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Commodity Futures Markets in India: Its Impact on Production and Prices

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I

INTRODUCTION

Commodity futures markets have a limited presence in developing countries. Historically, governments in many of these countries have discouraged futures markets. If they were not banned, their operations have been constricted by regulation. In the recent past, however, countries have begun to liberalise commodity markets. And in a reversal of earlier trends, the development of commodity futures markets is being pursued actively with support from governments (UNCTAD, 2002). Policy makers expect social benefits in terms of price discovery, risk management and better allocation of resources. Similarly, the World Bank has undertaken many initiatives to explore the possibility of market-based systems of price stabilisation (Claessens and Duncan, 1993). Yet, it is well known, that even in developed countries, not all commodities are traded on futures markets. Indeed, only a minority of contracts floated by commodity exchanges succeeds in attracting trading volumes to be liquid (Brorsen and Fofana, 2001; Thompson *et al.* 1996). If this happens in environments with smoothly functioning spot markets, mature legal institutions and supportive government policy what could be the prospects of futures markets in developing countries?

The history of organised commodity derivatives in India goes back to the nineteenth century when the Cotton Trade Association started futures trading in 1875, barely about a decade after the commodity derivatives started in Chicago. Over time the derivatives market developed in several other commodities in India. Following cotton, derivatives trading started in oilseeds in Bombay (1900), raw jute and jute goods in Calcutta (1912), wheat in Hapur (1913) and in Bullion in Bombay (1920). However, many feared that derivatives fuelled unnecessary speculation in essential commodities, and were detrimental to the healthy functioning of the markets for the underlying commodities, and hence to the farmers. With a view to restricting speculative activity in cotton market, the Government of Bombay prohibited options business in cotton in 1939. Later in 1943, forward trading was prohibited in oilseeds and some other commodities including foodgrains, spices, vegetable oils, sugar and cloth. After Independence, the Parliament passed Forward Contracts (Regulation)

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Act, 1952 (Government of India, 1952) which regulated forward contracts in commodities all over India. The Act applies to goods, which are defined as any movable property other than security, currency and auctionable claims. The Act prohibited options trading in goods along with cash settlements of forward trades, rendering a crushing blow to the commodity derivatives market. Under the Act, only those associations/exchanges, which are granted recognition by the Government, are allowed to organise forward trading in regulated commodities. The Act envisages three-tier regulation: (i) The Exchange which organises forward trading in commodities can regulate trading on a day-to-day basis; (ii) the Forward Markets Commission provides regulatory oversight under the powers delegated to it by the Central Government, and (iii) the Central Government - Department of Consumer Affairs, Ministry of Consumer Affairs, Food and Public Distribution - is the ultimate regulatory authority.

“Futures trading is an agreement between a buyer and a seller obligating the seller to deliver a specified asset of specified quality and quantity to the buyer on a specified date at a specified place and the buyer in turn is obligated to pay to the seller a renegotiated price in exchange of the delivery”. A World Bank study has stated that ‘the ability of a futures exchange to function properly depends in part upon the ability of the exchange and the regulator to ensure that the prices of the contracts traded on the exchange reflect supply and demand’. The already shaken commodity derivatives market got a crushing blow when in 1960s, following several years of severe droughts that forced many farmers to default on forward contracts (and even caused some suicides), forward trading was banned in many commodities considered primary or essential. As a result, commodities derivative markets dismantled and went underground where to some extent they continued as over the counter (OTC) contracts at negligible volumes. Much later, in the 1970s and 1980s the Government relaxed forward trading rules for some commodities, but the market could never regain the lost volumes.

The Indian economy is witnessing a mini revolution in commodity derivatives and risk management. Commodity options trading and cash settlement of commodity futures had been banned since 1952 and until 2002 commodity derivatives market was virtually non-existent, except some negligible activity on an OTC basis. Now in September 2005, the country has 3 national level electronic exchanges and 21 regional exchanges for trading commodity derivatives. As many as eighty (80) commodities have been allowed for derivatives trading. The value of trading has been booming and is likely to cross the \$ 1 Trillion mark in 2006 and, if all goes well, seems to be set to touch \$5 Trillion in a few years. This paper analyses questions such as: how did India pull it off in such a short time since 2002? Is this progress sustainable and what are the obstacles that need urgent attention if the market is to realise its full potential? Why are commodity derivatives important and what could other emerging economies learn from the Indian mistakes and experience? (Ahuja, 2006).

II

COMMODITY DERIVATIVES MARKET IN INDIA

After the Indian economy embarked upon the process of liberalisation and globalisation in 1990, the Government set up a Committee in 1993 to examine the role of futures trading. The Committee (headed by Prof. K.N. Kabra) recommended allowing futures trading in 17 commodity groups. It also recommended strengthening of the Forward Markets Commission, and certain amendments to Forward Contracts (Regulation) Act 1952 (Government of India, 1952), particularly allowing options trading in goods and registration of brokers with Forward Markets Commission. The Government accepted most of these recommendations and futures trading were permitted in all recommended commodities. Commodity futures trading in India remained in a state of hibernation for nearly four decades, mainly due to doubts about the benefits of derivatives. Finally a realisation that derivatives do perform a role in risk management led the government to change its stance. The policy changes favouring commodity derivatives were also facilitated by the enhanced role assigned to free market forces under the new liberalisation policy of the Government. Indeed, it was a timely decision too, since internationally the commodity cycle is on the upswing and the next decade is being touted as the decade of commodities.

Why are Commodity Derivatives Required?

India is among the top-5 producers of most of the commodities, in addition to being a major consumer of bullion and energy products. Agriculture contributes about 22 per cent to the gross domestic product (GDP) of the Indian economy. It employs around 57 per cent of the labour force on a total of 163 million hectares of land. Agriculture sector is an important factor in achieving a GDP growth of 8-10 per cent. All this indicates that India can be promoted as a major center for trading of commodity derivatives. It is unfortunate that the policies of FMC during the most of 1950s to 1980s suppressed the very markets it was supposed to encourage and nurture to grow with times. It was a mistake other emerging economies of the world would want to avoid. However, it is not in India alone that derivatives were suspected of creating too much speculation that would be to the detriment of the healthy growth of the markets and the farmers. Such suspicions might normally arise due to a misunderstanding of the characteristics and role of derivative product. It is important to understand why commodity derivatives are required and the role they can play in risk management. It is common knowledge that prices of commodities, metals, shares and currencies fluctuate over time. The possibility of adverse price changes in future creates risk for businesses. Derivatives are used to reduce or eliminate price risk arising from unforeseen price changes. A derivative is a financial contract whose price depends on, or is derived from, the price of another asset. Two important derivatives are futures and options.

(i) *Commodity Futures Contracts:* A futures contract is an agreement for buying or selling a commodity for a predetermined delivery price at a specific future time. Futures are standardised contracts that are traded on organised futures exchanges that ensure performance of the contracts and thus remove the default risk. The commodity futures have existed since the Chicago Board of Trade (CBOT, www.cbot.com) was established in 1848 to bring farmers and merchants together. The major function of futures markets is to transfer price risk from hedgers to speculators. For example, suppose a farmer is expecting his crop of wheat to be ready in two months time, but is worried that the price of wheat may decline in this period. In order to minimise his risk, he can enter into a futures contract to sell his crop in two months' time at pre-determined price. This way he is able to hedge his risk arising from a possible adverse change in the price of his commodity.

