ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

PRICE VOLATILITY OF AGRICULTURAL PRODUCTS IN FUTURES TRADING IN INDIA – A STATISTICAL ANALYSIS

Prof. G. V. Chalam*, Mrs. A. Madhavi

* Department of Commerce & Business Administration, Acharya Nagarjuna University, Andhra Pradesh, India

Research Scholar, Department of Commerce & Business Administration, Acharya Nagarjuna University, Andhra Pradesh, India

DOI: 10.5281/zenodo.230925

ABSTRACT

Agriculture is the backbone of India with a sizeable population depend on it for employment and livelihood. Therefore, the effective functioning of markets of agricultural produce is important for cultivators, other producers, policy makers, etc. The markets are expected to realize a fair price for farmers, traders, which are often a serious issue due to seasonality, lack of storage facilities, yield differences across different geographical regions in our country.

The abundance during harvest season, with damped price and differences in yield and quality, frequent government interference with administered prices on select commodities is resulting in a complex marketing environment for agricultural produce. This environment throws the farmers and traders to price uncertainty at every harvest season.

Against this background, an attempt is made in this paper to provide a description on Indian commodities markets with a brief profile of agriculture commodities selected for detailed study is presented. Further, it also analysed the price volatility during the period of study. Finally, it came with suggestions for the providing a fair price for the agricultural products to the cultivators by way of regulating these futures markets.

KEYWORDS: Agricultural Products, Futures Markets, Price Discovery, Volatility.

INTRODUCTION

Agriculture is the backbone of India with a sizeable population depend on it for employment and livelihood. Therefore, the effective functioning of markets of agricultural produce is important for cultivators, other producers, policy makers, etc. The markets are expected to realize a fair price for farmers, traders, which are often a serious issue due to seasonality, lack of storage facilities, yield differences across different geographical regions in our country. The abundance during the harvest season, with damped price and differences in yield and quality, frequent government interferences with administered prices on select commodities is resulting in a complex marketing environment for agricultural produce. This environment throws the farmers and traders to price uncertainty at every harvest season.

PROFILE OF SELECT COMMODITIES

In order to understand the background of the sample commodities taken for a detailed study, now, an attempt is made to present the profile of the selected agricultural commodities. Based on the secondary sources of data from the CMIE database, an attempt is made to provide a price graph for daily prices and monthly price data for a decade period during 2005-2015 commodity-wise profile. This will help to the policy makers and other governmental agencies to regulate the marketing of the agri-products, so that the cultivators are able to get remunerative prices for their yields.

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

The study comprises of select sample agricultural commodities traded in the 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.

Table-1: Sample and Period of Study

Sl. No	Commodities	Period of study
1.	Barley	2011-15
2.	Soya Bean	2011-15
3.	Jeera	2011-15
4.	Channa	2011-15
5.	Chilli	2011-15
6.	Turmeric	2011-15
7.	Guar Seeds	2011-15

The sample is chosen as these agricultural commodities were regularly traded for the last 3 out of 5 years of study. Daily closing prices of Futures contracts for the period of 2011 to 2015 constitutes the data for the analysis. Based on the crop cultivation and harvesting period, the NCDEX trades the futures contracts for select cycles. Now, in the following paragraphs it is examined the price trends for the select agri-commodities during the period of study.

Barley

Barley is a member of grass family, is a major Cereal grain grow in temperate climate. It was one of the first cultivated grain, particularly in Eurasia as early as 1,300 years ago. Barley is also used as animal fodder. In 2007 ranking of cereal crops in the World, Barley was fourth both in terms of quantity and area of cultivation. In 2014-15, total coarse grain production was 39.1 million MT. Production of Barley is also carried out as winter crop in North India, which yields additional 1.8 million MT. Much of it was demanded by malting and brewing Industry. In the last few years, few new, high quality malting grade Barley varieties have been developed.

The World Barley production stood at 141 million MT in 2014-15 as compared to 145 million MT in 2013-14. Following the favorable conditions and increases in production recorded in Europe, Russia, Ukraine and Canada, the Barley production in 2015-16 has been estimated to be at 143 million MT from table-2 and figure-1.

Barley prices are found sturdily growth all through the decade of 2005 to 2015. They found ranging around Rs. 700 in 2005-07 Rs. 1100 in 2010-12 reached Rs. 11400 by 2015. Barley price are found exhibiting a systematic pattern with marginal increase in every off – season. The prices starting from October to February in every year increase compared to other months.

Table -2 Monthly Barley Prices during 2005 - 2016

BARLEY							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	662.40	Dec-07	999.10	Nov-10	1149.50	Oct-13	1161.70
Feb-05	662.00	Jan-08	990.10	Dec-10	1195.60	Nov-13	1222.20
Mar-05	627.20	Feb-08	1006.30	Jan-11	1228.50	Dec-13	1274.50
Apr-05	575.60	Mar-08	1006.60	Feb-11	1276.30	Jan-14	1294.30
May-05	583.90	Apr-08	956.60	Mar-11	1140.20	Feb-14	1322.70
Jun-05	628.40	May-08	984.10	Apr-11	1019.10	Mar-14	1252.80
Jul-05	651.90	Jun-08	1072.00	May-11	1176.10	Apr-14	1130.90
Aug-05	656.50	Jul-08	1041.50	Jun-11	1139.30	May-14	1176.80

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Sep-05	674.60	Aug-08	1018.70	Jul-11	1098.40	Jun-14	1185.00
Oct-05	799.30	Sep-08	965.20	Aug-11	1073.50	Jul-14	1244.10
Nov-05	814.40	Oct-08	911.10	Sep-11	1037.30	Aug-14	1288.00
Dec-05	793.70	Nov-08	889.40	Oct-11	1029.20	Sep-14	1328.50
Jan-06	842.30	Dec-08	870.20	Nov-11	1042.00	Oct-14	1365.50
Feb-06	842.00	Jan-09	850.70	Dec-11	1050.10	Nov-14	1407.90
Mar-06	717.30	Feb-09	842.50	Jan-12	1103.30	Dec-14	1457.70
Apr-06	671.60	Mar-09	816.40	Feb-12	1105.70	Jan-15	1513.70
May-06	753.00	Apr-09	810.50	Mar-12	1170.10	Feb-15	1504.20
Jun-06	724.00	May-09	822.80	Apr-12	1296.10	Mar-15	1340.30
Jul-06	716.70	Jun-09	783.90	May-12	1232.30	Apr-15	1124.00
Aug-06	723.40	Jul-09	774.00	Jun-12	1122.70	May-15	1184.80
Sep-06	746.90	Aug-09	796.50	Jul-12	1173.80	Jun-15	1183.70
Oct-06	761.60	Sep-09	779.90	Aug-12	1180.70	Jul-15	1181.50
Nov-06	791.90	Oct-09	809.40	Sep-12	1117.50	Aug-15	1198.00
Dec-06	799.90	Nov-09	893.30	Oct-12	1126.40	Sep-15	1228.50
Jan-07	779.90	Dec-09	899.00	Nov-12	1189.70	Oct-15	1308.80
Feb-07	757.90	Jan-10	903.60	Dec-12	1238.00	Nov-15	1383.60
Mar-07	723.90	Feb-10	897.30	Jan-13	1246.40	Dec-15	1415.70
Apr-07	718.20	Mar-10	855.80	Feb-13	1264.70	Jan-16	1478.00
May-07	701.30	Apr-10	854.40	Mar-13	1205.50	Feb-16	1459.40
Jun-07	701.70	May-10	889.80	Apr-13	1136.20	Mar-16	1377.80
Jul-07	732.70	Jun-10	955.10	May-13	1141.30	Apr-16	1428.80
Aug-07	766.80	Jul-10	981.70	Jun-13	1162.90	May-16	1497.10
Sep-07	933.40	Aug-10	1009.40	Jul-13	1167.50	Jun-16	1569.20
Oct-07	1030.80	Sep-10	1033.60	Aug-13	1144.10	Jul-16	1591.00
Nov-07	1022.00	Oct-10	1094.40	Sep-13	1166.80		

