

**(PROFORMA FOR SUBMISSION OF ANNUAL  
PROGRESS REPORT OF RESEARCH PROJECTS)**

**Part - I : General Information**

**600 Project Code :**

6001 Institute Project Code No. : 72

6002 ICAR Project Code No. :

**601 Name of the Institute and Division:**

6011 Name & Address of Institute: National Academy of Agricultural Research Management,  
Rajendranagar, Hyderabad

6012 Name of Division / Section : Agribusiness management

6013 Location of Project : NAARM

**602 Project Title: Impact analysis of Commodity future on spot price and risk management in high value commodities**

**603 Priority Area:**

6031 Research Approach:	<b>Applied</b>	<b>Res./Basic</b>	<b>Res./Process/</b>	<b>Transfer</b>
or Tech. of Tech.				
	Develop.			
	01	02	03	04

**604 Specific Area :**

**605 Duration of the Project:**

6051 Date of Start of the Project: April 2011

6052 Likely Date of Completion of the Project: September 2014

6053 Period for which Report Submitted: September 2011 to August 2014

**606 Total Cost of the Project:**

6061 Expenditure to Date: Nil

**607 Summary of Achievements:**

Review of literature on the subject and studied methodology related to subject. We have collected secondary data on few crops and tried to apply co-integration model to assess the impact of future trading on spot market. We have found that all the commodities are integrated and future and spot price move in the same direction. The future price and spot prices were co - integration in all the commodities except turmeric.

**608 Key Words:** Commodity futures, spot prices, risk management, co-integration

### **Part-II : Investigator Profile**

(Please identify clearly changes, if any, in Project Personnel)

#### **610 Principal Investigator :**

6101 Name : **Dr. PC Meena**  
6102 Designation : Senior (Agricultural Economics)  
6103 Division/Section : Agribusiness Management  
6104 Location : Hyderabad  
6105 Institute Address : NAARM, Rajendranagar, Hyderabad

#### **611 Co-investigator :**

6111 Name : **Dr. Ranjit Kumar**  
6112 Designation : Senior Scientist (Agricultural Economics)  
6113 Division/Section : NA : Agribusiness Management  
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### **Part - III : Technical Details**

#### **620 Introduction and Objectives:**

Commodities are considered as separate asset class. To obtain economic exposure to commodity asset, commodity derivatives is a very useful tool. There are many instruments traded in these markets which include financial instruments such as futures and forward contracts, options, swaps, and physical instruments like inventories. Future contracts are among the most important of these instruments, and provide significant information about cash and storage markets. Price discovery, hedging, financing, liquidity, price stabilization, encouraging competition, increasing efficiency, inherent leverage, low transaction costs, and lack of short sale restrictions as well as fulfilling desires of speculators are some of the prime economic functions of the futures market as suggested by( Fleming, Ostdiek and Whaley, 1996).

***Relationship between Futures and Spot Markets*** The issue of the lead-lag

relationship, price discovery in returns and volatility spillover has been researched extensively in developed countries equity, currency and commodity markets. In equity markets, there are numerous studies which explain the return and volatility spillovers between spot and futures markets .

Price discovery and risk transfer are considered to be two major contributions of futures market towards the organization of economic activity (Garbade and Silber, 1983). Price discovery refers to the use of future prices for pricing cash market transactions. This implies that futures price serves as market's expectations of subsequent spot price. Understanding the influence of one market on the other and the role of each market segment in price discovery is the central question in market microstructure design and is very important to academia and regulators. In efficient markets, new information is impounded simultaneously into cash and futures markets . In other words, financial market pricing theory states that market efficiency is a function of how fast and how much information is reflected in prices. The rate at which prices exhibit market information is the rate at which this information is disseminated to market participants (Zapata et al. 2005). In reality, institutional factors such as liquidity, transaction costs, and other market restrictions may produce an empirical lead-lag relationship between price changes in the two markets. Moreover, all the markets do not trade simultaneously for many assets and commodities. Besides being of academic interest, understanding information flow across markets is important for portfolio managers and hedgers for hedging and devising cross-market investment strategies. However, the growth path of the Indian derivative market was not smooth. Commodity futures trading has existed in India since 1875. However, the commodity futures have been in the state of hibernation for the past few decades owing to a lot of government restrictions. Significant developments took place in 2003-04 related to commodity futures market in terms of revoking prohibition on non-transferable specific delivery forward contracts. Commodity derivatives have a significant role in the price risk management process especially in case of India being an agricultural dominated economy. India is one of the top producers of commodities, 5th largest in the world, engages 57% of the world population and contributes 22% to the GDP of the country. It is also the largest consumers having a large population base and hence India should take a leadership role at international level. This indicates that India can be promoted as a major centre for trading of commodities derivatives market. The commodity derivatives

trading have ecosystem linkages which results in employment generation process. The developments in the Indian market in the past decade has led the Indian commodity exchanges to be at par with the world markets with setting up of national exchanges and modern institutions in term of warehousing facilities and clearing have led to reduction in price distortions.

