UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

DEVELOPMENT IMPACTS OF COMMODITY EXCHANGES IN EMERGING MARKETS

A study by the UNCTAD secreteriat on Emerging Commodity Exchanges

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Report of the UNCTAD Study Group on Emerging Commodity Exchanges

Development Impacts of Commodity Exchanges in Emerging Markets

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Note

The UNCTAD Study Group on Emerging Commodity Exchanges, coordinated by the secretariat of the United Nations Conference on Trade and Development (UNCTAD) consists of the Multi Commodity Exchange of India, Ltd. (MCX); the Bolsa de Mercadorias e Futuros (BM&F), Brazil; the Dalian Commodity Exchange (DCE), China; Bursa Malaysia; and the SAFEX Agricultural Products Division of JSE, South Africa. **Funding support for this Study has been provided by the Multi Commodity Exchange of India (MCX).**

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Abbreviations

ADBC	Agricultural Development Bank of China
ADD	Derivatives Distribution Agent (Brazil)
AgriBEE	Black Economic Empowerment in Agriculture (South Africa)
AMD	Agricultural Markets Division of SAFEX, South Africa
APMC	Agricultural product marketing committees (India)
ASEAN	Association of Southeast Asian Nations
BCB	Banco Central do Brasil, Brazil
BM&F	Bolsa de Mercadorias e Futuros, Brazil
BMSP	Bolsa de Mercadorias de São Paulo (São Paulo Commodities Exchange), Brazil
BNDES	Banco Nacional de Desenvolvimento Econômico e Social, Brazil
BRL	Brazilian reals

CETIP	Câmara de Custódia e Liquidação (Clearing House for Custody and Settlement), Brazil
CBOT	Chicago Board of Trade (United States)
CDA	Agricultural deposit certificate (Brazil)
CDCA	Agribusiness credit bond certificate (Brazil)
CDM	Clean Development Mechanism of the Kyoto Protocol
CFFE	China Financial Futures Exchange, China
CFTC	Commodity Futures Trading Commission, United States
CGOGST	China Grains and Oils Group Science and Technology Corporation, China
CIMAP	Central Institute of Medicinal and Aromatic Plants, India
COFCO	China National Cereals, Oils and Foodstuffs Import and Export Corporation, China
COMMEX	Commodity and Monetary Exchange of Malaysia
CONAB	Companhia Nacional de Abastecimento (national food supply company), Brazil
CPO	Crude palm oil
CPR	Cédula de Produto Rural (Brazil)
CRA	Agribusiness receivables certificate (Brazil)
CSRC	China Securities Regulatory Commission, China
CVM	Comissão de Valores Mobiliários, Brazil
DCE	Dalian Commodity Exchange, China
ECEX	Ethiopian Commodity Exchange, Ethiopia
ESALQ	Luiz de Queiroz College of Agriculture, Brazil
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCPO	Crude palm oil futures contract (Malaysia)
FELCRA	Federal Land Consolidation and Rehabilitation Authority, Malaysia
FELDA	Federal Land Development Agency, Malaysia
FIA	Futures Industry Association, United States
FIX	Financial Information Exchange
FMC	Forward Markets Commission, India
FOMA	Fundo de Operações do Mercado Agropecuário (Agricultural Market Trading Fund), Brazil
FPMC	Food Pricing Monitoring Committee, South Africa
FSB	Financial Services Board, South Africa
GDP	Gross domestic product
GLC	Gas-liquid chromatography (India)
GMO	Genetically modified organism
GOI	Government of India
Grain SA	Grain South Africa
GSK	Gramin Suvidha Kendra (Village Facilitation Centre), India
GTS	Global Trading System (Brazil)

HIPC	Heavily indebted poor country
HRS	Household Responsibility System (China)
ICA	International commodity agreement
ICO	International Coffee Organization
ICT	Information and communication technology
IFPRI	International Food Policy Research Institute
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IOF	Tax on Financial Transactions, Brazil
IOSCO	International Organization of Securities Commissions
ITF–CRM	International Task Force on Commodity Risk Management in Developing Countries
JSE	JSE Limited (formerly Johannesburg Stock Exchange), South Africa
KLCE	Kuala Lumpur Commodity Exchange, Malaysia
KLOFFE	Kuala Lumpur Options and Financial Futures Exchange, Malaysia
KLSE	Kuala Lumpur Stock Exchange, Malaysia
LCA	Agribusiness letter of credit (Brazil)
LDC	Least developed country
LLDPE	Linear low-density polyethylene
MCX	Multi Commodity Exchange of India, Ltd.
MDCH	Malaysia Derivatives Clearing House, Malaysia
MDEX	Malaysian Derivatives Exchange, Malaysia
MDGs	United Nations Millennium Development Goals
MFCC	Malaysia Futures Clearing Corporation, Malaysia
MME	Malaysian Monetary Exchange, Malaysia
MPOB	Malaysian Palm Oil Board, Malaysia
MPOPC	Malaysian Palm Oil Promotion Council, Malaysia
MSP	Minimum support price (India)
NAP	National Agricultural Policy, Malaysia
NASH	National Association of Smallholders, Malaysia
NBHC	National Bulk Handling Corporation, India
NCDEX	National Commodity and Derivatives Exchange, India
NGO	Non-governmental organization
NMCE	National Multi-Commodity Exchange, India
OECD	Organization for Economic Cooperation and Development
OTC	Over-the-counter derivatives markets
PNRA II	Second National Agrarian Reform Plan (Brazil)
PORIM	Palm Oil Research Institute of Malaysia
PORLA	Palm Oil Registration and Licensing Authority, Malaysia

RISDA	Rubber Industry Smallholders' Development Authority, Malaysia
RMB	Chinese renminbi yuan
ROFEX	Rosario Futures Exchange, Argentina
SAFEX	South African Futures Exchange (now part of the JSE), South Africa
SHFE	Shanghai Futures Exchange, China
SOE	State-owned enterprise (China)
SMS	Short message service
SRCA	Registration System for Agribusiness Securities Custody
SSA	Securities Services Act 2004 (South Africa)
UNCTAD	United Nations Conference on Trade and Development
USD	United States dollars
USDA	United States Department of Agriculture
VAT	Value-added tax
VSAT	Very small aperture terminal (India)
WA	Agricultural warrant
WFP	World Food Programme
wt/lt	litra weight
WTO	World Trade Organization
WTr	Web Trading System (Brazil)
WWF	World Wide Fund for Nature
ZCE	Zhengzhou Commodity Exchange, China

Executive summary

The UNCTAD Study Group on Emerging Commodity Exchanges comprises leading exchanges from five developing countries – Brazil, China, India, Malaysia and South Africa, and is coordinated by the United Nations Conference on Trade and Development (UNCTAD). The Study Group has been formed to raise awareness about the role and performance of emerging commodity exchanges, to share experience and perspectives, to promote innovative practice, and to foster South–South dialogue.

Under the auspices of the Study Group, an empirical investigation has been conducted into the development impacts arising from commodity exchanges in developing countries. The focus has been on the agricultural sector, including small-scale commodity producers – areas that typically lie at the heart of development concerns in emerging markets. The aim has been to identify, analyse and assess the impacts made by commodity exchanges in developing countries on economic growth, development, and poverty reduction, with a particular focus on the agricultural sector and farmers.

Commodity futures exchanges have been selected as the subjects of the study because they tend to be the most sophisticated adaptation of a commodity exchange. The array of impacts generated is potentially the broadest; a commodity exchange that offers other services but does not offer futures trading is likely to generate impacts that feature only a subset of those generated by commodity futures exchanges. However, this does not imply that a commodity futures exchange is always the appropriate form of exchange to be established in every market or for every commodity.

The result of the study report is threefold:

- Using a country case-study approach, the report provides a comparative review of agricultural commodity exchanges in five developing countries; under what conditions they have emerged, and the factors that have driven their ongoing development. The experience and the lessons learned in the case-study countries may shape other developing countries' understanding of commodity exchanges – whether having a commodity exchange would be beneficial, and if so, what kind of exchange and institutional framework would be appropriate.

- Applying impact assessment research methodology, the report sets out a framework for analysing a broad range of potential development impacts that may arise from agricultural commodity exchanges. Developing countries may use such a framework for setting objectives and monitoring progress, if they should decide to establish a commodity exchange.

- Documenting the results of an empirical investigation into exchange performance in the featured countries, the report assesses the development impacts that have arisen from agricultural commodity exchanges. This may provide developing countries with a sense of the opportunities, challenges and limitations associated with the establishment of a commodity exchange.

The study suggests that a commodity exchange – and specific commodity contracts – can be successfully established under a broad range of market conditions. Exchanges have functioned in economies that are open, but also in economies that are restricted. They have been established in the context of economic reform, political transition, and as a function of ongoing market development. Exchanges have developed in countries where smallholder production is the predominant mode, and in others where there is a duality between smallholder and commercial production. Contracts have been developed for commodities that are grown mainly for consumption in the domestic market, and also for commodities that are mainly exported to international markets. While many exchanges operate in countries where market infrastructure, institutions and procedures are highly developed and national markets are integrated, the study shows that they have also been successfully established in countries where markets are in need of substantial further development and integration.

Exchanges have been able to function in this range of situations by demonstrating significant versatility in purpose, function, structure, and services offered. They have been shaped according to specific requirements arising from the local context, responding to the specific needs of stakeholders along the respective commodity chains.

Reflecting this diversity, the pattern of development impacts found during empirical investigation has varied significantly from country to country too. Of 81 hypotheses about development impacts arising from commodity exchanges, evidence was found to support the occurrence of 69 of these in at least one of the featured countries.

It was found that exchange services can be accessed and used by farmers to enhance their marketing and risk management capacity, including through reducing exposure to price and, potentially, production risks. While some commercial producers use the markets directly, in many cases farmers benefit indirectly from exchange services, via contracting arrangements with cooperatives, banks or purchasers. One as yet unexplored possibility for broadening the access of small-scale farmers in particular could be the incorporation of exchange-based solutions into the microfinance toolkit.

For smallholders specifically, price-risk management may not be the most relevant service arising from a commodity exchange. Particularly in China and India, where smallholder production is the predominant pattern, the study found that exchanges can yield other impacts that are arguably more critical: broadening access to markets; empowering farmers to make better cropping and selling decisions; reducing information asymmetries that have previously advantaged more powerful market actors; upgrading storage, grading and technology infrastructure; and expanding access to cheaper sources of finance. Consequently, an exchange need not offer trade in futures contracts for many of these impacts to be realized.

It should be emphasized that commodity exchanges affect the performance of sectors upon which substantial developing-country populations are dependent for their livelihoods. Therefore, stakeholders are advised to be watchful in their approach to the establishment and development of exchanges. For a commodity futures exchange in particular, an appropriate enabling framework, effective ongoing regulatory oversight, and a commitment by Government to respect the market pricing mechanism appear to be essential foundations. It is also important to stress that the exchange has not been a panacea in the featured countries. Consequently, development of an exchange should be integrated within a holistic commodity strategy that incorporates complementary measures to build the productive and marketing capacity of farmers and to upgrade sectoral infrastructure and institutions.

Historical experience suggests that futures markets are stabilizing. However, in the short term, especially after the introduction of an exchange or the launch of a new contract, there may be a period of adjustment and adaptation. Education is key to ensuring that benefits arising from exchange activities are equitable and inclusive. Therefore, it is critical to ensure that all stakeholders are extensively educated about the markets and trained in how they may be constructively used. It is similarly important that exchanges collaborate closely with government and regulatory agencies in the development of an effective legal-regulatory framework. This should provide space for the markets to grow, while protecting investors who will initially be inexperienced and sometimes irresponsible, when faced with the new opportunities offered by an exchange.

The following are core recommendations that emerge from the study: embedding a partnership approach between the public and private sectors for the establishment and development of commodity exchanges, plus appropriate support from civil society and the international community; heightening recognition by established developing-country exchanges of their actual and potential development impact, and recognition that pursuit of these impacts represents a “win-win” solution both for the exchange and for the wider economy; maximization of development impacts through innovative applications of products, services, technologies and capacity-building programmes; recognition by Government that a robust but flexible regulatory framework, and a rules- or principles-based approach to regulation and governance – as opposed to a discretionary or ad hoc approach – are essential foundations for exchange success.

Part One: Introduction

1. The study

1.1 Rationale for study

It is reasonable to assume that a commodity exchange generating high volumes of trade will in some way deliver tangible benefit to its stakeholders. After all, commodity exchanges impose additional costs on participants, such as membership fees, transaction fees and compliance costs. Commercial entities will not pay unless they receive a more-than-commensurate reward for their participation. But what are the kinds of benefits that commodity exchanges deliver? Who gains and who loses? How, specifically, have these institutions functioned in developing countries? Has there been a notable development impact?

The definition of development is both heavily contested and conceptually challenging. It is not within the scope of this publication to provide a full or adequate account of this matter. While definitions vary widely, development approaches typically pursue some mixture of two broad goals, namely poverty reduction and economic growth.[1] The World Development Report 2001 – under the theme "attacking poverty" – identifies three priority areas for action:

- **Promoting opportunity:** Expanding economic opportunity for poor people by stimulating overall growth and by building up their assets and increasing the returns on these assets, through a combination of market and non-market actions.

- **Facilitating empowerment:** Making State institutions more accountable and responsive to poor people, strengthening the participation of poor people in political processes and local decision-making, and removing the social barriers that result from distinctions of gender, ethnicity, race, and social status.

- **Enhancing security:** Reducing poor people's vulnerability to ill health, economic shocks, policy-induced dislocations, natural disasters, and violence, as well as helping them to cope with adverse shocks when they occur (World Bank, 2001: 33).

As will be discussed at further length, the scope for commodity exchanges in developing countries to make an important contribution in each of these areas has been identified in previous UNCTAD papers:[2] facilitating trade, enabling the management of risk, and providing new tools and techniques that can be put in the hands of farmers and the other entities active in the commodity sectors. Moreover, as will be seen in the next chapter, the role of commodity exchanges fits into a number of broader policy debates: risks and transaction costs in agriculture, the existing and future role of smallholders in agriculture, and appropriate policy responses to commodity-price volatility. However, as far as is known, the development impacts of commodity exchanges have not yet been assessed in a manner that is empirical and systematic.

[1] In this respect, the United Nations Millennium Development Goals (MDGs) provide eight specific goals for enhancing development, particularly among the world's poorest people. For details, see: http://www.un.org/millenniumgoals

[2] See in particular the following materials: (a) UNCTAD. *Emerging commodity exchanges: from potential to success.* United Nations publication. UNCTAD/ITCD/COM/4. New York and Geneva. 1997; (b) UNCTAD. *A survey of commodity risk management instruments.* United Nations publication. UNCTAD/COM/15/Rev.2. New York and Geneva. 1998; (c) UNCTAD. Farmers and farmers' associations in developing countries and their use of modern financial instruments. UNCTAD/ITCD/COM/35. 2002; (d) UNCTAD. Progress in the development of African commodity exchanges. UNCTAD/DITC/COM/2005/9. 2005.

1.2 Study aims and objectives

1.2.1 Aim

To identify, analyse and assess the impacts made by commodity exchanges in developing countries on development, poverty reduction and economic growth, with particular focus on the agricultural sector and farmers.

1.2.2 Objectives

Awareness-raising: To build awareness of the solutions that commodity exchanges provide, and their track record in doing so, among key national, regional and international stakeholders – including Governments, regulators, the private sector, civil society and the media.

Accumulation of knowledge: To produce a high-quality report that adds to the existing knowledge base – establishing within a coherent framework the enduring impacts that commodity exchanges have made in key markets over time.

Promotion of best practice: To identify innovative and effective practices that can be held up as models for – or drivers of – embedding a pro-growth, pro-development symbiosis within exchange and market development.

Worldwide applicability: To demonstrate the extent to which the success of exchanges in upgrading commodity sectors and fostering development is part of a worldwide phenomenon.

Exchange of information: To share information, experience and perspectives from across the major developing-country regions.

Network-building: To bring together a study group of leading emerging commodity futures exchanges, fostering South–South dialogue and co-operation.

1.3 Project scope

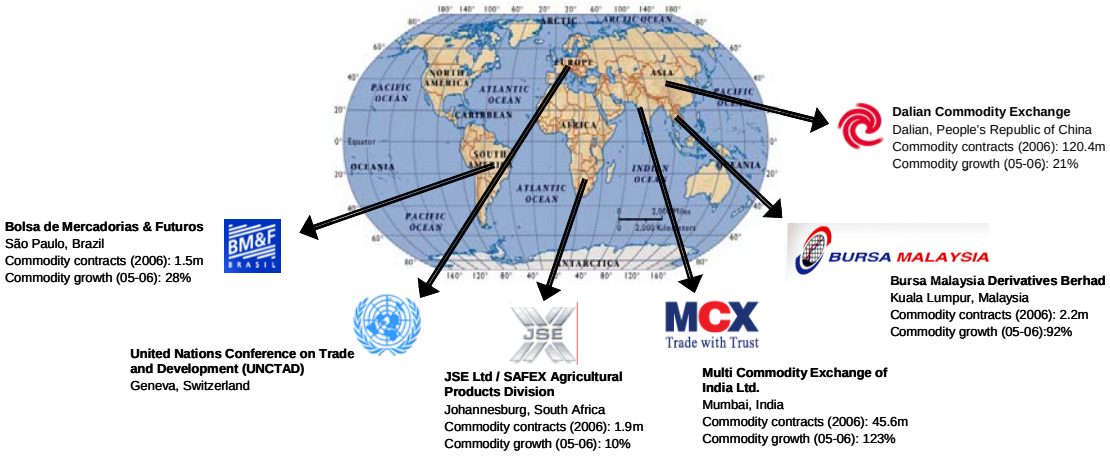
1.3.1 Composition

Five commodity exchanges agreed to participate in the United Nations Study Group on Emerging Commodity Exchanges. At the time of writing, each participant is a futures exchange. Furthermore, each one is the leading exchange, by volume, of futures and options contracts in a key developing region: Multi Commodity Exchange (MCX) of India, from South Asia; the Bolsa de Mercadorias e Futuros (BM&F) of Brazil, from Latin America; the Dalian Commodity Exchange (DCE) of China, from East Asia; Bursa Malaysia Berhad, from South-East Asia; and the South African Futures Exchange (SAFEX) Agricultural Products Division of JSE Limited, from sub-Saharan Africa (see fig. 1). Moreover, each exchange has substantial activity in the agricultural sector.

Each exchange was requested to nominate two agricultural commodities for which it offers futures contracts.[3] The markets for these two commodities have been assessed within the scope of the study. To the extent allowed, it was specified that the contracts selected should currently be trading in significant volumes.

[3] An exception is Bursa Malaysia, which offers one liquid commodity contract, namely crude palm oil.

Figure 1. Participants in the UNCTAD Study Group on Emerging Commodity Exchange



1.3.2 Justification

Three questions emerge as a result of the project's scope:

(a) Why were only commodity futures exchanges selected for the study?

Commodity futures exchanges were selected as the subjects of the study because they tend to be the most sophisticated adaptation of a commodity exchange. The array of impacts generated – and therefore the range of potential insights – is potentially the broadest. A commodity exchange that offers other services but not futures trading – i.e. that trades in other instruments or in non-trade services such as registrations or clearing – is likely only to generate a subset of the impacts that are generated by commodity futures exchanges. However, it should be emphasized that this selection does not imply that a commodity futures exchange is always the appropriate form of exchange to be established in every market or for every commodity, nor that every commodity futures market always generates in reality a wider array of impacts than other forms of commodity exchange, nor that a commodity futures exchange will always generate the same range of impacts as those identified in this study.

(b) Why were only high-volume commodity futures contracts selected for the study?

In order to gauge a potentially representative set of impacts that emerge from a commodity futures exchange, it is necessary to examine the impacts after a futures contract has been fully accepted by the market – as indicated by high volumes of trade, known as "liquidity". Futures contracts that have not yet been fully accepted by the market, or have been rejected, will not provide a full or accurate insight into the impacts that a commodity futures exchanges can make. Admittedly, it would be interesting to identify why futures contracts fail, or fail to become accepted, and whether there are significant impacts that arise from either of these scenarios, but these questions do not fall within the scope of this study.

(c) Why were only exchanges in middle-income developing countries selected for the study?

An important point to make regarding the fact that the sample was limited to high-volume commodity futures exchanges that trade agricultural contracts is that only a limited number of such institutions exist. All of these are situated in middle-income developing countries. This situation need not imply that it would be impossible to develop a commodity futures exchange in lower-income countries or regions. However, it is generally recognized that the challenges to doing so would be much greater.

1.4 Conceptualization and methodology

This study combines two approaches to examining impacts. For each featured exchange, there is first a macro-level assessment of agricultural development, exchange emergence and the regulatory

environment. The purpose of this appraisal is to ensure that the experience of each country and each exchange is located within its proper socio-historical and economic context. A number of questions will be addressed for each featured market: What have been the major development imperatives arising from the evolving agricultural environment? How did the agricultural futures exchange emerge within this context? How has the regulatory framework developed and what mechanisms for oversight does it incorporate?

There is then a systematic identification and analysis of the micro- and macro-level impacts generated by each featured commodity exchange. The following questions are pertinent to an understanding of the approach pursued:

1.4.1 What is impact?

"Impact refers to the results of a project that are assessed with reference to the long-term objectives. In this sense, impact represents changes in a situation, whether planned or unplanned, positive or negative, that a project brings about. The purpose is to assess how the target beneficiaries, their households, communities and country are going to benefit in the long term as the result of the project. Impact assessments broadly evaluate the effects of the programme on people in economic, social and environmental aspects" (Mallick, Dasgupta and Ahmed, 2002: 1).

1.4.2 How is impact measured?

Impact is measured via indicators, which show changes in certain conditions arising from specific projects or interventions. They provide evidence of progress in attaining the objectives. They are pre-established signs that are relevant to good performance and to achieving project objectives.

There are three types of indicators: quantitative, qualitative, and proxy indicators. Quantitative or qualitative indicators should be selected based on the nature of the impact being assessed. In cases where complexity, cost and timeliness of data collection prevent a result from being measured directly, proxy indicators can be used to measure performance trends.

