arrivals and prices data on month to month basis during the period of study. This analysis is expected to provide information for developing strategic in derivatives market.

Keywords: price volatility, derivative market, agri-commodities, market-seasonality

1. Introduction

Commodity prices are generally low during season due to market arrivals, sometimes, resulting in distress sale by farmers. A study on season and off season average prices help the traders and growers to design strategies for storage of commodity for different spells and participate in 'Futures' trading. Certainly, the differences in season and off season prices provide information on the extent one can take contracts in 'Futures' markets and justification for margin payments to participate in it. A study of seasonality is likely to provide the basis for growers and traders the information on the price fluctuations during season and off season. Keeping in view of the above objective, the Indian commodities market has attracted the policy makers, researcher and academicians to analyze different issue relating to the functioning of Commodity Derivatives Markets.

2. Review of Literature

In the following pages, an attempt is made to present a brief review of the existing studies, so as to identify the gap of the research to carry out the present study.

Mihir Das, *et al*., (2012), have conducted a study entitled "A Study on Commodity market behaviour, price discovery and its factors". The study considered 12 commodities for 2003 to 2011 and estimated long-term volatility of each commodity, Effect of inflation and volume on the prices of commodities was tested by GARCH (1.1) model. The results indicate that inflation had a significant effect on crude oil futures volatility in gold, natural gas and pepper.

Aloysius Edward and Narasimha Rao (2013) have conducted a study entitled "Price Discovery Process and Volatility spillover of Chilli Spot and Futures prices evidence from National Commodity and Derivative Exchange Ltd"., The causality between Chilli Spot and Future prices examined by Granger causality test Chilli Futures for April 1, 2006 to March 31, 2013 tested byco-integration models. In long-run the spot and futures market are co-integrated and causality is existing between the markets. The causality found is uni-directional Chilli futures market provides direction to farmers and the market is efficient.

Srinivasan (2011) has conducted a study entitled "Price Discovery and Volatility Spillovers in Indian Spot – Future commodity market. Data from June 2005 to November 2010 of four commodity future indices and its corresponding underlying spot indices of MCX Mumbai were used in the study. The VECM shows that commodity spot market play a dominant role and serve as effective price discovery vehicle, implying that there is a flow of information from spot to futures commodity market.

Pratap Kumar (2016) has conducted a study entitled "Financialisation of Commodity Market in India: A closer look at the evidence". The impact of financialisation of price risk and price volatility of Indian commodities market has been studied by using time series techniques. The commodity price index is related to stock index price and causality test indicated that commodity prices are Granger cause the stock prices in India.

Vijay Kumar Varadi, (2012) has conducted a study entitled "An evidence of speculation in Indian Commodity Market". Price volatility is influenced by several factors like supply and demand, excess liquidity and attitude of speculators and investors. The study has attempted to find the impact of the above said factors in Indian commodity futures market and the results show that speculation played vital role in price volatility especially during global crises. Fortnightly data is aggregated from FMC monthly series for MCX, NCDEDX and NMCEX

for the year of 2006 – 2010 and used in the study.
The above studies have considered "near' month prices and analyzed the data. Now, an attempt is made to examine the variations in prices of agri-commodities with the market arrivals. The data used in this section relates to monthly market arrivals of select commodities and average prices for latest three years from 2013 to 2015. Monthly data is drawn from the CMIE database updated as on June 2016.

3. Methodology of the Study

3.1 Objective of the Study

Against this backdrop, an attempt is made in this paper to examine the existence of seasonality in select agri-commodities. More specifically, the present study is intended to address and to explore the existence of seasonality in select agri-commodities contributing to price risk to producers and traders.

3.2 Scope of the Study

The present study has focused on the patterns, behaviour and trends in prices in select agri-commodities in India. Year-wise data was used to explore the annual changes in commodity prices, monthly data for select years was used to identify seasonality and daily price changes were analyzed to identify the prices differences.

3.3 Sources of Data

Data required for the study is drawn from primary and secondary sources. The primary source includes the website of NCDEX. The secondary sources include the published documents of SEBI, data compiled by the CMIE, etc.

3.4 Sample Selection

The sample of the study comprises of select agricultural commodities traded in National Commodity and Derivatives Exchange (NCDEX). The NCDEX organizes trading on 20 agricultural commodities and 10 non-agricultural commodities.
The study considered the following seven agricultural commodities.

a) Barley
b) Chilli
c) Jeera
d) Channa
e) Guar Seeds
f) Turmeric
g) Soyabean

The sample is chosen as these agricultural commodities were regularly traded during the last three years of the study. Daily closing prices of the select agri-commodities for the period 2013 to 2015 constitutes the data for the study.

3.5 Limitations of the Study

Primary data compiled by the NCDEX is used throughout the study. Spot prices for different commodities are recorded by NCDEX is used in the study. No importance is given in specific Mundi based prices. Prices are mostly market closing prices and no weightage is given for intra-day volatility. Seasonality is established based on only three agri – season's information.

