



TRENDS IN PRODUCTION AND PRICE BEHAVIOUR OF AGRI-COMMODITIES IN INDIA - A STATISTICAL ANALYSIS

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ABSTRACT

The demand for commodities normally stable and increases gradually with increased population, wherein the rise in production through high yielding/more cultivable land is very essential. Otherwise, the price of the commodities will increase and the people may spend more money for their demand of these goods. A brief review of the earlier studies indicates that there are no relevant studies attempted on the volume of production and prices of agri-commodities in India, which focuses the present study. Hence, the present study is intended to address and explore trends in production, prices of the select agri-commodities during the period of study. The data for identifying seasonality in agricultural commodities is drawn from the CMIE database. The monthly production, average prices, etc., are analyzed and trends are estimated. It is found from the study that there are additional hectares of land have been brought under cultivation to meet the demand of these commodities. It is also concluded from the data that there is a remarkable increase in the prices of some of these commodities due the additional demand the global markets of these select commodities.

Key words: Agri-Commodities, Market Arrivals, Yield per Acre, Production Trends, Price Trends

1.0 Indian Agricultural Space

While the Global Markets remained bearish through 2015-16, growth story of India has been somewhat better mostly due to depressed crude prices. With successive years of

differed rainfall since 2009, the production of food grains, oil seeds, and pulses recorded a sizeable decline. A decline of 12.36 million MT food grain production in a single year of 2014-15 followed by 26.7 million MT of oil seeds and 2.4 million MT of pulses recorded a serious strain in our country's agriculture space. While demand for commodities normally stable and increases gradually with increased population, food inflation is always the result of supply side dynamics. The newly developed commodities derivatives market in India started providing hedging opportunities for price risk to commodity producers.

2.0 Review of Literature

Sl. No	Author and Journal Name	Title of The Study	Variables and Period of The Study	Results
1	I. Chhajed And S. Mehta (2013), International Journal of Scientific and Research Publications. Vol. 3(3), Pp. 1-4.	Market Behavior and Price Discovery in Indian Agriculture Commodity Market.	Wheat, Chana, Soybean Oil, Jute, Mentha Oil, Rubber, Potato, Crude Palm Oil and Cardamom for the Period of 2009-2010. They Used Granger Causality Test.	Significant effect of futures prices on spot prices in Chana, wheat, cardamom, soya been, rubber, potato and crude palm oil exempt jute and menthe oil.
2	R. Sendhil, A. Kar, V. C. Mathur, And G. K. Jha, (2013), Agricultural Economics Research Review Vol. 26(1), Pp. 41–54.	Price Discovery, Transmission and Volatility: Evidence from Agricultural Commodity Futures.	Chickpea, Wheat, Maize and Barley for the Period of 2009-2010. They used Unit Root Test, Cointegration and Vector Error Correction Model.	The result shows futures markets are more efficient in price discovery of wheat and maize. Cointegration test showed the occurrence of one cointegration relationship between the futures market and spot market exempt barley.
3	P. S. Sehgal, D. N. Rajput, And R. K. Dua (2012) International Journal of Accounting and Financial Reporting, Vol. 2(2), Pp. 31–38.	Price Discovery in Indian Agricultural Commodity Markets.	Chana, Guar Seed, Soybean, Kapas, Potato Agra, Turmeric, Black-Pepper, Barley, Maize and Castor Seed for the Period of November 2003 to March 2012. However, they used Unit Root Test, Johansen's Co-Integration Test and Granger Causality Tests.	Price discovery is confirmed for all commodities except Turmeric.

Sl. No	Author and Journal Name	Title of The Study	Variables and Period of The Study	Results
4	Mihir Dash & Sowmya B. Andrews (2010), Social Science Research Network, No. 2, Pp. 1–11.	A Study on Market Behaviour and Price Discovery in Indian Commodity Markets.	Wheat, Potato, Maize, Barley, Masoor, Jeera, Gur, Groundnut Oil, Groundnut (In Shell), Guar Seeds, Sesame Seeds, Mustard Seeds, Cashew, Arabica Coffee, Chilli, Castor Seeds, Cotton, Mentha Oil, Gold, Silver and Aluminum Ingot for the Period of January 05 - April 07. They Used Correlation, Paired T Test and Granger Causality Test.	The results of the study suggest that the price discovery mechanism is quite effective for most commodities, but may not very effective for some commodities. Price discovery is confirmed for all commodities except Gur, Groundnut Oil, Mustard Seeds and Cashew.
5	Dash, M., Solanki Et Al. (2003) Social Science Research Network, Pp. 1-9.	A Study on Commodity Market Behaviour Price Discovery and its Factors.	Daily Closing Price of Twelve Commodities Traded in MCX from 2003-2011. They Used GARCH Model F-Test.	Long run mean return were appreciable for eight commodities, while that of aluminum, copper, zinc, and wheat were negligible. The effect of trading volume on futures price volatility was significant. Inflation had significant effect on the Crude oil future price volatility only.
6	Chhajed, I. & Mehta, S (2013) "International Journal of Scientific and Research Publications, Vol. 3(3), Pp. 1-4.	Market Behavior and Price Discovery in Indian Agriculture Commodity Markets.	Average Monthly Spot and Future Price for 9 Agri-Commodities were Collected for MCX & NCDEX during 2009-2010. They used Granger Causality Test.	The price discovery level is different for different commodities and it is showing bi-directional causality between spot and future price. Contango and Normal backwardation helps in identifying the hedging opportunity.
7	Maravi, A. S (2015) International Journal of Development Research, Vol.4(2), Pp. 1125-1135.	Performance Analysis of Indian Agricultural Commodity Markets.	Secondary Data were used in this study and the data was collected from various sources like Books, Journals, Magazines and Various Websites. They used Graphs and Comparative Analysis.	Wheat, Maize Soya oil, Mentha oil, potato and other agri-commodities were registered high fluctuation in terms of total value and volume during 2012-14.

Sl. No	Author and Journal Name	Title of The Study	Variables and Period of The Study	Results
8	Vijay Kumar Varadi (2012), MPRA Journal.	An Evidence of Speculation in Indian Commodity Markets.	Source: FMC, NCDEX, MCX, NMCEX and Period: 2006-2010, Fortnightly Data is Aggregate as Monthly. They used Multivariate GARCH, VAR Granger Causality, Block Erogeneity Wald Tests.	The result shows that, speculation has played an important role in price volatility especially during global crises.

3.0 Need for the Study

A brief review of the above mentioned Indian studies indicates the following gaps in the research. A few studies identified that the futures markets helped in price discovery in spot markets. But very few studies attempted on the volume of production and prices of agri-commodities in India, which focuses the present study. Hence, the present study is intended to address and explore trends in production, prices of the select agri-commodities during the period of study. More specifically, the objectives the studies are as follows:

4.0 Methodology of the Study

As the present study aimed at examining three different aspects, the methodology is accordingly carried out on:

- a) production trends in agri-commodities and price variations in the NCDEX,
- b) price discovery and efficiency of futures market over short and long-term.

The data for identifying seasonality in agricultural commodities is drawn from the CMIE database. The monthly production, average prices, etc., are analyzed and trends are estimated considering three agricultural seasons.

4.1 Objectives of the Study

The present study is aimed at to highlight the current trends in production, prices and existence of seasonality in select agricultural commodities. While overall trends are analyzed based on data commencing from 2001-02 to 2014-15, the seasonality is analyzed based on recent three years' monthly data drawn from the CMIE database.