The futures market was opened in anticipation of sound institutional framework and market design. At present there are five national and sixteen regional commodity exchanges operating in India. The total volume of trade in the commodity future market rose from Rs.21.55 lakh crores in 2005-06 to Rs.181.25 lakh crores in 2012-13. As in 2013, the number of commodities eligible for futures trading is 113 on 21 recognized exchanges. A number of committees have been constituted to inspect, control, and standardize this market at numerous occasions at the behest of government of India, namely, A.D. Shroff Committee (1950), M. L. Dantwala Committee (1966), A.M. Khusro Committee (1979), K.N. Kabra Committee (1993), Shankarlal Guru Committee (2001), Habibullah Committee (2003), and lastly Sen Committee (2008). More or less, those committees' recommendations, inevitably, stand out few indicatives with respect to measuring the efficiency of Indian commodity futures markets, contentions at the back of low extent of participation or on the contrary, unwarranted speculation, and inference behind impositions of ban on several commodities telling to their economic fundamentals and trade-policies (FTGKMC, 2011). The characteristics of emerging markets are very different from that of developed markets. Given these differences, it is important to investigate empirically the Indian commodity futures markets more extensively so as to shed light on the role played by the futures markets in the price discovery process. We specially focus on ten agricultural commodities, i.e. Chana, guar seeds, soya bean, Kapas, Potato Agra, Turmeric, Black Pepper, Barley, Maize and Castor seeds. In this backdrop, an attempt has been made to revisit the debate on price discovery in Indian commodities market. It covers fairly longer study period compared to prior research of the subject. The study attempts to address the following question: Is futures prices are useful in price discovery mechanism of spot prices?

The purpose of this study is to provide new empirical evidence in the ongoing debate about the impacts of futures trading activity on various dimensions of the nature of spot market volatility by investigating this relationship in India.

6201 Immediate Objectives :

1. To analyze the trend of agricultural commodities traded across commodity exchanges in India
2. To find out the relationship between spot and futures price of the selected agricultural commodities traded in commodity Exchanges
3. Know the perception of stakeholders and trader about future market and suggest measures for better inclusion

6202 Long-term Objectives:

The long term objectives of the study to create deeper understanding of commodity futures market in India. It aims to answer the impact of commodity futures prices on spot prices, how sport markets are integrate with futures market. What is perception of Stakeholder's about future markets.

6203 Specific Objectives for the Year, as Detailed in RPF-I :

Mukherjee (2011) examine the impact of future trading on Indian Agricultural Commodity Market. The empirical findings significantly shows that comparative advantage of future market in disseminating information, leading to a significant price discovery and risk management, that can again help to successfully develop the underlying commodity market in India. Therefore instead of curbing that commodity future market, it can always be suggested to strengthen the market structure to achieve broad target.

Sanjay Sahagal (2012) studied the price discovery relationship for ten agricultural commodities has been examined. Price discovery is confirmed for all commodities except Turmeric. Price discovery results are encouraging given the nascent character of commodity market in India. However the market does not seem to be competitive. The findings have implications for policy makers, hedgers and investors and will help in deeply understanding the role of futures market in information dissemination. The commodity exchanges must strengthen their surveillance system

for early detection on continuous basis of anomalous trading behaviour. These markets are becoming informational mature and market regulators have taken adequate steps for market development. Forward Market Commission (FMC) should be given adequate powers to regulate commodity market and penalise any insider trading and price manipulations. Well-organized spot markets must be developed, ensuring transparency and trading efficiency. Electronically traded spot exchanges must be developed and warehousing; testing labs as well as other eco-system linkages must be established to strengthen the derivative market trading mechanism for efficient price discovery mechanism

#### **621 Project Technical Profile :**

6211 Technical Programme :

(Indicate briefly plan of procedure, techniques, instruments and special materials, organisms, special environment, etc.)

6212 Man-months Involvement of Component Project Workers for the Specified Year

#### **622 Progress of Work:**

Secondary data collected from Forward Market Commission (FMC) and NCDEX website and growth rate of major group of commodity has been worked out. Since, these exchange the agricultural commodity group highest traded and the share was 66.10 per cent during the year 2004-05. On 7<sup>th</sup> May 2008, The government of the India announce a ban on future trading in four commodities - wheat, potato, soya oil and chickpea. As result of the ban confidence among participants goes down and they went away from commodity market.