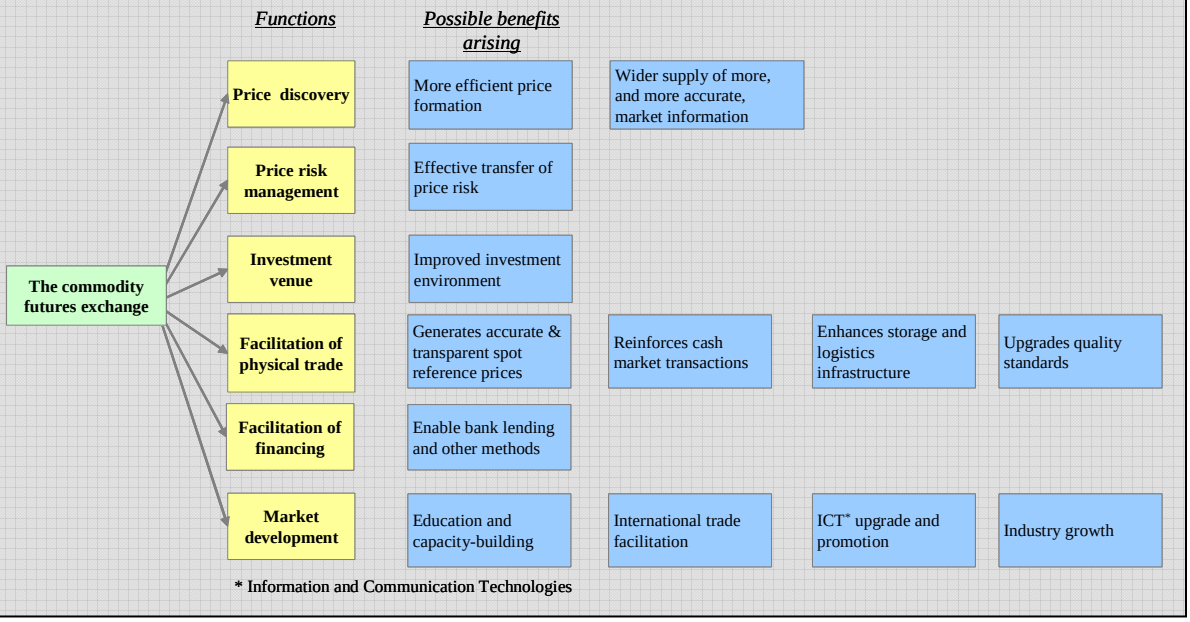
1.4.3 How can impact assessment be applied to commodity exchanges?

Impact assessment studies have become firmly established as a research methodology in a number of spheres, including health, the environment and microfinance. However, as far as is known, no systematic or empirical study has previously been conducted on the development impacts of commodity exchanges in emerging markets. By appraising impact assessment methodologies identified in other fields, and bearing in mind certain limitations when applied to the area of commodity exchanges (discussed below), the following methodological process was established:

Step 1: After a thorough examination of the literature, and leveraging the accumulated experience of UNCTAD and the participating exchanges, six potential functions of commodity futures exchanges were identified. Three may be identified as the core functions that commodity futures exchanges are intended to perform: price discovery, price-risk management (hedging), and a venue for investment (speculation). The second three may be identified as wider functions that can arise as a result of the exchange performing its core functions: facilitation of the physical (or cash) commodity trade, facilitation of financing to the agricultural sector, and a role in market development.

Step 2: Based on the same sources, a set of hypotheses about high-level benefits arising from each of these functions was identified (see fig. 2 below).

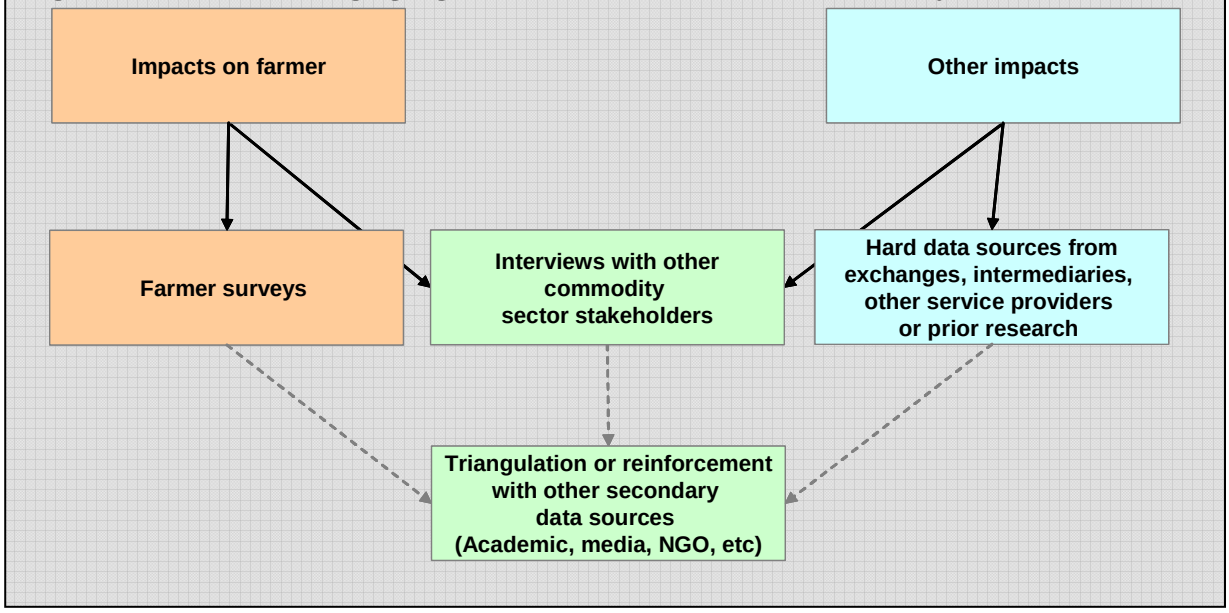
Figure 2. Exchange functions and hypotheses about high-level benefits



Step 3: Also using the same sources, and following from the analysis in chapter 5 of this paper, a range of impact hypotheses were generated as arising from each benefit hypothesis. In total, 81 impact hypotheses were identified: 37 that were specifically or mainly for the farmer, and a further 44 that pertained to the wider commodity sector or the overall economy. Of these impacts, 76 were positive impact hypotheses and five were negative impact hypotheses. The full list of impact hypotheses is documented in annex 3 of this study, and the impact performance at each exchange is documented in annex 4.

Step 4: The research set out to bring together qualitative and quantitative indicators from a range of sources, in order to establish the existence and extent of impacts on farmers and on other commodity sector stakeholders. The manner in which the different data sources were combined in the study is set out below in figure 3.

Figure 3. Schema for bringing together available data sources in the study



Step 5: UNCTAD conducted workshops at each exchange between March and June 2007. A collaborative approach was pursued with each exchange. Exchange representatives worked with UNCTAD, providing input into study methodology and identifying the appropriate data and data sources required to assess impact. The ultimate set of outputs was largely determined by the resources and time available at each exchange.[4]

Step 6: The exchanges generated and collected data subsequent to the workshops. One of the featured exchanges performed a market research survey – a fruitful source of information that generated representative results from a sample selected according to standard research practice (India). Other approaches included meetings with senior industry representatives, who provided qualitative feedback and in some cases hard data (Malaysia, South Africa); and the provision of indicative case studies and information generated by the exchange in partnership with beneficiary or other institutions (Brazil, China). The data were sent to UNCTAD, along with thorough documentation of sources and sampling as applicable. UNCTAD subsequently drafted the final report, taking account of the inputs and feedback provided by exchanges and other stakeholders, while retaining independent analysis.

1.4.4 What are the limitations of the study?

Firstly, due to restrictions on the available budget and the time frame for the study, the exchanges allocated their own personnel to generate and collect data about their respective markets. While this approach may have been suboptimal compared to engaging independent researchers, a combination of measures was put in place to enhance the objectivity of the study to the fullest possible extent:

- The exchanges were asked to set out in full their sampling methodology, if they were conducting primary research. They were further asked to record all the resulting output.
- It was specified that all assertions made by the exchanges concerning impacts must be backed up by supporting evidence – if possible, confirmed by two or more independent sources. Any assertions about impacts have been appropriately positioned in the report according to the evidence supporting them, or have been excluded altogether if there was a total absence of supporting evidence.
- UNCTAD, as the coordinator of the study, has sought to ensure accuracy and consistency by validating the data supplied by each exchange, while applying even interpretation standards.

Secondly, it was recognized that all parties involved in this study were embarking on unfamiliar territory. An impact assessment of this scope is believed to be a first for commodity exchanges in developing countries. Experience suggests it is unlikely that the process or outcome will attain perfection – or necessarily come close – the first time round. By extension, however, the study may be of interest by providing a platform that future such studies could build on.

Thirdly, commodity exchanges have not typically established monitoring and data capture systems specifically designed to collect hard data about impacts on various stakeholders. This contrasts with microfinance institutions, for example, which have often faced high incentives to systematically monitor and capture impacts – the accountability requirements of donors being among the most important of these. Thus, the requirement for periodic and/or frequent impact assessment has been integrated into the core structure and processes of many microfinance institutions' operations. By contrast, many commodity exchanges typically do not face such pressures, by virtue of being entities operating on a commercial footing. Furthermore, exchanges are often one step removed from the end user of their services; most users tend to access exchange services via intermediaries such as brokers. Brokers, rather than the end users, are therefore the direct customers of the exchange. Due to client confidentiality and data security prerogatives, access to information held by brokers is often restricted.

[4] It is noted that during the period of the study, BM&F was engaged in a demutualization process, and JSE/SAFEX and Bursa Malaysia were both introducing new trading systems. To a certain extent, these time-consuming activities constrained the available resources and inputs that the exchanges could provide.

As a result, exchanges typically do not hold data pertaining to the ultimate impact of their services on the end user, including farmers.

Therefore, despite best efforts, it is recognized that the impact assessment approach applied here may not yet be ready to yield evidence that is as clear-cut as that of similar studies in other fields. However, this also means the study may be of potential interest – revealing the gaps in data. It may, therefore, be beneficial for organizations active in the development sphere with direct access to end users of exchange services – such as government agencies, civil society, research institutes and others – to fill the monitoring and feedback role, which may shed further light in this area.

Finally, the findings in this study draw on a broad variety of experience, in terms of commodities, countries, regions, cultures and practices. In this respect, the study has the potential to document worldwide phenomena. On the other hand, and as has already been stated above, the study does not document findings from lower-income developing countries, including least developed countries, nor from commodity futures markets in middle-income countries that have not succeeded in generating high volumes. It will be argued that recommendations can be drawn from the experience of five middle-income developing countries that apply across the developing world, based on certain similarities across middle- and lower-income developing countries. Nevertheless, due care and attention will be made in so doing.

1.5 Structure of the study report

Part 1 of this report provides a brief overview of contextual themes that can aid an understanding of the findings and development implications contained herein: the study design, the policy context, the functions and performance of commodity exchanges in the developing world, the role of regulation, and an overview of the impacts identified and assessed as part of the study. Part 2 presents case studies from each of the five countries featured in the study. For each country, the report analyses the recent historical development of agricultural markets, the emergence of the featured commodity exchange and the specific commodity contracts under review, and the regulatory framework within which the exchange operates. It then provides an empirical assessment of the impacts arising from the featured commodity exchanges and the specific commodity contracts under review. (The impact performance at each exchange is documented in annex 4, and data sources are documented in annex 5.) Part 3 of the report summarizes the study's findings, draws out the development implications, and sets out policy recommendations for relevant stakeholders.

2. The policy context

2.1 Risks and transaction costs in agriculture

The Government of India (GOI) Working Group on Risk Management in Agriculture defines agricultural risk in the following way: "Agricultural risk is associated with negative outcomes that stem from imperfectly predictable biological, climatic, and price variables. These variables include natural adversities (for example, pests and diseases) and climatic factors not within the control of the farmers. They also include adverse changes in both input and output prices" (GOI, 2007b: 6). These risks are exacerbated by deficiencies in infrastructure and market formation, information asymmetries, and the lack of livelihood resilience that results from a situation of poverty and its root causes (these include access to health, education, social security, land and capital).

A range of risks can be identified:

- Production risk, associated with uncertainty about quantity and quality of output;
- Price risk, associated with commodity-price volatility that creates uncertainty about the level of return on investment and assets;
- Market risk, associated with uncertainty about whether a purchaser can be found for farmers' produce;
- Counterparty risk, associated with uncertainty about whether other parties to a transaction will fulfil the terms of a contract;
- Credit risk, associated with uncertainty about securing funds to cover working capital during the course of the season and investment for next year's crop;
- Institutional risk, associated with uncertainty about changes to public regulation or to government support regimes that may adversely affect the producer.

Farmers have a range of mechanisms for dealing with these risks (see table 1).

From the preceding remarks, it becomes clear that price risk is only one of the risks that farmers face, and futures contracts are only one of the mechanisms to deal with these risks. However, it will be argued in this study that commodity exchanges do not merely provide hedging services that enable producers to manage price risk – although this is what they are most "famous" for.

Instead, it will be contended that commodity exchanges are versatile and dynamic entities that enable entities in agricultural sectors, including small-scale farmers, to address the key challenges that face their market. It will be shown that they offer a range of instruments for tackling not just price risk, but also potentially production, market, counterparty and credit risk.

Box 1. Transaction costs in the commodity economy

Measurement/information costs prior to the transaction:

- Finding a buyer or seller with whom to transact
- Appraising the reliability of the counterparty
- Determining and locking in an acceptable price
- Ascertaining product quality
- Securing finance to fund the transaction
- Defining delivery and payment modalities, and other contractual terms and conditions

Enforcement/compliance costs after the transaction:

- Managing credit and cash flows
- Overseeing delivery
- Grading of product quality
- Arbitrating disputes
- Insuring against, or compensating for, default
- Sanctioning and excluding defaulters

Transaction costs are also an important issue, when considering the role of commodity exchanges in the policy debate. UNCTAD argues that the "utility of a commodity exchange… lies in its institutional capacity to remove or reduce the high transaction costs faced by entities along commodity supply chains in developing countries" (UNCTAD, 2007: 4). It is shown that a significant number of incremental, non-production costs would be incurred by the parties to a commodity-linked transaction (see box 1 above).

Table 1: Risk management strategies in agriculture

		Informal Mechanisms	*Formal Mechanisms*	
			Market based	*Publicly provided*
Ex-Ante Strategies	***On-farm***	• Avoiding exposure to risk • Crop diversification and inter-cropping • Plot diversification • Mixed farming • Diversification of income source • Buffer stock accumulation of crops or liquid assets • Adoption of advanced cropping techniques (fertilization, irrigation, resistant varieties)		• Agricultural extension • Supply of quality seeds, inputs, etc. • Pest management systems • Infrastructures (roads, dams, irrigation systems)
	Sharing risk with others	• Crop sharing • Sharing of agricultural equipment, irrigation sources, etc. • Informal risk pool	• Contract marketing • Futures contracts • Insurance	
Ex-Post Strategies	***Coping with shocks***	• Reduced consumption patterns • Deferred / low key social & family functions • Sale of assets • Migration • Reallocation of labor • Mutual aid	• Credit	• Social assistance (calamity relief, foodfor-work, etc.) • Rescheduling loans • Agricultural insurance • Relaxations in grain procurement procedures • Supply of fodder • Cash transfer

Source: GOI WG on Risk Management in Agriculture (2007)

Taken together, these costs would arguably amount to a considerable expense, consuming substantial funds, time and goodwill. Moreover, transaction costs tend to be significantly higher in developing economies than in developed ones – a consequence of imperfect market formation and weak or absent infrastructure and sector support institutions. It will be argued in this study that commodity exchanges can facilitate trade by significantly reducing many of the transaction costs outlined above.

2.2 The current and future role of smallholders in agriculture

UNCTAD documents the fact that "three fourths of the 1.2 billion people living on less than $1 a day live and work in rural areas, about half of the world's hungry people are from smallholder farming communities, another 20 per cent are rural landless and about 10 per cent live in communities whose livelihoods depend on herding, fishing or forest resources" (UNCTAD, 2006a: 3). It has been further noted that "improving the productivity of small-scale farmers has a ripple effect that spreads benefits throughout poor rural communities…boosting the incomes of the rural population as a whole, including landless labourers who make up a large part of the population of the poor and hungry in many countries" (Food and Agriculture Organization, 2004: 34).

While there may be little doubt that the state of smallholders is critical to the debate on development and poverty reduction, it is less clear whether smallholder farming as a model of developing-country agricultural production should be maintained and encouraged, or phased out and de-emphasized. If the former is the case, how can smallholders become competitive in national and global commodity markets that have undergone significant structural transformation in recent times? If the latter is the case, what are the alternatives, and how should they best be pursued?

What future for smallholders?

Acknowledging that there are strong arguments on both sides, a recent paper by the International Food Policy Research Institute (IFPRI) concludes that "the case for smallholder development as one of the main ways to reduce poverty remains compelling" (Hazell et al., 2007). However, the challenges are difficult, both in the production and marketing dimensions. Liberalization and deregulation of markets, the reduction or withdrawal of government support services, purchaser consolidation and dominance over supply chains are paradigm shifts in the agricultural economy that have made a corresponding impact on the terms of the debate. Recognizing this reality, "the challenge is to improve the workings of markets for outputs, inputs, and financial services to overcome market failures. Meeting this challenge calls for innovations in institutions, for joint work between farmers, private companies, and NGOs, and for a new, more facilitating role for ministries of agriculture and other public agencies" (Hazell et al., 2007: ix).

Examining the policy debate around the world, a number of possible models emerge. On the one hand, many countries are now promoting smallholder organization and commercialization programmes as a means of boosting productivity and competitiveness. (See, for example, the Ninth Malaysia Plan (Government of Malaysia, 2006) or the new Chinese law that came into force in July 2007 that promotes farmer cooperative development). By bringing greater scale, cooperatives are perceived to improve farmer access to extension services, education, capacity-building, input supply, credit and other market mechanisms. In addition, public investment in physical and social infrastructure can be more accurately and cost-effectively targeted when small-scale farmers are organized in a coherent manner.

Another possibility – not mutually exclusive with the first – is to promote diversification into non-farm activities. The Organization for Economic Cooperation and Development (OECD) is a strong proponent of this approach, arguing that "the long-term future for most semi-subsistence farming households lies outside agriculture, so there is a need for measures that facilitate income diversification and the exploitation of non-farm activities" (OECD, 2007: 14). In particular, the Chinese experience in rapidly developing non-farm rural industries in the 1990s to absorb surplus rural labour is attributed as being key to China's success in large-scale rural poverty-reduction. However, even as poverty falls, it is noted that in China, as in many other countries, wide inequalities remain between rural and urban areas, and indeed they are becoming exacerbated.

A third implicit possibility is a "do nothing" strategy, motivated either by deliberate "benign neglect" or by unintentional oversight by policymakers. However, previous experience suggests that poverty, unemployment and malnutrition in the countryside can lead to unsustainable levels of rural–urban migration, adding to pressure on the urban infrastructure, which in many developing countries is unable to absorb a rapid flow of migrants.

How do commodity exchanges fit into this picture? As was earlier noted, transaction costs lie at the core of understanding why commodity exchanges are useful. Small-scale farmers typically face proportionally the steepest transaction costs if they look to participate in markets. This is driven by factors including poor transportation, storage and communications infrastructure, a lack of access to information and expertise, and limited access to financing rooted in a lack of collateral. It is this predicament that often confines such producers to subsistence livelihoods.

Through the innovative application of emerging information and communications technologies (ICT), commodity exchanges can catalyse the integration of small producers into supply chains. This study

will document how in India, access via the internet to market information and expertise, satellite-enabled connectivity to commodity exchanges and other service providers, and technology-augmented partnerships with owners of rural distribution networks such as banks or post offices are just some of the ICT-driven structural advancements that have overcome long-standing infrastructure barriers to smallholder participation in markets.

It will be emphasized that small-scale farmers are not expected to participate directly in futures markets – at least, not until they build up the necessary knowledge, resources and capacity. Instead, dissemination of pricing and other market information – coupled with training of small-scale farmers in how to use it – is one way of increasing farmers' capacity and resilience. In China, the DCE in 2004 launched the "1,000 villages, 10,000 farmers" educational programme to do just that. By early 2007, over 40,000 farmers had been educated about how to use futures prices to make optimal planting decisions. Additionally, intermediary organizations – such as cooperatives, input suppliers, purchasers and financiers (including microfinance organizations) – can embed hedging functionality into the terms of contracts they offer to farmers. In this way, the small-scale farmer can receive the benefits of price-risk management, without having to devote the considerable time and resources that direct involvement in commodity futures markets would require.

2.3 The debate about commodity-price volatility and appropriate policy responses

Historically, unfavourable movements in world commodity prices have impeded development in the developing world. Two distinct tendencies have been noted. Firstly, commodity prices have often exhibited sharp volatility in the short run, with significant year-to-year variability. Secondly, there has been a long-run decline in commodity prices, both in absolute terms and relative to prices of manufacturing and services.

The effects of these tendencies have been felt in developing countries both at the macro and the micro level. At the macro level, developing countries find that price shocks in key imported commodities – particularly foodstuffs and fuel – can dampen growth, spur inflation, and in some circumstances, provoke political instability. Governments seeking to maintain low and stable domestic prices for these commodities may face increased pressure on their budgets, resources may need to be diverted from other important areas of spending, and levels of overall indebtedness may increase.

Commodity-exporting developing countries find that reductions in commodity export prices – either short-term shocks or long-term declines – undermine fiscal stability, exacerbate rural poverty, and impair the capacity of Governments to develop and maintain long-term investment programmes, particularly those directed towards provision of basic needs and development of infrastructure. The more a country is dependent on the export of a small number of commodities, the more serious this situation becomes. Additionally, for heavily indebted poor countries (HIPCs), price volatility may seriously affect the attainability of sustainability ratios (debt-to-gross domestic product (GDP), debt-to-exports), which, in turn, impacts upon the burden of debt service obligations.

Taken together, price reductions in key commodity exports, combined with increases in the cost of critical imports, can also place an enormous burden on a country's balance of payments, with associated effects on the exchange rate at which the national currency trades. Coupled with a long-term decline in the terms of trade faced by commodity-dependent developing countries, this scenario poses severe developmental challenges, and undermines efforts to meet the Millennium Development Goals (MDGs).