3.6 Data Analysis and Interpretation

Seasonal trends are worked out to identify the months of occurrence of season and off – season for select agri-commodities. Trends in market prices and volume of trade are analyzed for at least three agricultural cycles for each commodity. Commodity-wise monthly price movements are analyzed in the following paragraphs.

3.6.1 Barley

Barley (Hordeumvulgare) is a cereal crop consumed as food and animal feed. Barley is the most important crop after wheat, maize and rice in the World. During early periods, being a wild grass it was used as feed for animals. With the advancement of civilization, Barley was domesticated. During 16th and 17th Century Barley was introduced as a new crop by the European rulers. Currently, it is used as food, feed and in preparation of beverages.
Barley is cultivated during winter as well as summer in different countries. In colder regions, Barley is cultivated as summer crop during the months of April – May. In the warmer regions, Barley is sown in the months of September and November. In India, it is mostly cultivated as a Rabi crop. Sown normally takes place between October and December. Harvesting starts from March and ends till mid-April in the northern states, whereas in central and southern states, harvesting is done during February to May. The Barley arrives the market from March onwards. The crop cycle of Barley in India ranges from 120-150 days. The monthly prices and arrivals of Barley were given in Table-1 and the seasonality for the years 2013, 2014 and 2015 are shown in Fgure-1
The season for Barley is found to be during March and August. Barley prices are found lower during season compared to non – season. Similar trend is observed in all the three years of study. While the average seasonal price per quintal is Rs. 1159 in 2013 and off – season average prices are Rs. 1222 per quintal, the prices per quintal have marginally raised to Rs. 1212 per quintal in 2014 during season and Rs. 1367 during off season. The prices are found to be in similar range during season and off – season with Rs. 1202 per quintal and Rs. 1392 per quintal in 2015.
The average arrivals of Barley are found 9 to 12 times higher during season compared to average arrivals during off - season. Due to such huge arrivals, the average prices are found declining during season. This situation makes the traders and growers to resort to Futures market to protect the proceeds for their output.

Table 1: Monthly Market Prices and Market Arrivals of Barley in India during 2013 – 15, (Amount in Rs.)

	Prices (in Rs.)			Arrivals (in Quintals)		
Months	2013	2014	2015	2013	2014	2015
January	3,951.10	3,097.60	3,376.30	106,973.30	148,370.20	243,909.40
February	3,663.30	3,053.00	3,453.80	222,383.50	256,312.90	199,271.10
March	3,540.20	3,145.20	3,407.70	415,299.10	495,866.00	278,743.30
April	3,525.20	3,047.10	3,638.50	800,540.20	622,574.70	435,357.40

May	3,443.40	3,020.10	4,259.50	641,035.30	457,029.50	433,584.80
June	3,309.50	2,874.30	4,288.70	507,970.00	252,741.10	150,290.30
July	3,219.00	2,960.40	4,347.50	254,897.60	162,700.50	71,310.60
August	3,229.30	3,067.80	4,481.50	219,943.30	121,890.30	70,117.90
September	3,223.30	3,025.30	4,648.80	351,822.90	133,570.30	63,720.70
October	3,207.20	3,101.50	4,863.50	363,084.40	114,656.30	68,307.80
November	3,211.30	3,120.80	4,990.20	322,351.30	136,070.00	61,898.00
December	3,107.20	3,180.80	4,994.10	219,786.80	105,388.60	44,927.40
Averages during Season	1,159.58	1,212.93	1,202.05	131,159.00	142,402.48	92,350.40
Averages during Non-Season	1,222.72	1,362.77	1,392.42	15,793.65	11,198.12	8,406.95