The importance of the market can be realized by seeing the volume of trade. All though the agricultural commodity market in terms of percent goes down but absolute value increased to great extent from 3.9 lakh crore to 21.96 lakh crore from 2004-05 to 2006-07

Table 1. Commodity group wise value of trade

Commodity group	2004-05	2005-06	2006-07	2007-08	2009-10	2010-11	2011-12	2012-13
Bullion and other metals	1.80 (30.51)	7.79 (36.15)	21.29 (57.90)	26.24 (64.55)	49.65 (63.73)	81.80 (68.30)	130.77 (72.15)	78.62 (57.02)
Agriculture	3.90 (66.10)	11.92 (55.31)	13.17 (35.82)	9.41 (23.15)	12.18 (15.63)	14.56 (12.16)	21.96 (12.12)	21.55 (15.63)
Energy	0.20 (3.39)	1.82 (8.45)	2.31 (6.28)	5.00 (12.30)	15.78 (20.25)	23.11 (19.30)	28.51 (15.73)	37.68 (27.33)
Others	0.00 (0.00)	0.02 (0.09)	0.00 (0.00)	0.00 (0.00)	0.30 (0.39)	0.29 (0.24)	0.01 (0.01)	.01 (0.01)
<b>Total</b>	5.90 (100)	21.55 (100)	36.77 (100)	40.65 (100)	77.91 (100)	119.76 (100)	181.25 (100)	137.86 (100)

Source: Various Annual reports of Forward Market Commission

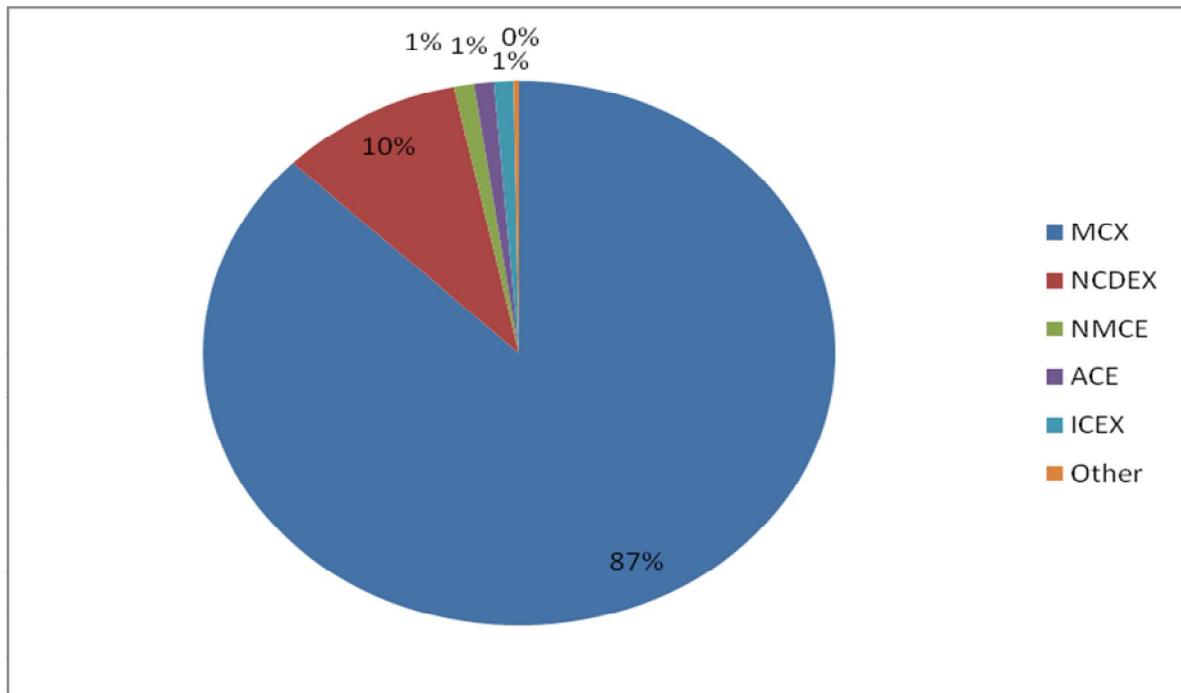
Out of 21 recognized exchanges, Multi Commodity Exchange (MCX), Mumbai, National Commodity and Derivatives Exchange (NCDEX), Mumbai, National Multi Commodities Exchange, (NMCE), Ahmedabad, Indian Commodity Exchange, Ltd., Gurgon contributed 99.71% of the total value of the commodities traded during the year.

Table 2. The share of various Exchanges in the total value of trade during 2012-13.

Name of the Exchanges	Value in Rs. cr.	% share to the total value of the commodities traded
MCX	14881057.12	87.30
NCDEX, Mumbai	1598425.98	9.38
NMCE, Ahmedabad	176570.86	1.04
ICEX, Mumbai	172010.18	1.01
ACE Ahmedabad	169897.1	1.00
<b>Total of five Exchanges</b>	16997961.24	99.71
Others	48878.92	0.29
<b>Grand Total</b>	17046840.16	100.00