At the micro level, unfavourable short-term shocks in the prices of key import or export commodities can undermine the livelihoods of developing-country populations where economic activity tends to be dependent on narrow profitability margins and allows minimal room for error in the management of working capital. In particular, it has been demonstrated that exposure to price volatility encourages farmers to pursue risk-minimizing strategies. The consequence of this is that investment in production is limited and the cultivation of higher-revenue but higher-risk products remains off-limits (International Task Force on Commodity Risk Management (ITF–CRM), 2003). While this is particularly the case for rural producers and workers in the informal sector, even a relatively

sophisticated private sector enterprise can be critically wounded by sharply rising prices for fuel or essential raw materials, or a significant year-on-year drop in realized prices. Moreover, volatility has particularly damaging effects on poor people in low-income countries, whose ability to cope is limited by shallow financial sectors and political and economic constraints that place limits on the type and nature of government interventions (National Bureau of Economic Research, 2004a).

A number of policy responses to commodity-price volatility have been explored by Governments (see box 2).[5] In the past, the focus of efforts has often been through domestic and international price stabilization schemes. Unfortunately, where Governments attempted to stabilize prices for domestic producers and consumers, many did not transfer the risk of unfavourable price movements outside of the economy. As a result, external price shocks were largely absorbed by the Government's budget (Claessens and Qian, 1991). International price stabilization schemes have included supply management schemes embedded in international commodity agreements (ICAs). Most have been ineffective or have collapsed as a result of internal or external pressures. They have also included compensatory financing mechanisms, such as the International Monetary Fund's Compensatory Finance Fund and the European Union's Stabex programme. While compensatory finance may have significant potential if the structural challenges impeding the International Monetary Fund (IMF) and the European Union (EU) schemes can be satisfactorily addressed, these mechanisms must currently be considered to be unproven, at best.

Box 2. Dealing with commodity-price volatility: policy options for commodity income stabilization

- *Diversification strategies:* Reducing dependence on limited and volatile income streams, by diversifying into new crops with unrelated price development.
- *Supply management:* Controlling the supply of a commodity relative to demand, in an attempt to influence price.
- *National revenue management:* Budgetary management designed to smooth government expenditure over time, via stabilization funds and spending rules.
- *Compensatory finance:* Relief loans or payments to countries, triggered by falls in commodity export revenues.
- *Market-based risk management instruments:* Instruments used to offset exposure to price risk through financial markets or other institutions.

In recent times, developing-country governments – often at the insistence of international agencies or bilateral donors – have taken up market-based solutions to long-standing developmental issues. Liberalization and deregulation have seen the removal of the protective insulation to commodity sectors, and the withdrawal of the Government from many of its earlier support functions. Therefore, volatility in commodity prices is now increasingly felt at the level of the farmer – the weakest and least resilient entity in the supply chain. It is in this context that new approaches to commodity-price-risk management grounded in the use of market instruments – and the institutions that facilitate them, such as commodity exchanges – have obtained greater salience in the developing world.

2.4 Developments at the international level on commodity exchanges

The benefits and importance of price-risk management have been well established over the last decade by specialists at the World Bank, UNCTAD, and other international organizations and research institutes (see, for example, Varangis and Larson, 1996). These intellectual foundations were put into practice from the late 1990s, with the establishment of the International Task Force on Commodity Risk Management in Developing Countries (ITF–CRM) – a partnership of public-sector and private-sector institutions, led by the World Bank and including UNCTAD. The ITF–CRM has explored

[5] For a range of viewpoints on the various policy options for dealing with commodity-price volatility, see: Larson, Anderson and Varangis (2004), South Centre (2004) and International Institute for Sustainable Development (2007).

innovative approaches for assisting small-scale producers in developing countries to better manage their vulnerability to commodity risks, including price and weather risks.

On price risk, the focus has been to connect developing-country farmers with established derivatives markets in the developed world. This has had some success, particularly where organized entities such as farmer cooperatives and financiers have been present in the local market to aggregate farmer requirements.[6] In many situations, however, this approach runs into major and sometimes insuperable challenges (see box 3).

Box 3. Challenges for developing-country entities to hedge in international derivatives markets

- The absence of suitable local aggregators with the capacity or capability to execute a hedging strategy
- Contracts traded in international markets can be too large for developing-country requirements
- Exchange rate controls on foreign currency flows, and exposure to exchange rate volatility can severely limit the possibility of, or benefits from hedging
- Basis risk between domestic and international markets can be high i.e. there can be a wide divergence between price development in local physical markets and international futures markets that may undermine the effectiveness of hedging
- Access to international markets has become more constrained as a result of stricter "know-your-customer" requirements and tighter lines of credit offered by intermediaries in developed markets

For over two decades, UNCTAD has also worked on an alternative approach – the establishment of local commodity exchanges situated in the developing country itself.[7] In 1983, UNCTAD issued its first publication on the theme, entitled "Commodity exchanges and their impact on the trade in developing countries" (TD/B/C.1/248). The issue was formally incorporated into the organization's mandate in 1992 at the eighth UNCTAD conference, held in Cartagena, Colombia. Subsequently, UNCTAD has carried out a broad-based programme of direct technical support, as well as research, policy advice and awareness-raising, directed at establishing and strengthening commodity exchanges based in developing countries.

UNCTAD's work on commodity exchanges is not focused purely on price-risk management. As will be seen in this study, commodity exchanges can generate a broad array of positive impacts for developing-country commodity sectors that includes – but is not limited to – price-risk management. Moreover, this study will document the versatility and dynamism of such institutions in fitting into local contexts and adapting to new and evolving challenges – benefits that are not realized when commodity-sector participants are directed overseas for their hedging requirements.

However, it is emphasized that this does not mean a commodity exchange should be established in every developing country – at least, not a commodity futures exchange. Whether an exchange is an appropriate institution, and the kind of services an exchange should offer, depends on the specifics of the local context. Commodity exchanges have not succeeded everywhere. Africa, in particular, has experienced a high rate of commodity-exchange failure, with only the JSE/SAFEX exchange in South Africa truly withstanding the test of time. This situation has occurred for a number of reasons, not least of which are the absence of a strong and transparent regulatory environment, the challenge of building trust and participation from established trading communities, and occasionally unpredictable government intervention that has distorted or undermined the price-formation process.

For these reasons, among others, the successful establishment of a commodity exchange is not an easy undertaking. Nor is it appropriate always and everywhere – in some circumstances, the costs imposed by an exchange may exceed the resulting benefits for commodity sectors. Alternatives do exist –

[6] See http://www.itf-commrisk.org for a wealth of documented experience. Also note that a more recent success has been the assistance provided to the Government of Malawi to hedge its exposure to price volatility through the JSE/SAFEX exchange in South Africa. This is discussed in chapter 10.

[7] It is stressed that UNCTAD's work is seen as a complement to the ITF–CRM approach, and not a replacement for it.

including the ITF–CRM approach to facilitating access to existing international exchanges, as well as non-exchange trade facilitation and risk management solutions – although each alternative also brings risks and challenges. Finally, where scope exists for a commodity exchange to make a positive impact on developing-country commodity sectors, it is essential not to view the exchange as a panacea. Instead, it should be considered as one potential element – albeit an important and dynamic element – within the overall policy package.

Recognizing some of the difficulties involved, some developing countries are taking a regional approach to the establishment or development of commodity exchanges. As long ago as 1991, the African Union's predecessor organization, the Organization of African Unity, recognized that a commodity exchange could act as an "instrument of integration" for Africa.[8] UNCTAD has worked with the African Union, national Governments and the private sector, in the development of a Pan-African Commodity and Derivatives Exchange. A hub in Botswana would link together local exchange platforms, as well as warehouses in various countries. The local exchanges would all use a common trading system and "back office". Apart from enabling domestic trade, this shared platform would make it possible to match trades from commodity exchanges in different participating countries. This hub and spoke "franchising" model would overcome the problem of high set-up costs that small African markets may struggle to recuperate, while a common technology platform would generate greater liquidity and price discovery, in order to better enable African commodity producers to market their commodities and manage their risk. A similar regional approach is now in its preliminary stages in Central America, also with UNCTAD support.

[8] Abuja Treaty establishing the African Economic Community, 1991.

3. Commodity exchanges: their functions and performance record in the developing world

3.1 What is a commodity exchange?

A commodity exchange is a market in which multiple buyers and sellers trade commodity-linked contracts on the basis of rules and procedures laid down by the exchange. In developed countries, and in an increasing number of developing countries, such exchanges typically act as a platform for trade in futures contracts, or for standardized contracts for future delivery. In other parts of the developing world, a commodity exchange may act in a broader range of ways, in order to stimulate trade in the commodity sector. This may be through the use of instruments other than futures, such as the cash or "spot" trade for immediate delivery, forward contracts on the basis of warehouse receipts, or the trade of farmers' repurchase agreements for financing (known as "repos"). Alternatively, it may be through focusing on facilitative activities, rather than on the trade itself, as is the case in Turkey, where exchanges have served as centres for registering transactions for tax purposes.

3.2 Why is a commodity exchange useful? What functions does it perform?

As has been discussed, the usefulness of a commodity exchange lies in its institutional capacity to remove or reduce the high transaction costs often faced by entities along commodity supply chains in developing countries. A commodity exchange reduces transaction costs by offering services at lower cost than that which participants in the commodity sectors would incur if they were acting outside an institutional framework. These can include – but are not limited to – the costs associated with finding a suitable buyer or seller, negotiating the terms and conditions of a contract, securing finance to fund the transaction, managing credit, cash and product transfers, and arbitrating disputes between contractual counterparties. Therefore, by reducing the costs incurred by the parties to a potential transaction, a commodity exchange can stimulate trade.

Box 4. Commodity-linked contracts

Spot (or cash): Contracts for the purchase or sale of a commodity with immediate delivery (i.e. within a few days).

Forwards: Contracts for the purchase or sale of a commodity with deferred delivery.

Futures: Standardized forward contracts which represent an obligation to make or take delivery of a fixed quantity and quality of a commodity at a specific location. Contrary to forwards, futures contracts do not often result in physical delivery, as they can be offset by an equal and opposite contract before the delivery date.

Options: Contracts giving the right, but not the obligation, to buy or sell a futures contract at a specified price or before a specified date. To obtain such a contract, the buyer needs to pay a *premium* – the maximum loss is limited to this premium. The seller of an option receives the premium, but the potential loss is theoretically unlimited.

Swaps: An exchange of specified future payment streams between two counterparties.

Moreover, properly functioning commodity exchanges can promote more efficient production, storage, marketing and agro-processing operations, and improved overall agriculture sector performance. It is precisely because of these benefits that transition and developing economies with large agricultural sectors have embraced commodity exchanges in recent years (Seeger, 2004).

Specifically, a commodity exchange can perform one or more of a range of potential functions – exactly which functions will depend on the nature of the exchange and the local context in which it operates. For exchanges that offer spot trade or supporting activities, the institutional function is to facilitate trade – bringing together buyers and sellers of commodities, and then imposing a framework of rules that provides the confidence to transact. Robust procedures for overseeing these transactions can also trigger improvements in the efficiency and infrastructure of commodity cash markets – for example, through the upgrading of exchange-accredited warehousing and logistics

infrastructure, the acceptance among market participants of exchange-defined product quality specifications, and the reduction of default levels, through intermediation by the exchange in the processing (or "clearing") and settling of contracts.

Commodity exchanges offering trade in instruments such as forwards and futures contracts also provide sector participants with a means of managing exposure to commodity-price volatility. This is important, as world commodity prices are often highly volatile over short time periods – sometimes fluctuating by over 50 per cent within a year. These "hedging" instruments can bring producers greater certainty over the planting cycle, while enabling processors, traders and purchasers to lock in a margin that can secure them a positive return. This allows those active in the commodity sector to commit to investments that yield longer-term gains, and also makes it more viable for farmers to plant higher-risk but higher-revenue crops. Even in the face of a long-term decline in the prices of their commodity, the ability to hedge against shorter-term price movements provides farmers with a window in which to adjust cropping patterns and diversify their risk profile.

Finally, where spot, forwards and futures transactions take place on a commodity exchange, the price information that results from this trade – the so-called "price discovery" mechanism – also performs a vital economic function. As exchange prices come to reflect the information known about the market, they provide an accurate reflection of the actual supply/demand situation. This provides important signals that market participants can use to make informed production, purchasing and investment decisions. Furthermore, the availability of a neutral and authoritative price reference can overcome information asymmetries that have often disadvantaged smaller or less well-connected sector participants in the past.

3.3 How is this relevant to the situation faced by commodity sectors in developing countries?

Many commodity sectors in developing and transitional economies have undergone severe structural reform in recent decades. Extensive liberalization has seen a substantial withdrawal of government support for the sector. As a result, the supply chains that participants in the commodity sector were accustomed to, have in many cases ceased to operate. Access to markets has become less predictable, as has access to the ancillary services that parastatal marketing boards – among others – used to facilitate. These ancillary services often included pricing support, market information, storage and logistics, finance, extension services, and input supply.

Without the stabilizing *institutions* and the established set of practices that previously facilitated engagement in commodity supply chains, transaction costs have risen steeply for many participants in the commodity sector. Thus, the commodity exchange, which can provide many of the same services as parastatal marketing boards, and in a manner that can be financially sustainable, may represent one of the best means of filling the void that has arisen from government withdrawal from the sector.

3.4 Have there been actual real-life examples of successful commodity exchanges set up in developing countries? What has been their experience?

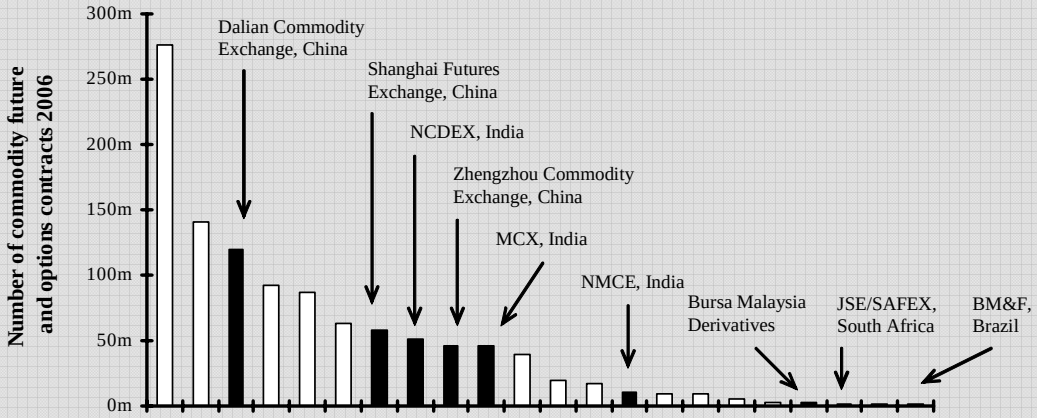
Measured by contract volumes, nine of the world's 22 major commodity futures exchanges[9] are now located in the developing world (see box 5). This includes three exchanges each in China and India, plus others located in Brazil, Malaysia and South Africa. Most of these exchanges were established in the 1980s and 1990s, in response to government liberalization of commodity markets. However, the three Indian exchanges were established in 2002–2003, and already two of them feature in the world's top 10, overtaking long-established institutions such as the New York Board of Trade.

[9] See: UNCTAD (2006b). In this report, major commodity exchanges are defined as those exchanges that trade over 1 million commodity futures and options contracts per year.

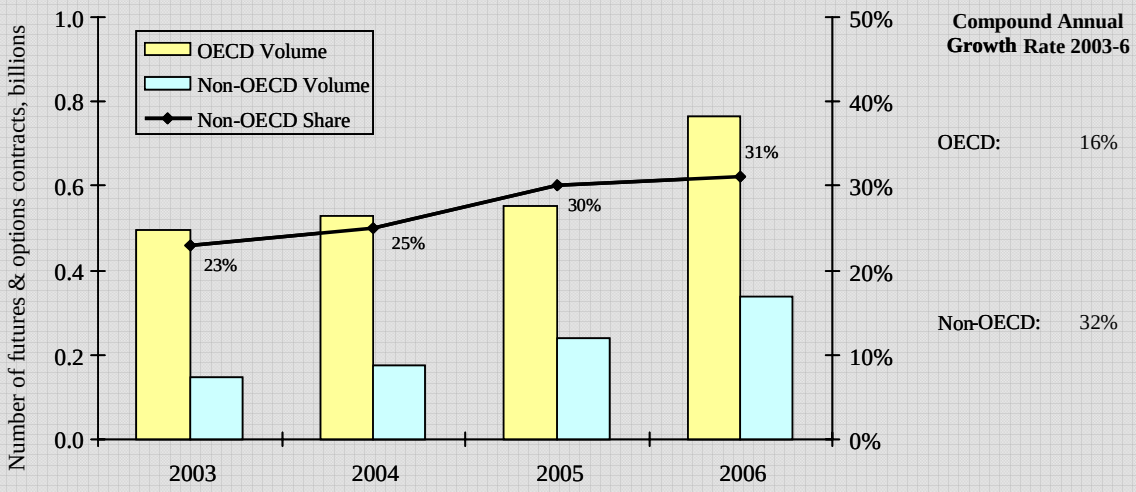
Box 5. Presence and performance of commodity exchanges in the developing world

The world's leading commodity exchanges, 2006

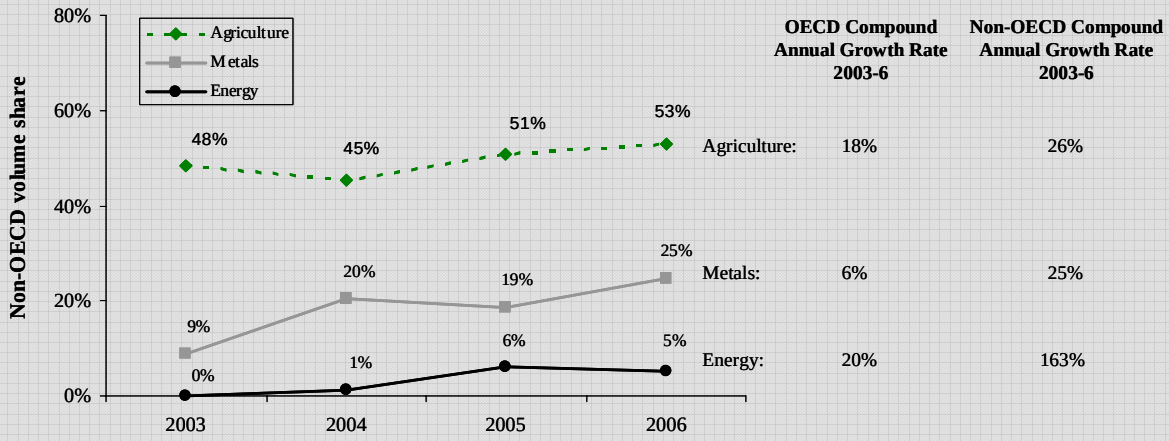
(Developing-country exchanges highlighted in black)



Exchange-traded commodity derivatives volumes, 2003–2006



Sector growth of exchange-traded commodity derivatives volume, 2003 - 6



Source: UNCTAD.

Note: The dataset comprises the world's leading commodity exchanges, defined as those trading over 1 million commodity futures and options contracts per annum.

The data also show how, since 2003, commodity exchanges in developing countries have experienced a rate of volume growth double that of their more established counterparts located in OECD markets. This has resulted in an increasing share for developing countries of overall commodity futures and options trading – currently approaching one third and rising fast. Moreover, when the data are disaggregated on a sector-by-sector basis, it is seen that developing-country volumes have now overtaken those of their OECD counterparts in a sector as critical to developing countries' development as agriculture. Rapid volume growth has also been experienced in developing-country metals and energy sectors (although developing countries' share in energy has remained limited, as high and volatile international oil prices have stimulated energy trading in OECD markets).

It should also be noted that many smaller exchanges are located across the developing world,[10] and not just in middle-income developing countries. A significant number of these focus on spot and forwards trade, rather than futures. Some, notably in Latin America, have also proven particularly innovative in applying exchange mechanisms to provide solutions in areas such as commodity finance and import quota allocations.

[10] For more information, see UNCTAD (2006b).

4. Commodity exchanges and regulation

Trade-facilitating institutions boost trade by reducing the cost and the uncertainty of entering into transactions. One of the ways in which they do this is by applying a framework of rules and procedures to regulate trade, thereby providing individuals or organizations with increased confidence to engage in mutually beneficial transactions.

As has been detailed by UNCTAD (1997), beyond basic oversight to ensure auctions are open and not manipulated, there are two important thresholds at which the regulatory framework becomes an important foundation for commodity exchange activities. The first is when an exchange moves from trading products that are physically present at its premises to trading paper which represents the right to commodities. These rights need to be enforceable, and this is achieved through the clear definition of contractual rights and obligations arising from transactions conducted in the exchange, and of the mechanisms that enforce them. A second threshold occurs when intermediaries start to play a role in the market on behalf of end users; the activities of these intermediaries need to be overseen to ensure that they fulfil obligations. When either of these thresholds is crossed, there is a requirement upon the exchange to act as a self-regulator of activities taking place in its markets, and for Government to provide an overall framework for oversight.

According to the "Objectives and Principles of Securities Regulation" (International Organization of Securities Commissions (IOSCO), 2003), regulation has three overarching objectives: the protection of investors; ensuring that markets are fair, efficient and transparent; and the reduction of systemic risk.

- **Protection of investors:** measures taken to protect investors – taken here to mean all market users – from unscrupulous or irresponsible practices by the exchanges, counterparties or intermediaries that they may interact with. Common mechanisms used to protect investors include: fitness or good character qualifications for intermediaries; requirements for intermediaries to segregate client funds from their own funds; and binding arbitration mechanisms for dispute settlement.

- **Ensuring that markets are fair, efficient and transparent:** measures taken to ensure that the market price truly reflects the information known about the market, to constrain "speculative excess", and to avoid manipulation of prices or physical stocks. Common mechanisms used to uphold market integrity include: ensuring a time-stamped audit trail of all trading activity; position limits for speculative participants, including tighter limits in delivery months; constant monitoring of trading for suspicious patterns; free, transparent dissemination of data; an approval process by the external regulator for new contracts to ensure an adequate deliverable supply (among other factors); and "know-your-customer" requirements for intermediaries.