***Source*:** CMIE Database – Commodity Review

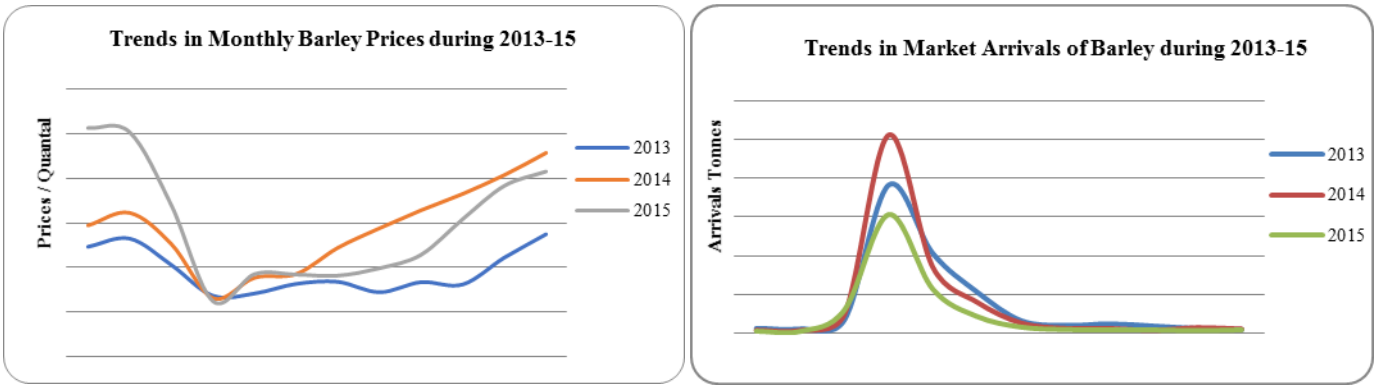

Fig 1

3.6.2 Turmeric

Turmeric is cultivated in only select countries like India, Sri Lanka, China, Indonesia, Australia, Nigeria, Peru and the West Indies. Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Orissa and Kerala are the major sates producing Turmeric in India. The harvesting of Turmeric begins when the plant leaves turn yellow and starts drying up. While harvesting, whole plant is uprooted, all leaves are cut and roots are removed. The remaining rizhome part of the plant is kept getting the desired turmeric. The average prices per quintal of Turmeric during 3 years on month to month basis are given in Table-2 and in Figure-2.

The average Turmeric prices are gradually raising from Rs. 5772 per quintal in 2013 to Rs. 6966 per quintal in 2015. The average prices during off-season are ranging from Rs. 5183 per quintal in 2013 to Rs. 7197 during 2015. Market arrivals during season are found to be 2 to 2 ½ times higher than off seasonal months. While 8,500 to 10,000 quintals of Turmeric reach the market during off-season the arrivals during season ranges 19,400 to 22,400 quintals per month.

Table 2: Monthly Market Arrivals and Market Prices of Turmeric during 2013-15

	Prices (in Rs.)			**Arrivals (in Quintals)**		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	4,746.90	5,283.00	6,328.60	12,370.20	10,160.50	13,102.70
February	5,149.50	5,438.20	6,497.50	16,904.60	13,553.50	16,074.10
March	6,052.40	5,698.90	7,123.80	66,780.00	28,093.90	17,674.80
April	6,545.90	5,989.70	7,334.00	8,381.40	25,864.60	37,204.90
May	6,103.00	6,283.40	7,291.70	14,277.10	28,210.20	19,454.40
June	6,036.40	6,169.10	7,226.20	15,757.80	23,600.40	12,904.10
July	5,975.10	6,357.90	7,075.60	15,267.10	16,345.30	9,649.00
August	5,575.00	6,145.00	6,936.70	5,442.30	9,289.60	8,054.20
September	5,058.60	5,975.90	7,232.20	9,253.90	8,845.70	15,672.50
October	4,786.10	5,570.30	6,921.50	6,194.60	7,742.00	8,598.40
November	4,800.50	5,668.60	7,269.00	7,043.50	8,685.20	6,578.00
December	4,903.60	5,928.50	7,748.60	7,593.30	10,601.10	7,611.10
Averages during Season	5,772.35	5,810.38	6,966.97	22,411.85	21,580.52	19,402.50
Averages during Non-season	5,183.15	5,941.03	7,197.27	8,465.78	10,251.48	9,360.53

***Source*:** CMIE Database – Commodity Review

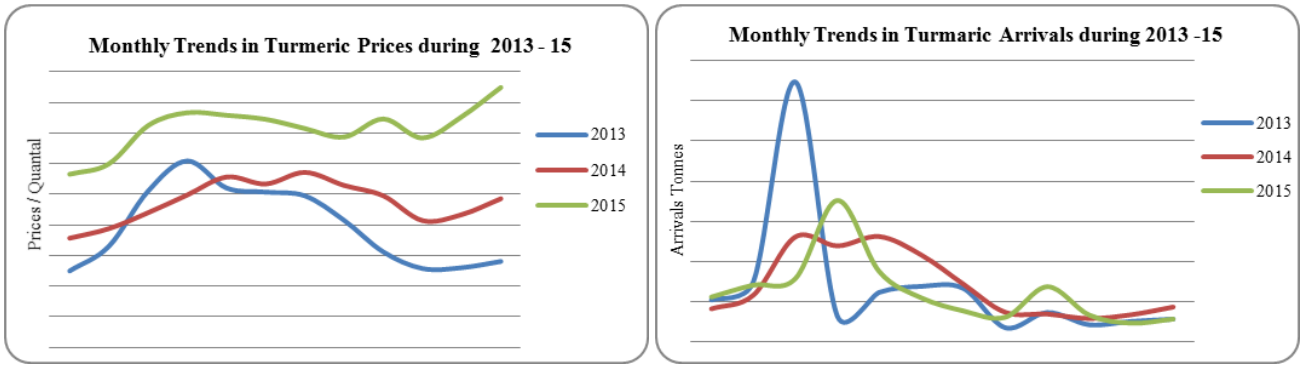

Fig 2

3.6.3 Chilli

Chilli (Capsicum annuum) belongs to the family of Sonanaceae. It grows as a fruit of a Chilli plant. Chilli is known for acidic flavor and color. It's mostly used in Food products industry, medicines and beverages. Chilli sowing starts in the month of July and continues till August – September. It is a 3-3.5 months crop and hence harvesting starts during December and ends during March. Monthly arrivals and prices of Chilli during 2013 and 2015 are given in Table-3 and in Figure-3.