Source: CMIE Database

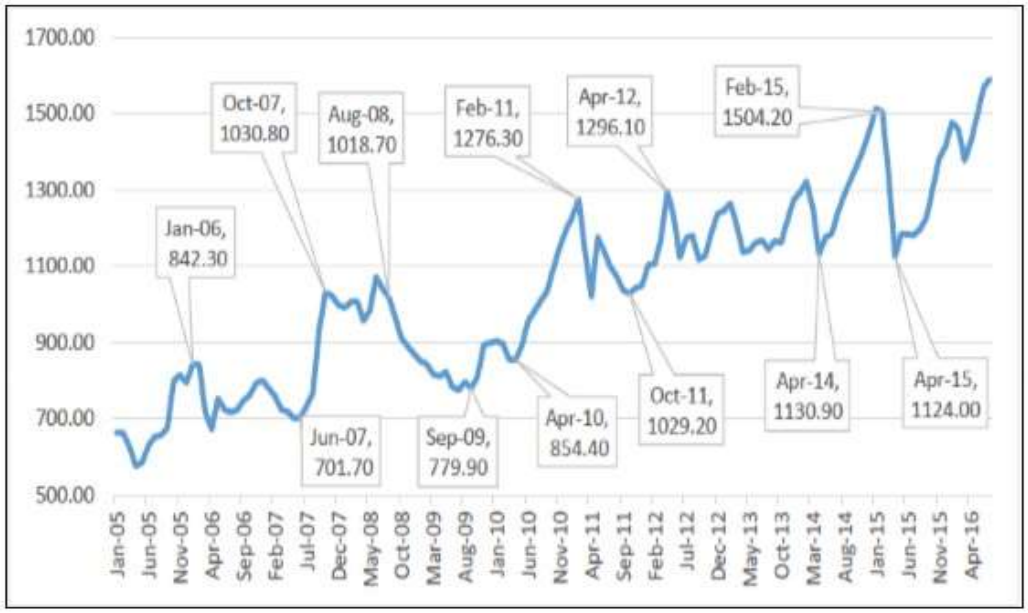

Figure-1: Trends in Daily Prices of Barley during 2005 – 2016

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Soya bean

The Soyabean or Soybean is called the Golden Bean. The Soyabean is classified as oilseed though being a legume crop. Soyabean thrives in most of the climates like tropical, sub-tropical and temperate. Soyabean is a rich source of protein (45%) and oil (18%). It is sown with the onset of Southwest monsoon i.e., by June end. India's production of Soyabean for the year 2014 is at 103.7 lac. MT and this carry over from the 2013-14 estimated as 118.6 lac MT. Dry weather in Maharashtra and excessive rain in MP has severely impacted the productivity of Soyabean. The two states accounted for 85% India's total Soyabean output are Maharashtra and MP.

Table-3 and figure-2 gives the price trends of Soyabean during 2005-2015. The prices of Soyabean found highly fluctuating. There is a three-fold increase in Prices of Soyabean. There were upward cycles in prices since 2012. The Soyabean prices are ranging around Rs. 1200 – Rs. 1400 in the year 2005-07 increased to Rs. 2000 Rs. 2200 in 2008 – 2010. The same crossed Rs. 3500 mark in 2014 and continued in that range up to July 2016.

Table-3: Monthly Soyabean Prices during 2005 – 2016 (Amount in Rs.)

SOYABEAN							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	1,226.90	Dec-07	1,776.40	Nov-10	2,005.90	Oct-13	3,172.40
Feb-05	1,204.10	Jan-08	1,945.10	Dec-10	2,041.10	Nov-13	3,444.30
Mar-05	1,281.50	Feb-08	2,036.90	Jan-11	2,219.30	Dec-13	3,503.50
Apr-05	1,268.00	Mar-08	2,105.20	Feb-11	2,276.70	Jan-14	3,456.20
May-05	1,213.90	Apr-08	2,045.20	Mar-11	2,180.40	Feb-14	3,579.80
Jun-05	1,229.30	May-08	2,184.60	Apr-11	2,233.20	Mar-14	3,802.50
Jul-05	1,227.60	Jun-08	2,404.30	May-11	2,239.90	Apr-14	4,040.60
Aug-05	1,214.20	Jul-08	2,434.70	Jun-11	2,197.70	May-14	4,280.30
Sep-05	1,174.10	Aug-08	2,423.00	Jul-11	2,212.20	Jun-14	3,885.20
Oct-05	1,125.60	Sep-08	2,247.30	Aug-11	2,263.00	Jul-14	3,839.00
Nov-05	1,077.80	Oct-08	1,655.30	Sep-11	2,169.70	Aug-14	3,616.40
Dec-05	1,067.60	Nov-08	1,564.40	Oct-11	1,963.80	Sep-14	3,179.60
Jan-06	1,120.60	Dec-08	1,719.80	Nov-11	2,030.60	Oct-14	2,968.60
Feb-06	1,131.60	Jan-09	2,108.80	Dec-11	2,176.40	Nov-14	3,108.00
Mar-06	1,121.80	Feb-09	2,176.20	Jan-12	2,319.60	Dec-14	3,137.50
Apr-06	1,147.40	Mar-09	2,178.20	Feb-12	2,328.70	Jan-15	3,201.10
May-06	1,252.90	Apr-09	2,387.30	Mar-12	2,553.80	Feb-15	3,180.90
Jun-06	1,230.90	May-09	2,500.50	Apr-12	2,982.40	Mar-15	3,108.30
Jul-06	1,198.80	Jun-09	2,379.40	May-12	3,244.90	Apr-15	3,433.80
Aug-06	1,211.20	Jul-09	2,181.30	Jun-12	3,330.00	May-15	3,718.50
Sep-06	1,177.10	Aug-09	2,178.30	Jul-12	4,168.60	Jun-15	3,455.80
Oct-06	1,136.60	Sep-09	1,899.10	Aug-12	4,189.30	Jul-15	3,256.60
Nov-06	1,284.10	Oct-09	1,935.00	Sep-12	3,741.80	Aug-15	3,112.70
Dec-06	1,296.80	Nov-09	2,243.40	Oct-12	2,937.00	Sep-15	3,162.10
Jan-07	1,324.60	Dec-09	2,272.00	Nov-12	3,086.30	Oct-15	3,570.90
Feb-07	1,355.30	Jan-10	2,131.10	Dec-12	3,108.40	Nov-15	3,497.80
Mar-07	1,420.10	Feb-10	2,019.60	Jan-13	3,103.30	Dec-15	3,470.10
Apr-07	1,479.70	Mar-10	1,935.30	Feb-13	3,138.40	Jan-16	3,493.20
May-07	1,459.50	Apr-10	1,882.60	Mar-13	3,341.30	Feb-16	3,488.80
Jun-07	1,465.90	May-10	1,856.70	Apr-13	3,750.90	Mar-16	3,498.10
Jul-07	1,540.40	Jun-10	1,816.90	May-13	3,749.00	Apr-16	3,740.70

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Aug-07	1,446.80	Jul-10	1,863.40	Jun-13	3,637.60	May-16	3,674.20
Sep-07	1,479.30	Aug-10	1,940.40	Jul-13	3,396.30	Jun-16	3,610.60
Oct-07	1,488.70	Sep-10	1,901.70	Aug-13	3,337.00	Jul-16	3,492.00
Nov-07	1,641.40	Oct-10	1,934.80	Sep-13	3,278.00		