- **Reduction of systemic risk:** measures taken to effectively manage the systemic risk arising from market operations, reducing the risk of default to acceptable levels, and ensuring the system as a whole is sufficiently resilient to withstand shocks, such as spikes in volatility or the collapse of a large trader. Common mechanisms used to reduce systemic risk include: minimum capital requirements in order to participate in the markets; the rigorous use of the margining system, with margin levels related to market risk (including higher margin requirements in periods of increased volatility and during the delivery period); daily price movement limits (or "circuit filters") that confine daily trading within defined price parameters; and a "risk hierarchy", which ensures that exchange members cover their clients' positions in the case of a client default and a clearing-house guarantee fund covers members' positions in the case of a member default.

In a mature structure, regulatory oversight – fulfilling each of the three objectives outlined above – can exist at three levels:

- **External regulator:** a governmental agency, or an independent agency accountable to Government, that provides regulatory oversight across national markets as a whole. An external regulator may also act as an interface with the external regulators of other national markets to ensure adequate regulation of transactions that are cross-jurisdictional in nature.

- **The exchange as a self-regulatory organization:** the exchange's own personnel and systems that provide regulatory oversight over exchange operations, including both the trading and – where it is performed in-house – the clearing and settlement functions.

- **The industry self-regulatory organization:** a body that either represents market intermediaries (i.e. brokers and other entities active in the markets), or is appointed by Government to oversee the activities of market intermediaries. In particular, an industry self-regulatory organization can ensure investor protection by overseeing relations between the intermediary and the end user.

As documented in annex 2, each level of regulation incorporates an often wide array of mechanisms and instruments. This framework must be robust, in order to fulfil regulatory objectives. However, a balance is required between the benefits and the costs of regulation, and also between the degree of external regulation and self-regulation. As far as the first of these balances is concerned, ascertaining the optimal "weight" of regulation depends to a large extent on the level of assurance that market participants require. Markets with well-established practices and relations, and goodwill between participants, may find a more flexible, light-touch regulatory model more suitable than markets in which participants are unfamiliar or uncomfortable with market institutions, counterparties and procedures. As far as the balance between external regulation and self-regulation is concerned, the right balance may be seen as a function of the level of confidence that Government and market participants have in the market institutions – exchanges and industry self-regulators – that could potentially act in a self-regulatory capacity.

The role of Government within the regulatory structure is typically twofold, involving both an oversight role – disciplining those who try to manipulate the markets for their own benefit, and ensuring the sanctity of contracts – and an enabling role – providing the necessary legal and regulatory framework, and in certain circumstances, elements of the physical infrastructure without which markets may not function effectively (e.g. warehousing, logistics, telecommunications and information networks).

Concerning the nature of government intervention in commodity markets, a recent historical review of interventions concludes that:

> "Interventions in regulated futures markets can be either discretionary or automatic (often referred to as rules-based), and may be initiated by the exchange as a self-regulating organization or by the regulator charged with market oversight. Discretionary futures markets interventions usually involve limiting, suspending, or halting trading in a particular contract market… An historical review of market interventions reveals that, while rules-based interventions can succeed within a market economy, discretionary interventions often fail to achieve projected policy goals. Indeed, discretionary interventions often produce a variety of unintended consequences that prove costly to the Government and harmful to the majority engaged in the producing and marketing of the targeted commodity" (Hathaway, 2007: 3).

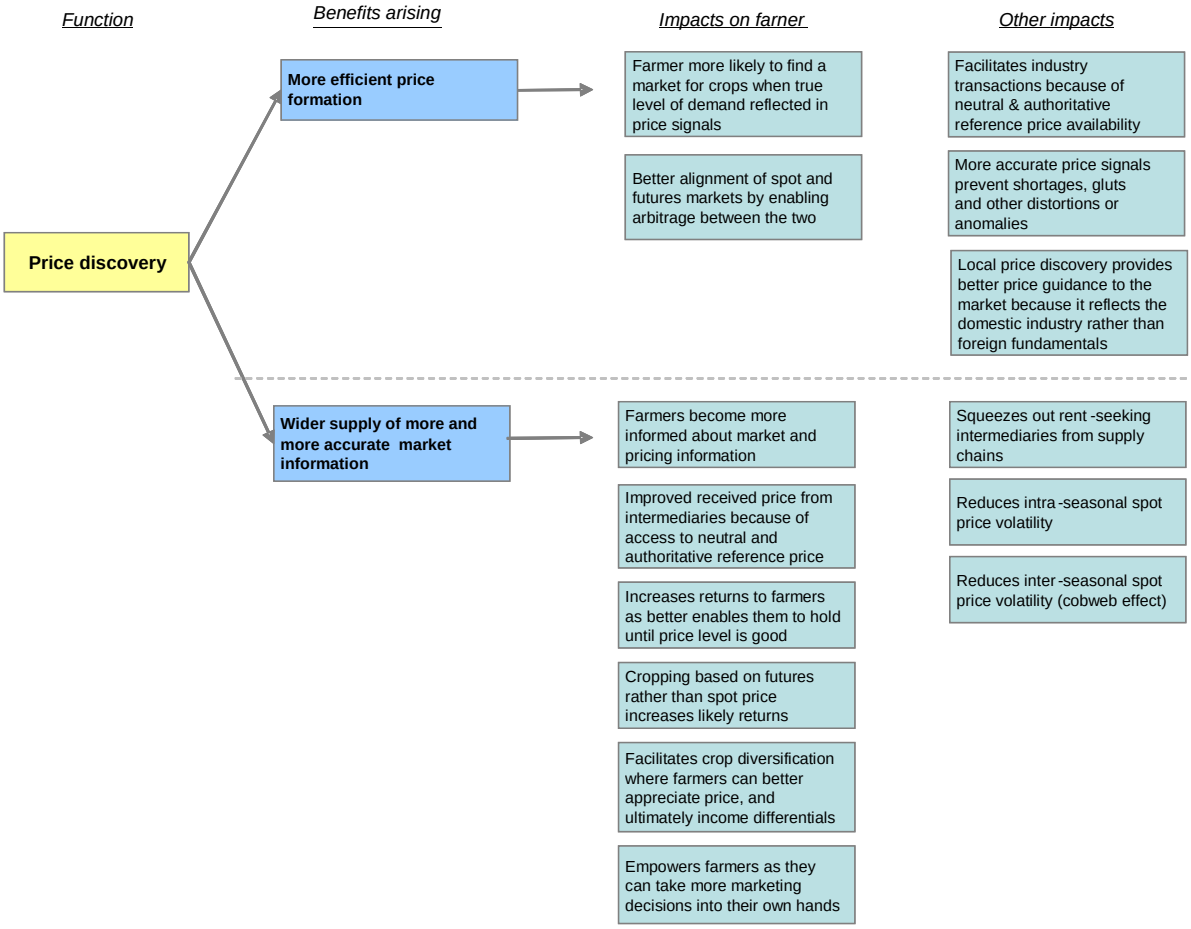
Therefore, while intervention may be necessary and can be beneficial, Governments may wish to give careful consideration to the modalities and purposes of such intervention.

5. Impacts

After a thorough examination of the literature, and as a result of leveraging the accumulated experience of UNCTAD and the participating exchanges, six potential functions of commodity futures exchanges have been identified. The first three may be identified as the **core functions** that commodity futures exchanges are intended to perform: price discovery, price-risk management ("hedging") and a venue for investment ("speculation"). The second three may be identified as **wider functions** that can arise as a result of the exchange performing its core functions: facilitation of the physical (or "cash") commodity trade, facilitation of financing to the agricultural sector, and a role in market development. From these functions, a further set of benefits have been identified, which ultimately yield 81 impact hypotheses: 37 that are specific or mainly for the farmer, and a further 44 that pertain to the wider commodity sector or the overall economy. Of these impacts, 76 are positive impact hypotheses and five are negative impact hypotheses. The full list of impact hypotheses is documented in annex 3 of this study, and the impact performance at each exchange is documented in annex 4.

5.1 Price discovery

5.1.1 Summary of impact hypotheses



5.1.2 Justification

Price discovery refers to the mechanism through which prices come to reflect known information about the market. The price level established on the open market can therefore represent an accurate depiction of the prevailing supply/demand situation in the underlying commodity markets, whether in the spot market for current deliveries or in the forwards/futures markets for deliveries at specified

future occasions. The benefits of price discovery can be categorized as those arising from a more efficient price formation process, and those arising from the wider supply of more – and more accurate – market information. The former refers to those benefits arising from the proper alignment of supply and demand, ensuring that the market pricing signal triggers efficient production, purchasing and investment decisions by participants in the sector. The latter refers to those benefits arising from the publication and dissemination of market information,[11] with the resulting price transparency providing a readily available, authoritative and neutral price reference to sector participants.

Special attention may be drawn to three particular categories of impact:

Price dissemination, reduced information asymmetries and improved farmer returns: Readily available price references can benefit farmers who are otherwise disconnected from the market and are vulnerable to receiving sub-optimal prices and conditions from better-informed intermediaries. Information disseminated by the exchange can therefore reduce the information asymmetries that privilege intermediaries, and can empower participants in the commodity sector to take better decisions in light of a more accurate understanding of market conditions. For example, with reference to Ethiopia, the Economist magazine (2007) documented how intermediaries' margins plus other market failures add 20 per cent to the cost of grain. It argued that "information, crucial to efficient trading, is scanty. But, thanks in part to technology, things are improving. Mobile phones help farmers to find out about price discrepancies from which they might benefit. In some cases, better market information has encouraged farmers to diversify their crops."

Improved farmer returns and reduced cash market volatility: There are two phenomena at work. Both are to do with market price information increasing the sensitivity of producers to anticipated price levels, enabling them to adjust their behaviour accordingly:

- *Reduced intraseasonal volatility*: At a micro level, the availability of market price information shows producers how the price is developing – and is expected to develop – during the season. This enables them to decide when the optimal time is to deliver goods to market. At a macro level, this can translate into reduced intraseasonal price volatility. The arrival of goods to market becomes more staggered, instead of having commodities arrive in large, infrequently delivered consignments which can cause prices to spurt and dip as the season develops. However, it is important to note that a farmer is dependent on access not only to information, but also to storage and finance, in order to have an effective choice about when to deliver goods to market. A study by Morgan (1999), referring to the British potato market after the introduction of the London Potato Futures Market in 1980, suggested that farmers' decisions about storage, based on futures information, was an important driver of reduced spot price volatility.

- *Reduced interseasonal volatility:* At a micro level, the availability of futures prices for the coming season provides producers with an effective guide to deciding which crops to plant – and in what quantities – in order to maximize expected returns at the time of the next harvest. Use of spot prices as a guideline – the way that many farmers currently work – can lead to an exacerbation of interseasonal volatility, known as the "cobweb effect" of interseasonal price fluctuations.[12] The futures price typically provides a more accurate indicator of the future spot price at the time of harvest. Therefore, at a macro level, if the market anticipates shortages for a given commodity next season, futures prices will rise and farmers will have a better

[11] An exchange is often in a position to disseminate important forms of market information beyond information related to prices. This information may include volume of open positions; depth or liquidity in the market; stocks and flows at warehouses; and acceptable quality standards, including premiums/discounts for superior/inferior quality.

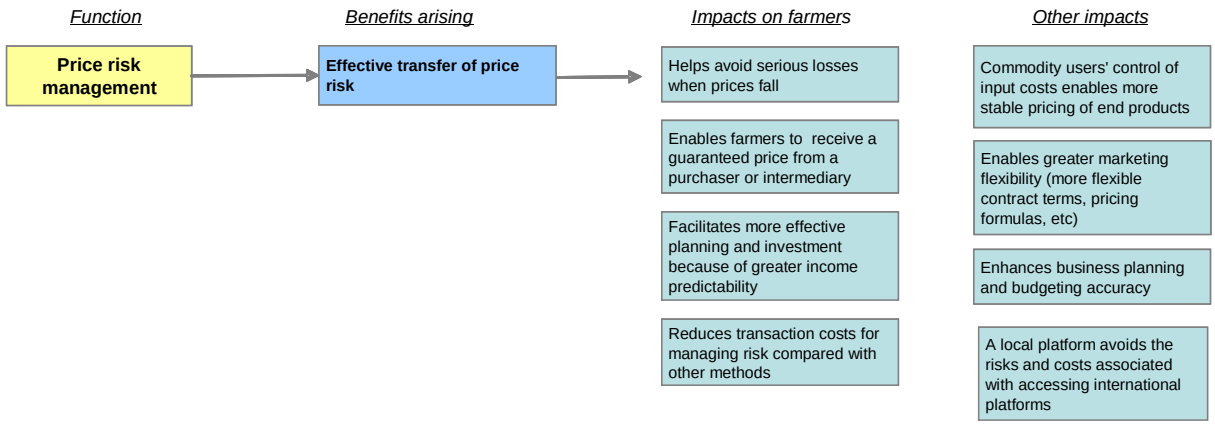
[12] A simplified example of the cobweb effect: Based on high spot prices for crop X in season 1, farmers will increase their production of crop X for season 2. When harvest occurs in season 2, there is a glut of crop X leading to low prices. Farmers will then reduce production of crop X for season 3, leading to high prices again, and so on.

incentive to plant that commodity, thereby mitigating the expected shortage (and vice versa). However, it is important to note that a farmer is also dependent on the availability of inputs and expertise, and a natural environment that allows for crop rotation or intercropping. A number of studies have suggested that the birth of the modern futures contract at the Chicago Board of Trade around the 1870s led to a marked decrease in interseasonal cash price volatility (see, for example: Chandler, 1977 and Santos, 2002).

More efficient price formation and effective signalling for production, purchasing and investment decisions: Efficient price formation for agricultural commodities can lead to an increase in the allocative efficiency of the agricultural sector. Prices typically act as a signal that informs the commodity-production, purchasing and investment decisions of sector participants. Therefore, as pricing becomes more reflective of the underlying supply/demand fundamentals in the sector, so these decisions lead to more efficient outcomes that can increase the net welfare gains to sector participants. However, the market-determined futures price will only be a reflective and unbiased indicator of future cash prices to the extent that there is participation in the markets from interests along the commodity supply chain. By providing an efficient, open and transparent platform for trading on a daily and ongoing basis, commodity futures exchanges can be an effective platform for fulfilling this purpose. A high level of participation from major producer, processor and purchaser interests – either domestic or international – strengthens the price-discovery mechanism. Conversely, a lack of participation from industry interests weakens it. Moreover, in circumstances where price formation in the domestic industry differs significantly from price formation in world markets, having a local platform reflecting domestic fundamentals can provide better signalling for the domestic industry.

Finally, the commodity futures exchange provides a framework for convergence between futures and cash prices, making overall price formation across time more efficient. This works in two ways. Firstly, if futures and cash prices become misaligned – because of distortions caused by short-term speculative movements, for example – market participants can simultaneously buy in the cash market and sell in the futures market (or vice versa) to "arbitrage away" such discrepancies, and bring the two markets back into line. Secondly, when a futures contract enters its delivery period prior to expiry, market participants can demand to receive or deliver the physical product through the exchange. The threat of delivery brings about convergence between the futures and cash price as the expiry date nears.

5.2 Price-risk management



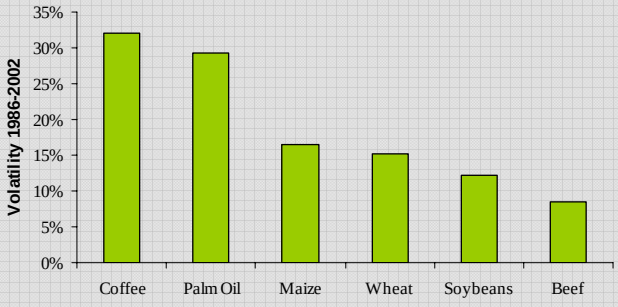
5.2.1 Summary of impact hypotheses

5.2.2 Justification

A commodity exchange can provide price-risk management solutions by offering trade in commodity futures and options contracts.[13] These instruments address the fact that as Governments have withdrawn from the sector, commodity sector participants have become increasingly exposed to the notorious price volatility that has long afflicted global commodity markets (see chart 1, which refers to commodities that are featured in this study).

Price volatility breeds risk, and vulnerability to risk is recognized as one of four dimensions that constitute poverty.[14] When farmers receive prices that are unstable and uncertain, they run price risks from the moment that they decide to plant a crop and every time that they buy and apply inputs such as fertilizers or pesticides, or use paid labour. They never know whether the price that they receive at the end will cover their costs and be worth their efforts. Such risks can deter farmers from making important investments in upgrading their productive activities, and can instead lock them into a vicious cycle of low productivity and low returns. Thus, price volatility creates and sustains rural poverty.

Chart 1. Price volatility for selected commodities, 1986–2002



Source: Gilbert (2004).

Note: Volatilities are calculated as the standard deviation of the annual changes in the log of the deflated price.

The usage of commodity-linked instruments to hedge commodity price risk can bring greater certainty over the planting cycle, allowing those active in the commodity sector to commit to investments that yield longer-term gains, and increasing the viability of planting higher-risk but higher-revenue crops. Even in the face of a long-term decline in the prices of their commodity, the ability to hedge against shorter-term price movements provides farmers with a window in which to adjust cropping patterns and diversify their risk profile.

Citing a series of studies, Varangis, Larson and Anderson (2002: 6) state that "there is strong evidence that farmers in poor rural communities are risk-averse, and take actions that result in lower but more stable incomes". While many of the mechanisms used are currently informal (see table 1 of this report), the imperative of farmers to reduce exposure to risk implies there is significant scope for market-based risk management solutions. However, it should also be borne in mind that price risk is only one of the risks faced by farmers (see section 2.1), that it may form complex interrelationships with these other risks (Fafchamps, 2000), and that it may not be the most urgent risk – particularly in situations where a relatively large source of farmer income is derived from non-farm activities.

As was described in chapter 2, Governments are also heavily impacted by commodity-price volatility – both importing countries that are dependent on commodities for food and energy security, and exporting countries that may be heavily dependent on commodities for revenues and foreign exchange,

[13] There are also commodity risk-management instruments that are usually traded directly between counterparties off-exchange, or "over-the-counter" (OTC). These include forwards, "exotic" options, and swaps. However, for these instruments, exchanges are increasingly providing registration and clearing services. For a brief description of commodity risk-management instruments, see figure 4 in this publication; for a more detailed account, see UNCTAD (1998).

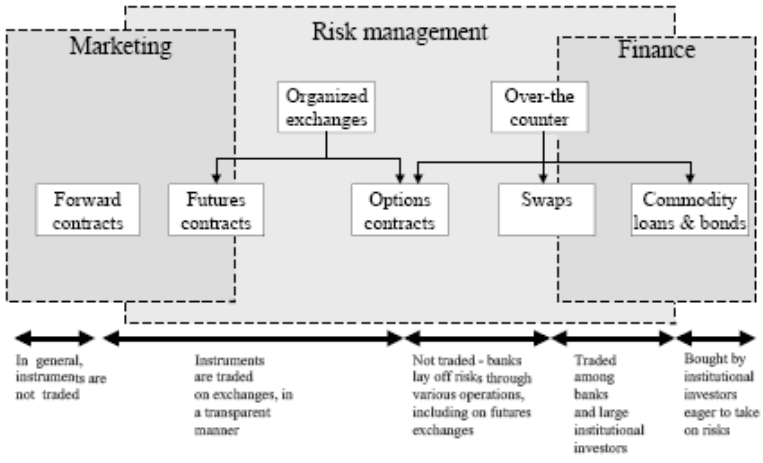
[14] World Bank. *World Development Report 2000/2001*. 2001. The four dimensions are income poverty, deprivations in health and education, vulnerability to risk, and voicelessness/powerlessness.

and as a generator of employment, growth and poverty reduction. The same imperative that applies for producers to manage exposure to price risk therefore also applies for Governments.

Exchange-traded price-risk management instruments may be used by a farmer or other commodity sector participant directly – either through direct membership of an exchange, or more likely through an exchange-accredited broker. However, farmers' direct participation in futures markets faces a number of well-documented barriers: contract sizes that may far exceed the annual quantity of production; lack of knowledge, resources and capacity; infrastructure deficiencies; a cumbersome process of execution that may be beyond farmer capacity; and the wariness of brokers "unwilling to engage with a new and unfamiliar customer base of small-scale producers that is characterized by high transaction costs, diminished access to credit, and performance risk" (ITF–CRM, 2003: 2).

Alternatively, farmers may use exchange instruments indirectly, via an intermediary, such as a farmers' association. Intermediaries can aggregate the hedging needs of several small-scale farmers, execute the trade on the exchange, manage the positions in the market, and then liquidate the contract at an appropriate time. Another form of indirect usage might involve an over-the-counter (OTC) instrument negotiated off-exchange between two counterparties. This allows for greater flexibility between the provider of the instrument – typically a financial institution, and the recipient of the instrument – whether a producer or an aggregator. OTC instruments documented in a study of coffee market practice include "average price" options and "zero cost" options (Rutten and Youssef, 2007).[15]

Figure 4. Typology of risk-management instruments



Source: UNCTAD (1998).

Finally, price-risk management can be embedded into physical trading contracts between market participants along the supply chain. They can also be embedded into contracts between a commodity sector participant and a service provider, such as a financier or an input supplier.[16] Under this arrangement, the counterparty would perform the hedging and pass on the benefits to the producer – for example, a price for future delivery that is fixed in advance, or fixed with reference to some agreed benchmark at or near the time of delivery.

Forwards, futures, options and swaps are the most prevalent instruments available for commodity price-risk management (see fig. 4). However, each instrument has a different functionality, different usage requirements and different cost implications – which makes the choice of instrument dependent both on the type of user and on the specifics of the user's situation (see box 6). The ITF–CRM has focused on the purchase of "put options" – an option that gives the holder the right, but not the obligation, to sell at a specified price level at or before a specified date – as the most appropriate solution for commodity producers:

[15] Average price options (also known as Asian options) would be exercised depending on the average price over, say, a season, rather than on individual daily price movements as would be the case with exchange-traded options. Zero cost options enable a producer to receive protection against falling prices in return for giving up some or all of the potential benefit from rising prices.

[16] For more about price-risk management embedded in physical trading contracts, see UNCTAD (2002).

> "For providers, the most important constraint to doing business with developing-country commodity producers is credit risk. Structuring business so that derivative products are simple put options with cash payment of the premium upfront removes credit risk from the provider's perspective and opens the door to doing business with clients they otherwise would not be able to approach. Developing-country clients also do not desire to begin with complicated hedging strategies, but would rather begin using simple instruments. As they become more sophisticated in the use of hedging instruments and find an acceptable form of collateral for the provider, they could then possibly move into other forms of hedging instruments" (ITF–CRM, 2003: 4).