The season for Chilli starts in March and ends in August. Chilli is grown in Guntur (Andhra Pradesh) and traded in Futures market of NCDEX. The prices of 'Teja' variety of Chilli of Guntur record Rs. 200 to Rs. 400 lower per quintal during season compared to other months. The average monthly price of Chilli during season works out to Rs. 3037 in 2013 Rs. 3021 in 2014 and Rs. 3093 in 2015 compared to Rs. 2961 per quintal in 2013, Rs. 3242 in 2014 and Rs. 3496 in 2015. The average market arrivals of Chilli found 12,000 quintals higher than the off-season arrivals in 2015. In other years, the off seasonal arrivals are higher than season. This indicates that the seasonal impact on prices and market arrivals are marginal supporting traders or producers to go on long or short positions in Futures markets to avoid risks arising out of seasonality.

Table 3: Monthly Market Arrivals and Prices of Chilli during 2013-15

	Prices (in Rs.)			Arrivals (in quintals)		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	2,454.60	3,154.10	3,167.40	123,928.40	90,521.30	95,964.30
February	2,890.50	3,256.10	3,370.70	128,845.00	83,237.40	108,562.90
March	2,992.30	3,369.10	3,482.60	62,958.40	81,593.00	151,794.10
April	2,922.20	2,988.10	3,345.20	60,803.90	58,506.10	105,858.60
May	3,128.00	2,679.90	3,011.00	52,659.50	60,713.70	71,716.10
June	2,970.30	2,422.40	2,777.60	44,124.10	74,743.40	51,746.70
July	2,800.70	3,236.40	2,890.30	52,380.70	72,571.40	38,855.80
August	3,410.30	3,430.80	3,054.00	37,835.50	54,536.50	28,025.50
September	3,273.20	3,340.80	3,889.50	36,903.10	58,335.50	32,418.00
October	3,140.10	3,684.00	3,852.40	45,466.30	57,027.90	31,732.30
November	3,066.80	3,257.40	3,289.50	53,765.20	92,956.80	52,227.70
December	2,943.40	2,763.00	3,407.20	67,602.20	91,645.60	50,984.50
Averages during Season	3,037.30	3,021.12	3,093.45	51,793.68	67,110.68	74,666.13
Averages during off-Season	2,961.43	3,242.57	3,496.12	76,085.03	78,954.08	61,981.62

***Source*:** CMIE Database – Commodity Review

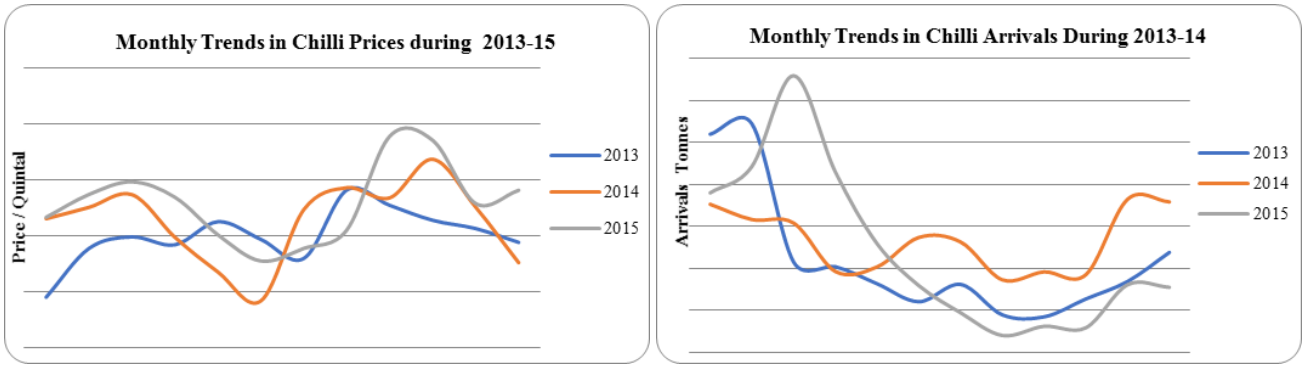

Fig 3

3.6.4 Channa

India is the largest producer, consumer and importer of pulses. Although pulses are traditionally called as poor man's protein, of late, they have become unaffordable because of share rise in prices. India annually produces around 14 million tons of pulses, out of which, 60 per cent is produced in kharif season

and the remaining 40 per cent is produced in Rabi. Chana constitutes 40 per cent in the total production of pulses in India. In India, it is mainly used to produce 'dal' and besan (ground flour). It is largely cultivated in the central and northern parts of India. Channa production during 2014-15 was 0.7 million tones and decreased by 19 per cent from previous year (0.95 million tons). The gross area under cultivation during 2014-15 was 8.285 lakh hectares with an average yield of 888 kgs per hectare.