4.2 Sample Selection and Sources of Data

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

Table-1: Sample Commodities and Period of Study

Sl. No.	Commodity	2011	2012	2013	2014	2015	No. of Observations
1	Barley	Jan-Dec	Jan-Dec	Mar-Jan	Feb-Dec	Jan-Sep	1153
2	Jeera	Jan-Dec	Jan-Dec	Feb-Dec	Feb-Dec	Jan-Sept	1206
3	Channa	Jan-Dec	Jan-Dec	Mar-Jan	Jan- Dec	Jan-June	1297
4	Soyabean	Jan-Dec	Jan-Dec	Jan-June Sep – Dec	Jan-July Sept- Dec	Jan-Mar	1175
5	Turmeric	Mar- Dec	Mar-Dec	Mar-Dec	Mar-Dec	Mar-Dec	768
6	Guar Seeds	Jun-Dec	Jan-Mar	Sep-Dec	Jan-Dec	Jan-July Sep – Dec	842
7	Chilli	Jun-Apr	Jun-Apr Jun-Aug Sep-Dec	Feb-Apr Jun-Dec	Nil	Feb-Apr Jun-Dec	659

Size of the production, yield, area under cultivation, etc., are analyzed based on arrival data from 2005-06 to 2014-15 by taking the data from the CMIE database. The seasonality in each commodity is observed by plotting the prices and arrivals for the latest 3 years of the 2013-2015.

4.3 Scope of the Study

The present study has focused on the pattern, behavior and trends in production and prices of agri-commodities markets in India. The study was made on select agro-commodities in respect of seasonality of spot and future prices during the harvest time, price discovery process, etc. The year-wise data was used to explore the annual changes in commodity prices, monthly data for select years to identify the seasonality and daily price changes.

4.4 Hypotheses

As the study was an exploratory one, there are no apriori relationships identified. The major hypotheses include:

- a) The daily price changes in normal months are minimum due to nature of product and the size of the market
- b) The market prices are largely influenced by area under cultivation and yield and the expected price

4.5 Statistical Tools

The relevant statistical tools are used in the analysis for addressing the objectives of the study.

a) Seasonal Trends

Seasonal trends are worked out to identify the months of occurrence of season and off-season for select agri-commodities. Trends in market production, market prices and volume of trade are analyzed for at least three agricultural cycles for each of the commodity.

b) Line Charts

Line charts are drawn to depict the behavior of production of select commodities during the entire 3-month period.

4.6 Limitations of the Study

- (i) Primary data compiled by the NCDEX is used throughout the study. Prices are mostly market closing prices. No weightage is given for intra-day volatility.

- (ii) Spot prices for different commodities are recorded by the NCDEX is used in the study. No importance is given in specific Mundi based prices
- (iii) Seasonality is established based on only three agri-season's information.

5.0 Analysis of the Study

Trends in Area under Cultivation, Yield, Production and Average Prices

In this section, a detailed note on trends in select commodities chosen as sample for study are analyzed. Such an analysis is expected to provide a big picture of each commodity in terms of its production, prices, area under cultivation, etc. These trends provide direction to analyze whether heaving or investing in commodity futures traded in different exchanges provide expected reduction in price risk and portfolio benefits.

The commodities chosen for detailed study are:

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

Yearly time-series data drawn from the CMIE database for the period of 2001-02 to 2014-15 is used for estimating trends in area under cultivation, yield, production and average price realized in spot markets.

5.1 Barley

Barley is the most important food crop after Wheat, Maize and Rice in the World. The European Union is the major producer of Barley. They produce about 42 per cent in the World's production. India is producing only 1.2-1.8 million MT of Barley annually. The major States where the Barley is largely cultivated are: Rajasthan, Uttar Pradesh, Madhya Pradesh, Haryana and Punjab. India's Barley production is stable between 1.2 and 0.8 million MT. Total Rabi Crop production was 39.1 million MT during 2014-15, which is 10 per cent lower compared to 2013-14 production. World's production of Barley is also declined by 4

million MT during 2014-15, and it is expected around to be 143 MT. Barley is raw material for manufacturing of Beer, Whiskey, Milk Foods, Barley products, Cornflake mediums for bacteria cultivation, etc., Barley is demanded by malting and brewing industry.

The NCDEX offers Futures on Barley except in the months of February, March. Futures trading on Barley is carried out since December 2007. During 2014-15 the prices of Barley drastically declined by 30 per cent to its previous year. By the end of 2015, the prices were gradually picked-up and trading in the range of Rs. 1175 – 1200 per quintal.

The data drawn from the CMIE – Commodities database on Barley is given in Table -2 and shown in Figure-1 also. The data indicates a marginal increase in area under cultivation from 2001-02 to 2013-14. The area under Barley cultivation mostly concentrated in Jaipur, Rajasthan and Utter Pradesh, which ranges around 650 thousand hectares. Although, there is a marginal decline in area under cultivation to 602 thousand hectares in 2006, it has picked-up to 673 thousand hectares by 2013-14. With an average yield of 2000 kgs per hectare the overall production of Barley has grown from 1425 thousand tones to 1830 thousand tones by the year 2013-14.

The average price available for production in spot markets gradually rose from Rs. 440 per quintal to Rs. 1280 per quintal in 2014-15. Thus, the data indicates that the area under Barley production is constant but 2 ½ times raise is reported in average price per quintal. The investors in Futures market can expect increased Futures prices for Barley leaving seasonal fluctuations.

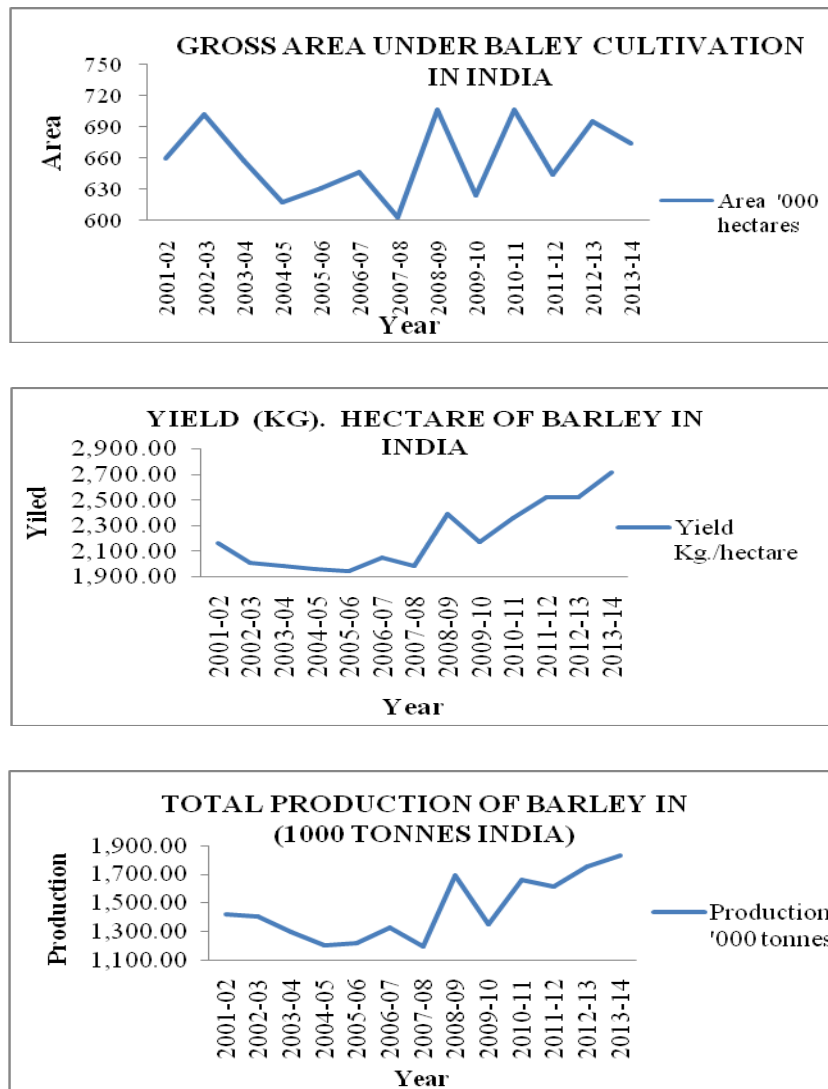
Table -2: Trends in Production and Prices of Barley during 2001-15