Box 6. Forwards, futures and options: pros and cons for farmers

	Forwards	Futures	Options	OTC Options
Exchange-traded	No	Yes	Yes	No
Counterparty risk	Depends on the counterparty - may be high	Minimal	Minimal	Depends on the counterparty - may be high
Contract terms	Flexible	Inflexible	Inflexible	Flexible
Delivery expected	Yes	No	No	Depends on the contracts
Timing flexibility	No	Yes	Yes	Depends on the contract
Regulatory oversight	Low	High	High	Low
Cashflow implications	Low cost - usually subtracted from payment by purchaser at time of purchase	Indeterminate margin requirements until contract is closed	*Options buyer*: One-off upfront payment - can be high *Options seller*: Indeterminate margin requirements until upon is exercised or expires	Depends on the contract

Source: Corcoran et al. (2003).

The ITF–CRM's main challenge has been in establishing effective models of cooperation with a local aggregator counterparty. Therefore, it has focused on providing technical assistance and training, as well as building understanding among farmer communities. The relative simplicity of put options has helped considerably. However, two issues have arisen: firstly, options can sometimes be too expensive, because premiums are often highest exactly when they are needed most; and secondly, these instruments are typically not aimed at the poorest of the poor, but at more commercially-oriented farmers (Varangis, Larson and Anderson, 2002). The key lesson from the ITF–CRM experience, therefore, is that a certain degree of farmer organization and commercialization is a prerequisite for the advantageous use by farmers of price-risk management instruments.

Use of a local developing-country platform for risk management can in certain circumstances bring advantages over the use of established international exchanges. Challenges to accessing international exchanges typically include controls on flows of currency, capital and commodities; volatility in exchange rates; and stringent credit and "know your customer" requirements that often deter brokers in developed countries from taking on business from the developing world (see box 3). Crucially, there can also often be a wide basis risk – fundamental divergences in the price development on international futures markets compared with domestic cash markets – that undermines the efficacy of hedging. Many of these issues can be satisfactorily addressed with a local platform.

On the other hand, many exchanges have struggled when attempting to introduce a contract for a commodity that differs from an established international benchmark contract. Some exchanges have addressed this issue by licensing the contract specifications and settlement prices of an established benchmark contract from the international exchange, and offering it denominated in local currency and traded on a local platform. This approach can align domestic cash market practices with established international markets, as local participants adjust to the international contract specifications. It can also offer potential for arbitrage across both cash and futures markets – domestically and internationally – to better align pricing between them.

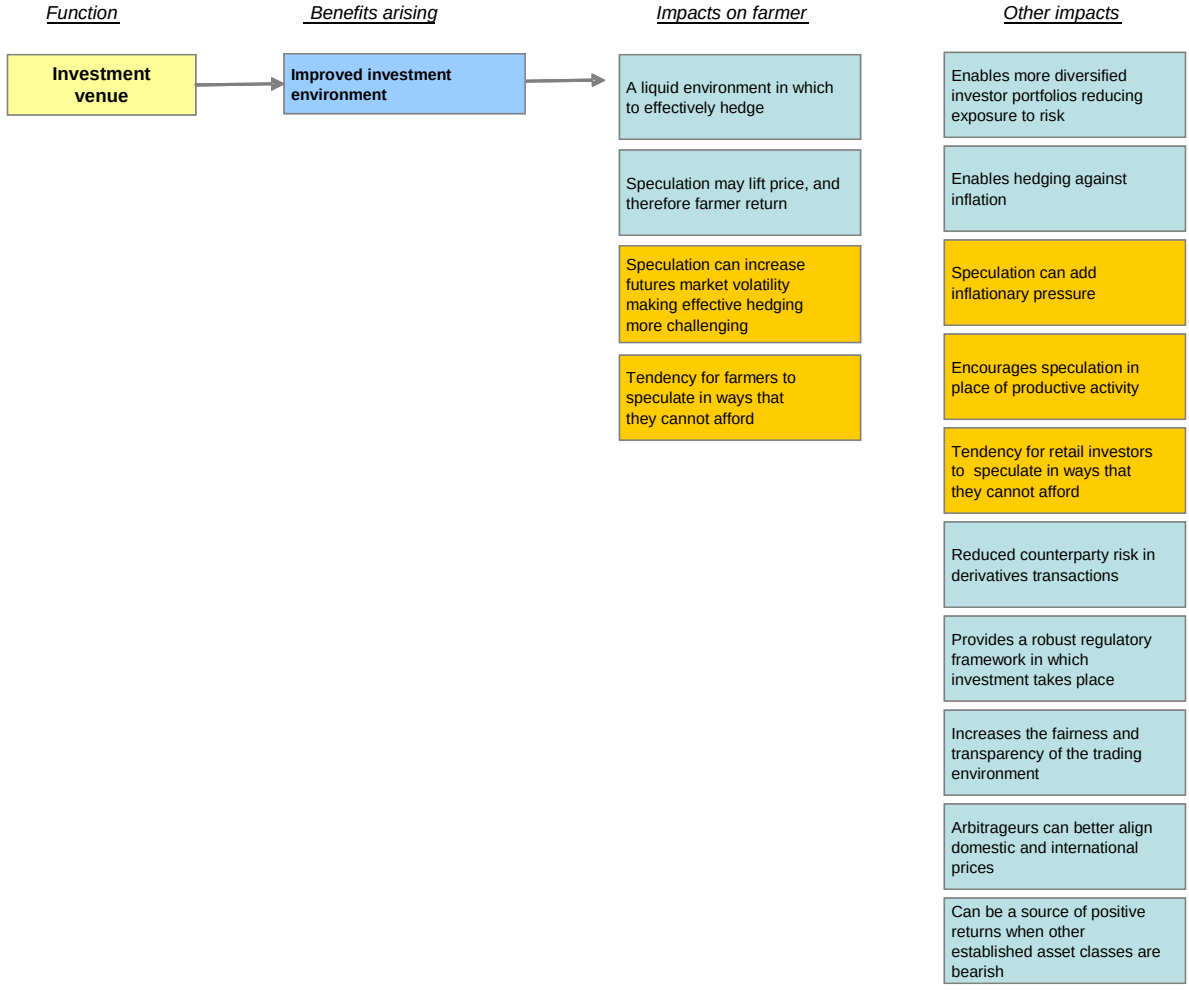
Finally, market-based solutions may have substantial advantages over government intervention in dealing with commodity price uncertainty. Varangis and Larson (1996) identify four:

- They rely on market-determined prices instead of administratively determined prices;
- They shift risk to entities better able and willing to assume risks;
- They can be linked to financing instruments, in some cases making financing feasible at lower cost;
- In most cases, they cost less than government price intervention programmes.

A market-oriented approach using exchange-traded instruments may be able to almost directly replicate existing government programmes. For example, Sen (2005) suggests that an appropriate use of exchange-traded options can replicate the Government of India's minimum-support-price mechanism for wheat at a cost saving of between $35 and $151 per tonne,[17] depending on the structure and the ambition of the scheme.

5.3 Venue for investment

5.3.1 Summary of impact hypotheses

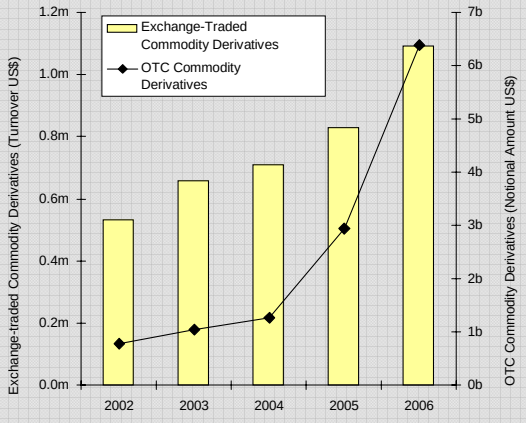


[17] This figure has been converted from the original 140 to 610 rupees per quintal that is quoted in the article, using the July 2007 rupee–US dollar interbank rate of 40.3:1 and a quintal–tonne conversion factor of 10:1.

5.3.2 Justification

In recent years, commodity derivatives markets have undergone significant growth (see chart 2). Growth in exchange-traded commodity markets (31 per cent in 2006; 20 per cent compound yearly average between 2002 and 2006) has been more than matched by that in OTC, or off-exchange, commodity markets (69 per cent in 2006; 117 per cent compound yearly average between 2002 and 2006). Some of the growth can be attributed to increased engagement by physical market participants. However, institutional investors have also been attracted into the markets in ever-larger volumes, by rising prices and increased volatility.

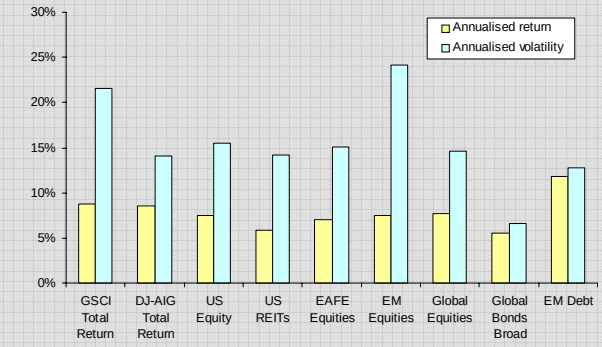
Chart 2. Growth in exchange-traded and OTC derivatives, 2002–2006



Sources: OTC data: Bank for International Settlements. Exchange-traded data: Futures Industry Association.

Commodities are increasingly seen by investors as an asset class in their own right (Banque de France, 2006). As chart 3 demonstrates, the commodity sector offers a combination of high returns and high volatility – the second highest category in each metric. Represented here by the Goldman Sachs Commodity Index, commodities have outperformed all asset classes in annualized return, except emerging market debt. They have also been the most volatile of all investment destinations, other than emerging market equities.

Chart 3. Asset class characteristics: the appeal of commodities



Source: IMF (2006), Global Financial Stability Report.
Notes: Annualized returns measured for the 10 years, ending July 2006. Annualized volatility based on correlation data over 10 years, ending July 2006.
Acronyms: DJ-AIG = Dow Jones - American Industrial Group; EAFE = Europe, Australia, Far East; EM = emerging markets; GSCI = Goldman Sachs Commodity Index; REITs = Real Estate Investment Trusts.

Analysis suggests that investment in commodity futures markets yields other positive impacts. These include a potential hedge against inflation (expected and unexpected), and enhanced portfolio diversification because of low correlation in price development with traditional asset classes (Ibbotson, 2006; National Bureau of Economic Research, 2004b). Portfolio diversification is particularly important for pension funds and insurance companies, which typically aim to carefully balance risk and reward so as to fulfil their obligations to customers over a long-term horizon. In the words of a commodity investor at a large Dutch pension fund, "…more than anything else, the added value of commodities lies in their power to reduce the overall risk, without sacrificing the expected overall return. When it comes to the diversification power of commodities as an asset class, a little goes a long way" (Beenen 2005: 61).

Another potential impact is the capacity of certain types of financial institution to perform arbitrage. Arbitrage may be defined as the simultaneous sale and purchase of two related contracts, to take advantage of pricing differentials between them. It may be performed in a domestic context between contracts for the same commodity that expire in different calendar months. This is known as a "calendar spread" – an example of which would be buying a wheat futures contract with expiry next month, and simultaneously selling a wheat futures contract whose delivery is in six months' time. It

may also be performed between contracts for the same commodity at different stages in the supply chain, such as the "soybean crush spread" between soybeans and their derivates – soybean oil and soybean meal. In the domestic context, the presence of arbitrageurs can keep prices in the domestic markets efficiently aligned. In an international context, arbitrage may be performed between two commodities in different international markets, such as soybean traded on the Chicago Board of Trade (CBOT) and soybean traded on the BM&F. This can keep prices in domestic markets efficiently aligned with international price movements.

Commodity futures exchanges also offer a number of wider benefits as an institutional venue for investment. Firstly, the exchange clearing house acts as a counterparty to all trades, reducing the risk of counterparty default and providing a more secure and reliable investment environment.[18] Secondly, the exchange's rules, regulations and governance procedures, coupled with those of its regulators and intermediary bodies, provide an orderly rule-based framework within which investment practices can be enhanced and disputes can be arbitrated. Thirdly, the speculative interest that it generates is usually necessary to provide the liquidity required for hedging to be effective (Corcoran et al., 2003).

However, the role of speculative participation in commodity futures markets is heavily contested. In some situations, speculation may be considered by Government or society to be a wasteful or morally undesirable activity. This is sometimes compounded by a lack of conceptual clarity about what speculation is, and who speculators are. Speculation may be defined as participation in a market with the aim of benefiting from the correct anticipation of future price movements. Many forms of investment in financial markets are a form of speculation – stock, bond and real estate prices can go down as well as up, just as commodity prices do. A farmer who keeps crops in storage in the expectation of rising prices in the future, but without hedging that position, is also a kind of speculator – that farmer would lose out if prices fell. Other organizations that participate in commodity supply chains can and do speculate. There are responsible and irresponsible speculative positions – the latter being those which leave the speculator open to losses that he or she cannot afford. There are situations of "excessive speculation" – defined as those situations that cause "sudden or unreasonable fluctuations or unwarranted changes in the price of such commodity" (United States Government, Commodity Exchange Act, 1936, 1 (6a)); exchanges and their regulators impose regulations to control against such situations. There is also an important distinction between speculation and manipulation, the latter being defined as "intentional conduct designed to deceive investors by controlling or artificially affecting the market for a security" (United States Securities and Exchange Commission, 2007).

The effects of speculation on markets are far from clear. On the one hand, analytical evidence suggests that speculators follow hedgers in establishing positions – the implication being that it is the hedgers who are responsible for driving changes in price, not the speculators (IMF, 2006b; Haigh, Hranaiova and Oswald, 2005). On the other hand, it may also be true that with active speculators on the market, prices react very fast to new information, and sometimes overreact, leading to high short-term volatility, which can make it problematic for hedgers to manage open positions. This duality of opinion is reflected in the following appraisal by the Bank for International Settlements:

> "Intuitively, one might expect large inflows of funds into commodity markets to cause prices to rise sharply, possibly to higher levels than are justified by economic fundamentals. The prima facie evidence seems to support this view, as financial activity has broadly increased in parallel with prices during the past four years. However, the results of empirical work on the impact of the growing presence of financial investors on commodity prices are less clear-cut. Several recent studies, which explore the relationship between investor activity and

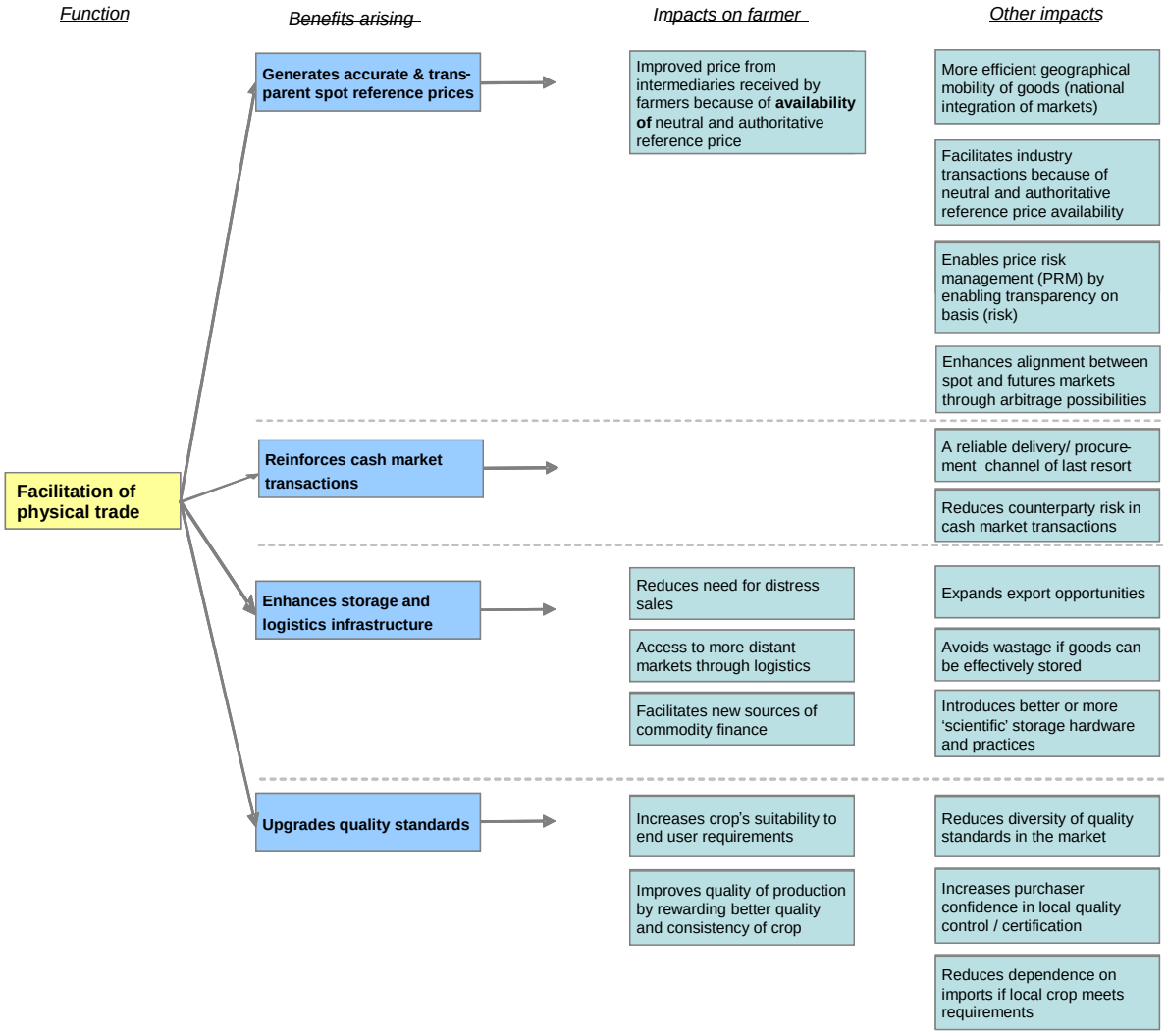
[18] After a futures transaction has been executed, the exchange's designated clearing house guarantees the performance of every contract by interposing itself between the parties to a transaction – becoming the buyer to every seller and the seller to every buyer – through a process known as novation. The clearing house subsequently controls the risk arising from its guarantee through a range of mechanisms that includes a system of daily-adjusted margin deposits and minimum capital requirements for all market participants, as outlined in chapter 4.

> commodity prices, indicate that price changes have led to changes in investor interest rather than the other way around… Notwithstanding all these factors, it still appears difficult to reconcile the increases in futures prices until mid-2006 with economic fundamentals, especially in the case of copper" (Bank for International Settlements, 2007: 61).

Looking at the debate from another perspective, it is often in the interests of market participants adversely affected by price rises, namely purchasers and consumers, to cite speculation or manipulation as the cause. This may be an attempt to pre-empt government intervention to reduce prices. On the other side of the debate, farmers and other producers normally benefit from price rises (as long as the benefits from price rises pass along the supply chain). A third view is that the exchange is merely the messenger. As long as an exchange provides a fair, efficient and transparent marketplace, with appropriate regulatory oversight in place, exchanges typically argue that they should not be held responsible for the prices that are formed in their markets.

5.4 Facilitation of physical commodity trade

5.4.1 Summary of impact hypotheses



5.4.2 Justification

The orthodox theory argues that futures markets evolve after the development of a well-ordered cash market (Nair, 2004). However, recent experience suggests that in certain circumstances, the introduction of a commodity futures market can stimulate the development of the cash markets. Central to this experience has been the notion of the exchange as an "island of excellence", extending the high levels of performance in its core trading functions to the physical commodity markets that it serves. Four facets of this effect can be identified:

Generates improved spot pricing: In order to function effectively, futures markets require that an authoritative spot reference price be available to market participants. Hedging is effective only to the extent that price development in the futures and cash markets is closely correlated. This is because a hedging position in the futures market must offset exposure to price movement in the cash market. If the discrepancy in prices between these two markets (known as the "basis") is wide, then hedgers are said to be exposed to "basis risk". Basis risk becomes greater as the correlation between price development in the futures and cash markets diminishes. The greater the basis risk, the less effective a hedge placed in the futures market will be in offsetting an exposure in the cash market.

Importantly, the basis can only be calculated if spot reference prices are available. In many developing countries, however, physical commodity markets can be fragmented and disorganized. In such a situation, it may not be ordinarily possible to establish a national spot price for a given commodity. In these situations, futures exchanges may have to generate an authoritative spot price itself, in order for there to be transparency on the basis, and the basis risk, that market participants incur.

Once generated, a neutral and authoritative spot price can provide an important reference for farmers and other commodity sector participants in conducting transactions with purchasers and intermediaries. Moreover, by establishing accepted and transparent cost differentials associated with purchase or delivery at different geographic locations, an exchange can integrate national markets through more efficient geographical mobility of goods across the country.

Reinforces cash market transactions: Commodity market participants look for reassurance when entering new or untested markets in the face of at least three major uncertainties: Will I be able to procure or sell the goods when I need to? Will my contractual counterparty fulfil the terms of the deal? Will the goods I receive meet the quality standards I require (or for a seller, will the goods I deliver be accepted as being of good quality by the purchaser)? A commodity futures exchange can provide this assurance, by acting as a delivery channel of last resort. Although the vast majority of futures contracts do not result in physical delivery, the possibility of delivery assures market participants in the event that their usual channels for cash commodity transactions do not perform. Moreover, the exchange, as a central counterparty,[19] guarantees performance of the contract at the published specification, thereby providing further confidence for market participants to transact.

The requirement for confidence in physical procurement channels is not just limited to corporate entities. With this in mind, the executive director of the World Food Programme (WFP) – one of the largest buyers of Ethiopian cereals – thinks that a proposed Ethiopian Commodity Exchange (ECEX) "will help it buy much more efficiently, perhaps even using futures" (Economist, 2007). As the WFP starts to source more of its procurement from local cash markets in the developing world – where conditions and practices are often substandard – "donors are starting to think that commodities exchanges such as ECEX could play a big role in reducing hunger across Africa" (Economist, 2007).