The season for Channa starts in February and ends in July. The data given in the Table-4 and Figure-4 show that market arrivals are at peak in February – March and April. Channa production seems declining over years and the year 2015 records the lowest both during season and off-season. May be due decline in market arrivals the average prices per quintal recorded the highest in 2015 with Rs. 3900 Rs. 4560 during season and off – season respectively. The average price per quintal of Channa recorded to be during season and off season periods.

The arrivals on the other hand during season found to be 200 to 250 per cent higher than off- season in all the three years. The arrivals worked out at 473 thousand quintals during season in 2015 compared to 264 thousand quintals during off season in 2013 and 374 thousand quintals in season in 2014 compared to only 126 thousand quintals in 2014 and 261 thousand quintals during season in 2015 compared to only 92 thousand quintals in off season in 2015. Existence of serious seasonal fluctuations on market arrivals, declining market arrivals over years, resulted in sizeable increase in per quintal prices of Channa.

Table 4: Monthly Market Arrivals and Prices of Channa during 2013-15

	Prices (in Rs.)			Arrivals (in quintals)		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	3,951.10	3,097.60	3,376.30	106,973.30	148,370.20	243,909.40
February	3,663.30	3,053.00	3,453.80	222,383.50	256,312.90	199,271.10
March	3,540.20	3,145.20	3,407.70	415,299.10	495,866.00	278,743.30
April	3,525.20	3,047.10	3,638.50	800,540.20	622,574.70	435,357.40
May	3,443.40	3,020.10	4,259.50	641,035.30	457,029.50	433,584.80
June	3,309.50	2,874.30	4,288.70	507,970.00	252,741.10	150,290.30
July	3,219.00	2,960.40	4,347.50	254,897.60	162,700.50	71,310.60
August	3,229.30	3,067.80	4,481.50	219,943.30	121,890.30	70,117.90
September	3,223.30	3,025.30	4,648.80	351,822.90	133,570.30	63,720.70
October	3,207.20	3,101.50	4,863.50	363,084.40	114,656.30	68,307.80
November	3,211.30	3,120.80	4,990.20	322,351.30	136,070.00	61,898.00
December	3,107.20	3,180.80	4,994.10	219,786.80	105,388.60	44,927.40
Averages during Season	3,450.10	3,016.68	3,899.28	473,687.62	374,537.45	261,426.25
Averages during Non-season	3,321.57	3,098.97	4,559.07	263,993.67	126,657.62	92,146.87

Source: CMIE Database – Commodity Review

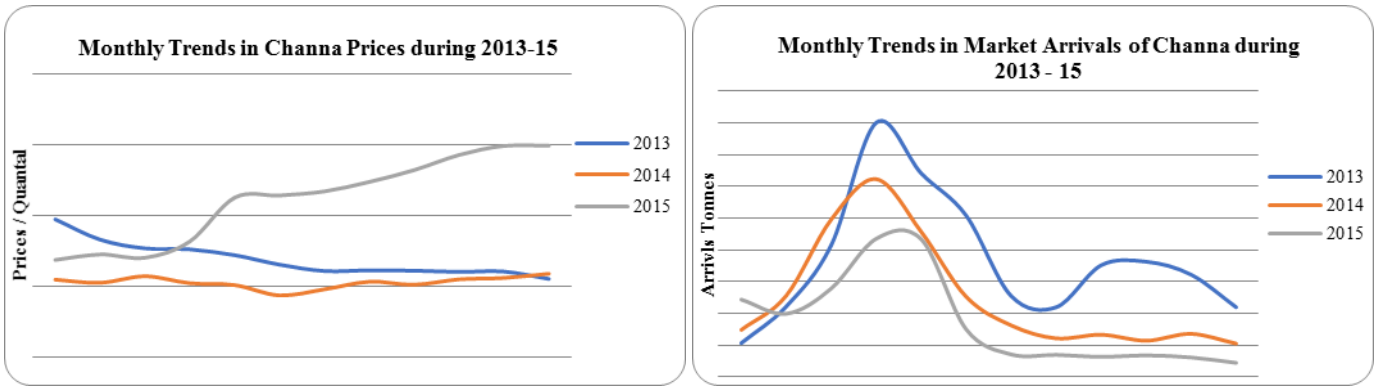

Fig 4

3.6.5 Jeera

Jeera is a Rabi crop with crop duration of 120-150 days. Jeera is sown during October – November and is harvested in February – March. Crop is harvested once plant turns yellowish brown. Monthly sport prices and market arrivals are analyzed in Table -5 and Figure -5.