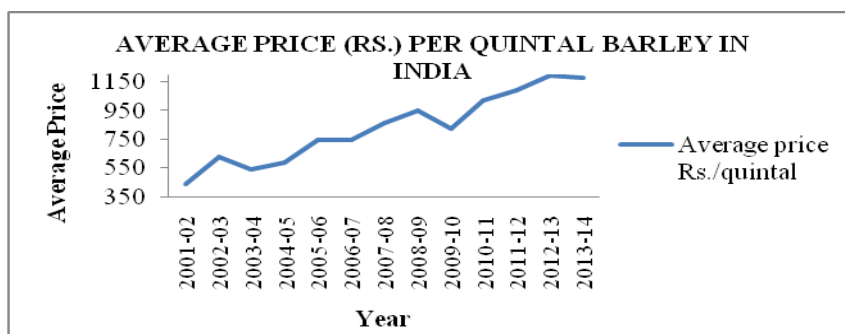
Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average prices Rs./quintal
2001-02	659.5	2,160.00	1,424.50	439.9
2002-03	701.6	2,010.00	1,407.40	630.5
2003-04	657	1,980.00	1,297.60	540.2
2004-05	616.5	1,960.00	1,207.10	588.8
2005-06	629.9	1,940.00	1,220.60	742.3
2006-07	646.2	2,050.00	1,327.90	745.4
2007-08	602.6	1,980.00	1,196.10	860.3
2008-09	705.7	2,390.00	1,689.10	950.9
2009-10	623.8	2,170.00	1,354.70	826
2010-11	705.4	2,360.00	1,662.90	1,025.50

2011-12	643.4	2,520.00	1,618.70	1,093.40
2012-13	695.1	2,521.10	1,752.40	1,194.30
2013-14	673.5	2,718.10	1,830.70	1,178.70
2014-15	707.5	2280.0	1613.00	1280.10

Source: CMIE Database – Commodity Review on Barley 2015 – 16.

Figure -1





5.2 Turmeric

Turmeric (*Curcuma Longa*) belongs to the Zingiberaceae family. Rizome part of the plant is exploited for commercial purposes. Turmeric thrives in light black, black clayey loamnes and red soils. It grows under irrigated and rain-fed conditions. The temperature between 20 and 30 degrees celecious is required for the growth of this crop. Water logging or alkalinity destroys the crop. Turmeric is used to color the foodstuff and used as a flavoring agent. Besides, it is having medicinal and cosmetic use. At the global level, turmeric production is mostly from certain regions of Asia and Nigeria in Africa. In Asia, turmeric is cultivated in India, Bangladesh, Myanmar and Pakistan. Turmeric is a duration of 240-270 days' crop. In India turmeric is cultivated as 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 under Turmeric cultivation in 2014-15, the production declined by around 20-25 per cent as compared to previous years. The government estimated Turmeric output to be 8.52 lakh MT for 2014-15, but the actual is lower than projected 1.19 mm MT. "Futures" on turmeric were launched in 2004 by the NCDEX. The delivery unit for Turmeric is 5 MTs. The details of area under cultivation, yield, production and average price per quintal during the period of 2001-02 to 2015-16 are given Table-3 and also shown in Figure-2.

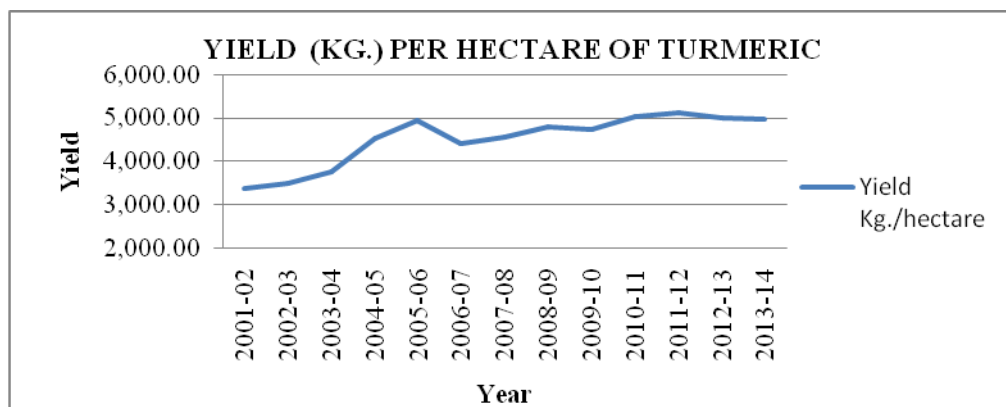
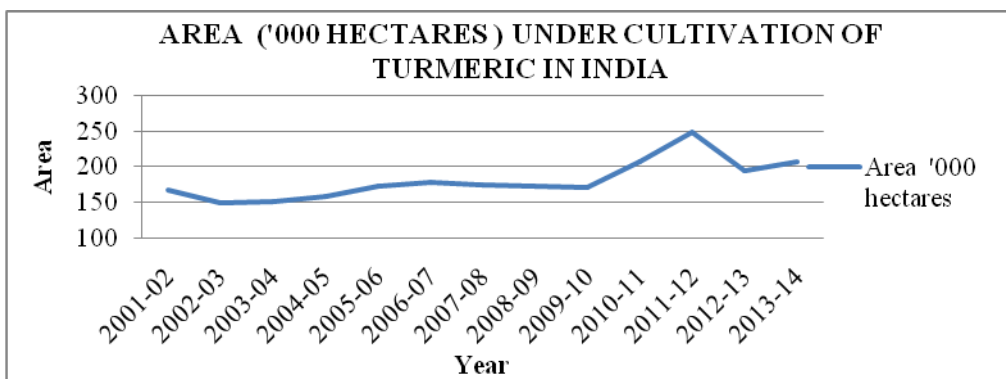
Table -3: Trends in Production and Prices of Turmeric during 2001-15

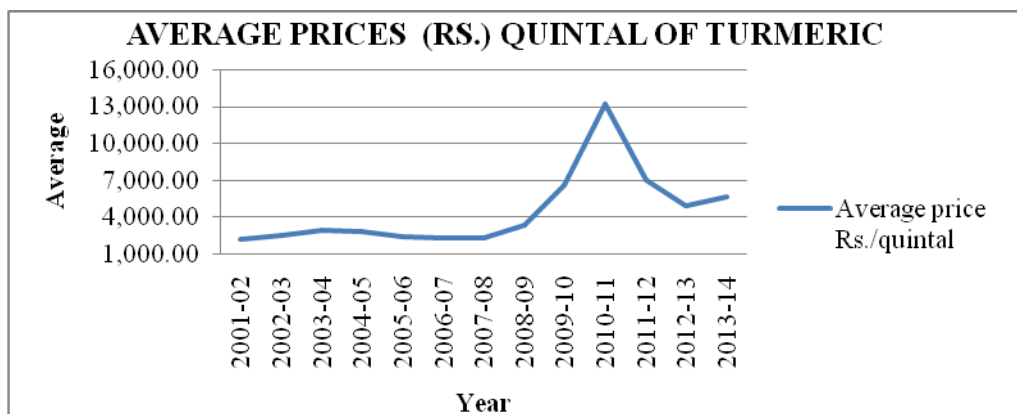
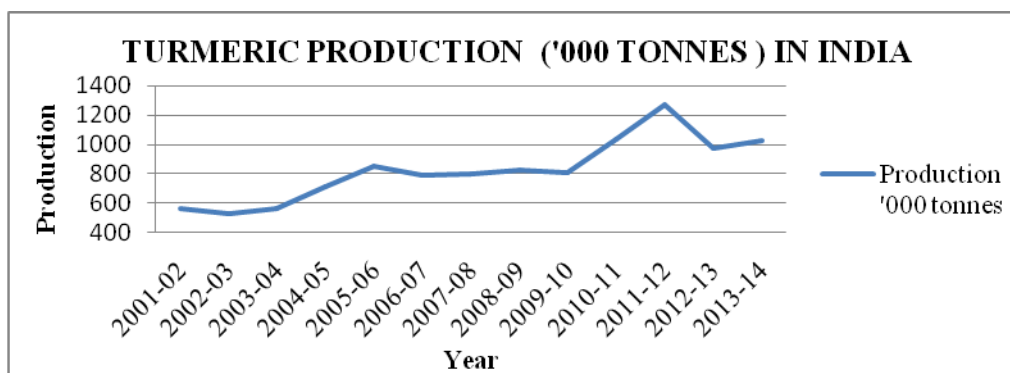
Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average price Rs./quintal
2001-02	167.1	3,368.60	562.9	2,187.40
2002-03	150.1	3,479.00	522.2	2,497.50
2003-04	150.4	3,752.70	564.4	2,964.10
2004-05	157.9	4,513.00	712.6	2,827.00