Source: CMIE Database

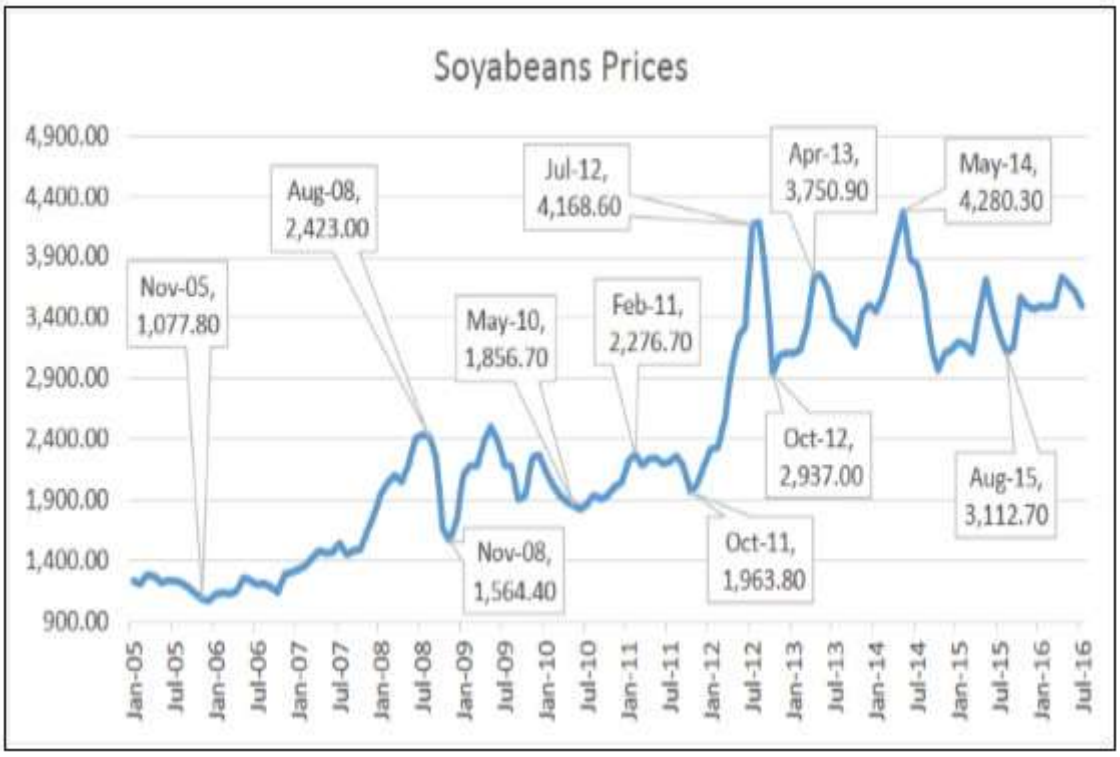

Figure-2: Trends in Daily Prices of Soyabean during 2005 – 06 to 2016

Guar Seed

Guar Cluster Bean traces its origin to South Africa but is grown throughout Southern Asia. In India, Pakistan Guar Seeds are cultivated since ancient times as a fresh vegetable. The plant has peculiar properties, drought resistant and capacity to absorb ground water. It grows easily in semi- irrigated areas. In addition, it is used as thickening agent to prevent ice – crystal formation in cold frozen areas. World's 80% of production of Guar Seed is contributed by India. Other major producers of Guar Seed are Pakistan, South Africa, etc. It is grown in Northwest part of the country and the States of Rajasthan, Gujarat and Punjab are major cultivating center.

Table-4 and figure-3 shows that the prices of Guar Seeds. They have recorded a study growth during 2005 – 2016. The Prices are ranging around Rs. 1400 to Rs. 1500 per quintal for all most 4 years of 2005 – 2009. In one – two occasions, the prices have recorded a peak level of Rs. 10,000 to Rs. 13,000 in February – April 2012 and Rs. 7000 to Rs. 9000 in December 2012 and March 2013 and settled back to Rs. 3000 – Rs. 3300 by 2015 – 16.

Table-4: Monthly Guar Seed Prices during 2005 – 2016
(Amount in Rs.)

GUAR SEED							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	1,240.60	Dec-07	1,502.80	Nov-10	2,050.60	Oct-13	4,730.20
Feb-05	1,301.80	Jan-08	1,600.40	Dec-10	2,279.60	Nov-13	4,221.30
Mar-05	1,323.80	Feb-08	1,678.10	Jan-11	2,304.20	Dec-13	3,798.80
Apr-05	1,222.50	Mar-08	1,816.10	Feb-11	2,511.30	Jan-14	4,327.90

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

May-05	955.20	Apr-08	1,587.70	Mar-11	2,714.20	Feb-14	4,223.10
Jun-05	1,132.60	May-08	1,357.50	Apr-11	2,149.30	Mar-14	4,013.90
Jul-05	1,306.20	Jun-08	1,365.60	May-11	1,932.60	Apr-14	3,812.10
Aug-05	1,342.90	Jul-08	1,488.70	Jun-11	2,485.10	May-14	3,874.60
Sep-05	1,141.50	Aug-08	1,414.00	Jul-11	2,978.10	Jun-14	3,985.20
Oct-05	1,146.30	Sep-08	1,401.20	Aug-11	3,032.50	Jul-14	4,326.10
Nov-05	1,287.00	Oct-08	1,481.70	Sep-11	3,249.30	Aug-14	4,492.40
Dec-05	1,409.40	Nov-08	1,409.70	Oct-11	3,160.10	Sep-14	4,478.90
Jan-06	1,425.30	Dec-08	1,413.40	Nov-11	3,658.70	Oct-14	4,186.00
Feb-06	1,459.80	Jan-09	1,505.10	Dec-11	4,658.20	Nov-14	4,020.70
Mar-06	1,420.90	Feb-09	1,565.70	Jan-12	6,882.10	Dec-14	4,026.00
Apr-06	1,275.80	Mar-09	1,687.40	Feb-12	10,073.00	Jan-15	4,157.10
May-06	1,351.60	Apr-09	1,472.70	Mar-12	13,371.50	Feb-15	3,737.20
Jun-06	1,371.70	May-09	1,216.90	Apr-12	12,348.30	Mar-15	3,552.00
Jul-06	1,369.70	Jun-09	1,370.20	May-12	8,720.90	Apr-15	3,493.60
Aug-06	1,433.00	Jul-09	1,543.60	Jun-12	6,242.70	May-15	3,629.30
Sep-06	1,363.30	Aug-09	1,619.80	Jul-12	4,753.80	Jun-15	3,557.90
Oct-06	1,488.80	Sep-09	1,505.10	Aug-12	4,315.60	Jul-15	3,217.00
Nov-06	1,465.00	Oct-09	1,670.90	Sep-12	3,397.80	Aug-15	3,024.30
Dec-06	1,581.20	Nov-09	2,177.30	Oct-12	4,962.80	Sep-15	3,105.80
Jan-07	1,616.60	Dec-09	2,416.20	Nov-12	5,820.50	Oct-15	3,448.20
Feb-07	1,610.80	Jan-10	2,337.80	Dec-12	9,620.60	Nov-15	3,128.40
Mar-07	1,624.50	Feb-10	2,229.20	Jan-13	9,822.80	Dec-15	3,169.40
Apr-07	1,429.50	Mar-10	2,153.20	Feb-13	8,480.50	Jan-16	3,337.90
May-07	1,167.20	Apr-10	1,877.50	Mar-13	7,986.80	Feb-16	3,199.00
Jun-07	1,189.90	May-10	1,708.90	Apr-13	7,277.50	Mar-16	3,269.20
Jul-07	1,331.60	Jun-10	1,982.20	May-13	6,208.40	Apr-16	3,320.10
Aug-07	1,278.60	Jul-10	1,989.80	Jun-13	5,337.20	May-16	2,941.90
Sep-07	1,294.40	Aug-10	1,853.00	Jul-13	5,074.80	Jun-16	3,273.00
Oct-07	1,402.00	Sep-10	1,739.10	Aug-13	4,613.60	Jul-16	3,391.80
Nov-07	1,397.80	Oct-10	1,824.00	Sep-13	5,452.50		

Source. www.cmie.com

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Figure-3: Trends in Daily Prices Guar Seeds during 2005 – 2016

Jeera

Jeera is also called Cumin seed of a hurb. Jeera traces its origin to Levant and upper Egypt and was known to Egyptians in 5000 B.C. Jeera is a Rabi Crop with a Crop duration of 120-150 days. Jeera is sown during October – November and harvested in February to March. According to Gujarat Govt. data Jeera sowing has declined by 42% to 62,000 hectors acres against 545000 hectors in 2014-15. Similarly in the Rajasthan are under Jeera cultivation declined by 10-15% during 2015. India is the largest producer and consumer as well as exporter of Jeera. It provides 70% of Worlds supply and consumes 90% what it produces. Jeera exports in 2014-15 were 55% higher than the earlier year.