(ii) *Commodity Options Contracts:* Like futures, options are also financial instruments used for hedging and speculation. The commodity option holder has the right, but not the obligation, to buy (or sell) a specific quantity of a commodity at a specified price on or before a specified date. Option contracts involve two parties – the seller of the option writes the option in favour of the buyer (holder) who pays a certain premium to the seller as a price for the option. There are two types of commodity options: a 'call' option gives the holder a right to buy a commodity at an agreed price, while a 'put' option gives the holder a right to sell a commodity at an agreed price on or before a specified date (called expiry date). The option holder will exercise the option only if it is beneficial to him; otherwise he will let the option lapse. For example, suppose a farmer buys a put option to sell 100 quintals of wheat at a price of \$25 per quintal and pays a 'premium' of \$0.5 per quintal (or a total of \$50). If the price of wheat declines to say \$20 before expiry, the farmer will exercise his option and sell his wheat at the agreed price of \$25 per quintal. However, if the market price of wheat increases to say \$30 per quintal, it would be advantageous for the farmer to sell it directly in the open market at the spot price, rather than exercise his option to sell at \$25 per quintal.

Futures and options trading therefore helps in hedging the price risk and also provide investment opportunity to speculators who are willing to assume risk for a possible return. Further, futures trading and the ensuing discovery of price can help farmers in deciding which crops to grow. They can also help in building a competitive edge and enable businesses to smoothen their earnings because no hedging of the risk would increase the volatility of their quarterly earnings. Thus futures and options markets perform important functions that can not be ignored in modern business environment. At the same time, it is true that too much speculative activity in essential commodities would destabilise the markets and therefore, these markets are normally regulated as per the laws of the country.

Modern Commodity Exchanges

To make up for the loss of growth and development during the four decades of restrictive government policies, FMC and the Government encouraged setting up of the commodity exchanges using the most modern systems and practices in the world. Some of the main regulatory measures imposed by the FMC include daily mark to market system of margins, creation of trade guarantee fund, back-office computerisation for the existing single commodity exchanges, online trading for the new exchanges, demutualisation for the new exchanges, and one-third representation of independent Directors on the Boards of existing exchanges, etc. Responding positively to the favourable policy changes, several nationwide Multi-Commodity Exchanges (NMCE) have been set up since 2002, using modern practices such as electronic trading and clearing. The selected information about the two most important commodity exchanges in India [Multi-Commodity Exchange of India Limited (MCX), and National Multi-Commodity and Derivatives Exchange of India Limited (NCDEX)] is given in Exhibit 1 and Exhibit 2.

EXHIBIT 1. MULTI-COMMODITY EXCHANGE OF INDIA LIMITED (MCX)

MCX an independent and de-mutualised multi commodity exchange has permanent recognition from Government of India for facilitating online trading, clearing and settlement operations for commodity futures markets across the country. Key shareholders of MCX are Financial Technologies (India) Ltd., State Bank of India, NABARD, NSE, HDFC Bank, State Bank of Indore, State Bank of Hyderabad, State Bank of Saurashtra, SBI Life Insurance Co. Ltd., Union Bank of India, Bank Of India, Bank Of Baroda, Canara Bank, Corporation Bank. Headquartered in Mumbai, MCX is led by an expert management team with deep domain knowledge of the commodity futures markets. Through the integration of dedicated resources, robust technology and scalable infrastructure, since inception MCX has recorded many first to its credit. Inaugurated in November 2003 by Shri Mukesh Ambani, Chairman & Managing Director, Reliance Industries Ltd, MCX offers futures trading in the following commodity categories: Agri Commodities, Bullion, Metals- Ferrous & Non-ferrous, Pulses, Oils & Oilseeds, Energy, Plantations, Spices and other soft commodities. MCX has built strategic alliances with some of the largest players in commodities eco-system, namely, Bombay Bullion Association, Bombay Metal Exchange, Solvent Extractors' Association of India, Pulses Importers Association, Shetkari Sanghatana, United Planters Association of India and India Pepper and Spice Trade Association. Today MCX is offering spectacular growth opportunities and advantages to a large cross section of the participants including Producers / Processors, Traders, Corporate, Regional Trading Centers, Importers, Exporters, Cooperatives, Industry Associations, amongst others MCX being nation-wide commodity exchange, offering multiple commodities for trading with wide reach and penetration and robust infrastructure, is well placed to tap this vast potential.

Source: <http://www.mcxindia.com>.

Booming Business: US\$ 1 Trillion and Beyond

Since 2002 when the first national level commodity derivatives exchange started, the exchanges have conducted brisk business in commodities futures trading. In the last three years, there has been a great revival of the commodities futures trading in India, both in terms of the number of commodities allowed for futures trading as well as the value of trading. While in the year 2000, futures trading were allowed in only 8 commodities, the number jumped to 80 commodities in June 2004. The value of trading in local currency saw a quantum jump from about INR 350 billion in 2001-02

EXHIBIT 2. NATIONAL COMMODITY & DERIVATIVES EXCHANGE LIMITED (NCDEX)

National Commodity and Derivatives Exchange Limited (NCDEX) is a professionally managed online multi commodity exchange promoted by ICICI Bank Limited (ICICI Bank), Life Insurance Corporation of India (LIC), National Bank for Agriculture and Rural Development (NABARD) and National Stock Exchange of India Limited (NSE). Punjab National Bank (PNB), CRISIL Limited (formerly the Credit Rating Information Services of India Limited), Indian Farmers Fertiliser Cooperative Limited (IFFCO) and Canara Bank by subscribing to the equity shares have joined the initial promoters as shareholders of the Exchange. NCDEX is the only commodity exchange in the country promoted by national level institutions. This unique parentage enables it to offer a bouquet of benefits, which are currently in short supply in the commodity markets. The institutional promoters of NCDEX are prominent players in their respective fields and bring with them institutional building experience, trust, nationwide reach, technology and risk management skills. NCDEX is a public limited company incorporated on April 23, 2003 under the Companies Act, 1956. It obtained its Certificate for Commencement of Business on May 9, 2003. It has commenced its operations on December 15, 2003. NCDEX is a nation-level, technology driven de-mutualised on-line commodity exchange with an independent Board of Directors and professionals not having any vested interest in commodity markets. It is committed to provide a world-class commodity exchange platform for market participants to trade in a wide spectrum of commodity derivatives driven by best global practices, professionalism and transparency. NCDEX is regulated by Forward Market Commission in respect of futures trading in commodities. Besides, NCDEX is subjected to various laws of the land like the Companies Act, Stamp Act, Contracts Act, Forward Commission (Regulation) Act and various other legislations, which impinge on its working. NCDEX is located in Mumbai and offers facilities to its members in more than 390 centres throughout India. The reach will gradually be expanded to more centres. NCDEX currently facilitates trading of thirty six commodities - Cashew, Castor Seed, Chana, Chilli, Coffee, Cotton, Cotton Seed Oilcake, Crude Palm Oil, Expeller Mustard Oil, Gold, Guar gum, Guar Seeds, Gur, Jeera, Jute sacking bags, Mild Steel Ingot, Mulberry Green Cocoons, Pepper, Rapeseed - Mustard Seed, Raw Jute, RBD Palmolein, Refined Soy Oil, Rice, Rubber, Sesame Seeds, Silk, Silver, Soy Bean, Sugar, Tur, Turmeric, Urad (Black Matpe), Wheat, Yellow Peas, Yellow Red Maize and Yellow Soybean Meal. At subsequent phases trading in more commodities would be facilitated.