2005-06	172	4,949.40	851.3	2,454.60
2006-07	178.6	4,405.80	787	2,338.80
2007-08	174.5	4,550.90	794.2	2,340.20
2008-09	172	4,803.40	826	3,377.40
2009-10	170.3	4,738.90	807.2	6,559.90
2010-11	206.3	5,013.90	1,034.50	13,203.80
2011-12	247.8	5,124.20	1,269.70	7,023.90
2012-13	194.2	4,999.70	971.1	4,874.50
2013-14	207.6	4,955.00	1,028.60	5,610.00
2014-15	184.4	4502.20	830.40	6350.90
2015-16	191	4350.80	831	7422.00

Source: CMIE Database – Commodity Review on Turmeric 2015 – 16.

Figure -2





The turmeric cultivation is mostly limited to southern States of India. It is mostly grown in Erode district of Tamil Nadu, Nizamabad district of Andhra Pradesh. The total area under cultivation is largely constant around 150-170 thousand hectares up to 2010 and it is marginally grown to 207 thousand hectares by 2013-14.

The average yield gradually increased from 3368 kgs per hectare in 2001-02 to 4550 kgs in 2006-07 and touched 5000 kgs per hectare in 2013-14. With an increase in area and yield per hectare, turmeric reports a raise in production from 562 thousand tones in 2001-02 to 1034 thousand tones in 2010-11 and reached the peak of 1264 thousand tones in 2011-12. The average rate per quintal has wide fluctuations. The prices per quintal has ranged around Rs. 2300 to Rs. 2400 during 2001-02 and 2007-08. The same crossed 3 times to Rs. 6560 per ton in 2004-10 and reached the peak of Rs. 13,200 per quintal in 2010-11 which declined to Rs. 5610 per quintal by the year 2013-14.

5.3 Chilli

Chilli is a food product consumed by people throughout the World. Chilli belongs to the family of Solanaceae Chilli is used in medicines and beverages. It is grown in sandy and light loamy soils. A warm humid climate with temperature ranging 20-25 Celcius degrees is required for good crop production. China and Pakistan are the major producers of Chilli apart

from India. In Pakistan Chilli is grown on an area of 48,000 hectares with an average yield of 1.6 MT per hectore. Chilli sowing starts in the month of July and continues till September and the best time for harvesting is between December and March for Kharif crop and June-July for rabbi. The major producers are Andhra Pradesh (30%) followed by Karnataka (20%) Odisha (9%), Tamil Nadu (8%), Maharashtra (1%), remaining 32 per cent is contributed by other States.

The Chilli Future contracts were launched in 2005 on the NCDEX platform. The contracts are trading in all months except in May, June and July. The trends in production and prices of Chilli are given in Table-4 and depicts in Figure-3 also. Chilli is mostly produced in rain irrigated lands of Guntur and Warangal in Andhra Pradesh. The total area under cultivation is constant all through the study period. Around 750-800 thousand hectares of land is under cultivation with marginal changes year to year.

The yield per hectare is gradually raised from 1215 kgs per hectare in 2001-02 to 1550 kgs in 2005, which further touched 1645 kgs in 2010-11. Only during last two years the yield is touched the peak level of 2014 kgs per hectare in 2014-15. The static area under cultivation and stable yield has resulted in production, which revolved around 1200 thousand tones in most of the years excepting the last two years where in it has touched 1492 thousand tones in 2013-14 and 1605 thousand tones in 2014-15. The average price of Chilli gradual increase from Rs. 1525 per quintal in 2002- 03 to Rs. 2425 in 2010-11 and as high as Rs. 3151 per quintal in 2014-15. The increased yield per hectare and raise in prices makes Chilli trading attractive.

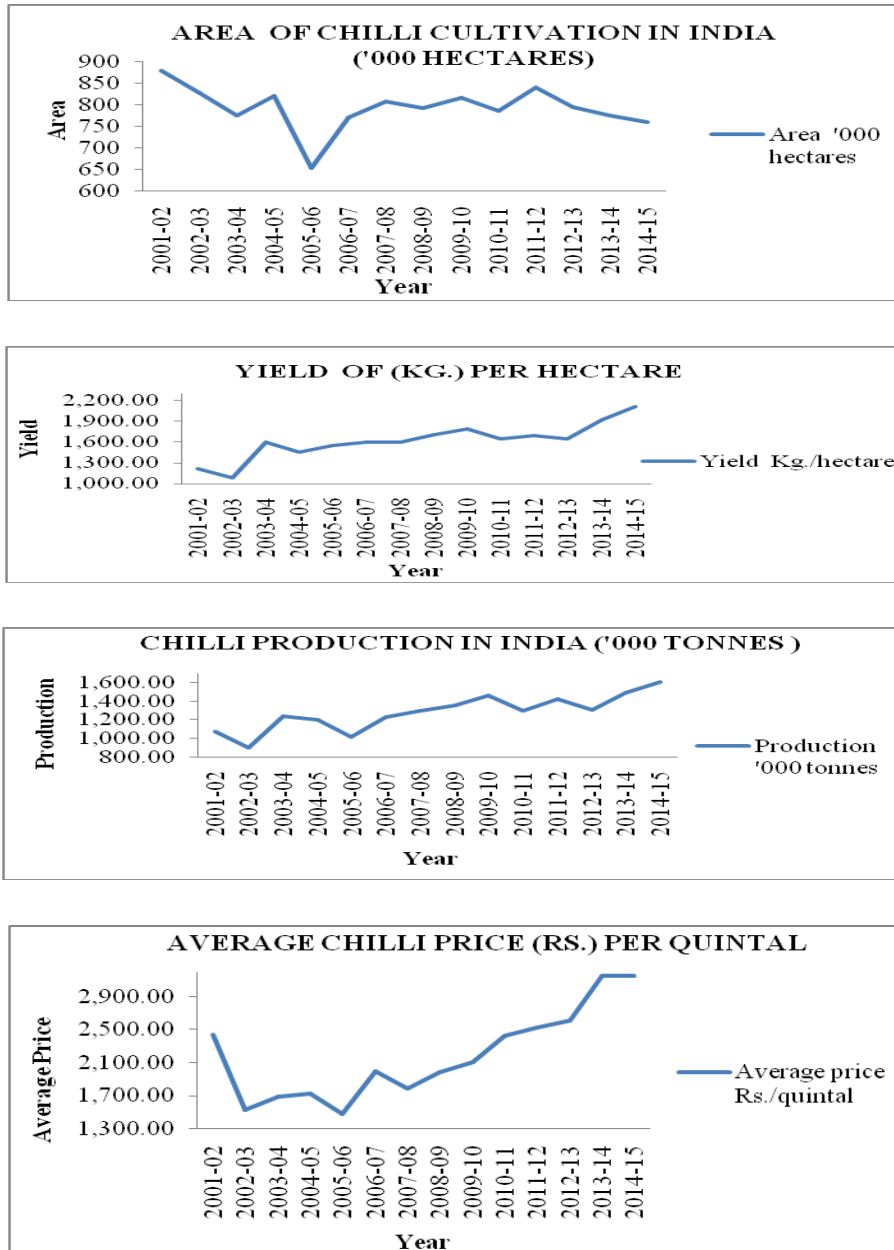
Table-4: Trends in Production and Prices of Chilli during 2001-15

Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average prices Rs./quintal
2001-02	880	1,214.80	1,069.00	2,440.90
2002-03	827.4	1,081.20	894.6	1,525.30
2003-04	774.6	1,594.90	1,235.40	1,680.20
2004-05	820.9	1,460.00	1,198.50	1,723.30
2005-06	652.9	1,552.20	1,013.40	1,481.80
2006-07	769.8	1,593.80	1,226.90	1,987.90
2007-08	808.2	1,601.30	1,294.10	1,786.30
2008-09	792.2	1,705.10	1,350.70	1,981.00
2009-10	815.7	1,791.20	1,461.10	2,109.20
2010-11	786.7	1,645.80	1,294.80	2,425.00

2011-12	840.5	1,695.80	1,425.30	2,522.20
2012-13	794.1	1,642.50	1,304.40	2,612.70
2013-14	774.9	1,925.70	1,492.10	3,149.10
2014-15	761	2,109.10	1,605.00	3,151.20

Source: CMIE Database – Commodity Review on Chilli 2015 – 16.

Figure -3



5.4 Channa

Chickpea (*Cicer Arietinum*) or Channa is a pulse crop, which belongs to the family Leguminosae. 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 it is brown split peas. Channa is grown in winter in many countries, like India, South and Central America. Channa also grown in Australia and Canada and the crop cycle of desi Channa is 95-105 days and Kabuli Channa is 100-110 days.

Global Channa prices firmed up in response to India's strong import demand in 2014-15. The prices particularly scored in Australia, the largest exporter of Channa to India. Channa Futures were started on the NCDEX platform from April 2004. Channa contracts are traded for all months except in March. The main delivery center for Channa is Delhi. The trends in Channa production and yield prices are analyzed in Table-5 and also shown in Figure-4. Channa is mostly grown in Rajasthan, Uttar Pradesh and traded in Delhi, Bikaner. The area under cultivation of Channa has gradually increased from 6400 thousand hectares in 2001-02 to 9,927 thousand hectares in 2013-14. The yield per hectare is mostly stable around 850 kgs per hectare all through the period except in 2011-12, 2012-13 and 2013-14 where it touched 950 kg per hectare. The overall production of Channa is also found gradually raised from 5,473 thousand tones in 2001-02 to 8221 thousand tones in 2010-11 and to 9528 thousand tones on 2013-14. The average price per quintal has gone-up from Rs. 1808 per quintal in 2001-02 to Rs. 2343 in 2006-07 and to a peak level of Rs. 4183 per quintal in 2012-13.

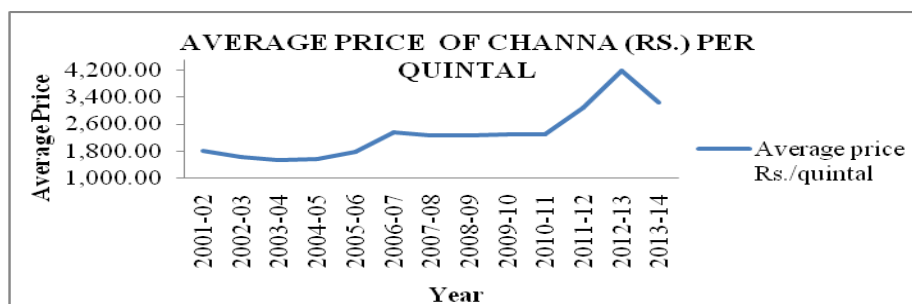
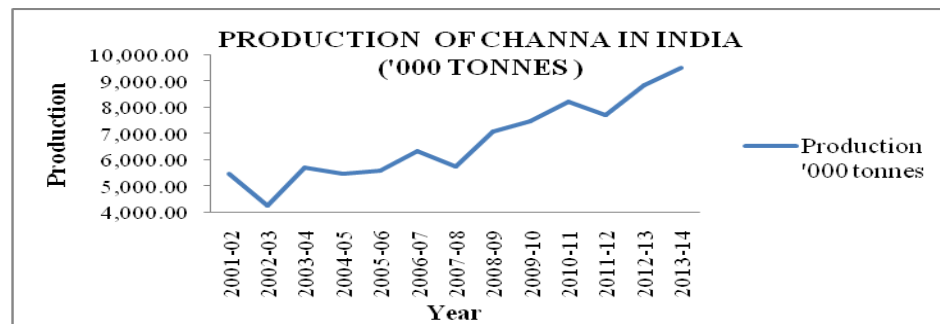
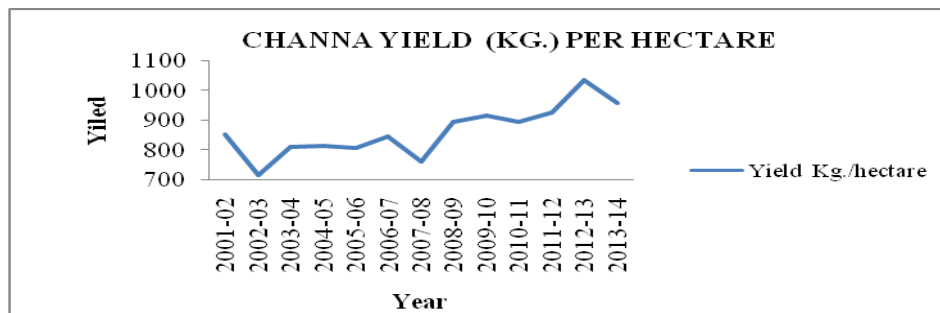
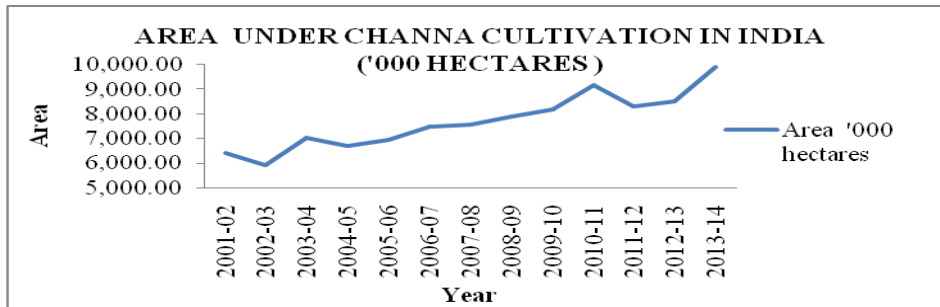
Table -5: Trends in Production and Prices of Channa during 2001-15

Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average price Rs./quintal
2001-02	6,416.20	853	5,473.00	1,808.80
2002-03	5,906.40	717.3	4,236.80	1,627.70
2003-04	7,048.10	811.2	5,717.50	1,538.90
2004-05	6,714.60	814.6	5,469.40	1,550.50
2005-06	6,926.40	808.5	5,599.90	1,782.30
2006-07	7,493.90	845.2	6,333.70	2,343.60
2007-08	7,543.70	762	5,748.60	2,255.40
2008-09	7,892.50	894.5	7,060.20	2,260.10
2009-10	8,169.20	915.1	7,475.90	2,280.50
2010-11	9,185.60	895	8,221.10	2,299.30
2011-12	8,299.10	928.1	7,702.30	3,075.00

2012-13	8,521.80	1,036.50	8,832.50	4,183.90
2013-14	9,927.40	959.6	9,526.30	3,236.00
2014-15	8251.10	888.60	7332.30	3121.70

Source: CMIE Database – Commodity Review on Channa 2015 – 16.