Infrastructure enhancement: When an exchange proactively drives the creation of a warehouse network to improve the efficiency of its delivery and collateral management processes, it can substantially enhance the storage and logistics infrastructure for the commodities traded. It is well

[19] See footnote 18.

documented that developing countries face high storage and transportation costs.[20] The exchange can catalyse the expansion of warehouse capacity. Moreover, warehouse facilities accredited by the exchange have strong incentives to introduce rigorous and effective practices for overseeing delivery, grading the delivered commodity, and guaranteeing ongoing storage in a suitable and secure environment. This can reduce costs arising from lengthy or mishandled delivery procedures, and reduce wastage resulting from the deterioration of produce stored in unsatisfactory conditions. With the export market in mind, high-quality accessible storage at port facilities can be an essential prerequisite for trade.

A reliable system of collateral management, and in particular of warehouse receipts, can make the provision of commodity finance to the sector a more viable proposition for prospective financiers. Distress sales can be avoided, as farmers can store their goods in a secure facility, they can access finance to cover investments and ongoing expenses, and they can wait for better market conditions to make their sales than would be available immediately after harvest, when prices tend to be at their lowest. As a result, farmers can secure improved income realization and be better placed to make sustainable medium- or long-term investments. Moreover, intraseasonal price volatility in agricultural markets can be reduced, as better storage allows for a staggered supply of crops to market across the season.

Quality upgrade: When an exchange standardizes the specifications of commodities eligible for delivery at its facilities, in line with industry needs, it can drive the evolution of a transparent set of quality standards. As a result, farmers' awareness of quality requirements, and their ability to adhere to them, can increase. Transparent and accepted quality standards, particularly those that offer premiums to higher-quality produce, put in place a strong incentive for farmers to upgrade production and better meet the requirements of evolving commodity-supply chains, in which quality standards are playing an increasingly important role.

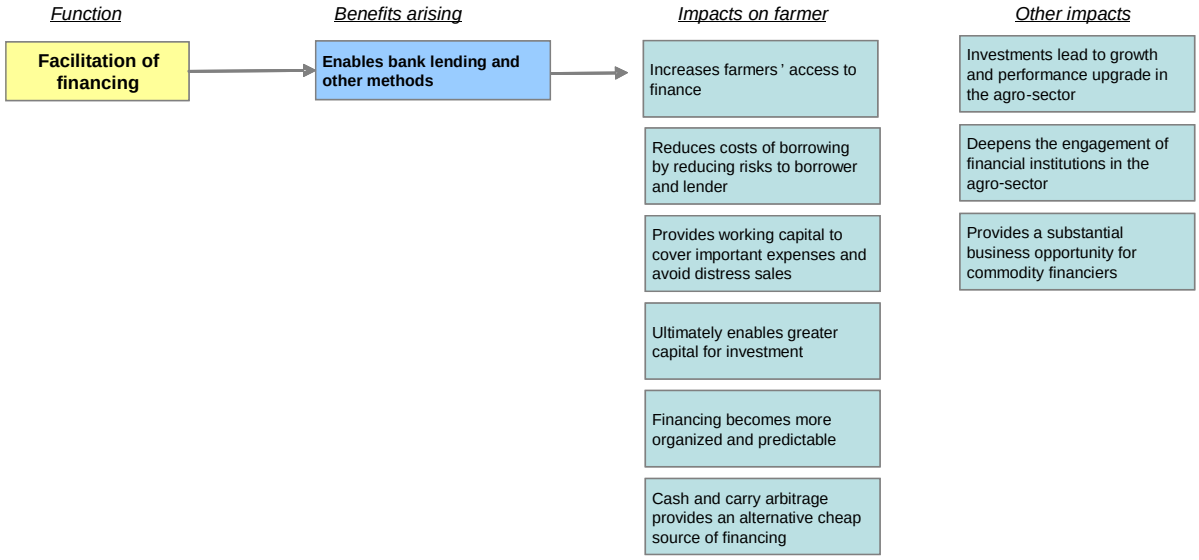
Three approaches to quality standards can be discerned. One possibility is to specify a "fair average quality" that represents a substantial proportion of production (e.g. Bursa Malaysia crude palm oil). This is helpful in circumstances where grade diversity is low. Another possibility is to take a benchmark grade, around which a series of premiums and discounts can be offered (e.g. DCE soybean). This approach is particularly useful where grades are transparent and are based on clearly understood differentials, such as the impurity content of the delivered soybean. A third possibility is to specify the premium quality as the deliverable grade (e.g. MCX cardamom). This can be advantageous where purchaser or export markets are particularly quality-sensitive. In this situation, perhaps discounts could be offered for deliveries of subquality product, or subquality product may be rejected altogether. Either way, specifying the premium quality as the deliverable grade provides quality-sensitive purchasers and exporters with the confidence to source produce from the market, because the exchange acts as the ultimate guarantor of the high-quality product they demand.

Whichever structure is chosen, the result can be an increase in the sensitivity of producers and processors to quality. Producers can become better informed about quality issues in the market and can take steps to improve their output. However, it should be emphasized that other asymmetries may remain – or even increase – such as which market actors hold standard-setting power, and which have the capacity to meet the standards. There are also limitations to what exchange quality-grading standards can do. The need for liquidity in futures markets means that a quality specification is unlikely to be microtailored for niche markets. To avoid being susceptible to manipulation, the deliverable supply needs to be sufficiently large, so that squeezes are prevented.

[20] In the United Republic of Tanzania, for example, transport costs are estimated to account for 60 per cent of the total marketing cost for maize, and losses due to inadequate storage facilities are estimated to be about 30–40 per cent of production. See UNCTAD (2001).

5.5 Facilitation of financing to the agricultural sector

5.5.1 Summary of impact hypotheses



5.5.2 Justification

Lack of access to affordable sources of finance is a significant constraint faced by many entities in the developing world. Financiers often consider agriculture to be a particularly high-risk and low-profit proposition for standard modes of bank lending. This means that farmers and other entities in agricultural sectors typically pay high rates of interest for borrowing, through both formal and informal channels. Alternatively, they may abstain from borrowing altogether, and become locked into a cycle of low investment and low returns. However, forms of commodity finance have been developed that can reduce financiers' risks and costs of delivery, by linking traditional financial tools with commodity exchange services. The lower risks and lower costs that ensue can enable banks to reduce accordingly the rates of interest charged to the borrower.

Perhaps the most straightforward model is inventory financing, using warehouse receipts as collateral. The warehouse receipt provides the financier with secure collateral that can be easily liquidated in the case of default. The exchange provides the financier with the mechanism for valuing the collateral, for hedging against changes in that value, and for liquidating collateral in the case of default. Also, the exchange may add further security to the process by evaluating and accrediting warehouses in which the physical good is stored. Key dependencies for this model include tradability of the warehouse receipt, a trusted system of warehouses and collateral management agencies, and permission for banks to participate in the commodity futures market.

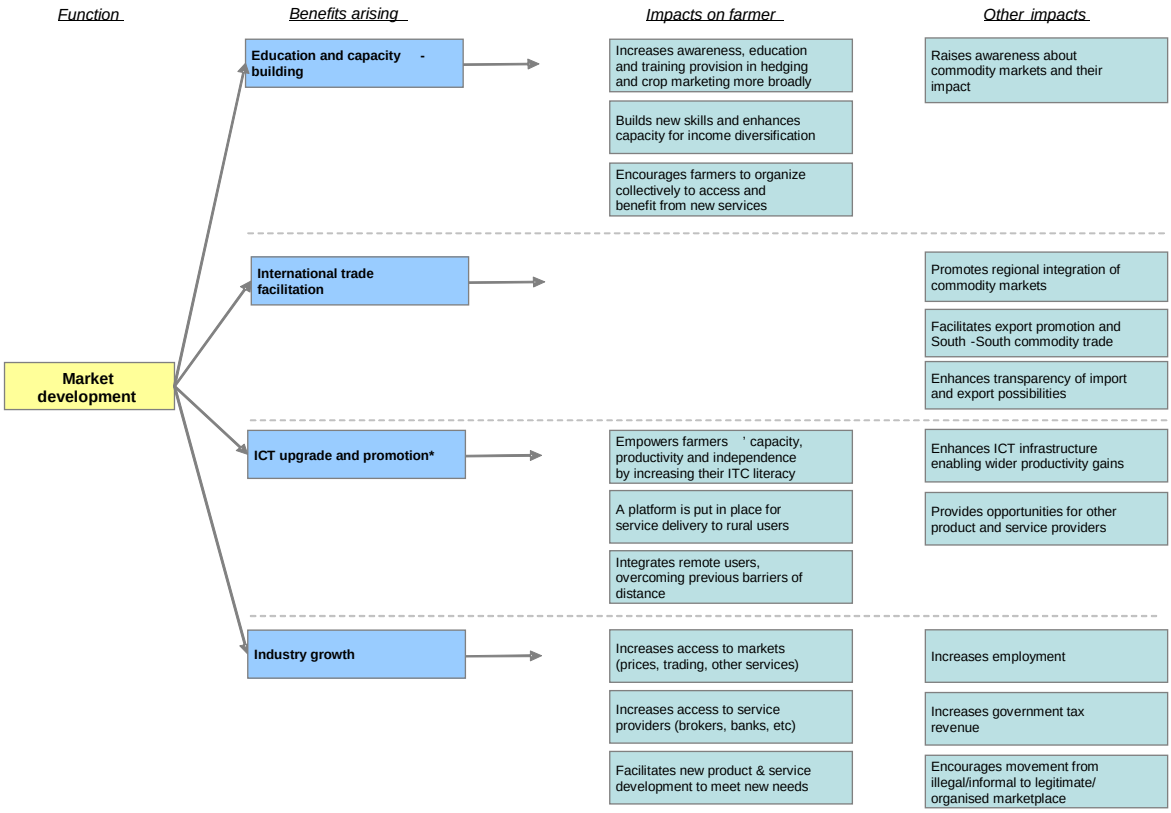
An alternative mechanism exists, by which the exchange itself can facilitate producers' access to commodity finance directly from capital market investors. The instrument is exchange-traded farmer repurchase agreements, also known as "repos". These can be structured on inventories, as well as on future receivables. For commodities that have already been produced, the warehouse receipt is transferred to an exchange broker, and the owner of the commodities signs an agreement to buy it back at a given price (for example, $1,000) after a certain period (for example, three months). The broker posts this "package" on the exchange network, and investors can bid on it. Investors know that after three months, they will receive $1,000. The higher they bid, the lower the effective interest rate they will receive. Where repos are structured around future receivables rather than commodities already produced, a higher degree of structuring is required to mitigate financial and physical risk. In either case, however, the exchange disintermediates banks, increasing access and reducing the cost of finance for the borrower.

A third possibility exists for commodity sector participants to earn relatively easy sources of funds by performing "cash and carry arbitrage". The futures price for a commodity should be equivalent to the cash price of that commodity plus the "cost of carry" – i.e. the storage and interest charges related to holding the commodity until it can be delivered to the exchange at the expiry of the futures contract. When the futures price rises above the true cost of carry, a market participant can lock in a profit by buying the commodity in the cash market, and simultaneously selling the same commodity in the futures market. At expiry of the contract, the commodity is delivered at the exchange to realize a profit for the market participant. (The reverse course of action is taken when the futures price falls below the true cost of carry.) This is a relatively easy source of cash for a market participant with access to the physical commodity. Importantly, it also acts as a check on speculators whose actions may move the price away from the level justified by the supply/demand fundamentals. In this situation, cash and carry arbitrage would restore the price to the level justified by the fundamentals.

Finally, there are many other possibilities for creating linkages between finance and price-risk management in financing agreements and also in the contract for a physical transaction. An example of each is provided by Varangis and Larson (1996). The first variety is the linking of a commodity producer's loan repayment conditionality to the price of the underlying commodity using derivatives instruments: if prices fall, the producer pays less interest, and vice versa. The second variety is where an exporter and a buyer agree on a fixed price for a certain volume of a commodity. The buyer then provides a line of credit to the exporter, which is drawn down as exports are made. In turn, the buyer sells the commodity for future delivery or hedges the price risk on the options market.

5.6 Market development

5.6.1 Summary of impact hypotheses



5.6.2 Justification

Under this category, four developmental impacts are identified, by which exchanges can deliver benefits to farmers and the market in general:

Awareness-raising, education and capacity-building: Commodity exchanges have an interest in bringing new users into the markets, including farmers – a group that represents a potentially large and often untapped source of trading volume. However, awareness of exchange solutions must be raised first. Effective use of commodity-linked instruments requires understanding, expertise and technical ability, which farmers and other types of market participants may not possess. Therefore, exchanges – often in partnership with intermediaries such as brokers or industry representative bodies – often provide potential market users with awareness-raising, education and capacity-building programmes. Conversely, farmers have an interest in understanding and using the instruments provided by commodity exchanges. The exchange's risk management, market information, financing and other services potentially provide the tools for farmers to radically upgrade marketing practices and empower themselves relative to intermediaries and purchasers. Thus, exchange-led or exchange-facilitated education programmes can be a win-win solution, for the farmer and the exchange.

International trade facilitation: A commodity exchange can create markets, by providing a forum in which multiple buyers and sellers trade commodity-linked contracts. This reduces the costs associated with finding a buyer or seller with whom to transact. This logic is perhaps even stronger in the context of international trade facilitation, whether it be regional or global in nature. The transaction costs of conducting international trade tend to be greater than those for domestic trade. This is driven by factors including distance, more pronounced information asymmetries, barriers to trade, divergent business practices, and cultural and linguistic differences. As a central focus for trade in a given geography or jurisdiction, a commodity exchange can be well placed to establish modalities for the conduct of cross-border transactions and the setting up of links between commodity sector participants in different jurisdictions, thus stimulating regional integration and South–South trade.

ICT upgrade and promotion: The last decade has seen the progressive transition from "open outcry" trading, based on the physical presence of market users on an exchange trading floor, to electronic trading executed by market users remotely from the exchange premises. Adoption and upgrade of financial and trading technologies is now a top priority for commodity exchanges around the world. ICT has the potential to increase the speed and efficiency of market performance, and to reduce the costs of volume expansion and new product development. Furthermore, ICT offers possibilities for integrating previously disparate services into packaged service bundles. Importantly, ICT can enable exchanges to overcome the market-access barriers faced by small-scale farmers that are caused by geographical distance and deficient physical infrastructure. Moreover, by extending ICT-enabled market access to previously marginalized entities, exchanges can also open the way for provision of other electronically delivered services. These might include banking, insurance, crop and weather advisory services, and e-commerce models for the supply of inputs and equipment.

Industry growth: There are a series of contingent benefits arising from the growth of the industry that supports commodity exchanges. As brokerages and other intermediaries expand – perhaps opening new branches in towns and villages, perhaps making services available through easily accessible internet platforms – access can be broadened to markets and services for new users, including farmers. Market users may previously have accessed similar services through informal or even illegal channels. The exchange can therefore lead to an increasingly organized framework of practices and rules for doing business. Industry expansion may also generate employment at the exchange and its associated institutions, such as brokerages, warehouses, regulators, and grading/certification centres. Under certain circumstances, trading can also generate tax revenues for Government. Finally, as an exchange develops – interacting with market participants in a close and ongoing dialogue – it quickly learns about obstacles to market expansion and about important risks that market users wish to mitigate. Financial markets innovate rapidly, and the exchange, working with commodity sector stakeholders, can act as an engine for generating new, dynamic products, tailored to address market users' evolving needs.

Part Two: Country case studies

6. Brazil

6.1 Historical development of agricultural markets, and specific commodity markets under review

6.1.1 Country factfile [21]

GDP (USDb, current prices) 2006:	1,068	*Average annual GDP growth 1990–2006:*	4.8%
GDP per cap. (USD, current prices) 2006:	5,717	*GDP per capita growth 1990–2006:*	65%
Population (millions) 2006:	187	*Population growth 1990–2006:*	27%
Inflation rate 1990 (2000 as 100):	0.001	*Inflation rate 2005 (2000 as 100):*	151
Current account balance (USDb) 1990:	–3.8	*Current account balance (USDb) 2006:*	13.6
Agriculture – share of GDP 2006:	8%	*Agro share of export revenues 2005:*	28%
Agriculture – share of employment 2003:	19 %	*Poorest 20% – share of national income:*	2.4%
Surface area (millions of sq. km) 2005:	8.5	*Life expectancy at birth (years) 2005:*	71
Adult literacy rate 2006:	89%		

USDb = billions of United States dollars

6.1.2 Historical development

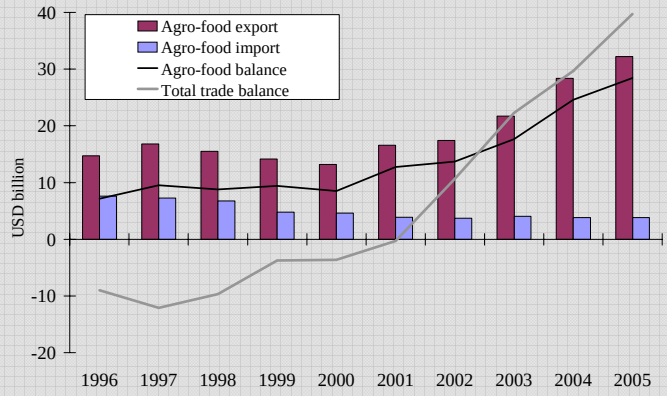
The post-war history of Brazil's agriculture has been closely related to the country's general economic situation and strategic development goals. At the start of the post-war period, Brazilian agriculture was marked by a commercial export sector largely focused on coffee, cotton and sugar, and a semi-subsistence sector producing for the domestic market. More broadly, Brazil was characterized by vast inequalities in income, asset ownership and access to land. The introduction of import substitution policies in the 1950s saw an explicit tax on the foreign exchange earned by agro-exports, and a persistent implicit tax, as commodity prices were held down to support industrial expansion. Nevertheless, agriculture grew rapidly, as the agricultural frontier in this vast country expanded and new land was made available for cultivation – particularly to the commercial sector, thus reinforcing the existing inequalities (Hudson, 1997).

After the military takeover in 1964, food security became a pressing concern, with rapid flows of people into the cities as the government-led import substitution strategy was stepped up. Very high levels of government intervention in the sector were carried out through various mechanisms: price controls, large-scale government procurement and storage, high tariffs, and large flows of subsidized credit (Chaddad and Jank, 2006). There was also high investment in research and extension infrastructure, as productivity gains overtook land development as the Government's priority engine for generating agricultural growth (Hudson, 1997).

[21] Data sources for the country factfiles: GDP, population, inflation, and current account data from IMF, *World Economic Outlook Database*, April 2007; agriculture share of GDP, employment and export revenues from OECD 2007; surface area, life expectancy at birth, and adult literacy from World Bank, *World Development Indicators 2006;* poorest quintile share in national income from World Bank, *World Development Indicators 2005*. (N.B. poorest quintile share in national income is a 1990–2003 average rate.)

The debt crisis that hit Latin America in the 1980s brought destabilizing levels of inflation, as well as the stagnation of economic growth. Government was forced to severely curtail its agricultural interventionism, rolling back price-support, credit-subsidy and public-investment programmes, thus substantially reducing the safety net to the sector. The ensuing structural reforms led to widespread deregulation and liberalization of Brazilian agriculture, in the dimensions of trade, marketing, finance and taxation policy.

Chart 4. Brazilian agrofood trade, 1996–2005



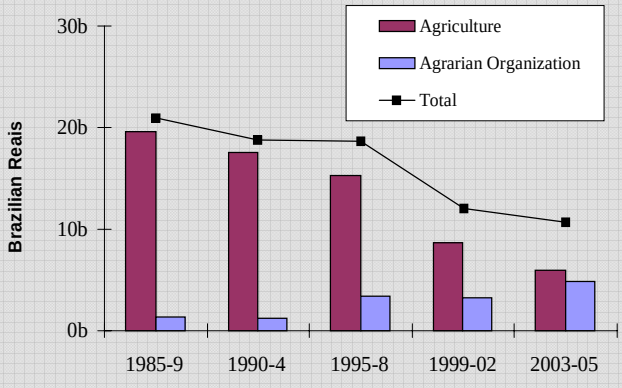
Source: OECD (2007).

The early-to-mid-1990s saw a strong push to transform Brazil into a leading agrofood export economy. Consequently, the period saw a significant transformation in the balance of Brazil's agricultural trade (see chart 4).

Starting from 1995, however, the Cardoso Administration brought about a significant shift in the Government's agricultural priorities. To address persistent rural poverty and resource inequality – "one of the most unequal in the world" (OECD, 2007) – land reform and smallholder development, or "family farming", became key focus areas. This was reflected in the increasing share of public resources channelled to "agrarian organization" – a government function dealing with land expropriation and resettlement of the rural landless (see chart 5).

Government activities to support the resettlement of the rural landless have included allocation of land to those in need, plus a proactive role in infrastructure development, extension service provision and credit supply with a view to creating economically viable producer entities. Further measures have included the establishment in 2000 of the Ministry of Agrarian Development, alongside the Ministry of Agriculture, and the launch of the Second National Agrarian Reform Plan (PNRA II) in 2003. Importantly, the Government has sought to provide support for the commercialization of the smallholder/family-farming sector, without challenging the macroeconomic stability that Brazil finally achieved in the new millennium. In order to do this, it has created an innovative, if complex, range of market-based procurement, price-support, credit and insurance instruments. It has also instigated a renewed focus on agricultural research, and has been proactive and aggressive in international trade negotiations to expand market access (Chaddad and Jank, 2006).

Chart 5. Agriculture-related expenditure by Brazilian Government, 1985–2005



Source: Chaddad and Jank (2006).

Despite the Government's focus on the poor, the commercial sector has experienced a revolutionary transformation, too. The entry of large international agrofood companies – and significant investment by them – has been accompanied by rapid consolidation among processors and retailers. On the one hand, this has generated a significant upside in terms of income, employment and export earnings, as well as wholesale modernization of sectoral practices and asset intensity. On the other hand, the integration of

supply chains has exposed farmers to "markets that are much more demanding in terms of food quality and safety, more concentrated and vertically coordinated, and more open to international competition" (Chaddad and Jank, 2006: 89).