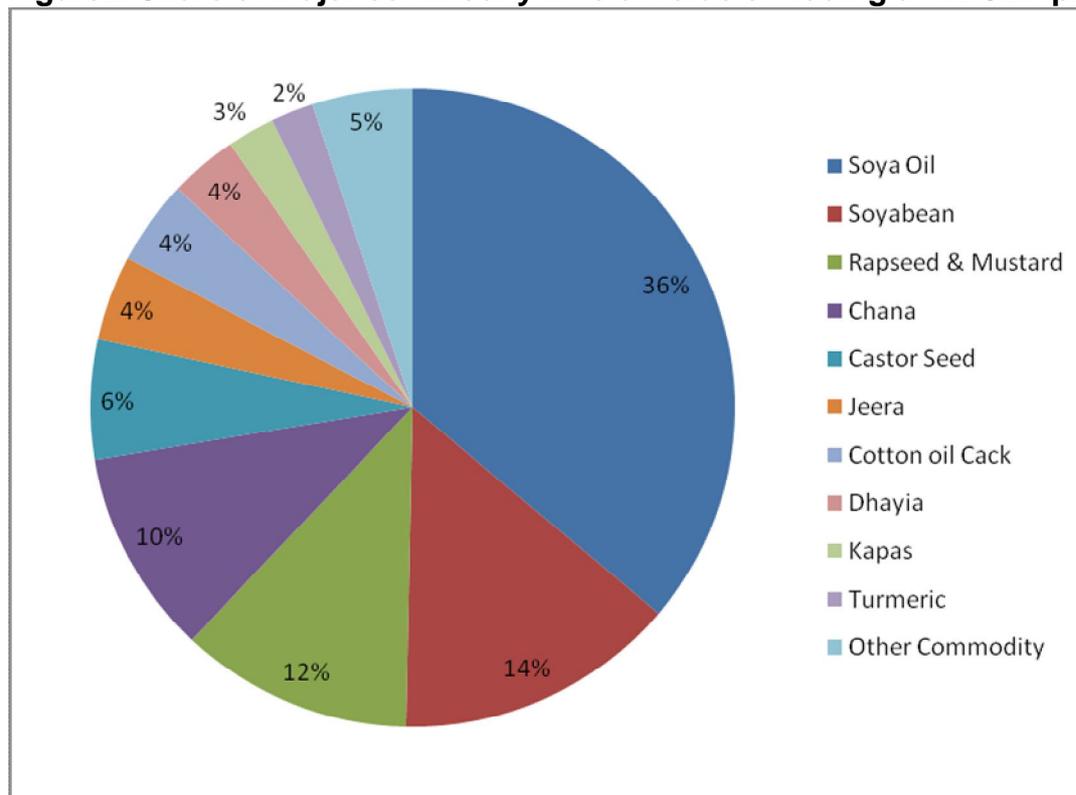
Source: Forward market commission

**Figure 1 Share for different exchange in total volume of trade during 2012-13**



During 2012-13, NCDEX, Mumbai accounted for 10.0% of the total value of trade in the commodity market. In actual terms the total value of trade in the NCDEX, Mumbai was Rs.15.9 lakh crore. During the year, 40 commodities were traded at NCDEX, Mumbai. Amongst which prominent commodities traded during the year were Soya Oil, Guar Seed, Chana, Mentha Oil, Pepper and Jeera at NCDEX, Mumbai. The total value of trade and the percentage share of each of these commodities to the total value of trade at NCDEX, Mumbai is given below.

**Figure2. Share of major commodity in total value of trading at NDCEX platform**



### **Data and methodology**

The sample used in the study consists of ten agricultural commodities traded on National Commodity Exchange of India, Mumbai. i.e. Chana, Guar Seeds, Soya Bean, Kapas, Potato Agra, Turmeric, Black Pepper, Barley, Maize and Castor Seeds. The period of study is from November 2003-to March 2013; however data period varies across commodities owing to their late introduction on trading exchanges and the fact that some agricultural commodities were banned from trading for a certain period to curb speculative impacts which according to policy makers could have triggered high inflation. The data comprises of daily closing spot and futures prices of the sample commodities. Natural logarithm of daily prices is taken to minimize the heteroscedasticity in data. The list of sample commodities as well as their data period is given in the following Table4.

**Table 3. Name of Sample Agricultural Commodities**

Agricultural Commodity	Data Periods	Future markets
Chana	13-04-2003 to 31-03-13	NCDEX, Mumbai
Guar seed	13-04-2003 to 31-03-13	NCDEX, Mumbai
Soybean	01-09-2004 to 31-03-13	NCDEX, Mumbai
Kapas (Cotton)	01-04-2004 to 31-03-13	NCDEX, Mumbai
Potato Agra	05-07-2006 to 31-03-13	NCDEX, Mumbai
Turmeric	13-04-2003 to 31-03-13	NCDEX, Mumbai
Black papper	13-04-2003 to 31-03-13	NCDEX, Mumbai
Barley	13-04-2003 to 31-03-13	NCDEX, Mumbai
Maize	01-05-2005 to 31-03-13	NCDEX, Mumbai
Castor Seed	21-09-2005 to 31-03-13	NCDEX, Mumbai

*The table shows the sample commodity and indices used in the study. The period of study is from November 2003-to March 2012 however the data period varies across commodities*

Given the nature of the problem and the quantum of data and to establish in detail price discovery mechanism we perform necessary test. The regression analysis would yield efficient and time invariant estimates provided that the variables are stationary over time. However, many financial and macroeconomic time series behave like random walk. We first test whether or not the spot and futures price series are co-integrated. The concept of co-integration becomes relevant when the time series being analyzed are non stationary. The time series stationarity of sample price series has been tested using Augmented Dickey Fuller (ADF) 1981. The ADF test uses the existence of a unit root as the null hypothesis. To double check the robustness of the results, Phillips and Perron (1988) test of stationarity has also been performed for the series, after confirming the co- integrating vector which confirms causality in one direction we perform block Exogeneity test which describes the direction of causality which is exhibited in detail in results section.