Figure -4



5.5 Jeera

Jeera (Jeeraum Cuminum) also called Cumin is a seed of a herb. Jeera traces its origin to Levant and upper Egypt and was known to Egyptians in 5000 BC. India is the largest consumer and producer of Jeera in the World. Jeera is a Rabi crop with crop duration of 120-150 days. Jeera is sown during October–November and harvested in February–March. Indian’s Cumin seed production for the crop year 2014-15 was estimated to be around 450 thousand MT as against the historic high production of 400 thousand MT in 2013-14. India is the largest producer as well as consumer and exporter of Jeera. It meets 70 per cent of World’s requirement. Jeera “Futures” were introduced on February 2004 in the NCDEX. The main delivery centres for Jeera are Ujjain, Delhi and Jodhpur. The data relating to trends in area of cultivation, yield per hectare, production and unit prices are given in Table -6 and shown in Figure-5.

Jeera is mostly grown in Jaipur, Rajasthan, Uttar Pradesh. About 500 thousand hectares of land is cultivated with exception in 2004-05 to 2007-08 when the area under cultivation declined to 350 thousand hectares. The yield per hectare is mostly fluctuating around 350 kgs per hectare in 2006-07 to 550 kgs in 2011-12 and to 644 kgs per hectare in 2013-14. The overall production widely fluctuated from 206 thousand tones in 2001-02 to lowest 124 thousand tones in 2006-07 which is gradually rose to 445 thousand tones in 2013-14. The average prices per quintal of Jeera has shown a gradual increase from Rs. 7185 in 2001-02 to Rs. 10,028 in 2009-10 and Rs. 12,534 in 2012-13 and settled at Rs. 11,429 per quintal in 2013-14.

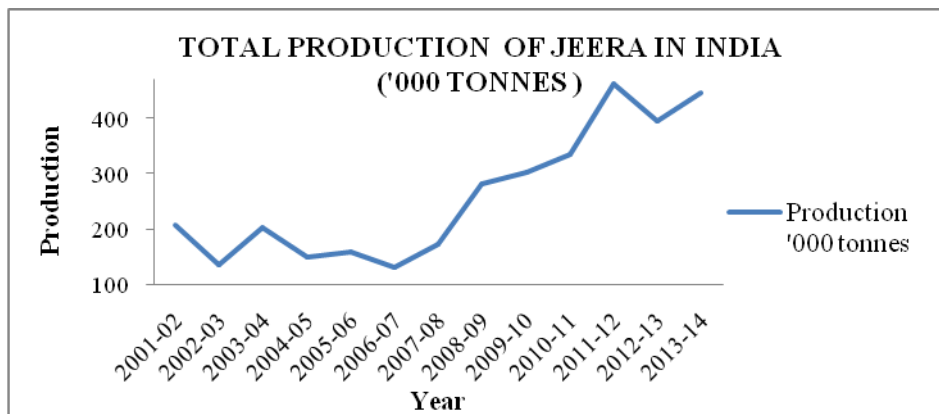
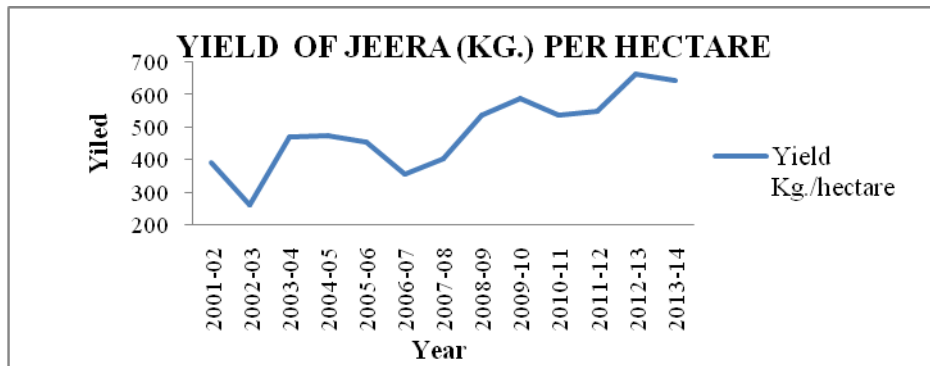
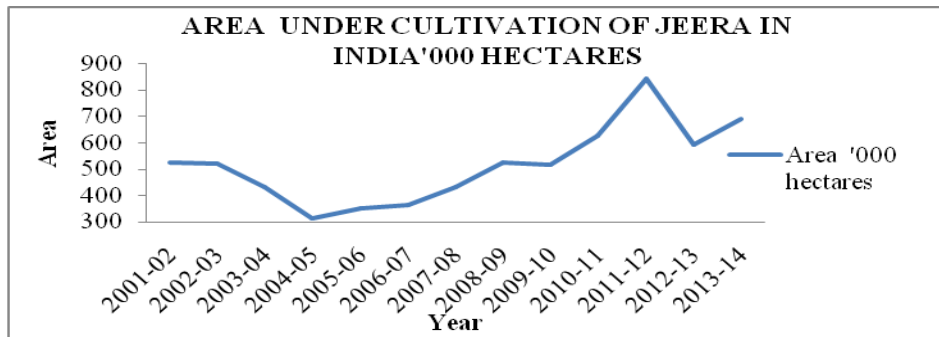
Table -6: Trends in Production and Prices of Jeera during 2001-15

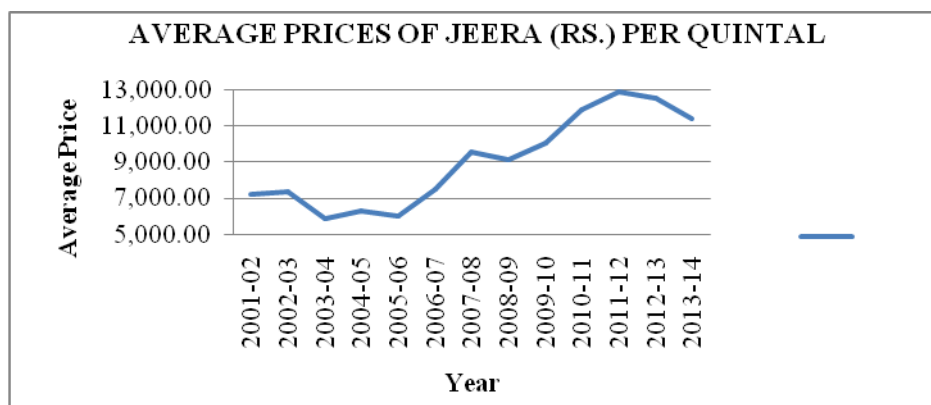
Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average price Rs./quintal
2001-02	526.6	392	206.4	7,185.10
2002-03	521.3	258.6	134.8	7,348.40
2003-04	430.1	471.1	202.6	5,838.20
2004-05	313.5	473.9	148.6	6,248.90
2005-06	349	453.7	158.4	6,026.60
2006-07	363.7	356.8	129.8	7,492.10
2007-08	429.4	401.7	172.5	9,556.30
2008-09	525.6	535.6	281.5	9,159.50
2009-10	515.6	586.6	302.4	10,028.70

2010-11	624.2	535.6	334.3	11,900.10
2011-12	842.6	547.3	461.2	12,896.50
2012-13	594	663.9	394.3	12,534.50
2013-14	858.9	598.3	513.9	11429.30
2014-15	889.8	545.7	485.5	10583.70
2015-16	702	529.9	372	13756.50

Source: CMIE Database – Commodity Review on Jeera 2015 – 16.

Figure - 5





5.6 Soyabean

The Soyabean or Soybean (*Glycine Max*) is called the “Golden Bean”. Soya Bean is classified as oilseed though being a legume Crop. Soyabean thrives in most of the climates, like tropical, subtropical and temperate. Soyabean is rich source of protein (45 per cent) and oil (18 per cent). It is a reliable source of essential amino acids, which are important constituents of proteins. Soyabean season starts in June and harvested in September / October. It is sown with the onset of south west monsoon, i.e., by June. The peak arrival of Soyabean to the market is in October. The Soyabean cultivation is mostly taken place in Maharashtra, Madhya Pradesh and Rajasthan. The dry weather in Maharashtra and excessive rains in Madhya Pradesh severally impacted the yield of Soyabean. These two States account for 85 per cent of India’s total Soyabean output. Both the Soyabean and soya oil highly traded Futures contracts on the NCDEX platform. The trends in production and prices of Soyabean are presented in Table-7 and also shown in Figure-6.