Source: <http://www.ncdex.com>.

TABLE 1. COMMODITY FUTURES TRADING AT NATIONAL MULTI-COMMODITY EXCHANGES IN INDIA: COMPARATIVE DATA FOR THREE PERIODS: FORTNIGHTLY VALUE OF TURNOVER IN USD MILLIONS

Name of the Exchange (1)	16 Mar 05 to 31 Mar 05 (2)	16 Jan 05 to 30 Jun 05 (3)	16 Sep 05 to 30 Sep 05 (4)
Multi-Commodity Exchange of India Limited, Mumbai	\$m 3,503.69 (100)	\$m 4,974.76 (142)	\$m 11,042.25 (315)
National Multi-Commodity Exchange of India Limited, Ahmedabad	\$m 135.64 (100)	\$m 113.13 (83)	\$m 106.85 (79)
National Commodity and Derivatives Exchange Limited, Mumbai	\$m 5,360.45 (100)	\$m 7,950.49 (148)	\$m 10,694.29 (200)
Total of three exchanges	\$m 8,999.78 (100)	\$m 13038.38 (145)	\$m 21,843.39 (243)

Note: The original data in local currency Indian Rupee (INR) was obtained from the website of Forward Markets Commission (www.fmc.gov.in). The INR figures were translated into USD using the monthly average exchange rates prevailing in the respective months, as obtained from www.xrates.com. These exchange rates were: March 2005: INR 43.5861 per USD, June 2005: INR 43.5245 per USD, and Sept 2005: INR 43.8445 per USD.

to INR 1.3 Trillion in 2003-04. The data in Table 1 indicates that the value of commodity derivatives in India could cross the US\$ 1 Trillion mark in 2006. The market regulator Forward Markets Commission (FMC) disseminates fortnightly trading data for each of the 3 national and 21 regional exchanges that have been set

up in recent years to carry on the futures trading in commodities in the country. Table 1 presents comparative trading data for three fortnightly periods in March, June and September 2005 and brings up some interesting facts.

A comparison of the trading data for the three two-weekly periods above shows that the market for commodity derivatives more than doubled over a six-month period between second half of March 2005 and the second half of September 2005. It also shows that the total commodity futures turnover for the three national level exchanges added up to \$21.84 billion for a fortnight in September 2005 or \$546 billion for a year (assuming 25 working fortnights a year). This rising trend gives a strong indication that if the commodity futures market continues to expand at the present rate, it is likely to cross the \$ 1 trillion mark in 2006 and possibly jump to \$4-6 trillion in another 2-3 years.

Unresolved Issues and Future Prospects

Even though the commodity derivatives market has made good progress in the last few years, the real issues facing the future of the market have not been resolved. Agreed, the number of commodities allowed for derivative trading have increased, the volume and the value of business has zoomed, but the objectives of setting up commodity derivative exchanges may not be achieved and the growth rates witnessed may not be sustainable unless these real issues are sorted out as soon as possible. Some of the main unresolved issues are discussed below.

(a) *Commodity Options*: Trading in commodity options contracts has been banned since 1952. The market for commodity derivatives cannot be called complete without the presence of this important derivative. Both futures and options are necessary for the healthy growth of the market. While futures contracts help a participant (say a farmer) to hedge against downside price movements, it does not allow him to reap the benefits of an increase in prices. No doubt there is an immediate need to bring about the necessary legal and regulatory changes to introduce commodity options trading in the country. The matter is said to be under the active consideration of the Government and the options trading may be introduced in the near future.

(b) *The Warehousing and Standardisation*: For commodity derivatives market to work efficiently, it is necessary to have a sophisticated, cost-effective, reliable and convenient warehousing system in the country. The Habibullah (2003) Task Force admitted, "A sophisticated warehousing industry has yet to come about". Further, independent labs or quality testing centers should be set up in each region to certify the quality, grade and quantity of commodities so that they are appropriately standardised and there are no shocks waiting for the ultimate buyer who takes the physical delivery. Warehouses also need to be conveniently located. Central

Warehousing Corporation of India (CWC: www.fieo.com) is operating 500 warehouses across the country with a storage capacity of 10.4 million tonnes. This is obviously not adequate for a vast country. To resolve the problem, a Gramin Bhandaran Yojana (Rural Warehousing Plan) has been introduced to construct new and expand the existing rural godowns. Large scale privatization of state warehouses is also being examined.

(c) *Cash Versus Physical Settlement:* It is probably due to the inefficiencies in the present warehousing system that only about 1 per cent to 5 per cent of the total commodity derivatives trade in the country is settled in physical delivery. Therefore the warehousing problem obviously has to be handled on a war footing, as a good delivery system is the backbone of any commodity trade. A particularly difficult problem in cash settlement of commodity derivative contracts is that at present, under the Forward Contracts (Regulation) Act 1952 (Government of India, 1952), cash settlement of outstanding contracts at maturity is not allowed. In other words, all outstanding contracts at maturity should be settled in physical delivery. To avoid this, participants square off their positions before maturity. So, in practice, most contracts are settled in cash but before maturity. There is a need to modify the law to bring it closer to the widespread practice and save the participants from unnecessary hassles.

(d) *The Regulator:* As the market activity pick-up and the volumes rise, the market will definitely need a strong and independent regular, similar to the Securities and Exchange Board of India (SEBI) that regulates the securities markets. Unlike SEBI which is an independent body, the Forwards Markets Commission (FMC) is under the Department of Consumer Affairs (Ministry of Consumer Affairs, Food and Public Distribution) and depends on it for funds. It is imperative that the Government should grant more powers to the FMC to ensure an orderly development of the commodity markets. The SEBI and FMC also need to work closely with each other due to the inter-relationship between the two markets.

(e) *Lack of Economies of Scale:* There are too many (3 national level and 21 regional) commodity exchanges. Though over 80 commodities are allowed for derivatives trading, in practice derivatives are popular for only a few commodities. Again, most of the trade takes place only on a few exchanges. All this splits volumes and makes some exchanges unviable. This problem can possibly be addressed by consolidating some exchanges. Also, the question of convergence of securities and commodities derivatives markets has been debated for a long time now. The Government of India has announced its intention to integrate the two markets. It is felt that convergence of these derivative markets would bring in economies of scale and scope without having to duplicate the efforts, thereby giving a boost to the growth of commodity derivatives market. It would also help in resolving some of the issues concerning regulation of the derivative markets. However, this would

necessitate complete coordination among various regulating authorities such as Reserve Bank of India, Forward Markets commission, the Securities and Exchange Board of India, and the Department of Company affairs etc.

(f) *Tax and Legal Bottlenecks*: There are at present restrictions on the movement of certain goods from one state to another. These need to be removed so that a truly national market could develop for commodities and derivatives. Also, regulatory changes are required to bring about uniformity in octroi and sales taxes etc. Value Added Tax (VAT) has been introduced in the country in 2005, but has not yet been uniformly implemented by all states.