Table-5 and the figure-4 indicates that Jeera prices have been doubled in 2005 – 2016. Jeera prices are stagnant at Rs. 6000 in 2005 – 06 gradually raised to Rs. 9000 – Rs. 10,000 in 2007 – 2010 and crossed Rs. 12,000 to Rs. 14,000 mark in 2014 – 2016. There are wide fluctuations in Jeera prices during 2010 – 2016.

Table-5: Monthly Jeera Prices during 2005 – 2016
(Amount in Rs.)

JEERA							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	6,334.00	Dec-07	9,438.50	Nov-10	12,860.80	Oct-13	11,551.10
Feb-05	6,622.80	Jan-08	9,632.90	Dec-10	12,662.20	Nov-13	11,753.00
Mar-05	6,477.90	Feb-08	8,900.10	Jan-11	13,098.90	Dec-13	11,539.80
Apr-05	6,367.50	Mar-08	7,986.80	Feb-11	13,486.50	Jan-14	11,377.40
May-05	6,324.10	Apr-08	7,936.20	Mar-11	13,020.80	Feb-14	10,451.10
Jun-05	6,485.00	May-08	8,905.70	Apr-11	12,462.20	Mar-14	9,245.40
Jul-05	6,231.30	Jun-08	9,178.10	May-11	12,365.50	Apr-14	8,658.00
Aug-05	6,611.00	Jul-08	10,427.00	Jun-11	12,316.20	May-14	9,466.80
Sep-05	6,294.90	Aug-08	10,103.40	Jul-11	12,902.50	Jun-14	9,520.70
Oct-05	6,063.50	Sep-08	9,113.00	Aug-11	13,702.30	Jul-14	9,981.30
Nov-05	6,315.50	Oct-08	9,241.60	Sep-11	13,283.80	Aug-14	9,962.50

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Dec-05	6,058.50	Nov-08	8,645.40	Oct-11	14,071.60	Sep-14	9,316.90
Jan-06	6,042.20	Dec-08	8,499.50	Nov-11	12,942.00	Oct-14	10,255.10
Feb-06	5,633.60	Jan-09	9,526.60	Dec-11	13,101.10	Nov-14	10,246.50
Mar-06	5,385.10	Feb-09	9,438.50	Jan-12	13,468.20	Dec-14	11,398.90
Apr-06	5,125.60	Mar-09	9,254.30	Feb-12	13,129.60	Jan-15	13,185.80
May-06	6,098.40	Apr-09	9,594.10	Mar-12	12,221.00	Feb-15	12,650.60
Jun-06	5,845.80	May-09	9,143.90	Apr-12	11,143.20	Mar-15	12,858.00
Jul-06	6,639.20	Jun-09	8,966.80	May-12	11,710.20	Apr-15	13,575.60
Aug-06	7,068.80	Jul-09	9,327.20	Jun-12	11,895.70	May-15	14,431.20
Sep-06	7,732.70	Aug-09	9,697.00	Jul-12	13,323.10	Jun-15	14,214.90
Oct-06	7,530.00	Sep-09	9,269.50	Aug-12	14,065.90	Jul-15	14,173.20
Nov-06	7,187.40	Oct-09	9,807.90	Sep-12	12,834.90	Aug-15	13,510.10
Dec-06	7,605.10	Nov-09	11,604.30	Oct-12	13,135.20	Sep-15	13,921.40
Jan-07	7,986.40	Dec-09	11,999.20	Nov-12	13,867.30	Oct-15	14,004.20
Feb-07	8,603.70	Jan-10	11,241.80	Dec-12	13,319.70	Nov-15	14,773.10
Mar-07	9,900.20	Feb-10	10,291.00	Jan-13	12,759.10	Dec-15	13,570.40
Apr-07	10,642.50	Mar-10	10,136.60	Feb-13	12,266.10	Jan-16	12,637.40
May-07	10,065.50	Apr-10	10,244.60	Mar-13	11,696.80	Feb-16	12,850.80
Jun-07	9,892.30	May-10	10,590.00	Apr-13	11,636.40	Mar-16	13,106.70
Jul-07	9,882.80	Jun-10	10,932.90	May-13	11,423.30	Apr-16	13,917.20
Aug-07	9,980.00	Jul-10	12,067.00	Jun-13	11,675.80	May-16	14,228.20
Sep-07	9,938.90	Aug-10	12,247.10	Jul-13	12,109.20	Jun-16	14,430.80
Oct-07	9,624.80	Sep-10	12,111.70	Aug-13	12,321.20	Jul-16	15,851.70
Nov-07	10,056.20	Oct-10	11,610.70	Sep-13	11,935.10		

Source: www.cmie.com

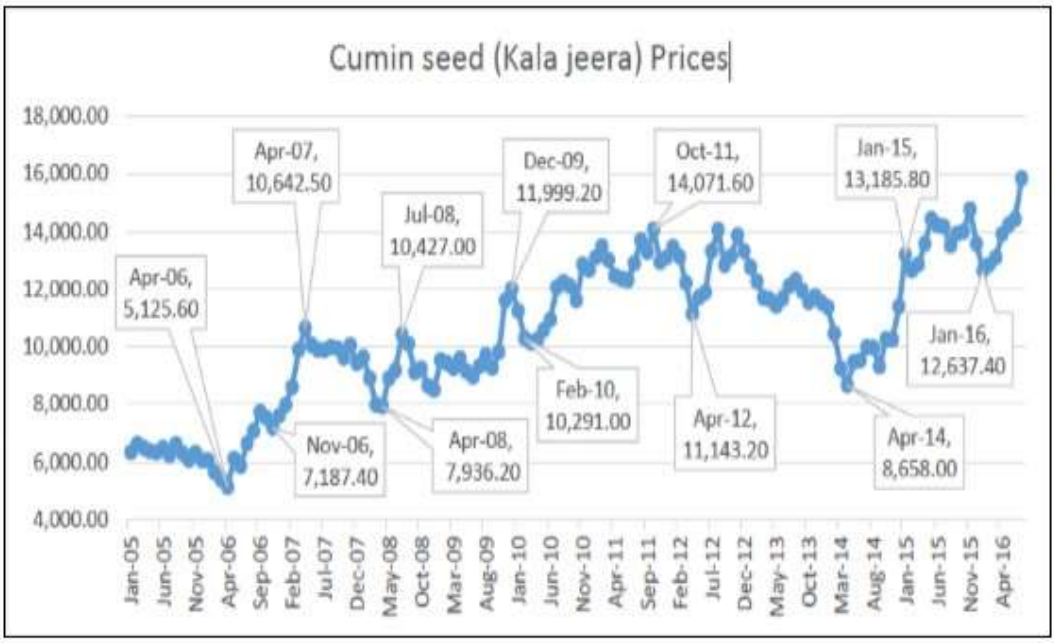

Figure-4: Trends in Prices of Jeera during 2005 – 2016

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Turmeric

Turmeric belongs to the Zingiberaceae family. Rizome part of the plant is exploited for commercial purposes. Turmeric thrives in light black, black Loams and red soils. It grows under irrigated and rain fed conditions. The temperature between 20 and 30 degree is required for the growth of the crop. Turmeric is 240-270 days crop. In India Turmeric is a Kharif crop and is harvested in January to March. While harvesting, whole plant is uprooted, all leaves are cut and roots are removed.