### **Analysis and Interpretations of Results**

The results of stationarity tests are given in Table 4. It confirms non stationarity of commodity price data; hence we repeat stationarity tests on return series (estimated as first difference of log prices) which are also provided in Table 5. The table describes the sample price series that have been tested using Augmented Dickey

Fuller (ADF) 1981. The ADF test uses the existence of a unit root as the null hypothesis. To double check the robustness of the results, Phillips and Perron (1988) test of stationarity has also been performed for the price series and then both the test are performed on return series. Panel A (Price Series) and Panel B (Return Series) report results of and commodities respectively. The sample return series exhibit stationarity thus conforming that both spot and future commodity prices are integrated to the first order.

If two or more series are themselves non-stationary, but a linear combination of them is stationary, then the series is said to be co-integrated. Given that each commodity spot and futures prices are integrated of the same order, co-integration techniques are used to determine the existence of a stable long-run relationship between the price pairs. Arrival of new information results in price discovery for short intervals of time between futures and spot market due to communication cost. Increased availability and lower cost of information account together for faster assimilation of information in the futures market than a spot market (Koontz *et al.*, 1990). First cointegration analysis reveals the extent to which two markets have moved together towards long run equilibrium. Secondly, it allows for divergence of respective markets from long-run equilibrium in the short run. The co-integrating vector identifies the existence of long run equilibrium while error correction dynamics describes the price discovery process that helps the markets to achieve equilibrium (Schreiber and Schwartz, 1986). Co-integrating methodology fundamentally proceeds with non-stationary nature of level series and minimizes the discrepancy that arises from the deviation of long-run equilibrium. The observed deviations from long-run equilibrium are not only guided by the stochastic process and random shocks in the system but also by other forces like arbitrage process. As a result, the process of arbitrage possesses dominant power in the commodity future market to minimize the very likelihood of the short run disequilibrium. Moreover, it is theoretically claimed that if futures and spot price are cointegrated, then it implies presence of causality at least in one direction. The cointegration results are reported in Table 5.

Table 4. Satationarity test for sample commodities

Commodity	(Panel )A Prices Series		(Penal) B Return Series integration 1(1)	
	ADF Test	Phillips Perron test	ADF Test	Phillips Perron test
	T Statistics	T Statistics	T Statistics	T Statistics
<b>Chana</b>				
Future Price	-2.42	-2.46	-40.85**	-40.82**
Spot Price	-2.41	-3.32	-40.62**	-40.62**
<b>Guar Seed</b>				
Future Price	-2.19	-2.17	-36.5**	-36.51**
Spot Price	-1.1	-1.3	-24.9**	-42.18**
<b>Soybean</b>				
Future Price	-1.17	0.096	-44.07**	-44.17**
Spot Price	-0.1	0.44	-44.08**	-44.99**
<b>Kapas</b>				
Future Price	0.81	0.69	-34.95**	-34.95**
Spot Price	-0.10	-0.16	-36.44**	-36.44**
<b>Potato Agra</b>				
Future Price	-2.67	-2.67	-36.33**	-36.33**
Spot Price	-1.85	-3.09	-8.36**	-36.84**
<b>Turmeric</b>				
Future Price	-2.19	-2.17	-36.5**	-36.51**
Spot Price	-1.1	-1.3	-24.9**	-42.18**
<b>Black Pepper</b>				
Future Price	-0.57	-0.53	-26.75**	-26.74**
Spot Price	-0.42.	-0.42	-27.76**	-27.71**
<b>Barley</b>				
Future Price	-0.81	-0.69	-34.95**	-34.95**
Spot Price	-0.1	-0.16	-36.44**	-36.95**
<b>Maize</b>				
Future Price	-2.67	-2.67	-36.33**	-36.33**
Spot Price	-1.85	-3.09	-8.36**	36.84**
<b>Castor Seed</b>				
Future Price	-0.36	-0.40	-42.47**	-42.47**
Spot Price	-0.35	-.32	-43.76**	-43.76**

The table describes the sample price series that have been tested using Augmented Dickey Fuller (ADF) 1981. The ADF test uses the existence of a unit root as the null hypothesis. To double check the robustness of the results, Phillips and Perron (1988) test of stationarity has also been performed for the price series and then both the test are performed on return series also as shown in Panel-A (price series) and Panel B (Return series) are integrated to I(1). All tests are performed using 5%level of significance (\*\*).