III

COMMODITY FUTURES: SOYA OIL EXCHANGE IN INDIA

Although the above literature has researched these issues in the context of developed countries, similar concerns have been expressed in India as well. According to Nair (2004), “the major stumbling block for the development of commodity futures markets in India is the fragmented physical/spot market”. As Nair points out, government laws and various taxes hinder the free movement of commodities. Furthermore, the absence of certified warehouses has meant that exchanges have promoted cash settlement rather than physical delivery. Thomas (2003) in a similar critique draws attention to the prevalence of bilateral deals, the lack of price transparency and the absence of certified warehouses. How does one assess the emergence of a futures market, however? We are not aware of a coherent theoretical framework within which this question could be answered. In this paper, we rely on the work of previous researchers to suggest empirical strategies that could be applied to the NBOT soya oil contract. In particular, we draw on that strand of commodity market literature that emphasizes the commercial use of futures markets as a critical factor in its evolution. Peck (1980) refers to the “widely held and commonly accepted [proposition].... that levels of activity on futures markets reflect commercial as distinct from speculative needs. In the absence of commercial use, futures markets have closed, and fundamental changes in a commodity’s underlying productive pattern have caused fundamental changes in contract specifications”. Similarly, Williams (2001a) states that “commercial firms as hedgers are the fundamental participants in futures markets”.

For a firm that combines a futures position with a position in the spot market, the return from this portfolio is the change in basis. Hence, Working (1953) argued that commercial firms make money from predictable changes in the basis. The predictability of the change in basis is then a test of hedging effectiveness – an insight that has been used by a number of authors subsequently (Heifner, 1966; Hranaiova and Tomek, 2002; Peck and Williams, 1992) and is exploited in this study as well. If the change in basis is a return to the portfolio of commercial firms, then their

commercial decisions (in the aggregate) should affect the basis. This provides yet another way for examining the use of futures markets by commercials. While stocks held by commercials are not publicly observable, soya oil imports data is available and is used here to examine its effect on the basis. This way we are able to track econometrically the links between commercial decisions that affect supply and outcomes in the commodity futures market. Tilley and Campbell (1988) in an earlier effort investigated the impact of underlying economic factors (including export commitments) on the basis in the Kansas city wheat futures contract.

The Soyabean and Oil Complex

From being a minor oilseed, soyabean has grown in importance and is next only to groundnut in terms of the output of oilseeds in India. With an annual production of around 6-7 million tonnes, soybean constitutes about 25 per cent of total oilseed production of the country in 2004. Between 1981 and 2004, the output of soybean grew at about 10 per cent per annum although the growth seems to be tapering off in the last 4-5 years. The detrended series is remarkably stable with its coefficient of variation around 8 per cent. Soyabean production is concentrated in the state of Madhya Pradesh that accounts for nearly 75 per cent of the country's output. The crop year is October-September and 60 per cent of the crop marketing occur in the period from November – January. Soyabean prices exhibit a typical pattern of seasonality where the low price occurs in the harvest months of October-November after which prices rise till June when they level off (Ramaswami and Singh, 2007). Most soyabeans are processed to extract the oil for food and industrial use and high-protein meal or de-oiled cakes (DOC) for animal feed. Soyabean crushing operations are generally located near major soyabean production regions, i.e., in Madhya Pradesh. Soya oil accounts for 18 per cent of soyabean weight while the remainder 82 per cent is soyabean meal.

Paralleling the growth in soyabean production has been the increase in soya oil consumption. In 2000, soya oil accounted for 21 per cent of the consumption of all edible oils in India. In the early 1970s, the share of soya oil was negligible (Dohlman, Persaud and Landes, 2003). Higher crushing of domestically produced soybeans as well as higher imports of soya oil supplied the growth in soya oil consumption. Between 1990/91 and 2000/01, soy oil imports increased from 20,000 tons to 1.4 million tonnes. The oil is mostly imported in crude form and is refined locally (Dohlman, Persaud and Landes, 2003). The seasonal pattern of soyabean production means that soya oil supplies tend to come from domestic crushing through October to March while soya oil imports dominates supplies in the other months. Since about the middle of 2001, the government has applied an ad-valorem tariff of 45 per cent on soya oil. To prevent under-invoicing, the government follows a tariff rate value system where the tariffs are applied with respect to a government reference price.

Delays in revising these reference prices have meant that the effective tariff rate is sometimes higher than 45 per cent.

Within Madhya Pradesh, Indore is the centre of soyabean and soya oil trade. The soya oil spot market in Indore operates through specialised brokers operating out of their offices. There is no centralised market. Spot market contracts are for deliveries within 7-10 days. Brokerage is about Rs. 25 per tonne in the spot market as opposed to Rs. 14 per tonne in the futures market. Sometimes the spot market brokers arrange for forward deals upto 1-2 months. In case of disputes, the broker is the principal arbiter. As such deals can greatly affect the reputation of the brokers, they accept such transactions depending on the reputation and past dealings with the client. Compared to soyabean prices, seasonality is much less marked in soya oil prices. The strongest seasonality is that oil prices in the first 3 months of the soyabean marketing year (October – January) are significantly lower than the prices in the remaining months. The absence of seasonality in the remaining months is due to imports.

The Soya Oil Exchange

The National Board of Trade (NBOT) operates the soya oil futures exchange at Indore. The exchange trades contracts for delivery in every month of the year. At any particular time, however, only the maturing contract and the two nearby contracts are traded. Thus, for instance, on February 1, the contracts that could be traded would be the February, March and April contracts all of which expire in the middle of the respective months. Thus, a contract is open for trading for a maximum for three months (Ramaswami and Singh, 2007). The basic quantity for trading in respect of all contracts in soya oil is one metric ton or its multiple. The trading uses the open outcry system although the exchange plans to switch over to electronic trading in the near future. At the end of the trading day, transactions are marked to market. The trading rules allow for delivery at certain warehouses although in practice, delivery is rare and cash settlement at the exchange determined price is the norm. In India, law does not yet back the negotiability of warehousing receipts and this might have discouraged physical deliveries. The absence of gradation and certification systems and the fragmented nature of the spot markets also lead exchanges to avoid physical delivery. This feature is common to all exchanges in India.

The settlement price is decided by a committee of exchange members and is usually an average of the spot prices over 4 days preceding the settlement date. The exchange declares a spot price every day based on the sample of prices collected from brokers. The exchange maintains that it minimises biases by taking care that quotations are not obtained from brokers with active positions in the futures market. NBOT is owned by its members. About 64 per cent of the members are brokers/trading merchants, about 25 per cent are traders, 8 per cent are processors and 3 per cent are importers/exporters. However, under a regulatory directive, NBOT has to transform itself to a demutualised exchange in the near future. Trading in the soy

oil contract at NBOT began in February 2000. Till the beginning of 2004, trading volumes in the soy oil contract at NBOT accounted for more than 50 per cent of the combined volumes in all futures exchanges. From 2004, NBOT lost its position as a leading exchange as trading commenced at three well-equipped exchanges – the National Commodities and Derivatives Exchange (NCDEX) in Mumbai, the Multi-Commodity Exchange (MCX) also in Mumbai and the National Multi-Commodity Exchange in Ahmedabad. These exchanges have excellent financial backing, demutualised ownership structures and more transparent electronic trading systems. Of these exchanges soya oil is most actively traded at NCDEX. Trading volumes in this contract is still short of NBOT volumes by about 20 per cent. However, the rapid growth in volumes in this new exchange suggests that NCDEX could emerge as the leading exchange in soya oil contracts in the future. In this paper, we focus on futures trading at NBOT as the experience with other exchanges is much too limited to afford a detailed study. Our data covers the period from February 2000 (i.e., from the inception of trading in the soya oil contract) to January 2005. In terms of contracts traded, this period includes 59 contracts starting from March of 2000 to February of 2005.¹

Volume of Trade and Net Open Interest

As noted earlier, the soya oil contract at the NBOT exchange in Indore is open for trading for a maximum of three months. Across the 59 contracts in the sample, the average number of days traded is 56. In 60 per cent of the contracts, the number of trading days was between 49 and 59 days. The average number of days traded has remained stable over the years (in the range 52-56) except for contracts maturing in 2002 where the average number of trading days surged to 65. While imports were highest in this year, it was not substantially higher than in 2001 where contracts traded on an average for 53 days (Ramasmami and Singh, 2007).