Despite an increase in the area sown under Turmeric in 2014-15, the production declined by around 20-25% as compared to previous year. Table 3.9 and figure 3.5 indicates the trends in prices of Turmeric. Turmeric prices steadily rose from Rs. 2500 in 2005-07 Rs. 4000 to Rs. 5000 in 2010-12 touched Rs. 7000 mark in 2015. During 2010, the prices reached peak crossing Rs. 10,000 to Rs. 12,000 per quintal.

Table-6: Monthly Turmeric Prices during 2005 – 2016
(Amount in Rs.)

TURMERIC							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	2,544.80	Dec-07	2,040.60	Nov-10	13,018.40	Oct-13	4,786.10
Feb-05	2,775.90	Jan-08	2,288.60	Dec-10	12,751.20	Nov-13	4,800.50
Mar-05	2,540.20	Feb-08	2,554.30	Jan-11	12,701.30	Dec-13	4,903.60
Apr-05	2,665.20	Mar-08	3,140.80	Feb-11	11,707.90	Jan-14	5,283.00
May-05	2,540.70	Apr-08	3,061.70	Mar-11	11,414.10	Feb-14	5,438.20
Jun-05	2,475.70	May-08	3,198.20	Apr-11	11,026.40	Mar-14	5,698.90
Jul-05	2,365.40	Jun-08	3,526.70	May-11	9,696.30	Apr-14	5,989.70
Aug-05	2,482.10	Jul-08	3,773.50	Jun-11	8,703.30	May-14	6,283.40
Sep-05	2,673.30	Aug-08	3,654.30	Jul-11	8,524.10	Jun-14	6,169.10
Oct-05	2,288.00	Sep-08	3,333.30	Aug-11	8,465.20	Jul-14	6,357.90
Nov-05	2,355.70	Oct-08	2,786.10	Sep-11	7,082.20	Aug-14	6,145.00
Dec-05	2,452.60	Nov-08	2,607.70	Oct-11	6,952.00	Sep-14	5,975.90
Jan-06	2,118.60	Dec-08	2,727.10	Nov-11	6,172.80	Oct-14	5,570.30
Feb-06	2,434.30	Jan-09	3,062.00	Dec-11	5,522.90	Nov-14	5,668.60
Mar-06	2,485.30	Feb-09	3,380.40	Jan-12	5,271.90	Dec-14	5,928.50
Apr-06	2,352.50	Mar-09	3,825.10	Feb-12	4,852.60	Jan-15	6,328.60
May-06	2,387.30	Apr-09	4,463.30	Mar-12	4,507.60	Feb-15	6,497.50
Jun-06	2,524.90	May-09	4,732.50	Apr-12	4,020.20	Mar-15	7,123.80
Jul-06	2,560.40	Jun-09	4,872.10	May-12	4,002.70	Apr-15	7,334.00
Aug-06	2,721.60	Jul-09	5,418.40	Jun-12	4,009.50	May-15	7,291.70
Sep-06	2,502.50	Aug-09	6,520.20	Jul-12	4,753.00	Jun-15	7,226.20
Oct-06	2,095.80	Sep-09	6,648.30	Aug-12	5,670.90	Jul-15	7,075.60
Nov-06	1,955.90	Oct-09	6,549.60	Sep-12	5,484.80	Aug-15	6,936.70
Dec-06	1,912.60	Nov-09	7,493.50	Oct-12	4,766.90	Sep-15	7,232.20
Jan-07	2,190.50	Dec-09	7,122.80	Nov-12	4,561.40	Oct-15	6,921.50
Feb-07	2,327.30	Jan-10	7,664.80	Dec-12	4,501.80	Nov-15	7,269.00
Mar-07	2,202.80	Feb-10	7,267.00	Jan-13	4,746.90	Dec-15	7,748.60
Apr-07	2,289.00	Mar-10	9,009.40	Feb-13	5,149.50	Jan-16	7,167.70
May-07	2,144.80	Apr-10	11,314.90	Mar-13	6,052.40	Feb-16	7,705.70
Jun-07	2,116.40	May-10	14,105.10	Apr-13	6,545.90	Mar-16	8,231.20
Jul-07	2,285.90	Jun-10	14,960.00	May-13	6,103.00	Apr-16	8,286.90

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Aug-07	2,331.50	Jul-10	15,284.80	Jun-13	6,036.40	May-16	8,390.60
Sep-07	2,330.40	Aug-10	14,452.50	Jul-13	5,975.10	Jun-16	8,220.30
Oct-07	2,087.20	Sep-10	13,833.80	Aug-13	5,575.00	Jul-16	8,027.70
Nov-07	2,038.30	Oct-10	12,756.80	Sep-13	5,058.60		

Source: www.cmie.com

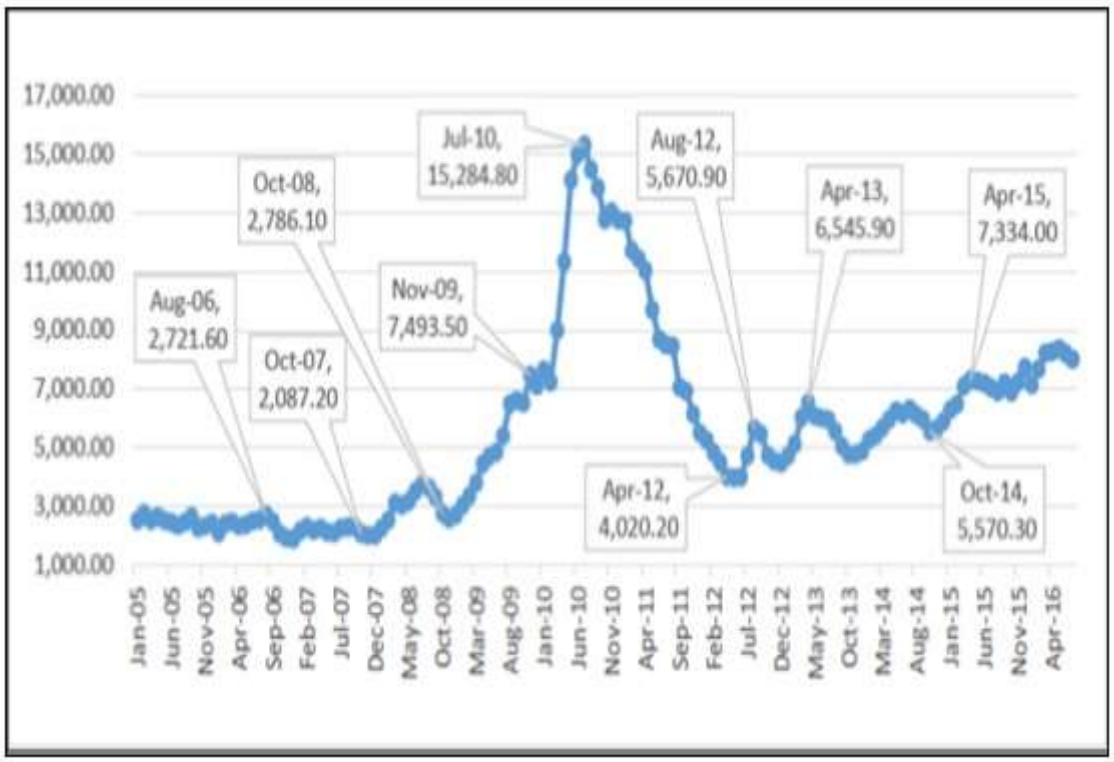

Figure-5: Trends in Prices of Turmeric during 2005 – 2016

Chilli

Chilli is considered as a highly consumed product by the people throughout the World. It grows basically in light soils and sandy areas. For Chilli production a warm, humid climate and a temperature of 20-25º is required. China and Pakistan are the major producers of Chilli apart from India. The best time for harvesting is between December and March. Nearly 80% of India's production is consumed within the country and the major producers are Andhra Pradesh, Karnataka, Odisha and Maharashtra.