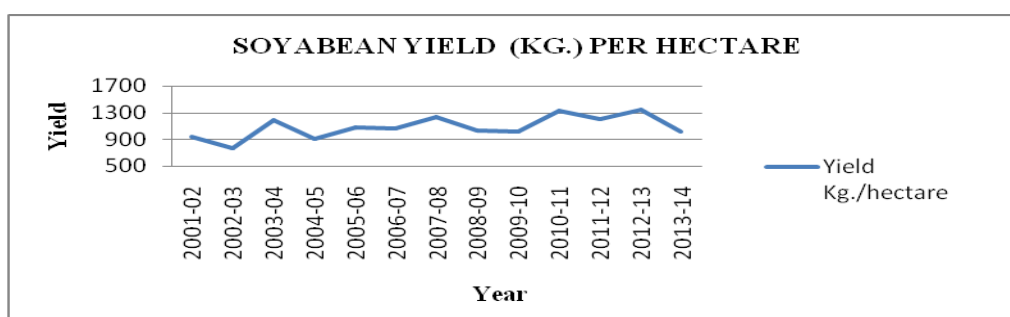
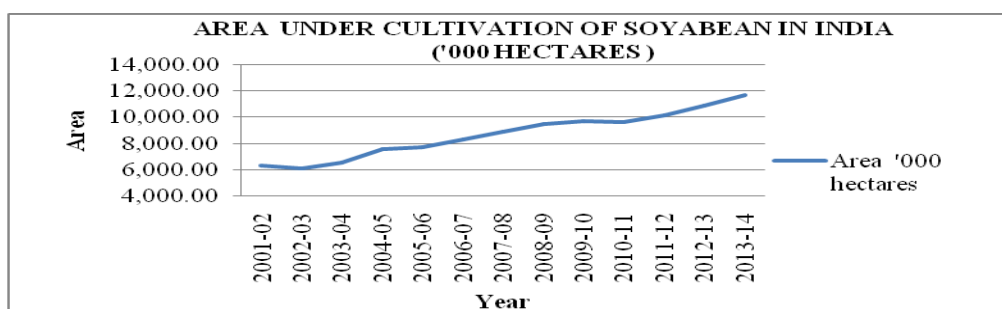
The acreage of Soyabean has steadily increased from 6343 thousand hectares in 2001-02 to 11,716 thousand hectares in 2013-14. The yield per hectare has gone-up from 940 kgs per hectare in 2001-02 to 1073 kgs in 2005-06 and to 1352 kgs in 2012-13 and declined to 1012 kgs in 2013-14. As the area under cultivation has gradually increased, the production is also reported an increase from 5962 thousand tones in 2001-02 to 14,666 thousand tones in 2012-13 and 11,860 thousand tones in 2013-14. The average market price for Soyabean per quintal recorded a gradual increase from Rs. 1128 per quintal in 2001-02 to Rs. 3,524 per quintal in 2013-14.

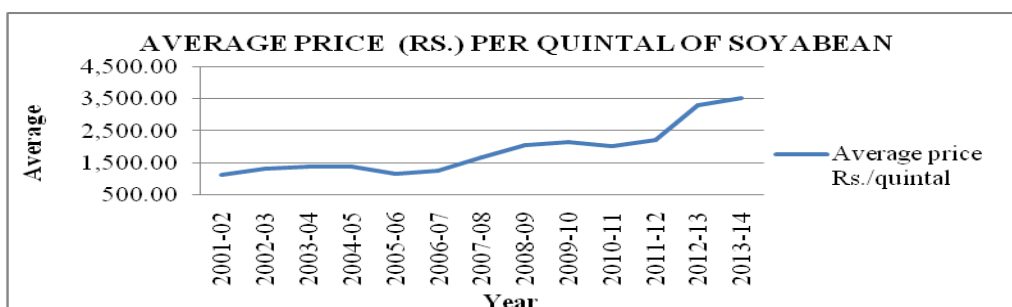
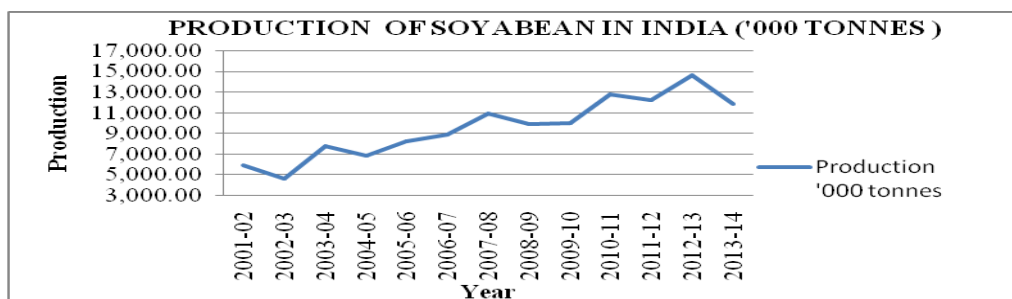
Table-7: Trends in Production and Prices of Soyabean during 2001-15

Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average price Rs./quintal
2001-02	6,343.10	940	5,962.70	1,128.40
2002-03	6,105.50	762.4	4,654.70	1,307.20
2003-04	6,554.70	1,192.90	7,818.90	1,393.80
2004-05	7,571.20	908.2	6,876.30	1,393.20
2005-06	7,707.50	1,073.40	8,273.50	1,148.90
2006-07	8,328.70	1,062.70	8,850.80	1,266.30
2007-08	8,881.70	1,234.90	10,968.20	1,661.30
2008-09	9,510.80	1,041.50	9,905.40	2,057.60
2009-10	9,734.70	1,023.60	9,964.50	2,165.50
2010-11	9,601.00	1,326.60	12,736.40	2,011.80
2011-12	10,109.10	1,208.20	12,213.50	2,220.80
2012-13	10,840.70	1,352.90	14,666.40	3,311.80
2013-14	11,716.40	1,012.30	11,860.80	3,524.10
2014-15	10910.80	950.80	10373.80	3403.80

Source: CMIE Database – Commodity Review on Soyabean 2015 – 16.

Figure-6





5.7 Guar (*Ganopsis Tetragonoloba*) or Cluster Bean

It traces its origin to South Africa but is grown throughout the southern Asia, since ages as a vegetable and fodder. In India and Pakistan, Guar is cultivated as fresh vegetable. The plant has peculiar properties, being drought resistant and capacity to absorb ground water, it is grown easily in semi-arid areas. In addition, it is used as thickening agent to prevent ice crystal formation in frozen desserts. It usually 90 day's crop. In India, it is sown by the end of July and harvested during November. World's 80 per cent of the production is contributed by India. Other major producers of Guar seeds are Pakistan, USA, Malawi, Zaire and South Africa. The "futures" trading on Guar seeds started in 2004 on the NCDEX. Guar seeds and Guar Gum contracts are traded for all months excepting July, August and September. The trends in acreage, production and prices are given in Table -8 and also shown in Figure-7.