TABLE 2. TRADING VOLUMES AND SUPPLIES IN SOYA OIL

Calendar Year	Volume of Trade ('000 tonnes)	Domestic Production ('000 tonnes)	Imports ('000 tonnes)	Total Supplies ('000 tonnes)	Ratio of Volume of Trade to total Supplies	Open Interest	Ratio of Volume of Trade to Open Interest
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2000	2313	622	601	1223	2	2621	0.88
2001	4629	714	1444	2159	2	4738	0.98
2002	13700	570	1531	2101	7	8297	1.65
2003	21700	602	1109	1711	13	8955	2.42
2004	26400	528	1091	1619	16	10500	2.51

Source: Soya Oil Exchange in India, Indian Statistical Institute, 7, SJS Sansanwal Marg, New Delhi.

Despite no trend in the number of days traded, the volume of trading in soya oil contracts has grown rapidly while soya oil supplies have grown only modestly. Table

2 shows that the volume of trading started off in 2000 being twice that of the quantity of total supplies (domestic production plus imports). By 2004, trading volumes were 16 times the quantity of supplies. The large increases in trading volumes without such a corresponding movement in physical supplies suggest that the soya oil contract has attracted speculative interest. The exchange does not report the positions of hedgers and speculators separately. However, as discussed earlier, previous research has established that open interest mainly reflects the trading positions of commercial firms. The last two columns in Table 2 are yearly totals of open interest and the ratio of trading volumes to open interest. These numbers confirm the rapid growth in speculative volumes. Based on daily volume data, we compute the empirical distribution of the volume of trade as a function of time. For any particular time interval, the histogram estimate of the probability of a trade occurring in that period is the ratio of volume of trade in that interval to the total volume.

IV

PERFORMANCE OF INDIAN AGRICULTURAL MARKETS

India's economic growth has been enviable (8 to 9 per cent a year). The manufacturing and service sectors are experiencing double-digit growth and have attracted investment from the private as well as public sectors. China's economy grew well over 10 per cent last year, compared with the U.S. growth rate of around 2.5 per cent. During the past four years, Sadly, the farm sector, which accounts for less than one-fifth of India's gross domestic product, has been growing the slowest. The growth rate in the agricultural sector has been stagnant at about 2.3 to 2.6 per cent per year over the last decade. It remains well below the potential and is unlikely to reach the Eleventh Plan target of 4 per cent without major intervention and reform. Variable and low outputs and volatile markets have affected the confidence of the farmers. There is large-scale migration of farmers and farm workers to cities in search of job opportunities. India's economic growth has not reached all sectors of the population, especially those living in rural areas. However, some analysts argue that agricultural markets are in for a long and strong future. The farm sector, they contend, is heading towards its golden era, a post-Second World War period. At any rate, the time is right for Indian agriculture to focus on its strengths and drive enhanced growth and continued development (Kadambot Siddique, 2008).

Food prices jumped 25 to 70 per cent in recent months. The cost of cereal imports to low-income food-deficit countries increased from \$14.03 billion in 2002-03 to \$33.11 billion in 2007-08. Jacques Diouf, Director-General of the Food and Agricultural Organisation (FAO), has warned: "The problem is very serious around the world due to severe price rises and we have seen riots." Population growth, rising incomes, the declining rate of agricultural productivity trends, climate variability and change, and the increased use of grain and sugar for biofuel production are leading to a surge in food commodity demand. This is in an environment where land and water

constraints will limit agricultural production growth. Every human being on this planet is a net consumer of food. Food, nutrition, bio-energy, the environment, and livelihood are global concerns. For these reasons, the integration of whole aspects of agriculture and the food industry is important in the future (FAO Report, 2007-08).

India Needs Strategic Approaches

The world's ability to maintain food supplies through rapid demand, changing climate, declining natural resources, trade liberalisation policies, and regional disturbances is a critical issue. The recent Food and Agricultural Organisation (FAO) reports remind us that about 800 million people are still undernourished globally. All these issues have a major influence on the way we plan future policy, education, research, and development in agriculture worldwide — and in India because two out of three Indians depend on agriculture for their livelihood. To address these matters effectively, India needs strategic approaches to agricultural research and development that target the following areas: (1) improved technologies for higher and more profitable production and for the sustainable conservation of natural resources; (2) diversified farming systems that reduce risk and improve resource-use efficiency, leading to better returns to growers; (3) enhanced vertical integration from grower to consumer; (4) equipping a new generation of agricultural graduates and post-graduates with modern scientific, analytical, communication, and business skills; and (5) institutional, organisational, and policy reforms (FAO Report, 2007-08).

The Central, State governments and other agencies should work together to develop and implement improved policies and developmental models to radically change and modernise Indian agriculture. The challenge is to consolidate the fragmented landholdings based on land capability studies. It is to focus on areas and regions where comparative advantages of specific agricultural, horticultural, animal husbandry, and fisheries production exist. It is to introduce low cost agricultural credit systems, including micro-credits. It is to improve and strengthen input availability and delivery systems. The challenge is also to improve the efficiency of current irrigation and expanding new systems. It is to strengthen rural infrastructure, post-harvest storage, and public distribution systems. It is to strengthen the marketing and price structure. It is to enhance technology development and transfer. It is to renew investment and modernisation of agricultural education, research, and development. It is to bring about an integrated approach among various sectors: the Centre, States, local universities, farmer groups, and NGOs. It is to lobby and negotiate through the World Trade Organisation and other world forums to remove huge subsidies provided by the EU and the U.S. to their farm sector. It is to attract private and foreign investment in Indian agriculture and the food sector.

The coming generation of Indian farmers needs to be both innovative and competitive in the global market. It is the task of government, policy-makers, educators, researchers, and extension workers to ensure they have the tools,

technologies, and new farming systems that enable them to be so. The approach should be participatory, involving farmers, researchers, the market, and the political level. Training new generation agricultural scientists will take time, commitment, and resources from the government, universities, and the agricultural industries. Urgent measures are needed to attract bright students into agricultural, food, and natural resource science areas. A reorientation in the mindset of teachers and agricultural graduates can be brought about only by innovative changes in curricula and courses in Indian agricultural universities. It will accelerate development and adoption of improved agricultural practices and technologies to meet future constraints imposed by climate changes, population pressure, and increased food and feed demand. The expected outcome is improved productivity and the sustainable use of agricultural lands by developing a more diverse farming system, supporting economic development in India.