In 2014-15, 1.5 million MT of Chilli produced in India. Production has marginally improved by 15% compared to 2013-14 production of 1.2 million MT. The prices of Chilli gradually increased from Rs. 1500 – Rs. 2000 in 2005-07 to Rs. 2000 to Rs. 3000 in 2011 – 2013. They suddenly picked up to Rs. 8000 – Rs. 9000 in 2016 (details in table-7 and figure-6).

Table-7: Monthly Chilli Prices during 2005 – 2016
(Amount in Rs.)

CHILLIES							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	1,573.80	Dec-07	1,514.60	Nov-10	1,887.40	Oct-13	3,140.10
Feb-05	1,599.00	Jan-08	1,651.30	Dec-10	2,002.60	Nov-13	3,066.80
Mar-05	1,515.10	Feb-08	1,882.60	Jan-11	2,465.10	Dec-13	2,943.40
Apr-05	1,455.80	Mar-08	1,973.40	Feb-11	2,779.10	Jan-14	3,154.10

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

May-05	1,210.10	Apr-08	2,011.30	Mar-11	2,954.20	Feb-14	3,256.10
Jun-05	1,153.70	May-08	1,999.70	Apr-11	2,436.40	Mar-14	3,369.10
Jul-05	1,315.10	Jun-08	1,633.10	May-11	2,157.80	Apr-14	2,988.10
Aug-05	1,287.60	Jul-08	1,647.90	Jun-11	2,015.70	May-14	2,679.90
Sep-05	1,424.30	Aug-08	1,899.20	Jul-11	2,086.70	Jun-14	2,422.40
Oct-05	1,432.40	Sep-08	1,998.20	Aug-11	2,479.40	Jul-14	3,236.40
Nov-05	1,466.80	Oct-08	2,210.10	Sep-11	2,742.00	Aug-14	3,430.80
Dec-05	1,478.70	Nov-08	2,123.20	Oct-11	2,673.10	Sep-14	3,340.80
Jan-06	1,469.30	Dec-08	1,832.50	Nov-11	2,540.60	Oct-14	3,684.00
Feb-06	1,626.70	Jan-09	1,836.90	Dec-11	2,373.90	Nov-14	3,257.40
Mar-06	1,744.70	Feb-09	1,935.10	Jan-12	2,741.90	Dec-14	2,763.00
Apr-06	1,632.70	Mar-09	2,130.00	Feb-12	2,795.60	Jan-15	3,167.40
May-06	1,818.40	Apr-09	2,005.90	Mar-12	2,762.70	Feb-15	3,370.70
Jun-06	1,656.10	May-09	1,888.30	Apr-12	2,775.60	Mar-15	3,482.60
Jul-06	1,742.60	Jun-09	1,854.70	May-12	2,409.90	Apr-15	3,345.20
Aug-06	1,917.30	Jul-09	2,197.10	Jun-12	3,140.40	May-15	3,011.00
Sep-06	1,850.10	Aug-09	2,048.70	Jul-12	3,202.10	Jun-15	2,777.60
Oct-06	1,963.50	Sep-09	2,016.40	Aug-12	2,357.30	Jul-15	2,890.30
Nov-06	2,227.90	Oct-09	2,248.20	Sep-12	2,261.80	Aug-15	3,054.00
Dec-06	2,076.90	Nov-09	2,036.00	Oct-12	2,274.40	Sep-15	3,889.50
Jan-07	1,982.00	Dec-09	1,906.50	Nov-12	2,165.50	Oct-15	3,852.40
Feb-07	2,057.70	Jan-10	1,974.90	Dec-12	2,179.50	Nov-15	3,289.50
Mar-07	2,179.40	Feb-10	2,057.90	Jan-13	2,454.60	Dec-15	3,407.20
Apr-07	1,978.30	Mar-10	2,398.40	Feb-13	2,890.50	Jan-16	4,117.10
May-07	1,808.10	Apr-10	2,295.50	Mar-13	2,992.30	Feb-16	7,560.50
Jun-07	1,509.20	May-10	2,494.50	Apr-13	2,922.20	Mar-16	8,319.20
Jul-07	1,509.00	Jun-10	2,205.50	May-13	3,128.00	Apr-16	8,799.30
Aug-07	1,641.60	Jul-10	2,270.50	Jun-13	2,970.30	May-16	9,037.10
Sep-07	1,729.30	Aug-10	2,399.40	Jul-13	2,800.70	Jun-16	9,353.90
Oct-07	1,948.70	Sep-10	2,557.40	Aug-13	3,410.30	Jul-16	9,198.50
Nov-07	1,652.60	Oct-10	2,246.00	Sep-13	3,273.20		

Source: www.cmie.com

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

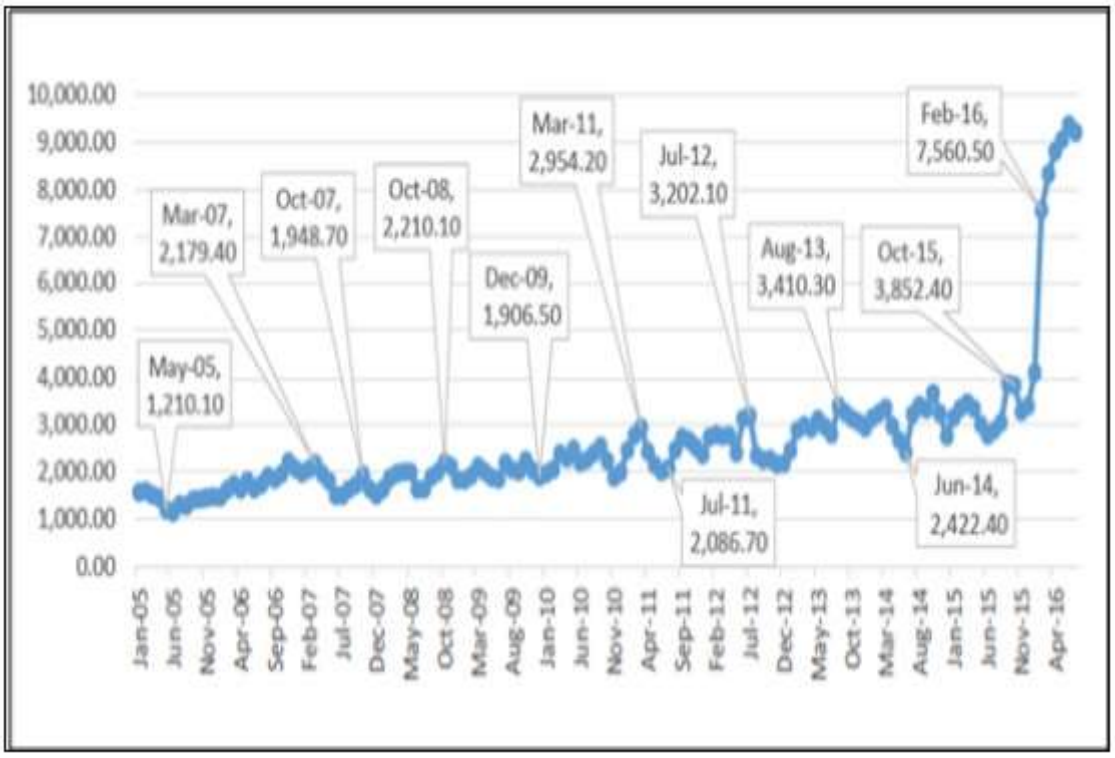

Figure-6: Trends in Prices of Chilli during 2005 - 2016

Channa

Channa is a rich source of protein and is also used as edible seed for making flour. Channa is two types Desi and Kabuli. Desi Channa is mainly grown in India and they are brown split peas. The production of Channa in the year 2014-15 fell to 7.17 million MT from 9.53 million MT in 2013-14. Lower production is mainly because of lower rain fall received during the year 2014, which resulted in sharp fall in the area under cultivation in key growing belts. The area under cultivation is a dropped due to poor margins from Channa crop. In order to boost production Govt. increased the minimum support price for Channa by more than 10% for 2015-16 to Rs. 3500 per quintal from 3175 per quintal offered to farmers in previous year.