A glance at the figure indicates sizeable market arrivals during February and March resulting in lowest prices for Jeera during those months. The monthly data indicates 300 to 350 per cent raise in market arrivals during season compared to off-season, when only 8,800 quintals arrive in 2013 against 27,500 quintals during seasons. The seasonal arrivals are 59,115 quintals in 2014 and 23,426 quintals in 2015. The average price of Jeera is gradually rose from Rs. 10,000 per quintal to Rs. 13,800 per quintal in 2015. The declining market arrivals and the seasonal differences followed by raise in prices of Jeera direct the traders to cover the price risk in Futures market.

Table 5: Monthly Market Arrivals and Prices of Jeera during 2013 – 15

	Prices (in Rs.)			Arrivals (in quintals)		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	12,759.10	11,377.40	13,185.80	3,922.30	12,980.00	16,790.50
February	12,266.10	10,451.10	12,650.60	15,710.40	26,082.50	13,586.40
March	11,696.80	9,245.40	12,858.00	41,467.10	104,385.20	44,233.20
April	11,636.40	8,658.00	13,575.60	25,459.30	83,878.60	42,104.10
May	11,423.30	9,466.80	14,431.20	32,141.40	66,880.00	24,158.50
June	11,675.80	9,520.70	14,214.90	31,737.00	40,865.10	10,647.30
July	12,109.20	9,981.30	14,173.20	18,888.10	32,596.50	5,827.30
August	12,321.20	9,962.50	13,510.10	11,358.00	16,758.10	3,832.60
September	11,935.10	9,316.90	13,921.40	9,464.90	31,134.60	5,002.10
October	11,551.10	10,255.10	14,004.20	5,083.30	12,683.70	5,856.90
November	11,753.00	10,246.50	14,773.10	9,171.40	20,857.10	4,766.60
December	11,539.80	11,398.90	13,570.40	13,677.30	21,806.70	3,637.30
Averages during Season	11,801.27	9,553.88	13,650.58	27,567.22	59,114.65	23,426.13
Averages during Off Season	11,976.55	10,426.22	13,827.50	8,779.53	19,370.03	6,647.67

***Source*:** CMIE Database – Commodity Review

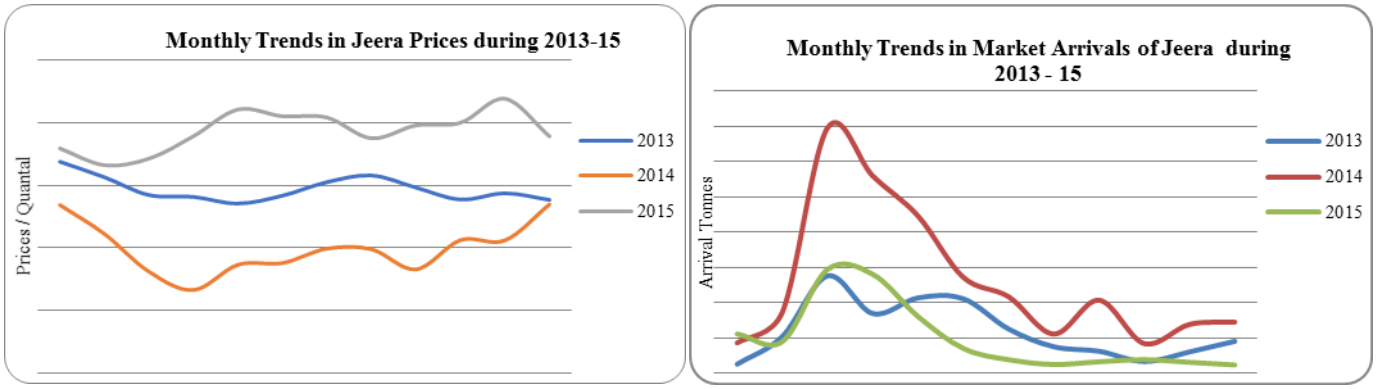

Fig 5

3.6.6. Soyabeans

Soyabean is the basic ingredient in many processed foods mostly dairy products. Soya oil has wide industrial applications. Soyabean has emerged as an important commercial crop. India ranks fifth in soybean production worldwide accounting for 53 per cent of total production. Soyabean is grown in Maharashtra and Rajasthan. Soyabean is also produced in the states of Andhra Pradesh, Karnataka and Chhattisgarh. The average monthly arrivals of Soyabean and the prices for last 3 years are given in Table-6 and Figure-6.