V

PRODUCTION OF FOODGRAINS IN FUTURE PRICE POSITION

The main elements of the Government's food management policy are procurement, storage and movement of foodgrains; public distribution and maintenance of buffer stocks. These and other related aspects of this policy, such as production, procurement and issue prices of foodgrains, quality control, imports and exports, behaviour of market prices, etc., during the year 2007-2008 are discussed in the succeeding paragraphs (Annual Report 2007-08).

Foodgrains Production during 2006-07

The cumulative rainfall from 1st June to 30th September, 2006 was excess to normal in 26 meteorological sub-divisions and deficient in 10 out of the 36 meteorological sub-divisions in the country. The rainfall from the south-west monsoon in 2006, for the country as a whole, was 99 per cent of its long period average. The foodgrains production during 2006-07 is estimated at 217.28 million tonnes which is 8.68 million tonnes or 4.16 per cent more than 208.60 million tonnes of foodgrains production in 2005-06. The *kharif* foodgrains production estimated at 110.57 million tonnes in 2006-07 is 0.70 million tonnes or 0.64 per cent more than 109.87 million tonnes of *kharif* production in 2005-06. The *rabi* foodgrains production estimated at 106.71 million tonnes is 7.98 million tonnes or 8.08 per cent more than 98.73 million tonnes of *rabi* foodgrains production in 2005-06.

Foodgrains Production during Kharif 2007-08

The cumulative rainfall from 1st June to 30th September, 2007 was excess to normal in 30 meteorological sub-divisions and deficient in 6 out of the 36

meteorological sub-divisions in the country. The rainfall from the south-west monsoon in 2007, for the country as a whole, was 105 per cent of its long period average. As per the second advance estimates released on 07.02.2008, the foodgrains production in the country is estimated at 219.32 million tonnes during 2007-08 which is 0.94 per cent more than last year's foodgrains production. The production of rice is estimated at 94.08 million tonnes, production of wheat is estimated at 74.81 million tonnes, production of coarse cereals is estimated at 36.09 million tonnes and production of pulses is estimated at 14.34 million tonnes during 2007-08. The details of final estimates of production for 2006-07 and the second advance estimates for 2007-08 are given in Appendix I.

Price Position of Foodgrains

A statement giving the Monthly Average of Wholesale Price Index (WPI) of Foodgrains (Base: 1993-94 = 100) is given in Appendix II. The WPI of Foodgrains declined by 1.2 per cent to 210.9 in May, 2007 from 213.5 in January, 2007. Then, the index of foodgrains began to rise gradually from 211.2 in June, 2007 registering an increase of 3.3 per cent. The index for cereals began with 207.1 in January, 2007, declined and stood at 213.9 in November, 2007 registering an increase of 3.3 per cent. The WPI of rice which stood at 181.1 in January, 2007 rose to 194.1 in November, 2007 recording a rise of 7.2 per cent during January-November, 2007.

TABLE 1. COMPARATIVE MSP OF WHEAT AND PADDY SINCE 2002-03 TO 2007-08
(MARKETING SEASONS)

Year (1)	Wheat (2)	<i>(Rs. per quintal)</i> Paddy	
		Common (3)	Grade-A (4)
2002-03	620	530*	560*
2003-04	620**	550	580
2004-05	630	560	590
2005-06	640	570	600
2006-07	650#	580&	610&
2007-08	750\$	645@	675@

Source: Ministry of Consumer Affairs Food and Public Distribution, Government of India, New Delhi.

* The Government approved the payment of special drought relief price of Rs.20 per c quintal for paddy.

** The Government approved the payment of special drought relief price of Rs. 10 per quintal for wheat.

An incentive bonus of Rs.50 per quintal approved for wheat procured during the period 20.3.06 to 30.6.06.

& An incentive bonus of Rs.40 per quintal approved for paddy procured till 31.3.2007. Later the applicability of bonus extended upto 30.9.2007 for the States of Andhra Pradesh, Tamil Nadu, Orissa, West Bengal and Chhattisgarh and for Bihar and Kerala upto 31.5.2007.

\$ An incentive bonus of Rs.100 per quintal over and above the MSP was also given during the entire RMS 2007-08.

@ An incentive bonus of Rs.100 per quintal over and above the MSP was also given during the entire KMS 2007-08.

The WPI of wheat stood at 230.2 in November, 2007 as compared to 234.5 in January, 2007 (Annual Report 2007-08). Foodgrains are procured at the Minimum Support Price (MSP) fixed by the Government. The MSP for Common and Grade 'A' paddy was fixed at Rs. 645 and Rs. 675 per quintal respectively for the *Kharif* Marketing Season (KMS) 2007-2008 (October, 2007-September, 2008). An incentive bonus of Rs. 100 per quintal over and above the MSP was also given during the entire KMS 2007-08. The MSP of wheat was fixed at Rs. 750 per quintal for the Rabi Marketing Season (RMS) 2007-2008. An incentive bonus of Rs. 100 per quintal over and above the MSP was also given during RMS 2007-08.

Decentralised Procurement of Foodgrains

The scheme of Decentralised Procurement of Foodgrains was introduced by the Government in 1997-98 with a view to effecting savings in the form of reduction in the outgo of food subsidy, enhancing the efficiency of procurement and Public Distribution System (PDS) and encouraging local procurement to the maximum extent thereby extending the benefits of Minimum Support Price (MSP) to local farmers. Under the decentralised procurement scheme, the State Government itself undertakes direct purchase of paddy and wheat and procurement of levy rice on behalf of Government of India. The purchase centres are opened by the State Governments and their agencies as per their requirements. The State Governments procure, store and distribute foodgrains under TPDS and other welfare schemes. In the event of the total quantity of wheat and rice thus procured falling short of the total allocation made by the Central Government for meeting the requirement of TPDS and other Schemes, the Central Government, through Food Corporation of India (FCI), meets the deficit out of the Central Pool Stocks (Annual Report 2007-08).

The Central Government undertakes to meet the entire expenditure incurred by the State Governments on the procurement operations as per the approved costing. The Central Government also monitors the quality of foodgrains procured under the scheme and reviews the arrangements made to ensure that the procurement operations are carried on smoothly. The State Governments presently undertaking Decentralised Procurement are West Bengal, Uttar Pradesh, Madhya Pradesh, Chattisgarh, Uttaranchal, Andaman & Nicobar Islands, Orissa, Tamil Nadu, Gujarat, Karnataka and Kerala. The total procurement of rice in the States which have adopted decentralised procurement was 40 lakh tonnes in *Kharif* Marketing Season (KMS) 2002-03. This went up sharply to 78 lakh tonnes during KMS 2003-04 and further to 109 lakh tonnes during KMS 2005-06. During KMS 2006-07, 94.7 lakh tonnes of rice were procured.

Procurement of Rice and Wheat

Besides extending price support to farmers for wheat and paddy, rice was also procured under levy from rice millers/dealers at prices announced separately for each State (Annual Report 2007-08).

TABLE 2. PROCUREMENT OF RICE FOR THE CENTRAL POOL
(INCLUDING PADDY IN TERMS OF RICE) SINCE 2003-04

Year (1)	Procurement (lakh tonnes)		
	FCI (2)	State Agencies (3)	Total (4)
2003-04	109.73	118.55	228.28
2004-05	116.31	130.52	246.83
2005-06	109.77	166.80	276.56
2006-07	168.85	81.90	250.75
2007-08*	27.15	100.08	127.23

Source: Government of India, Ministry of Consumer Affairs Food and Public Distribution, New Delhi.