The price trend of Channa started from Rs. 1500 to Rs. 2200 in 2005 - 07 moved up to Rs. 2500 to Rs. 3500 in 2010 – 11. The prices of Channa reached more than Rs. 3500 since May 2015 with a substantial fall in area under cultivation (table-8 and figure-7).

Table-8: Monthly Channa Prices during 2005 – 2016
(Amount in Rs.)

CHANNA							
Date	**Prices**	**Date**	**Prices**	**Date**	**Prices**	**Date**	**Prices**
Jan-05	1,568.80	Dec-07	2,069.10	Nov-10	2,363.80	Oct-13	3,207.20
Feb-05	1,555.10	Jan-08	2,050.40	Dec-10	2,422.10	Nov-13	3,211.30
Mar-05	1,571.20	Feb-08	2,334.10	Jan-11	2,488.10	Dec-13	3,107.20
Apr-05	1,576.90	Mar-08	2,487.40	Feb-11	2,546.10	Jan-14	3,097.60
May-05	1,575.00	Apr-08	2,383.50	Mar-11	2,441.50	Feb-14	3,053.00
Jun-05	1,706.90	May-08	2,258.50	Apr-11	2,363.10	Mar-14	3,145.20
Jul-05	1,788.80	Jun-08	2,230.40	May-11	2,426.20	Apr-14	3,047.10
Aug-05	1,812.30	Jul-08	2,348.10	Jun-11	2,597.30	May-14	3,020.10
Sep-05	1,779.60	Aug-08	2,388.00	Jul-11	2,781.00	Jun-14	2,874.30
Oct-05	1,769.00	Sep-08	2,330.50	Aug-11	2,918.00	Jul-14	2,960.40

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Nov-05	1,939.50	Oct-08	2,290.80	Sep-11	3,287.00	Aug-14	3,067.80
Dec-05	1,886.00	Nov-08	2,176.20	Oct-11	3,314.80	Sep-14	3,025.30
Jan-06	1,855.60	Dec-08	2,171.70	Nov-11	3,514.40	Oct-14	3,101.50
Feb-06	1,766.50	Jan-09	2,218.80	Dec-11	3,413.90	Nov-14	3,120.80
Mar-06	1,822.60	Feb-09	2,221.00	Jan-12	3,445.00	Dec-14	3,180.80
Apr-06	1,936.90	Mar-09	2,097.40	Feb-12	3,511.50	Jan-15	3,376.30
May-06	2,139.20	Apr-09	2,127.40	Mar-12	3,583.10	Feb-15	3,453.80
Jun-06	2,177.20	May-09	2,130.30	Apr-12	3,615.40	Mar-15	3,407.70
Jul-06	2,112.20	Jun-09	2,100.50	May-12	4,096.50	Apr-15	3,638.50
Aug-06	2,275.20	Jul-09	2,300.40	Jun-12	4,200.20	May-15	4,259.50
Sep-06	2,749.60	Aug-09	2,363.90	Jul-12	4,588.50	Jun-15	4,288.90
Oct-06	2,869.10	Sep-09	2,321.60	Aug-12	4,747.70	Jul-15	4,347.70
Nov-06	2,684.90	Oct-09	2,347.60	Sep-12	4,659.80	Aug-15	4,481.60
Dec-06	2,584.30	Nov-09	2,449.50	Oct-12	4,577.20	Sep-15	4,648.60
Jan-07	2,449.90	Dec-09	2,439.90	Nov-12	4,568.10	Oct-15	4,863.70
Feb-07	2,276.60	Jan-10	2,372.10	Dec-12	4,239.60	Nov-15	4,990.20
Mar-07	2,171.30	Feb-10	2,263.80	Jan-13	3,951.10	Dec-15	4,993.70
Apr-07	2,253.20	Mar-10	2,164.80	Feb-13	3,663.30	Jan-16	4,762.50
May-07	2,198.40	Apr-10	2,151.00	Mar-13	3,540.20	Feb-16	4,574.40
Jun-07	2,176.80	May-10	2,107.20	Apr-13	3,525.20	Mar-16	4,653.10
Jul-07	2,290.60	Jun-10	2,106.60	May-13	3,443.40	Apr-16	5,278.10
Aug-07	2,234.80	Jul-10	2,217.10	Jun-13	3,309.50	May-16	6,305.60
Sep-07	2,239.30	Aug-10	2,243.90	Jul-13	3,219.00	Jun-16	7,884.90
Oct-07	2,258.70	Sep-10	2,223.20	Aug-13	3,229.30	Jul-16	8,927.80
Nov-07	2,202.80	Oct-10	2,294.90	Sep-13	3,223.30		

Source: www.cmie.com

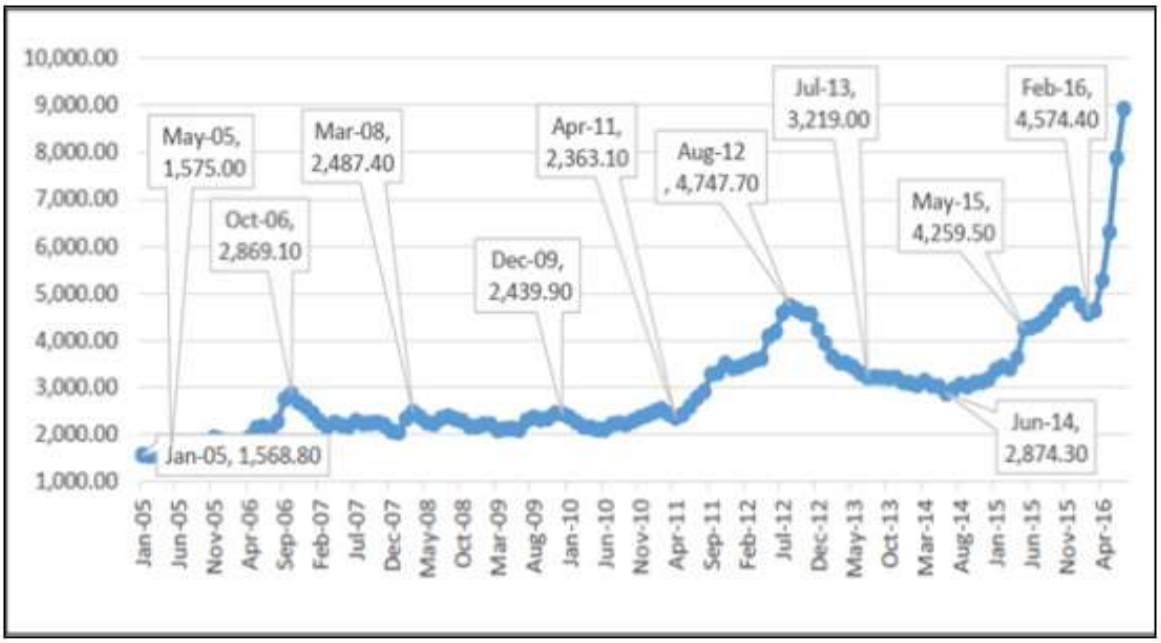

Figure-7: Trends in Price of Channa during 2005 – 2016

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Findings:

This study focused on providing overall picture relating to the profiles of select commodities especially in terms of price trends are analyzed. The price fluctuations might have made the Futures trading to pick up the derivatives markets.