The figure shows that the Soyabean arrivals are highest in September and October with a corresponding decline in prices. On the other hand, the arrivals are low during April and May with corresponding rise in prices. There is a gradual raise in Soyabean prices from Rs. 3,283 per quintal in 2013 to Rs. 3,338 in 2015. The off-season prices are marginally higher than seasonal prices with Rs. 3525 in 2013 Rs. 3806 in 2014 and Rs. 3356 per quintal in 2015. The seasonal market arrivals are high at 200 to 400 per cent during season. The market arrivals are at 847 thousand tones in season compared to only 354 thousand tonnes in 2013 and 808 thousand tonnes in season compared to only 181 thousand tonnes in 2014 and 557 thousand tonnes in season compared to 268 thousand tonnes in 2015 with a declining market arrivals resulting in unstable market prices.

Table 6: Monthly Market Arrivals and Prices of Soyabean during 2013-15

	Prices (in Rs.)			Arrivals (in quintals)		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	3,103.30	3,456.20	3,201.10	726,428.70	419,562.20	413,046.60
February	3,138.40	3,579.80	3,180.90	606,844.60	457,860.20	374,999.30
March	3,341.30	3,802.50	3,108.30	479,170.10	365,939.60	258,840.40
April	3,750.90	4,040.60	3,433.80	234,850.70	190,096.70	248,959.20
May	3,749.00	4,280.30	3,718.50	218,935.40	192,357.40	269,726.70
June	3,637.60	3,885.20	3,455.80	463,618.50	211,718.60	315,966.40
July	3,396.30	3,839.00	3,256.60	433,405.80	208,631.10	265,852.20
August	3,337.00	3,616.40	3,112.70	228,986.00	144,019.50	164,201.80
September	3,278.00	3,179.60	3,162.10	543,319.70	143,294.80	345,702.00
October	3,172.40	2,968.60	3,570.90	1,535,991.90	1,015,841.50	1,124,993.30
November	3,444.30	3,108.00	3,497.80	1,066,710.70	1,672,386.40	679,427.80
December	3,503.50	3,137.50	3,470.10	666,745.30	920,506.10	492,956.80
Averages during Season	3,283.87	3,342.10	3,338.18	846,981.88	808,682.67	557,377.37
Averages during Off-Season	3,524.80	3,806.85	3,356.58	353,852.68	181,686.35	268,401.38

***Source*:** CMIE Database – Commodity Review

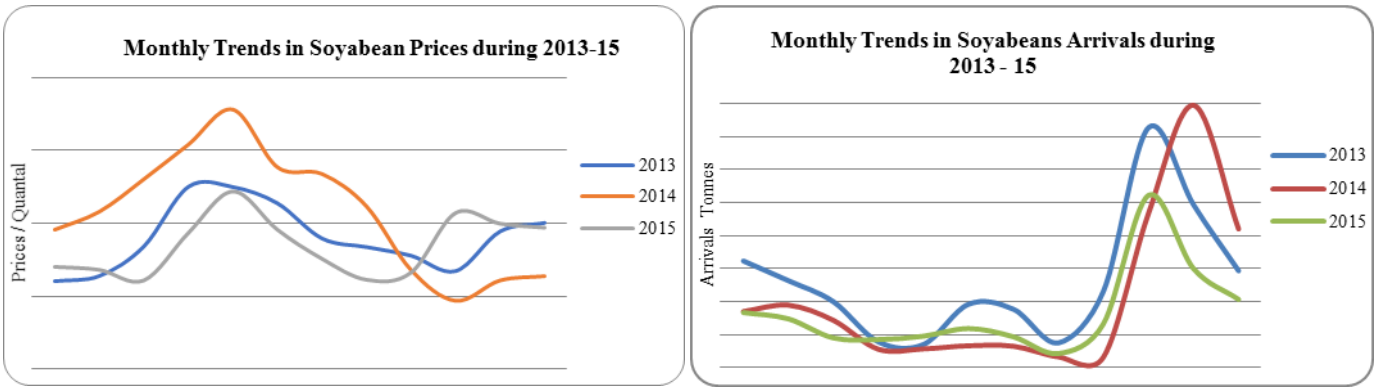

Fig 6

3.6.7 Guar Seeds

India is the largest producer of Guar Seed (80% of World production) in the World. It is grown in the northwest part of the country which includes the States of Rajasthan, Gujarat, Haryana and Punjab. Rajasthan. 70 per cent of the total production of Guar in India is contributed by Rajasthan alone and rest by all other States. The major trading centers for Guar Seeds are Jodhpur, Bikaner, Jaipur, Ganganagar, Alwar, etc. The production of Guar Seeds in 2012 – 13 was 24.6 million tones almost 12% increase over the previous year. The area under Guar Seed cultivation during 2012-13 was 52 lakh hectares and the average yield was 644Kg/hectare. The data required to explore seasonality and prices of Guar Seeds are given in Table-7 and Figure-7.