Potentially, "Brazil, with its abundant supplies of water and arable land, will be able to grow many of the agricultural commodities that China, India and the rest of the developing world need" (Bunge Ltd., 2006: 3). Yet sizable challenges remain. While PNRA II aims to benefit one million families directly and a further five million indirectly, the OECD believes that "land reform and targeted price and credit policies are unlikely to reverse" Brazil's increasingly concentrated and dualistic production structure (OECD, 2007). Weak infrastructure is a significant bottleneck, particularly in the transportation and logistics networks that are required to integrate its vast territory, while the terms and availability of credit are a major constraint – high real interest rates persist, despite greater macroeconomic stability (OECD, 2005). In addition, the balance between agricultural growth and environmental conservation, particularly of the Amazonian rainforests, remains one of Brazil's most pressing policy dilemmas (Cattaneo, 2002).

6.1.3 Summary of key agricultural challenges over time

- Building an internationally competitive agricultural sector
- Addressing the widespread inequalities and entrenched duality in the sector
- Consolidating and commercializing the smallholder sector
- Executing government support functions through sustainable private-sector-led operations
- Expanding key export markets, particularly in Asia, as well as in other parts of the developing world

6.1.4 Specific commodities under review: coffee, and live cattle

(a) Coffee

Characteristics and industry process

Arabica coffee

Coffea arabica is a species of coffee indigenous to Ethiopia. It is said to produce better coffee and contain less caffeine than Robusta – the other major commercially grown species of coffee. Therefore, most gourmet coffees are made from Arabica. The commercial coffee plant typically grows up to 5 metres tall. The plant takes approximately seven years to mature, but it starts producing coffee berries (or "beans") after three to four years. It is from these berries that raw coffee is derived. The plant is difficult to cultivate, sensitive to climate and to cultivation technique, and therefore has a wide yield range of between 0.5 and 5 kilograms. In most conditions, coffee plants have a season, and are harvested in winter, although in certain ideal conditions they can be harvested on a year-round basis. Typically, coffee is grown at mid-altitude – between 1,300 and 1,500 metres – but it can adapt to conditions above or below that range. The coffee berries are typically picked by hand. The flesh of the berry is removed before the berry is fermented. After it has been dried and sorted, the coffee is roasted prior to being consumed – most frequently as a beverage, but also as an ingredient in other foodstuffs.

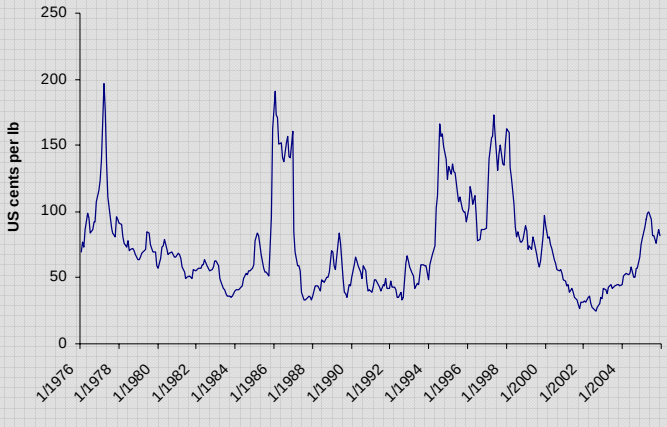
Industry structure and supply chain

Coffee is a global industry. Most of the production takes place in tropical areas in the developing world, with numerous smallholders dependent on coffee for their livelihood. By contrast, four roaster

companies situated in the developed world – Kraft, Nestlé, Procter and Gamble, and Sara Lee – purchase more than 50 per cent of the world's annual production.

Prices for growers have been highly volatile (see chart 6). This volatility is compounded by an uneven market structure, in which large falls in the world price typically result in similar falls in the prices received by growers, yet the benefits of price rises are not fully passed on (UNCTAD analysis, based on International Coffee Organization (ICO) data). As a consequence, coffee has been one of the key commodities for which fair trade and sustainability labelling have become priority areas for development.

Chart 6. Price paid to growers of Arabica coffee in Brazil, 1976–2005



Source: ICO website database.

Brazil is by far the world's largest producer and exporter of coffee, with 30 per cent and 28 per cent respectively of the world share, according to the ICO. Viet Nam, the second largest producer and exporter, accounted for a 13 per cent share of production and a 15 per cent share of exports. The gross production value of Brazilian coffee in 2006 was approximately $5 billion – about 6.5 per cent of the country's agricultural total. The production chain of coffee accounted for 6.6 per cent of agribusiness exports[22] in 2006 (this compares with 11.5 per cent in 1995).

Brazilian coffee production (Arabica and Robusta-Conillon) is concentrated in the states of Minas Gerais, Espírito Santo and São Paulo. These states accounted for 51.7 per cent, 21.9 per cent and 10.5 per cent, respectively, of the production in the 2006/07 harvests, according to the National Company of Food Supply (CONAB). Arabica coffee accounts for approximately 70 per cent of total coffee production in Brazil, with Conillon – produced mainly in the State of Espírito Santo – accounting for the remainder.

Industry development

Coffee is one of the world's most important primary commodities. The coffee economy has witnessed volatility and crisis since the collapse of the International Coffee Agreement in 1989 (Osorio, 2004). Supply scarcity caused relatively high prices in the mid-1990s. However this, in turn, prompted a vast increase in supply. Most notable has been the rapid growth of Viet Nam as a major producer and exporter – from zero exports in 1980, to 1.1 million bags of exports in 1990, to 14.6 million bags in 2000 (ICO data), a volume second only to that of Brazil.

Estimated Brazilian production for the 2007/08 harvests will amount to 36.2 million bags, according to data from the United States Department of Agriculture (USDA). Production is expected to fall by 22.5 per cent, compared to the 2006/07 harvests. This reduction is due to the biennial nature of coffee trees, which alternate between years of higher and lower productivity. The lower production in the 2007/08 harvests will absorb the stocks, which are likely to fall from 9.1 million bags at the start of the harvest period to approximately 4 million bags.

Users and uses

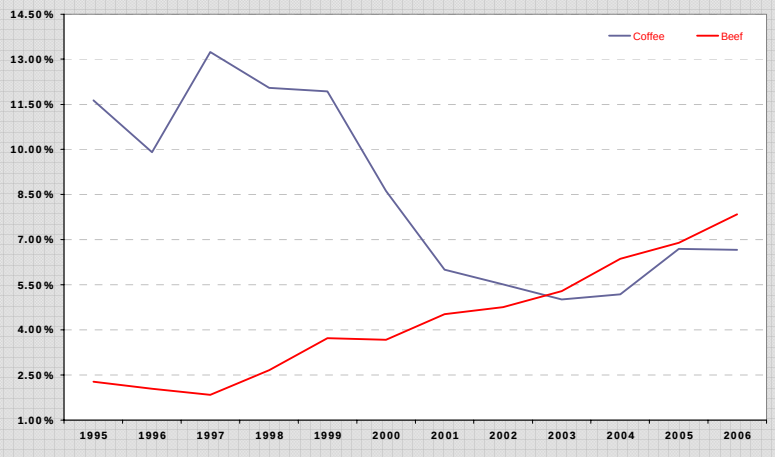
Coffee is exported in processed or unprocessed form for consumption as a beverage, and also as an ingredient in food preparation. According to ICO data, the share of Brazilian coffee that is exported

[22] Agribusiness is taken here to include production, processing and industrial usage.

stood, on average, at 70 per cent of production between 2000 and 2005 – approximately 24.9 million bags per year. The volume of exports and the proportion of production that is exported have been increasing since the 1970s. Average 1977–1979 exports were 58 per cent – approximately 11.3 million bags per year. Brazil's share of world exports has grown rapidly, too – from 20 per cent, on average, between 1977 and 1979, to 28 per cent, on average, between 2000 and 2005.

On the other hand, the contribution of coffee to total Brazilian agribusiness exports has shrunk significantly since the late 1990s (see chart 7). This reflects the significant growth and shifting configurations of Brazilian agriculture, rather than any decline in Brazil's coffee industry.

Chart 7. Evolution of the contribution of coffee and beef exports to total agribusiness exports, 1995–2006



Source: Foreign Trade Secretariat (SECEX)/ Ministry of Development, Industry and Foreign Trade (MDIC).

Key export markets for coffee are North America and Europe, with the United States in 2004 accounting for 20 per cent of world imports, Germany accounting for 15 per cent, and Japan and Italy accounting for 6 per cent each. On the demand side, "the evolution of the coffee economy in importing countries has shown a completely different and in fact very positive pattern. The industry has flourished, new products have been developed, the value of the retail market has more than doubled, and profits have risen" (Osorio, 2004: 1). This is perhaps seen best with the rise of specialist retail coffee chains, largely originating in North America and Europe but with an increasingly global reach. These chains have increased both the quantity consumed and the quality awareness of the consumer, including the mass market.

(b) Live cattle

Characteristics and industry process

Live cattle

There are two species of cattle: *bos taurus* – cattle originating from Europe but now found around the world; and *bos indicus* – the zebu, or "humped cattle", typically found in tropical areas, including Africa, South Asia, and – since the early twentieth century – Brazil. Rearing of domesticated cattle has a history that may date back to the Neolithic period. It has supported livelihoods in agricultural communities across the world, whether through the production of meat or dairy products, as a source of leather and hide products, or as a draught animal used for transport or farm labour. Cattle are typically raised by grazing, whether on a commercial scale with sizable herds on large, specialized ranches, or on a smaller scale using individual cows or smaller herds on non-dedicated land.

Industry structure and supply chain

Brazil has the world's second-largest cattle herd after India, with a total of 180 million head of cattle. Brazil is also the world's largest exporter of beef, and the second-largest producer after the United States. The gross production value of beef in 2006 was approximately $14 billion – about 17.7 per cent of the total of Brazilian agriculture.

The national herd is spread out among several States, with the largest portion concentrated in Brazil's Central region. The current State-by-State breakdown for that region is as follows: (i) Mato Grosso – 12.9 per cent, (ii) Mato Grosso do Sul – 11.8 per cent, (iii) Minas Gerais – 10.3 per cent, and (iv) Goiás – 10.0 per cent. In the North region of Brazil, the leading States for production are Pará – 8.7 per cent, and Rondônia – 5.48 per cent, while in the South region, the State of Rio Grande do Sul accounts for 6.9 per cent of the national herd (mostly breeds of European origin). Although the State of São Paulo's cattle population has declined to 6.5 per cent of the total, its beef processing and exportation segments are still the most important in the country.

Industry development

The production chain of live cattle accounted for 7.8 per cent of agribusiness exports in 2006. This compares with only 2.3 per cent in 1995 (see chart 6). This reflects recent profound changes in the configuration of Brazilian agribusiness, with beef (as well as poultry and pork) growing rapidly in importance as an agribusiness export. Since 1994, the national herd has increased by 24 per cent, export volume by 450 per cent, and export value by 385 per cent (Choices magazine, 2006). More recently, its share of exports jumped from 10.8 per cent in 2001 to 21.8 per cent in 2007 (see table 2). Another way of quantifying this move towards the external market is to observe that, during the period from 2001 to 2007, production rose by 32 per cent, internal consumption by only 16 per cent, and exports by 165 per cent.

Increases in the Brazilian cattle industry's levels of productivity and export have resulted from a combination of factors: improvements to animal genetics; subsidized credit programmes to support the industry, including specific funds for land conservation, farm machinery, storage, and irrigation infrastructure; and the aggressive promotion of Brazilian beef overseas by the Brazilian Beef Processors and Exporters Association, in association with the National Export Promotion Agency (Choices magazine, 2006).

The physical location of the national cattle herd is reflected in the new map of Brazilian agribusiness, in which production has migrated towards the Central-West and North regions of Brazil, centred in the states of Pará, Rondônia and Tocantins. The rapid expansion of the cattle herd in these regions is a direct result of the increasing land prices in the more urbanized areas of the South, and the competition for pasture land, which is being increasingly diverted to other lucrative crops. Another contributing factor is that the meat-processing industry has been shifting its operations to the Central-West and North regions, thereby eliminating the high cost of transporting cattle long distances for slaughter.

Table 2. Brazilian beef: supply and demand statistics, 2001–2007

(In thousands of tonnes/carcass equivalent)

Year	*Production*	*Exportation*	*Domestic consumption*	*Share of exportation*
2001	6,895	748	6,191	10.8%
2002	7,240	881	6,437	12.2%
2003	7,385	1,175	6,273	15.9%
2004	7,975	1,628	6,400	20.4%
2005	8,592	1,867	6,774	21.7%
2006*	8,850	1,945	6,935	22.0%
2007 **	9,120	1,985	7,180	21.8%

* Preliminary ** Estimates

Source: USDA.

However, there are key constraints on the expansion of the Brazilian cattle industry. These include social, environmental and health factors. The agrarian reform movement seeks to transform land usage priorities, with emphasis on settling landless workers or peasants, while conservation of the Amazon rainforests represents a major environmental imperative. The cattle industry has also faced several outbreaks of foot-and-mouth disease. This has limited access to premium markets such as the United States, and quality control and traceability are a key challenge for the industry (Choices magazine, 2006).

Users and uses

Live cattle are used as a source for beef, dairy products, and leather/cattle hide. The meat-processing industry slaughters, processes, and distributes meat for human consumption directly via retail outlets and restaurants, or indirectly via food processors and manufacturers. Industry growth is expected to be driven by exports to China, as Chinese consumers experience rising income levels and increasing sophistication of taste. The dairy industry produces milk, as well as foodstuffs produced from milk, including cheese, butter and ice cream. The leather and hide industry tans the animal skin, which is used as an input for clothing and shoes, furniture and decoration, and industrial products. The leather industry in Brazil is estimated to generate $21 billion of turnover, provide employment for 500,000 people, and account for exports of leather and shoes totalling around $4.5 billion in 2006 (Brazzil Magazine, 2007).

Summary: Salient features about the physical market

- Highly competitive world-traded commodities, with competition between numerous producer-exporter countries to supply a wide range of importing markets
- Rapidly growing export industry – especially the cattle industry – for important commodities experiencing new sources of demand growth
- Significant levels of price volatility, especially for coffee
- Externalities that pose a range of social, environmental and health challenges to the industry
- Coffee: extensive production by smallholders

6.2 Exchange emergence and contract development – Bolsa de Mercadorias e Futuros (BM&F):

*Year founded:*1985	*Location:* São Paulo, Brazil
Instruments traded: (i) At BM&F: financial futures and options (equity index, interest rate, currency); commodity futures and options, including "mini-contracts"; OTC swap and option registration; government bonds; carbon emission registration and auctions. (ii) At BM&F's Brazilian Commodity Exchange subsidiary: physical commodity cash transactions; forwards registration; and secondary market for rural financing instruments/agribusiness securities.	*Commodities traded:* 11 - anhydrous alcohol, Arabica coffee, Robusta-Conillon coffee, corn, cotton, crystal sugar, ethanol, feeder cattle, gold, live cattle, soybean.
Ownership: Non-profit, membership-owned organization (demutualization expected late 2007).	*Trading system:* Open-outcry trading floor and electronic trading systems, including Global Trading System (GTS) for all derivatives markets and WebTrading (WTr), a custom platform for trading "mini-contracts".
Clearing house: Three in-house clearing houses, including a specialized derivatives clearing house.	*Regulator:* Comissão de Valores Mobiliários (CVM) and Banco Central do Brasil (BCB).
Total futures and options volume 2006: 283.6 million	*Commodity futures and options volume 2006:* 1.5 million
Futures Industry Association (FIA) world ranking 2006 (all futures exchanges based on total derivatives volumes): 9	*UNCTAD world ranking 2006 (commodity exchanges – commodity derivatives volumes only):* 22

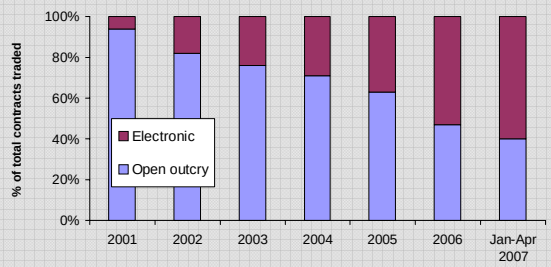
Website: http://www.bmf.com.br.

The BM&F is Latin America's largest and most important commodity exchange. There are 29 other, much smaller commodity exchanges operating in Brazil, spread throughout the country.[23] They mainly trade in commodities for immediate or forward delivery, but an electronic network that links most of the country's exchanges also makes it possible to trade in futures contracts.

Founded in July 1985, BM&F commenced trading in January of the following year. In May 1991, the exchange signed an operational agreement to merge with the São Paulo Commodities Exchange (BMSP), which was created in 1917. The BMSP was the first Brazilian institution to offer forward trading. With the passage of time, it established a rich tradition in trading agricultural commodities: especially coffee, live cattle and cotton. On June 30, 1997, another operational agreement took place, this time with the Brazilian Futures Exchange of Rio de Janeiro, which was founded in 1983. The purpose of this agreement was to strengthen the domestic commodity market and consolidate BM&F as the major derivatives trading centre in the Southern Common Market (Mercosur), especially as Brazil began a painful period of structural adjustment as it sought to regain macroeconomic stability. Subsequent expansion saw BM&F move into foreign exchange and fixed income securities. With these initiatives, BM&F broadened its capacity to become the major clearing house in Latin America, providing an integrated set of foreign exchange, securities and derivatives clearing services.

Trade at BM&F takes place on an open-outcry trading floor. Electronic trading was also introduced in 2000 through the exchange's Global Trading System (GTS), so that currently there is both electronic and floor trading. However, the trend over recent times has been a consistent migration of volumes to the exchange's electronic trading platforms (see chart 8). In 2006, for the first time, a majority of contracts at the exchange were traded electronically.

Chart 8. Migration to electronic trading on BM&F, 2001–2007



Source: BM&F.

BM&F markets have an in-house derivatives clearing house, which is a separate structure from the exchange's securities and foreign exchange clearing houses.

BM&F is a private, non-profit association owned by its members and governed by civil legislation under the regulation of the Commissão de Valores Mobiliários (CVM) and the Banco Central do Brasil (the Brazilian central bank, or BCB). BM&F membership is divided into several categories, which differ according to the functions performed and the method of access to exchange systems. Certain non-equity memberships also exist, including two specific membership categories for participants that perform in the agricultural markets only – Agricultural Commodities Brokerage House members and Agricultural Commodities local members.

Under its mutual structure, the twice-yearly General Meeting of Members is the highest decision-making body. Its powers include electing the Board of Governors and the Chief Executive Officer, approving the budget and taking other important decisions. An executive Collegiate Board administers the exchange, with further support from board and advisory committees, including market-specific committees made up of industry participants from the commodities traded, including coffee and live and feeder cattle. Largely driven by an imperative to participate in the expansion of and consolidation among international exchanges, BM&F's General Meeting of Members authorized the Board of Governors to study the possibility of exchange demutualization in December 2006. This is expected to take place in late 2007.

[23] They are listed on the website of Banco do Brasil, which provides their electronic trading network: http://www.agronegocios-e.com.br/leilao/informacoes.lel. A few of the exchanges are not active; three quarters do not have their own website.

Product advisory committees have formed an integral part of BM&F's governance structure since its foundation in 1986, including the coffee and live cattle advisory committees. These committees have allowed for a permanent relationship between the exchange and the market participants, with a primary goal of promoting growth in market usage. The enhancement of contracts, the impact of taxation on the physical and derivative markets, and the effect of government policies are some of the topics that are discussed within these committees.

In Brazil, exchange trading has remained legal since it first originated at the BMSP in the early twentieth century. However, the fluctuating level of government intervention in agriculture has provided varying amounts of scope for exchange activity over time. As has been the case elsewhere in Latin America, the exchange's quest to find a niche in commodity markets often squeezed by government intervention has spurred the development of innovative applications for exchange mechanisms. Brazilian government programmes – carried out through both the Ministry of Agriculture and the Ministry of Agrarian Development – provide many services to smallholders. As a result, BM&F has found other ways of providing services both to the commercial and the smallholder sector, including through mechanisms for the execution of government agro-policy.

The major vehicle for this has been the Brazilian Commodity Exchange, launched in August 2002. This united the commodity exchanges from the states of São Paulo, Goiás, Mato Grosso do Sul, Minas Gerais, Paraná and Rio Grande do Sul, and from the city of Uberlândia, transforming these exchanges into regional operation centres. BM&F renders clearing and settlement services to this new exchange. The result has been the creation of an integrated domestic market for agricultural commodities, with modern price-discovery mechanisms and an organized marketing structure. The Brazilian Commodity Exchange opened for trading in October 2002. In 2004, another regional operation centre was created in the State of Ceará, and a field office linked to the Paraná operation centre was opened in Florianópolis (State of Santa Catarina).

In September 2005, the Exchange launched the BM&F Carbon Facility, as part of a joint initiative with the National Ministry of Development, Industry and Foreign Trade. The focus of this initiative is to develop a Brazilian carbon market that will provide incentives for the reduction of greenhouse gas emissions. The BM&F Carbon Facility operates through an electronic system designed for the online registration of projects that have the potential to generate carbon credits, in accordance with the principles established by the Kyoto Protocol.

In summary, BM&F's key achievement within its local context has been to provide instruments and services that have supported the commercialization of the Brazilian agro-economy. This has been achieved by:

- Enabling the efficient flow of capital into the sector, by providing secondary markets for financing instruments. BM&F has worked in tandem with the Banco do Brasil, a Brazilian public bank that is the leading rural lending institution in the country (outside of government subsidy programmes);
- Hedging against price risk via futures markets;
- Enhancing the efficiency, transparency and sustainability of government policy, by providing transaction mechanisms for government procurement and financing interventions;
- Integrating the domestic physical market, through its Brazilian Commodity Exchange subsidiary;
- Facilitating the development of a key export market, through its various activities in cementing links with China.

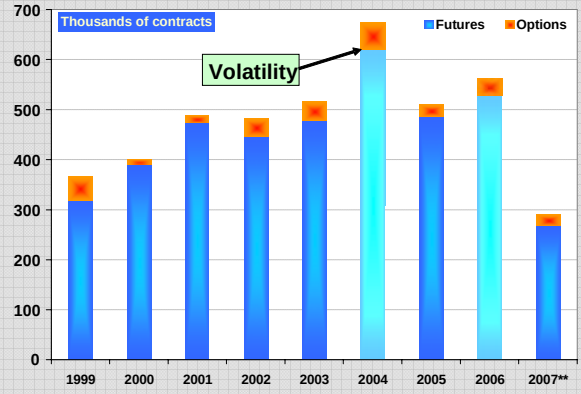
Direct participation in BM&F agro-markets has been concentrated in the cities and among commercial agribusiness. Until recently, the options market for BM&F agro-commodities has remained small. The exchange has recognized these challenges and is seeking to address them. BM&F has also been active

in exploring opportunities related to international trade facilitation, including regionally integrating Latin American commodity markets, and consolidating agricultural export linkages between Brazil and China. Key initiatives recently introduced in this respect – discussed in section 6.4 (Impacts) – include the Derivatives Distribution Agent (ADD) programme to broaden participation in agro-commodities, regional integration with the Rosario Futures Exchange (ROFEX) of Argentina, and the soybean export facilitation procedure with China.