Table 5 Johansen's Co-Integration test

Price Series	Leg length	Max Eigen Value	Trace statistics	Critical Value **
<b>Chana</b>				
Future Price	2 legs *	177	181.65	15.49
Spot Price		4.64	4.64	3.84
<b>Guar Seed</b>				
Future Price	2 Legs*	337.06	339.86	15.49
Spot Price		2.8	2.8	3.94
<b>Soybean</b>				
Future Price	2legs*	27.86	28.67	15.49
Spot Price		0.81	0.81	3.84
<b>Kapas</b>				
Future Price	3 legs	77.99	82.58	15.49
Spot Price		4.59	4.59	3.84
<b>Potato Agra</b>				
Future Price	3 legs*	57.59	62.41	15.49
Spot Price		4.82	4.82	3.84
<b>Turmeric</b>				
Future Price	3 legs*	11.76	12	15.49
Spot Price		0.24	0.24	3.84
<b>Black Pepper</b>				
Future Price	2legs*	77.54	77.69	15.49
Spot Price		0.14	0.14	3.84
<b>Barley</b>				
Future Price	3 legs*	300.6	302.56	15.49
Spot Price		1.96	1.96	3.84
<b>Maize</b>				
Future Price	3 legs*	65.13	69.99	15.49
Spot Price		4.52	4.85	3.84
<b>Castor Seed</b>				
Future Price	2 legs*	9.65	9.66	15.49
Spot Price		0	0	3.84

The table provides the Johansen's co-integration test, maximal Eigen value and Trace test statistics are used to interpret whether null hypothesis of  $r=0$  is rejected at 5 % level and not rejected where  $r=1$ . Rejection of null hypothesis implies that there exists at least one co-integrating vector which confirms a long run equilibrium relationship between the two variables, spot and future prices in our case. The null hypothesis is rejected in 9 commodities except Turmeric, which reveals that one cointegration relationship exists between spot and futures prices.

On the other hand, if some level series are integrated of the same order, it does not mean that both level series are cointegrated. Cointegration implies linear combinations of both level series cancelling the stochastic trend, thereby producing a stationary series.

Johansen's cointegration test is more sensitive to the lag length employed. Besides, inappropriate lag length may give rise to problems of either overparameterization or underparametrisation. The objective of the estimation is to ensure that there is no serial correlation in the residuals. Here, Akaike information criterion (AIC) is used to select the optimal lag length and all related calculations have been done embedding that lag length.

Maximal Eigen value and trace test statistics are used to interpret whether null hypothesis of  $r = 0$  is rejected at 5% level and not rejected when  $r = 1$ . Rejection of null hypothesis implies that there exists at least one co-integrating vector which confirms a long run equilibrium relationship between the two variables, spot and future prices in our case. The null hypothesis is rejected in case of 9 out of 10 commodities (Chana, Guarseed, Soybean, Kapas, Potato Agra, Black pepper, Barley, Maize and castor seed), with an exception of Turmeric, Which reveals that one cointegration relationship exists between spot and futures prices. Thus, spot and futures prices of these agricultural commodities share common long-run information. Our cointegration result confirm that in general there is a *price discovery process* in the spot and future commodity markets .Moreover, cointegration analysis delivers the message saying how two markets (such as futures and spot commodity markets) reveal pricing information that are identified through the price difference between the respective markets. The implication of cointegration is that the commodities in two separate markets respond disproportionately to the pricing information in the short run, but they converge to equilibrium in the long run under the condition that both markets are innovative and efficient. In other words, the root cause of disproportionate response to the market information is that a particular market is not dynamic in terms of accessing the new flow of information and adopting better technology. Therefore, there is a consensus that price change in one market (futures or spot commodity market) generates price change in the other market (spot or commodity futures) with a view to bring a long run equilibrium relation is :

$$F_t = \alpha + \beta S_t + e_t \quad (1)$$

Equation (1) can be expressed as in the residual form as:  $\hat{e}_t$

^

$$e_t = F_t - \alpha + \beta S_t \quad (2)$$

In the above equations  $F_t$  and  $S_t$  are futures and spot prices of a commodity in the respective market at time  $t$ . Both  $\alpha$  and  $\beta$  are intercept and coefficient terms, where  $\hat{e}_t$  is estimated white noise disturbance term. The main advantage of cointegration is that each series can be represented by an error correction model which includes last period's equilibrium error with adding intercept term as well as lagged values of first difference of each variable. Similarly, spot returns Granger cause futures returns if some of the coefficients of lagged spot returns are nonzero and/or the error correcting term is significant at conventional levels. The results of Granger causality tests are reported in Table 6