Guar Seeds are grown in Rajasthan, Jaipur and Utter Pradesh. The area under cultivation is around 3000 thousand hectares, which has grown to 5151 thousand hectares in 2012-13. The yield per hectare is highly fluctuating from 380 kgs per acre in 2001-02 to 581 kgs in 2010-11 and settled at 477 kgs in 2012-13. The overall production is highly fluctuating from 1090 thousand tones in 2001-02 to 2460 thousand tones in 2012-13. The production is recorded as lowest as 200 thousand tones in 2002-03 and 594 thousand tones in 2009-10. The average price per quintal are gradually increased from Rs. 873 per quintal in 2001-02 to Rs. 2100 per quintal in 2010-11 and Rs. 7852 per quintal in 2012-13. The fluctuating yield per

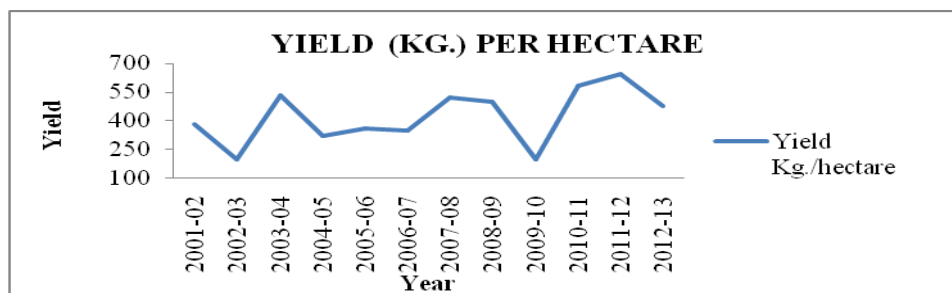
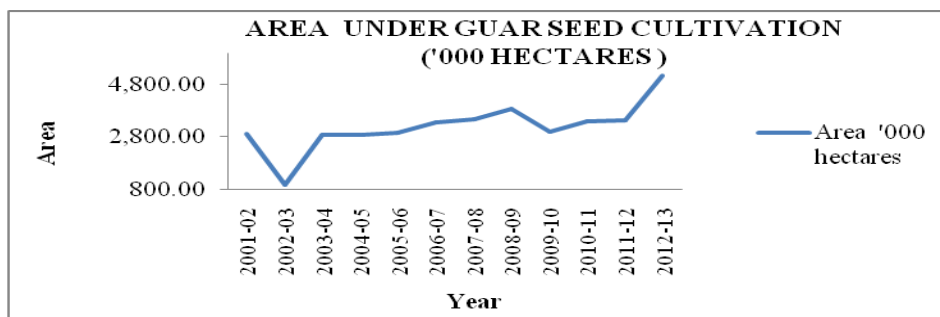
hectare seems made the spot prices of Guar Seeds to record a substantial rise during 2010-11 and 2012-13.

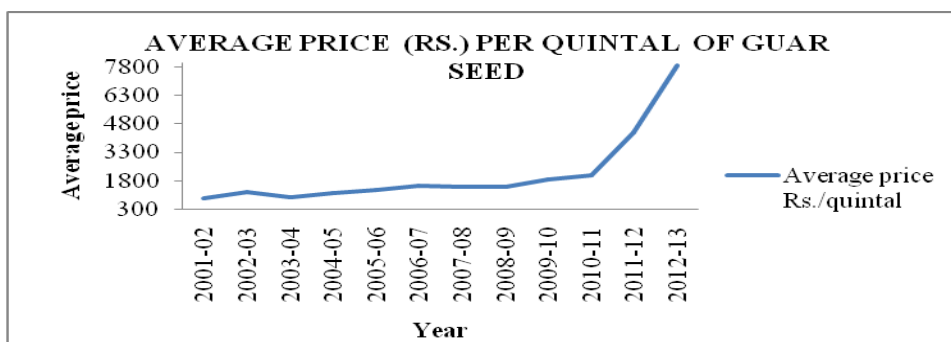
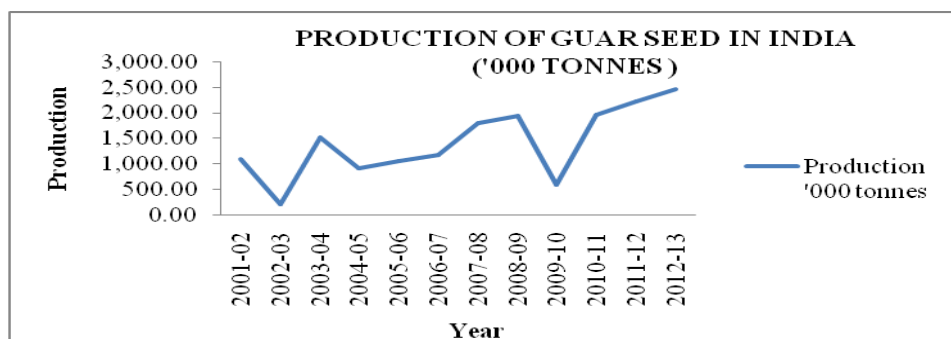
Table -8: Trends in Production and Prices of Guar Seed during 2001-13

Year	Area '000 hectares	Yield Kg./hectare	Production '000 Tones	Average price Rs./quintal
2001-02	2,903.10	380	1,089.90	873.6
2002-03	975.1	200	199.2	1,184.60
2003-04	2,854.00	530	1,513.40	913.8
2004-05	2,867.40	320	903.3	1,123.10
2005-06	2,955.50	360	1,059.00	1,325.80
2006-07	3,343.70	350	1,169.30	1,508.70
2007-08	3,471.60	520	1,788.50	1,451.30
2008-09	3,862.50	501.2	1,935.80	1,474.10
2009-10	2,995.20	198.5	594.7	1,846.90
2010-11	3,382.10	581.1	1,965.30	2,099.00
2011-12	3,444.20	643.9	2,217.60	4,349.00
2012-13	5,151.70	477.6	2,460.70	7,852.80

Source: CMIE Database – Commodity Review on Guar Seed 2015 – 16.

Figure - 7





6.0 Findings

The trends in area under cultivation, production, market arrivals and prices of select agri-commodities are analyzed based on the data taken from the CMIE during the last one and half decade period from 2001-02 to 2014-15. From the foregoing analysis, the following observations could be made crop-wise:

- (i) The average price of Barely is gradually rose and registered a growth of three times during the period of study. Further, the area under cultivation as well as yield of Barley is constant but the average price per quintal reported an increase.
- (ii) In case of Turmeric the average yield gradually increased over the period of study. With an increase in area and yield per hectare, turmeric reports a raise in production. The prices per quintal has gradually increased and after that it declined. Thus, the price of the turmeric registered a fluctuating trend during the period of study.
- (iii) The yield of Chilli per hectare is gradually raised during the period of study and only during the last two years the yield is touched a peak level per hectare. The static area under cultivation and increased yield has resulted in more production. The average price of Chilli gradual increase over the period of study. The increased yield per hectare and raise in prices makes Chilli trading attractive.

- (iv) The area under cultivation of Channa has gradually increased and the yield per hectare is mostly stable throughout the period except during the last three years of the study. The overall production of Channa is gradually raised and the average price per quintal has also gone-up two and half times during the period of study.
- (v) The overall production of Jeera increased double during the period of study. The average prices per quintal of Jeera has shown an increase one and half times during the period of study.
- (vi) The acreage of Soyabean has steadily increased and the yield per hectare has also gone-up 10 to 15 percent during the period of study. As the area under cultivation has gradually increased, the production is also reported an increase trend. The average market price for Soyabean per quintal recorded a gradual increase and registered three times raise during the period of study.
- (vii) The overall production of Guar Seeds is highly fluctuating though there is an increase in area under cultivation during the period of study. The average price per quintal is gradually increased and registered a hike of nine times. The fluctuating yield per hectare seems made the prices of Guar Seeds to record a substantial rise during the period of study.

7.0 Conclusion

The average acreage of cultivation of select commodities found no change during the first ten years of the study period in most of the cases. But for the last five years, additional hectors of land have been brought under cultivation in case of Soyabean, Guar Seeds, Channa during the period of study. However, there is no change or marginal charge in case of commodities, like Turmeric, Barley, Chilli and Jeera. In consequence effect of the increase in acreage of cultivation, there is an increase in production and yield per acre due to the latest technology they have been adopting in agricultural activities. It is also concluded from the data that there is a remarkable increase in the prices of Guar Seeds and Soyabean increased and in the rest of the cases there is a gradual increase during the period of study. It can be said from the study that the additional cultivated area results increase in production and the additional demand both in domestic and global markets of these select commodities effect the price trends.

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