* Position as on 31.12.2007.

Government undertakes to purchase all wheat and paddy of prescribed specifications offered on sale by the farmers at the notified Minimum Support Price (MSP), thereby ensuring them a stable market for their produce. Non-basmati rice is procured for the Central Pool under the statutory levy system imposed by the State Governments in exercise of powers conferred on them under the Essential Commodities Act, 1955. The levy percentage prevailing in various States/UTs as on 31.12.2007 for the *Kharif* Marketing Season (KMS) 2007-08 is given in Appendix 3. State Governments have been directed to impose and collect minimum 50 per cent levy on all rice millers in their States. Government has approved the proposal of Government of West Bengal for imposing levy on dealers of rice also in addition to rice millers.

TABLE 3. STATE-WISE PROCUREMENT OF WHEAT OF DIFFERENT STATES DURING
2003-04 TO 2007-08

State (1)	Procurement (lakh tonnes)				
	2003-04 (2)	2004-05 (3)	2005-06 (4)	2006-07 (5)	2007-08 (6)
Haryana	51.22	51.15	45.29	22.29	33.50
Madhya Pradesh	1.88	3.50	4.84	Neg.	0.57
Punjab	89.38	92.40	90.10	69.46	67.81
Rajasthan	2.59	2.79	1.59	0.02	3.83
Uttar Pradesh	12.13	17.40	5.60	0.49	5.46
Others	0.81	0.71	0.43	0.00	0.11
All India	158.01	167.95	147.85	92.26	111.28

Source: Government of India, Ministry of Consumer Affairs Food and Public Distribution, New Delhi.

VI

CONCLUSIONS

India is one of the top producers of a large number of commodities, and also has a long history of trading in commodities and related derivatives. The commodities derivatives market has seen ups and downs, but seem to have finally arrived now. The market has made enormous progress in terms of technology, transparency and the trading activity. Interestingly, this has happened only after the Government protection was removed from a number of commodities, and market forces were allowed to play their role. This should act as a major lesson for the policy makers in developing countries, that pricing and price risk management should be left to the market forces rather than trying to achieve these through administered price mechanisms. The management of price risk is going to assume even greater importance in future with the promotion of free trade and removal of trade barriers in the world. All this augurs well for the commodity derivatives markets.

Trading volumes at the National Board of Trade (NBOT) soya oil contract at Indore have grown rapidly. They have also grown relative to the change in supplies and in open interest suggesting a growth in speculative trading. Open interest, which past work has shown to be highly correlated with hedging positions, displays the typical pattern of mature exchanges – of rising steadily as the contract moves towards expiry but peaking and falling rapidly in the time just before maturity. Like commodity exchanges in developed countries, the NBOT exchange offers opportunities to short and long hedgers (at different times) to construct riskless profit-earning trading strategies. If hedgers actively participate in futures trading, then their commercial decisions in the aggregate would affect the returns from such trading. We find that soya oil imports exercise a significant impact on the basis and the impact varies with the extent of supplies that come from domestic production. Thus, by these commonly used criteria, the soya oil contract has attracted hedging interest from commercial firms. The one count on which the NBOT falls short of developed country exchanges is that the NBOT contracts are open for trading for a shorter period of three months or less. The main elements of the Government's food management policy are procurement, storage and movement of foodgrains; public distribution and maintenance of buffer stocks. These and other related aspects of this policy, such as production, procurement and issue prices of foodgrains, quality control, imports and exports, behavior of market prices, etc., during the year 2007-2008 are discussed in the succeeding paragraphs.

NOTE

1. In the initial year, 2000, the exchange did not trade the June contract.

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APPENDIX I

STATEMENT SHOWING FINAL ESTIMATES OF PRODUCTION OF FOODGRAINS FOR
2006-07 AND SECOND ADVANCE ESTIMATES FOR THE YEAR 2007-08

Crop (1)	Season (2)	As on 7/2/08 (million tonnes)			
		2006-07		2007-08	
		2nd Advance Estimates (3)	Final Estimates (4)	Targets (5)	2nd Advance Estimates (6)
Rice	<i>Kharif</i>	77.43	80.17	80	81.52
	<i>Rabi</i>	12.70	13.18	13	12.56
	Total	90.13	93.35	93	94.08
Wheat	<i>Rabi</i>	72.5	75.81	75.5	74.81
Jowar	<i>Kharif</i>	3.95	3.71	4.2	3.70
	<i>Rabi</i>	3.77	3.44	3.8	3.64
	Total	7.72	7.15	8	7.34
Bajra	<i>Kharif</i>	7.54	8.42	8.5	8.26
Maize	<i>Kharif</i>	11.1	11.56	13	14.29
	<i>Rabi</i>	2.46	3.54	3	2.49
	Total	13.56	15.1	16	16.78
Ragi	<i>Kharif</i>	1.49	1.44	2.5	1.89
Small Millets	<i>Kharif</i>	0.42	0.48	0.5	0.46
Barley	<i>Rabi</i>	1.29	1.33	2	1.36
Coarse Cereals	<i>Kharif</i>	24.50	25.61	28.7	28.59
	<i>Rabi</i>	7.52	8.31	8.8	7.50
	Total	32.02	33.92	37.5	36.09
Cereals	<i>Kharif</i>	101.93	105.78	108.7	110.11
	<i>Rabi</i>	92.72	97.30	97.3	94.87
	Total	194.65	203.08	206	204.98
Tur	<i>Kharif</i>	2.64	2.31	2.7	2.9
Gram	<i>Rabi</i>	6.16	6.33	6.4	5.83
Urad	<i>Kharif</i>	0	0.94	0	1.07
	<i>Rabi</i>	0	0.50	0	0.42
	Total	0	1.44	0	1.49
Moong	<i>Kharif</i>	0	0.84	0	0.98
	<i>Rabi</i>	0	0.28	0	0.27
	Total	0	1.12	0	1.25
Other Kharif Pulses	<i>Kharif</i>	0	0.71	0	0.82
Other Rabi Pulses	<i>Rabi</i>	0	2.29	0	2.06
Total Pulses	<i>Kharif</i>	5.24	4.8	5.5	5.77
	<i>Rabi</i>	9.28	9.4	10	8.57
	Total	14.52	14.2	15.5	14.34
Total Foodgrains	<i>Karif</i>	107.17	110.57	114.2	115.88
	<i>Rabi</i>	102	106.71	107.3	103.44
	Total	209.17	217.28	221.5	219.32

Source: Ministry of Consumer Affairs Food and Public Distribution, Government of India, New Delhi.