The figure and data shows that Guar Seeds have October – November as season unlike other agri-commodities, the arrivals as well as prices of Guar Seeds during season declining from the year 2013 to 2015. The average price per quintal is declined from Rs. 6930 in 2013 to Rs. 3539 per quintal in 2015. The market arrivals are ranging from 145 thousand quintals per month to 87 thousand quintals during 2013 and 2015. The off-season arrivals, on the other hand, marginally lower ranging from 100 thousand per tonnes in 2013 to 67 thousand per tonnes in 2015. The decline in prices may direct the traders to resort to Futures markets for covering their price risk.

Table 7: Monthly Trends in Market Arrivals and Prices of Guar Seed during 2013-15

	Prices (in Rs.)			Arrivals (in quintals)		
Months	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
January	9,822.80	4,327.90	4,157.10	120,665.50	189,224.50	66,730.90
February	8,480.50	4,223.10	3,737.20	79,954.60	205,514.70	44,982.50
March	7,986.80	4,013.90	3,552.00	105,036.20	178,540.40	58,947.90
April	7,277.50	3,812.10	3,493.60	109,474.00	147,432.40	46,434.50
May	6,208.40	3,874.60	3,629.30	106,719.50	180,390.00	62,070.40
June	5,337.20	3,985.20	3,557.90	67,060.90	144,778.90	66,393.90
July	5,074.80	4,326.10	3,217.00	105,854.30	87,651.90	36,367.70
August	4,613.60	4,492.40	3,024.30	59,234.10	54,259.10	21,393.00
September	5,452.50	4,478.90	3,105.80	62,781.10	112,664.20	34,460.40
October	4,730.20	4,186.00	3,448.20	201,553.10	276,945.20	184,629.90
November	4,221.30	4,020.70	3,128.40	308,235.00	257,822.20	162,404.70
December	3,798.80	4,026.00	3,169.40	149,924.30	166,104.70	144,553.10
Averages during Season	6,931.28	4,070.62	3,539.62	145,548.27	190,773.15	87,342.27
Averages during off- Season	5,236.12	4,223.87	3,330.42	100,533.83	142,781.55	67,552.55

Source: CMIE Database – Commodity Review

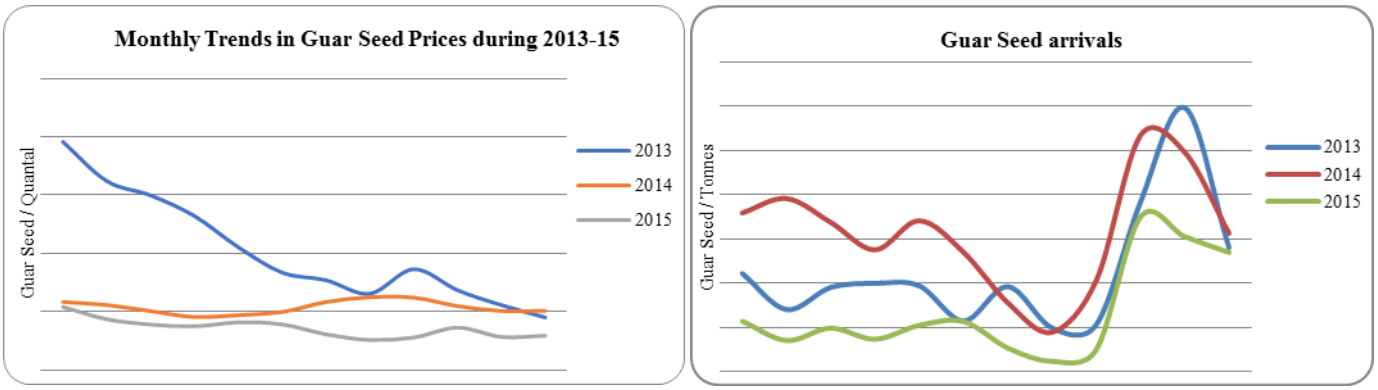

Fig 7

4. Findings

From the foregoing analysis, the following observations could be made

- The seasonality existing in select agricultural commodities are analyzed by using monthly data for the years 2013, 2014 and 2015 to identify the possible fluctuations in prices and consequent success of future markets hedging.
- An analysis of prices of select commodities indicate that commodity average prices per quintal is gradually increasing over the period of study for all the commodities. The increase in prices are substantial in case of Guar Seeds, Channa, Turmeric and Barley.
- The existence of seasonality or otherwise is analysed with the help of market arrivals and prices data on month to month basis for the last 3 years, i.e., 2013, 2014 and 2015 for select commodities. This analysis is expected to provide information for developing strategic in derivatives market.
- There exists clear seasonality in market arrivals and prices in all the seven selected commodities. It can be observed from the data that the seasonal market arrivals are high with a decline in average prices for 2 to 3 months.
- In case of Soyabean and Barley the season is very clear terms with substantial raise in arrivals, working out to two to three times with 270 thousand quintals in off season against 560 thousand quintals during the season in the year 2015.

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