- The profile of select commodities indicates rise in prices in all the seven commodities during 2005-2016. A three-fold increase in prices are observable in case of commodities like Barley, Soya Been, Turmeric and Channa.
- Barley prices rose from Rs 1200 in 2005-06 to Rs2000 in 2010-11 to Rs. 3000 in 2015-16. Prices reached peak level during May-June and lower level during Oct-Nov may be due to harvest time in most years.
- Jeera prices are ranging at Rs 6000 in 2005-06 doubled to Rs 12000 in 2010-11 and grown to Rs 14000 in 2015-16. The monthly prices are widely fluctuating in every year.
- Turmeric prices rised from Rs 2500 in 2005-06 to peak level of Rs 13000-14000 in 2011. The prices gradually declined to Rs 6000- Rs7000 in 2015-16.
- Chilli prices are stagnant for long time at Rs1500-1600 in 205-06 grown to Rs 2000- Rs3000 in 2010-11 and to Rs 3000 - Rs 3500 in 2015-16. There is sudden spurt in Chilli prices in 2016 where the prices shooted up to Rs. 8000- Rs. 9000.
- Channa prices are found stable during 2005-06 and 2010-11 around Rs. 2000 to Rs 2300. Subsequently, the Channa prices shooted up to Rs4500 toward end of 2015.

SUGGESTIONS

The following suggestions are offered for an assurance of providing a fair price for the agricultural products to the cultivators by way of regulating these futures markets by the government regulatory authorities.

1. Futures markets are faring well in price discovery process but failing in hedging effectiveness and in reducing basis risk. The eco-system needed for the play of arbitragers needed to be created.
2. Larger the number of players in the market, lower the distortions and arbitrage benefits. Efforts need to be directed towards increasing the participants like small and medium farmers to corporate hedgers.
3. Contracts are to be designed for good number of grades and locations. Introduction of multiple contracts on simple commodity with variation in grades and location is the need of the hour.
4. Arbitragers face numerous costs, like fees, taxes, margin requirements high unpredictable liquidity requirements prices vitalities based margins, regulatory margin etc., which need to be rationalized.
5. Merged FMC–SEBI should design regulatory environment to monitor both financial market participants and commodity players together. This require technological support and Human Capacity.
6. Newer contracts need to be designed at exchanges and the practices in established markets need to be adopted for greater disclosures, risk management.

REFERENCES

[1] **Andrews, Mihir Dash and Sowmya B (2010),** "A Study on Market Behaviour and Price Discovery in Indian Commodity Markets." S*ocial Science Research Network* (2): 1–11.
[2] **Baillie, Richard T., G. Geoffrey Booth, YiumanTse, and Tatyana Zabotina (2002),** "Price Discovery and Common Factor Models." *Journal of Financial Markets* 5(3): 309–21.
[3] **Chakraborty, Ranajit, and Rahuldeb Das (2013**), "Dynamic Relationship between Futures Trading and Spot Price Volatility : Evidence from Indian Commodity Market." *he IUP Journal of Applied Finance*, Vol. 19 (4): 5–18.
[4] **Chhajed, Isha, and Sameer Mehta (2013),** "Market Behavior and Price Discovery in Indian Agriculture Commodity Market." *International Journal of Scientific and Research Publications,* 3(3): 1–4.
[5] **Dash, Mihir, and Abhishek Solanki and Shobana T (2012)**, "A Study on Commodity Market Behaviour, Price Discovery and Its Factors." S*ocial Science Research Network* 1(5): 1042–59.
[6] **Figuerola-Ferretti, Isabel, and Jess Gonzalo (2010)**, "Modelling and Measuring Price Discovery in Commodity Markets." *Journal of Econometrics* 158 (1): 95–107.
[7] **Karmakar and Madhusudan (2009)**, "Price Discoveries and Volatility Spillovers in S&P CNX Nifty Future and Its Underlying Index CNX Nifty." *Vikalpa* 34 (2): 41– 44.
[8] **Lokare, Sm. (2007)**, "Commodity Derivatives and Price Risk Management: An Empirical Anecdote from India." *Reserve Bank of India Occasional Papers* 28(2): 27–76.
[9] **Mallikarjunappa, T, and EM Afsal. (2010)**. "Price Discovery Process and Volatility Spillover in Spot and Futures Markets: Evidences of Individual Stocks." *Vikalpa: The Journal,* 35(2): 49–63.

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

[10] **Nirmala, K. (2015)**, "Price Discovery in Commodity Markets : A Study of Indian Cardamom Market in Multi Commodity Exchange." *Indian Journal of Accounting*, XLVII (June): 92–97.
[11] **Srinivasan P (2011)**, "Price Discovery and Volatility Spillovers in Indian Spot-Futures Commodity Market." *Munich Personal RePEc Archive (MPRA)* (35423).
[12] **Pavabutr, Pantisa, and Piyamas Chaihetphon (2010**), "Price Discovery in the Indian Gold Futures Market." *Journal of Economics and Finance*, 34(4): 455–67.
[13] **Saranya, V.P. (2015)**, "Volatility and Price Discovery Process Of Indian Spot and Futures Market For Non- Agricultural Commodities." *International Journal in Management and Social Science, Vol.* (03): 452–67.
[14] **Sehgal, Prof. Sanjay, Dr. Namita Rajput, and Rajeev Kumar Dua. (2012**), "Price Discovery in Indian Agricultural Commodity Markets." *International Journal of Accounting and Financial Reporting* 2(2): 31–38.
[15] **Sendhil, R, Amit Kar, V C Mathur, and Girish K Jha (2013**), "Price Discovery, Transmission and Volatility : Evidence from Agricultural Commodity Futures." *Agricultural Economics Research Review* 26(1): 41–54.
[16] **Shakeel, Moonis, and ShriramPurankar (2014**), "Price Discovery Mechanism of Spot and Futures Market in India : A Case of Selected Agri-Commodities." I*nternational Research Journal of Business and Management*, VII (8): 50–61.
[17] **Srinivasan, P (2009),** "Price Discovery in NSE Spot and Futures Markets of Selected Oil and Gas Industries in India : What Causes What ?" *The IUP Journal of Financial Risk Management*, Vol. VI (3 & 4), 22–38.
[18] **Srinivasan, P. (2009**), "An Empirical Analysis of Price Discovery in the NSE Spot and Futures Markets of India." *IUP* 15(11): 24–37.
[19] **Tobergte, David R., and Shirley Curtis (2013**), "Price Discovery Process and Volatility Spillover of Chilli Spot and Futures Prices Evidence from National Commodity and Derivative Exchange Ltd (NCDEX)." *International Journal of Engineering and Management Research*, 3(12): 1–23.
[20] **Tripathy and Trilochan (2008**), "Volatility and Price Integration in Primary Commodities Market : A Strategic Direction in India." *The ICFAI Journal of Business Strategy*, Vol. V (1), 7–21.
[21] **Yang, Jian, David A. Bessler, and David J. Leatham (2001**), "Asset Storability and Price Discovery in Commodity Futures Markets : A New Look." *The Journal of Futures Markets* 21(3): 279–300.
[22] **Zhang, Lin. (2013),** "Price, Return and Volatility Linkages of Base Metal Futures Traded in India." *Munich Personal RePEc Archive (MPRA)* (47061).