APPENDIX II

MONTHLY AVERAGE OF WHOLESALE INDEX OF FOODGRAINS

(Base 1993-94 = 100)

Commodity Name (1)	Year (2)	January (3)	February (4)	March (5)	April (6)	May (7)	June (8)	July (9)	August (10)	September (11)	October (12)	November (13)	December (14)
Foodgrains	1998	144.5	142.1	140.2	139.2	139.8	141.9	146.1	148.2	150.1	152.7	156.9	157.4
	1999	159.7	165.9	166.5	168.2	169.7	172.8	175.8	180.5	183.2	182.9	180.9	177.1
	2000	175.4	174.8	175.3	177.6	178	178.4	179	176.2	172.7	170.5	171.1	172.1
	2001	171	169.2	169.8	171.1	173	175.7	175.6	174.1	173.3	172.9	172.4	171.2
	2002	168.9	169.7	170.7	170.1	169.9	170.7	172.6	175.8	177.1	175.1	175.9	175.6
	2003	175.2	176.9	177.3	176.1	176.1	177.3	177.5	176.4	175.9	176.6	176	174.2
	2004	176.4	177.7	175.4	172.7	173.2	174.1	175.4	178.7	178.9	179	178.9	179.3
	2005	179.3	180.2	179.9	179.1	179.2	182.1	184.9	185.6	186.1	187	188.4	189.3
	2006	192.7	194.4	194.8	194.5	196.7	198.4	198.8	201	206.5	210.6	212.4	214.1
	2007	213.5	213.8	211.1	210.9	210.9	211.2	214.1	215.6	215.5	216.3	216.9	
	1998	142.1	139.9	138.4	137.9	139.1	141.3	144.9	147	149.1	150.3	154.2	154.5
	1999	158	166.5	168.3	170	170.7	173.8	177.3	182.7	184.9	183.6	181.9	178.7
	2000	176.7	176.3	176.6	178.4	178.4	178.4	178.3	175.5	172	169.4	169.4	170.1
Cereals	2001	169.6	168.2	168.2	169.6	171.3	173.3	173.2	171.1	170.4	169.6	169.3	168.4
	2002	166.8	168.4	169.8	168.9	168.6	169.1	171.6	174.8	175.8	173.6	174.4	175.1
	2003	175.6	177.3	177.4	176	175.9	177.4	177.4	176.4	176	176.3	175.7	174.1
	2004	176.5	178	175.7	172.9	173.5	174.6	175.6	178.9	178.7	178.9	179.1	179.7
	2005	180.1	181.5	181.5	180	179.5	182.3	184.5	185.1	185.5	186.2	186.6	187
	2006	190.3	191.5	191.7	189.1	190.6	192.3	192.8	195.4	199.6	201.5	204.3	206.7
	2007	207.1	207.3	205.8	205.2	205.6	206.3	209.2	211.1	211.5	212.6	213.9	

(Contd.)

APPENDIX II (CONCLD.)

Commodity Name (1)	Year (2)	January (3)	February (4)	March (5)	April (6)	May (7)	June (8)	July (9)	August (10)	September (11)	October (12)	November (13)	December (14)
Rice	1998	133.2	132.4	134.5	136.3	137.4	139	141.3	144.5	147.8	148.1	148.3	147.3
	1999	148.4	157.1	159.3	167	167.3	170.5	172.2	176.9	178.3	178.8	175.8	169.7
	2000	166.9	166	166.6	169.9	171	171.9	173.1	170.5	167.6	164.3	162.8	164.8
	2001	164.8	163.8	165.1	166.8	169.3	171	171.1	168.6	169.8	168.9	168.3	165.6
	2002	161.5	161.6	161.6	162.4	162.5	162.6	166.4	168	168.6	167	166.9	165.8
	2003	165.9	167	168.4	168.3	169.9	171	171.9	172.4	172.6	172.7	169.3	163.2
	2004	164.4	165.5	164.5	163.3	164.9	166.6	167.1	169	170.2	170.1	169.1	168.7
	2005	168.5	170.2	170.3	170.9	170.5	173.7	175.8	177.5	177.8	178.1	176.8	173.5
	2006	173	173.3	173.6	174.6	176.4	177.3	177.3	178.3	179.7	181.5	182	181.1
	2007	181.1	181.9	183.7	185.5	186	186.5	188.4	190.6	192.6	193.2	194.1	
	1998	153	148.8	140.8	136.4	137.5	140	145.4	146.9	146.7	148.8	155.6	156.7
	1999	162.9	171.7	173.2	163.4	161.7	164.7	170.8	175	178.6	179.3	180.9	180.2
Wheat	2000	180.8	180.7	180.3	179.8	178.4	178.8	178.3	177.4	175.8	175.9	177.1	176.1
	2001	175.6	174	172	173.9	175.1	176.3	177.2	175.6	172.7	173.5	174.8	175.5
	2002	173.9	177	178.4	173	171.5	172	172.3	173	175	175.2	177.1	178.6
	2003	179.1	182.1	179.9	176.5	174.8	176.2	176.1	176	176.3	178	183.2	187.1
	2004	190.9	192.6	188.6	180.3	178	179.4	179.8	183.9	183.7	184.6	186.7	187.7
	2005	188.5	189.6	187.2	180.9	180	183.6	186.1	184.8	184.9	187	191	196.2
	2006	205.5	209	209.4	198.9	199.2	200	201.1	207.4	216.8	221.2	228.4	233.7
	2007	234.5	232.1	224.5	218.5	217	217.1	222.6	224.3	224.2	227.1	230.2	

Source: Government of India, Ministry of Consumer Affairs Food and Public Distribution, New Delhi.

APPENDIX III

PERCENTAGE OF LEVY RICE TO BE DELIVERED IN STATES/UTS UNDER LEVY
ORDERS DURING KMS 2007-08

(as on 31.12.07)

Sr.No (1)	Name of the State/UTs (2)	Category (3)	Quantum of Levy (4)
1.	Andhra Pradesh	Millers/Dealers	50% to 100% @
2.	Assam	Millers	50%
3.	Bihar	Millers/Dealers	40% or 2500 qtls.compound levy on millers. 25% or 500 qtls. Compound levy on wholesalers.
4.	Chhattisgarh	Millers/Dealers	50% Levy Order has not been formally concluded in by Central Government.
5.	Delhi	Millers/Dealers	75%
6.	Gujarat	Millers	15%
7.	Haryana	Millers/Dealers	75%
8.	Himachal Pradesh	Millers/Dealers	50%
9.	Jammu and Kashmir	Millers/Dealers	50%
10.	Jharkhand	Millers/Dealers	50%
11.	Karnataka	Millers/Dealers	33.33%
12.	Madhya Pradesh	Millers/Dealers	30%
13.	Maharashtra	Millers/Dealers	30%
14.	Nagaland	Millers/Dealers	50%
15.	Orissa	Millers	75%
16.	Punjab	Millers/Dealers	75% to 90%*
17.	Rajasthan	Millers/Dealers	50%
18.	Tamil Nadu	Millers/Dealers	50%
19.	Uttar Pradesh	Millers/Dealers	60% to 75%**
20.	Uttarakhand	Millers/Dealers	60%
21.	West Bengal	Millers	50%
22.	Chandigarh	Millers/Dealers	75%
23.	Pondicherry	Millers/Dealers	10% (20% transport levy)

Source: Government of India, Ministry of Consumer Affairs Food and Public Distribution, New Delhi.

* Levy percentage increased from 75% to 90%

** Levy percentage increased from 60% to 75% and the increased levy % has been permitted for State Pool.

@ The advance levy within the overall 75% will be permitted upto 31st March, 2008 and the adjustment of advance levy collected will be made against the levy rice delivered by Millers till September, 2008.(It has been decided that States in which levy% age is less than 50% should immediately increase the levy% age to 50%).