<b>Gaur seed</b>		<b>Turmeric</b>		<b>Soy bean</b>		<b>Back pepper</b>	
DP: Future Price	DP: Spot Price						
P (0.00)	P (0.00)	P (0.80)	P (0.70)	P (0.00)	P (0.00)	P (0.02)	P (0.03)
<b>Barley</b>		<b>Maize</b>		<b>Castor Seed</b>		<b>Chana</b>	
DP: Future Price	DP: Spot Price						
P (0.00)	P (0.00)	P (0.24)	P (0.004)	P (0.00)	P (0.00)	P (0.00)	P (0.00)
<b>Kapas</b>		<b>Potato Agra</b>					
DP: Future Price	DP: Spot Price	DP: Future Price	DP: Spot Price				
P (0.00)	P (0.00)	P (0.00)	P (0.00)				

*The results show bi-directional Granger lead relationships between spot and futures in all the commodities except Turmeric*

Therefore, casual relationship can be gauged by examining the statistical

significance. In addition, the empirical results of the Granger causality test find the short run lead-lag relationship between futures and spot prices. It tests whether one variable is significantly explained by the other variable. More specifically, we say that futures returns Granger cause spot returns if some of the coefficients of lagged futures returns are nonzero and/or the error correcting term is significant at conventional levels.

In sum the results confirm that there is a price discovery process all the commodities except Turmeric .This makes futures market more informational efficient and cost competitive thus ensuring their lead role in price discovery

### **The Farmers participation in Future Market a case study of Jaipur District of Rajasthan**

Small and medium scale farmers do not benefit from economies of scale in production, enjoying limited profitability even in the best of times. They are particularly vulnerable to fluctuations in harvest time output prices. Since many smallholders buy farming inputs on credit, and have few assets, the negative price shocks at harvest time can prove to be disastrous. Even a 10% swing can make the difference between stable consumption and food insecurity. The recent arrival of national agricultural futures markets in India holds the promise of providing both producers and consumers with additional tools to manage price fluctuation risk.

This policy paper reports on a series of interventions designed to enable farmers to use information from futures markets with the goal of helping them improve agricultural planning and decision-making, reduce their risk exposure, and increase harvest time revenue. While most medium and small-scale farmers cannot directly participate in futures markets because of minimum trading quantity thresholds, exchanges may nevertheless offer important benefits to all farmers. Most saliently, the availability of futures price information can help farmers make informed agricultural decisions about which crop to plant, when, in what quantity, when to harvest their crops as well as provide guidance about when to sell, and at which markets.

#### **Relevance to small and medium farmers**

Investors, traders and brokers have been able to directly benefit from price hedging and options contracts. The benefits of futures markets to small and medium scale farmers are not as direct. Minimum trading quantity thresholds

Minimum quantity thresholds for participation in selected agricultural commodity traded on NCDEX

Commodity	Minimum Quantity Threshold	Tick size (Rs.)
Guar seed	10 tons	1.0
Turmeric	5 tons	5.0
Soybean	10 tons	1.0
Black paper	1 tones	
Barley	10 tones	0.50
Maize	10tones	1.0
Castor seed	10 tons	2.0
Chana	10tons	2.0
Kapas	4 tons	1.0
Potato Agra	10 tons	1.0

(a selected list is provided in Exhibit above) prevent this latter group from direct participation in agricultural futures market. Most marginal farmers do not produce crops in large enough quantities to be able to trade in the futures market (MCA, 2008). While in theory farmers could combine output to meet minimum lot size requirements, in practice quality differences vary significantly by producer, and may make such aggregation difficult. Combine output to meet minimum lot size requirements, in practice quality differences vary significantly by producer, and may make such aggregation difficult. harvest liquidity constraints faced by small and medium scale farmers could be a significant obstacle to this mechanism. While farmers may be willing to wait to get higher revenues for their produce, they might be forced to sell their crops early because of liquidity constraints aggravated by limited assets or savings, the need to repay creditors including inputs suppliers as well as basic household consumption needs. Another potential channel through which spot and futures prices could help farmers is by increasing their bargaining power in price negotiations with local traders and middlemen. Many small-scale farmers sell their produce to local traders at their own villages; this saves the cost of transporting the harvest to the district market. However, if farmers lack accurate knowledge of market prices, the intermediaries may underpay for the farmers output preventing them from

fully realizing their potential income. Accurate knowledge of prevailing prices at different markets may also help farmers who can afford to transport their produce to local district markets by helping them choose the markets at which they want to sell their produce.

A survey was conducted at Jaipur, Choumu, Shrimadhapur grain mandi and randomly 25 farmers are interviewed. Farmers are asked about the future markets and it was surprising to know that no one know about the future market. Farmers and not even coming to Jaipur grain mandi for selling the produce and they were selling in local mandi on the prevailing prices on that day. It was surprise to know that even claimed made by MCX that electric price display board put in every mandi for displaying the prices. That was not found in any of the visited mandi. The produce handle in the all the tree mandies were wheat, chana, Barley and mustard. The farmers were not known about the future trading.

Balaji Trading company case: A meeting was held with Balaji Trading Company at Jaipur and asks him about the farmer's participation in his terminal. He has informed that farmers are not coming to Jaipur and traders from small mandi purchasing from local area and coming to capital for sale of produce. He has trading terminal of MCX and NCDEX and allow the traders to participate in future trade. He told that only speculation activities are taking place and big traders were used the future market to mitigate the risk arises due to price fluctuation. The manager of trading company also express his view that launching multiple

### **Interaction with NCDEX officer and Traders in Khammam District of Telangana**

A Meeting with NCDEX official was conducted to know the participation of farmers and traders in future market. The officer inform that small traders and farmers are not participating in future market due to many restriction impose by forward market commission. Maintaining daily mark to margin is difficult for farmers and small traders. Traders are benefiting from price transmission but not the farmers. If producer organization can be formed and these organizations can participate in market on behalf of farmers is only solution for inclusion in commodity future market. It is observed that there are big farmers who are producing the chilies and turmeric

but they are not participating in the market due to limited knowledge about the market operation.

### **Summary Conclusion and Suggestion**

The literature relating to price discovery has mainly been confined to developed economies. Though commodity markets in emerging economies like India have been growing exponentially, commodities and commodity derivatives are neither popular asset classes, nor have they been adequately researched. Empirical Studies on the subject show that the introduction of derivatives contracts improves the liquidity and reduces informational

asymmetries in the market. The present study evaluates price discovery in Indian commodities market to bridge the important gap in the literature. We cover ten agricultural commodities and the study period is from June 2003-march 2011. We find that spot and futures prices of all sample commodities and indices are non stationary, and in fact integrated to order one except one commodity Turmeric in which null hypothesis is accepted and there is no cointegration revealed in this market. Long run equilibrium relationship is confirmed for 9 out of 10 commodities. The results of Granger causality test show bi-directional Granger lead relationships between spot and futures in all agricultural commodities except Turmeric in which there is no cointegration and causality and is not informationally efficient. We conclude that Indian commodities market is still not perfectly competitive for some commodities. Overall, the price discovery results are encouraging given the nascent character of Indian commodity market. The commodity market in India needs strong policy support owing to its relevance in the macro economy with implications for price inflation, economic growth and employment. Hence there is an urgent need that the policy makers to support these trading platforms with infrastructure development, fiscal incentives, encouraging product innovation, widening investor base and investor education so that they are able to realise their true potential. Consequently, the institution of manager (or investor) should understand the futures markets clearly and supervise (or invest) properly to ensure the efficiency of futures market. More importantly, the international pricing authority in Indian futures market should be improved as quickly as possible in order to maintain economic security. The present research contributes to alternative investment literature for emerging markets. Future research on comparative analysis of emerging economies can grasp

the true picture of improvements that are needed to capture the gains of derivative market in India which is outside the scope of present study. A survey was conducted at Jaipur, Choumu, Shrimadhapur grain mandi and randomly 25 farmers are interviewed. Farmers are asked about the future markets and it was surprising to know that no one know about the future market. Farmers and not even coming to Jaipur grain mandi for selling the produce and they were selling in local mandi on the prevailing prices on that day. It was surprise to know that even claimed made by MCX that electric price display board put in every mandi for displaying the prices. That was not found in any of the visited mandi. The produce handle in the all the tree mandies were wheat, chana, Barley and mustard. The farmers were not known about the future trading.

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### **Last objective and policy implication further need to be carried out**

**623 Publications and Material Development:**  
(One copy each to be supplied with this Performa)

6231 Research Papers: One paper sent for publication

6232 Popular Articles : NIL

6233 Reports : NIL

6234 Seminars and Workshops (Relevant to the Project) in which the Scientists have participated:

**625 Infrastructural Facilities Developed:**

**Part - IV : Project Expenditure  
(Summary)**

**Year** \_\_\_\_\_

**630 Recurring Expenditure**

6301 Salaries : (Designation with pay scale)

i) Scientific

ii) Technical

iii) Supporting

iv) Wages

Sub-total

-----

6302 Consumables :

i) Chemicals

ii) Glasswares

iii) Others

----- Sub-total

-----

6303 Travel :

6304 Miscellaneous :  
(Other costs)

-----

6305 Sub-total  
(Recurring)

-----

**631 Non-recurring Expenditure :**  
(Equipment)

i)

ii)

iii)

(630 and 631)

-----632 Total  
-----

**Signature of the Project Investigator:**

**1. PC MEENA**

**Co-investigators**

**2. Ranjit Kumar (On Deputation)**

**Signature & Comments of the Head  
of the Division/Section :**

**Signature & Comments of the  
Joint Director (Research) :**

**Signature & Comments of the  
Director:**

- i)
  - ii)
  - iii)
- (630 and 631)

-----632 Total  
-----

Signature of the Project Investigator:

*[Signature]*  
11/9/2014  
1. PC MEENA

Co-investigators

2. Ranjit Kumar (On Deputation)

Signature & Comments of the Head of the Division/Section :

*He has completed the work meeting the objectives of envisaged the project & it may be closed*

*[Signature]*  
11/9/2014

Signature & Comments of the Joint Director (Research) :

*R. Kalpana Sathy*  
17/9

Signature & Comments of the Director:

*[Signature]*