Coffee

The Arabica coffee contract has been traded in Brazil since 1978. It was initially traded on the BMSP, and then, from 1991, at BM&F.

Chart 9. BM&F trading volume: Arabica coffee, 1999–2007



Source: BM&F.

The coffee contract is quoted in United States dollars per 60-net-kilogram bag (USD/bag), and has a size of 100 bags of Arabica coffee (or 6 tonnes) with settlement by physical delivery. BM&F has an internal department for analyzing and issuing coffee classification certificates. All participants interested in settling their transactions through physical delivery must deposit coffee lots in the warehouses accredited by the BM&F.

In August 2002, the System for Coffee Classification and Physical Delivery was implemented, linking the accredited warehouses and the brokerage houses to BM&F, and providing greater security and agility in the execution of solicited services. All exchange-licensed warehouses have access to this system, allowing them to register requests for classification and arbitration, fill in depositors' names, quantities of bags and lot numbers, and automatically generate certificate numbers. On request from the system, BM&F sends the warehouses bar-coded seals that must be affixed to the cans containing the coffee samples.

The classification standards adopted by BM&F are in accordance with the Brazilian Official Classification for coffee, as per specific legislation, and adhere to the following criteria for lot formation: green coffee beans produced in Brazil, variety *coffea arabica*, type 6 or better, good cup or better.

The legislation establishes an official table for the classification of coffee, ranging from type 2 (with four defects) to type 8 (with 360 defects). Coffee that has been poorly dried, damaged by rain, damaged by moisture (there is a moisture limit of 12.5 per cent), damaged by mud or infestation, or that has a taste uncharacteristic of Arabica coffee, cannot be delivered. After analyzing the coffee samples, the classification results are registered in the BM&F electronic system. Lots that are certified as valid for the purpose of contract settlement are subject to periodical inspections by a BM&F supervisor, who verifies the state of the bags and the conditions in the accredited warehouse. Samples of the coffee deposited in the warehouses are kept on file, so that on request, via the brokerage house, buyers may examine the samples to verify the quality of the coffee they are purchasing. The samples are kept in the BM&F files for as long as the lot is in the warehouse.

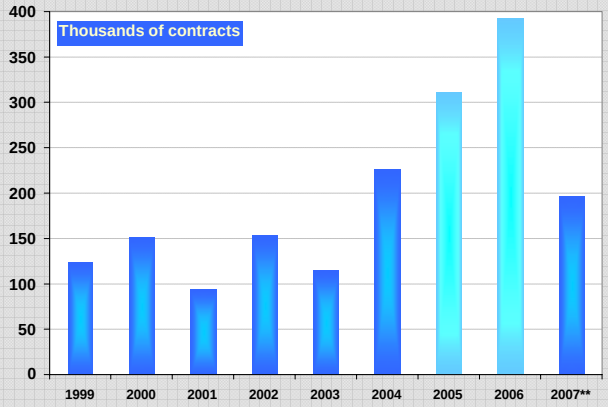
The options market for Arabica coffee remains small, but it may be given an impetus shortly, with permission granted to financial institutions to finance rural producers' participation in the markets, including through the financing of options premiums. BM&F is training Banco do Brasil staff, so that the bank is able to facilitate such transactions.

Live cattle

The live cattle futures contract has been traded in Brazil since 1980. It was initially traded on the BMSP, and then from 1991 at BM&F.

In 1994, the contract underwent an alteration in its form of settlement. Having been settled by physical delivery until 1994, the contract has since been settled in cash, based on the Luiz de Queiroz College of Agriculture (ESALQ)/BM&F[24] Live Cattle Spot Price Indicator. Settlement by physical delivery is now only permitted in special cases, when there is mutual interest on the part of both buyer and seller.

Chart 10. BM&F trading volume: live cattle, 1999–2007



Source: BM&F.

The ESALQ/BM&F Live Cattle Spot Price Indicator was designed to be a price indicator for the spot price in the State of São Paulo. This indicator is calculated daily, and is based on the weighted average of live cattle prices in the four largest producing regions of the State: Presidente Prudente, Araçatuba, Bauru/Marília, and São José do Rio Preto/Barretos. It takes into account the prices negotiated between the producers and the slaughterhouses, and also factors in the slaughterhouse time frame – that is, the time period from the sale of the animals to their effective slaughter – thereby allowing this period of time to be added to the current payment period. This is important for the calculation of the spot price, in view of the high interest rates prevailing in Brazil.

In the year 2000, the live cattle contract underwent another alteration, which changed its price quotation from United States dollars per "net arroba" (15 kilograms of carcass), to Brazilian reals (BRL) per net arroba. The contract size is 330 net arrobas (approximately 5-net tonnes of carcasses).

BM&F's key achievement within its local context:

- Boosting commercialization of Brazil's agro-economy

Success factors:

- A broad-based approach to market development, incorporating futures, spot and financing instruments
- Development of innovative applications for exchange mechanisms
- Close working relationship with Banco do Brasil
- Educational emphasis

Challenges:

- Expanding its geographical presence through Brazil
- Broadening the mix of participants in the market
- Developing liquidity in the options market

[24] The index is calculated by the Centre for Advanced Studies on Applied Economics at the Luiz de Queiroz College of Agriculture, University of São Paulo.

Future opportunities:

- Regional integration strategies in Latin American commodity markets
- Consolidating and deepening export linkages with China

6.3 Regulatory framework: Comissão de Valores Mobiliários (CVM)

The BM&F is regulated by two external entities. The BCB regulates systemic risk and clearing. The CVM regulates products and investors. The CVM is an independent government entity, linked to the Ministry of Finance and endowed with independent administrative authority. The law creating the framework for the CVM and the regulation of the markets is Law 6.385 from December 1976.

Among the CVM's functions are:

- "To assure the proper functioning of the exchange and over-the-counter markets;
- To protect all securities holders against fraudulent issues and illegal actions performed by company managers, controlling shareholders, or mutual fund managers;
- To avoid or inhibit any kind of fraud or manipulation which may give rise to artificial price formation in the securities market;
- To assure public access to all relevant information about the securities traded and the companies which have issued them;
- To ensure that all market participants adopt fair trading practices;
- To stimulate the formation of savings and their investment in securities;
- To promote the expansion and efficiency of the securities market and the capitalization of Brazilian publicly held companies" (CVM website, 26 July 2007).

Within this structure, the scope within which BM&F operates is broad. The market is open and accessible to overseas participants. Market oversight functions are largely concentrated in BM&F's derivatives clearing house. The exchange is at liberty to introduce new contracts, and there are no major prohibitions on common trading instruments such as options or index trading. A recent barrier to rural participation – the prohibition on bank financing to support futures market activity – was removed in September 2006. It is expected, following collaboration between Banco do Brasil and BM&F, that banks will soon start to provide financing for options premiums, exchange fees and exchange margining requirements.

BM&F has created mechanisms and rules to monitor and regulate its markets, and also to assure participants that obligations arising from transactions executed in the trading, registration, clearing and settlement systems will be fulfilled. In July 2002, the United States regulator – the Commodity Futures Trading Commission (CFTC) – recognized BM&F's rules and regulations, as well as its systems and mechanisms, as being comparable to those employed by the United States financial intermediary industry and/or enforced for local United States markets.

As a self-regulatory entity, BM&F:

- Creates rules and regulations to preserve equitable trading and market principles, as well as high ethical standards for the people who act directly or indirectly at the exchange;
- Regulates and monitors its members' transactions;
- Solves operational issues;
- Applies penalties to violators of legal, regulatory and operational rules;

- Extends operational credit to its members, in conformity with its programmes and purposes;
- Advocates its interests and any related interest of its members before constituted authorities;
- Promotes the market – and responsible use of it – throughout the country by means of educational programmes, training and publications.

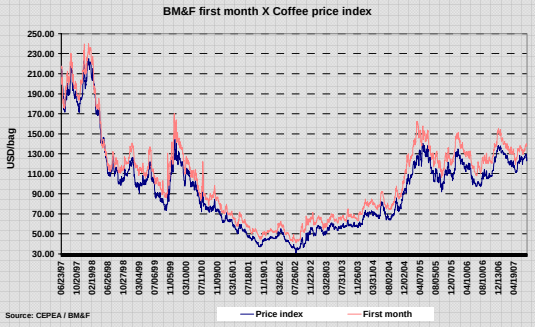
6.4 Impacts

6.4.1 Price discovery

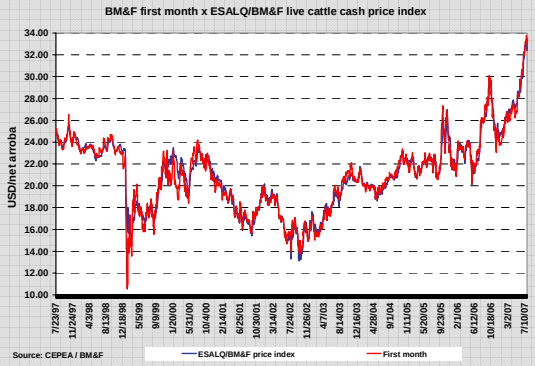
Price dissemination: In order to disseminate the prices negotiated on its trading floor and on its electronic platforms, BM&F has established an information dissemination structure, involving vendors, internet access and television broadcasts. Vendors – news and data companies – purchase BM&F trading floor signals, and pass them on to their subscribers in real time. Prices with a 15-minute delay and historical records can be obtained free of charge on BM&F's website. The exchange disseminates information to the press through daily news bulletins. BM&F also provides television stations with the necessary infrastructure to broadcast bulletins and programmes from within its facilities. There are currently six television channels providing the general public with a total of 10 hours of daily programming about the exchange, including dedicated rural farming networks and industry-specific channels, e.g. for the cattle industry. Correlation data between spot and futures markets (see box 7) suggests that the exchange offers an effective local price-discovery platform that is strongly integrated with the physical market.

Box 7. BM&F Arabica coffee and live cattle: spot/futures market price correlation, 1997–2007

(a) Arabica coffee



(b) Live cattle



Source: BM&F.

Using market information: There is secondary evidence from the literature that industry uses BM&F reference prices to fix a forward price with producers (Globo Rural, 2007a), and that farmers use futures prices to make better production and marketing decisions (Globo Rural, 2007c), including decisions to diversify the crops grown based on comparison of relative anticipated prices (Globo Rural, 2006a and 2006b). Lack of further available information about producer usage of BM&F data currently precludes an assessment of of the impacts on farmers in this area.

6.4.2 Price-risk management

First of all, it is important to note that for both the Arabica coffee and live cattle contracts traded on BM&F, the key prerequisites in the trading environment that allow for effective price-risk management are that:

- There are liquid markets – the proportion of Brazilian production hedged at BM&F in 2006 was 1.70 for Arabica coffee and 0.77 for live cattle.
- Trading takes place in a regulated, rule-based trading environment, under the rules and by-laws of BM&F, and with oversight by the CVM and the BCB.

- Market information is disseminated transparently, in order to avoid asymmetries that might privilege some interests over others.
- The exchange clearing house acts as a central counterparty, in order to guarantee the performance of every contract agreed through the exchange.

A futures market is efficient if a convergence occurs between the price in the futures market and the price in the spot market at the time of the contract's maturity. By this yardstick, the BM&F live cattle and Arabica coffee contracts are efficient, as can be observed in box 7.

BM&F exchange data allow for a detailed profile of market composition. Box 8 shows the distribution of open interest, by type of participant, on the following trade dates: 1 March 2000 and 31 July 2007. Although the data cannot exactly divide participants into hedgers and speculators positions, it does imply a good balance between the two.

Box 8. Changing market composition in BM&F Arabica coffee and live cattle markets, 2001–2007

(i) Profile of participants in Arabica coffee futures contracts at BM&F

Arabica coffee			
1 March 2001			
Long		***Short***	
Financial companies	8.97 %	Financial companies	8.54 %
Institutional investors	3.07 %	Institutional investors	14.63 %
Non-resident investors	6.43 %	Non-resident investors	1.57 %
Non-financial companies	74.60 %	Non-financial companies	62.99 %
Individuals	6.93 %	Individuals	12.26 %
Open interest	**10,733**	**Open interest**	**10,733**
31 July 2007			
Long		***Short***	
Financial companies	4.98 %	Financial companies	10.39 %
Institutional investors	2.67 %	Institutional investors	9.80 %
Non-resident investors	34.16 %	Non-resident investors	39.24 %
Non-financial companies	49.65 %	Non-financial companies	32.42 %
Individuals	8.55 %	Individuals	8.15 %
Open interest	**43,744**	**Open interest**	**43,744**

(ii) Profile of participants in live cattle futures contracts at BM&F

Live cattle			
1 March 2001			
Long		***Short***	
Financial companies	20.03 %	Financial companies	10.65 %
Institutional investors	5.83 %	Institutional investors	6.16 %
Non-financial companies	18.35 %	Non-financial companies	16.21 %
Individuals	55.79 %	Individuals	66.98 %
Open interest	**1,493**	**Open interest**	**1,493**
31 July 2007			
Long		***Short***	
Financial companies	4.93 %	Financial companies	3.44 %
Institutional investors	22.39 %	Institutional investors	24.93 %
Non-resident investors	2.88 %	Non-resident investors	14.79 %
Non-financial companies	30.40 %	Non-financial companies	47.96 %
Individuals	39.40 %	Individuals	8.87 %
Open interest	**50,160**	**Open interest**	**50,160**

Source: BM&F.

In the 2007 Arabica coffee market, commercial participants from commodity supply chains ("non-financial companies") – including cooperatives, input industries and trading companies – represented 50 per cent of long open positions and 32 per cent of short open positions. This was a decrease on 2001, when their participation represented 75 per cent and 63 per cent respectively. However, open interest has more than quadrupled in this period; in absolute terms, therefore, the commercial positions have increased on the long side by 171 per cent and on the short side by 110 per cent.

In the 2007 live cattle market, commercial participants from commodity supply chains represented 30 per cent of long open positions and 48 per cent of short open positions. This was an increase on 2001, however, the figures for which were 18 per cent and 16 per cent respectively. Open interest has increased in this period from 1,500 to 50,000 contracts, representing, in absolute terms, an increase of 57 times and 98 times on the long and short side respectively.

It is further noted that some non-resident investors may be participating as hedgers rather than as speculators – particularly those who are importers and consumers of Brazilian commodities. Financial institutions are often acting in the market as hedgers, too. They may be financing rural securities, which leave them with an exposure to price fluctuations in the underlying commodity.

In secondary literature, farmers have commented that the use of BM&F futures and options has helped them to reduce serious losses when prices fall (Portal Exame, 2007). In these interviews, it was also noted that industry purchasers and intermediaries have been able to offer guaranteed prices to farmers in physical contracts. This has been enabled by the commodity exchange, which has provided price references and a hedging mechanism. Secondary literature has also documented how futures enable farmers and other commodity sector participants to better plan and predict their activities (Globo Rural, 2007b). However, data on the extent of participation by farmers as hedgers in the market are unavailable.

As a further hedging service, BM&F provides registration to record over-the-counter, or "ex-pit", transactions for the coffee market. The ex-pit transaction is an arrangement between a farmer and an industry or trading company, in which the farmer delivers the product, and the futures market is used to fix the price. Exchange data show that 2,151 contracts have been negotiated in this way to date, representing 59 million Brazilian reals (approximately $29 million at August 2007 prices).

With its introduction planned for 2007, the ADD initiative – discussed in section 6.4.6 – may make a significant impact on further bringing agricultural producer communities from across Brazil into the markets. Importantly, there are two other innovative BM&F instruments – both of which are discussed further in the following section – that could be used to expand participation by small producers. It should be noted that both are focused on other market segments at the present time. The two other innovative instruments are:

- The **Agricultural Market Trading Fund (FOMA)**, which reduces the level of margin deposits required from agro-participants. A guarantee fund has been established instead, to protect the market in case of default. FOMA is currently aimed at larger commodity-trading entities and arbitrageurs, in order to align Brazil's margin requirements with those of overseas exchanges. However, the same logic could be used to reduce margin requirements for smaller commodity-sector participants. One possibility is to replicate the structure exactly. Alternatively, Government or a public bank could provide the guarantee fund that the scheme requires to maintain adequate risk management against the possibility of default (see box 9 for further details); and

- The **Web Trading facility,** which is a dedicated system for trading mini-contract versions of the full-sized contract. Dedicated arbitrageurs are employed to maintain liquidity and the price link with the main market. The system has exhibited rapid growth since its launch in 2005. While it is currently targeted at retail investors, it could feasibly be extended to smaller agricultural producers, providing a risk-management instrument that is better aligned with small producers' quantity and usage requirements than the full-sized contract is.

6.4.3 Venue for investment

Firstly, it is important to note that both for Arabica coffee and live cattle contracts, there are key prerequisites in the trading environment that make BM&F an attractive and secure venue for investment, which are that:

- There are liquid markets;

- Trading takes place in a regulated, rule-based trading environment under the rules and by-laws of BM&F, and with oversight by the CVM and the BCB;

- Market information is disseminated transparently to avoid asymmetries which might privilege some interests over others;

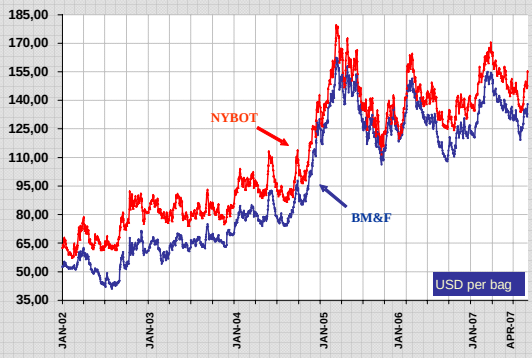
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

The composition of open interest in 2007 indicates a strong and growing presence of investors in both BM&F's Arabica coffee and live cattle markets (see box 8). There appears to be a reasonably high presence from institutional, "retail" (individual) and non-resident participants. Two points are highlighted. Firstly, investor presence is significantly higher in live cattle than in Arabica coffee – this is because BM&F's live cattle contract is cash-settled, with no danger that market participants may be required to take delivery. Secondly, in contrast to some commodity exchanges, such as those in China and India, there are no restrictions on the type of investor allowed to participate in BM&F's markets, subject to the usual minimal capital and "fit and proper person" requirements.

In the Arabica coffee market, open interest climbed from 10,733 to 43,744 contracts between 2001 and 2007. In 2001, the largest market participants were individuals and non-financial companies – cooperatives, input industries and trading companies. In 2007, the highlight has been the participation of non-resident investors, financial companies (banks) and institutional investors (funds), while the participation of non-financial companies has remained significant.

An important feature of the Brazilian Arabica coffee market is the key role that has been played by institutional investors, by structuring fixed-rate transactions through the combination of the Cédula de Produto Rural (CPR; in English, Rural Product Notes; see section 6.4.5) with futures markets positions. For example, let us suppose that an investor bought a CPR from a producer in March, with a December maturity. Through this mechanism, the investor lends funds to the producer in March, in order to finance the crop until harvest time. As collateral for the loan, the producer assumes the obligation of delivering a specified number of bags to the investor in December. When the funds are advanced to the producer through the CPR, the investor can then fix the sales price for the coffee, by means of coffee futures contracts for December. In this manner, the investor can determine the profit level by combining purchase prices with sales prices, in an effort to secure a rate of return that is higher than Brazil's basic rate of interest. Brazilian legislation prohibits investment funds from taking physical delivery of commodities. Therefore, the investment funds negotiate these contracts with the coffee roasters and/or the export companies to whom the coffee deliveries are made. Through this type of transaction, the institutional investors are able to gain access to the Arabica coffee futures contracts as part of their strategy of portfolio diversification. Presently, the Arabica coffee and live cattle markets have enough trading volume to allow institutional investors to execute these types of transactions without having to face any liquidity constraints.

Chart 11. BM&F Arabica coffee: correlation with international benchmark exchange NYBOT, 2002–2007



Source: BM&F.

As an open market trading an international commodity with a world price, BM&F Arabica coffee tends to very closely follow the international reference exchange, namely the New York Board of Trade (see chart 11). (The benchmark exchange for Robusta coffee is the former London International Financial Futures Exchange, now a part of NYSE–Euronext). As a result, price formation is the result of developments on the international market. Volatility – which is a key attraction for speculative interest – also tends to follow the international market.

In the live cattle market, increasing liquidity began to attract new participants in 2006, particularly institutional investors. Thus, the profile of agents who trade live cattle contracts has changed considerably over the years. The jump in live cattle open interest was spectacular between 2001 and 2007, increasing from to 1,493 to 50,160 contracts. In 2001, the biggest participants were individuals, followed by financial institutions and non-financial companies. In 2007, however, the participation of individuals was substantially reduced relative to that of non-financial companies, institutional investors and non-resident investors.

It is unclear to what extent retail investors and farmers are speculating in ways that they cannot afford in the Brazilian markets. However, regulatory measures are in place – see annex 2 – to control the level of speculation in the markets, to limit the possibility of default and to promote responsible investment practice.

BM&F has also introduced several innovative mechanisms for increasing the appeal of its markets to investors. One is the Agricultural Market Trading Fund (see box 9), designed to increase the liquidity of BM&F's agricultural markets without undermining the financial stability or integrity of the marketplace.

Box 9. The BM&F's Agricultural Market Trading Fund (FOMA)

In September of 2006, BM&F launched the Fundo de Operações do Mercado Agropecuário (Agricultural Market Trading Fund, or FOMA). Its goal was to reduce transaction costs and increase the attractiveness of the agricultural derivatives contracts traded in Brazil, while preserving the robustness of the BM&F derivatives clearing house safeguard structure.

BM&F's decision came as a response to market demand, and was taken after a study was carried out by the exchange, which compared its margin requirements to those required by international exchanges, particularly those that trade similar products to BM&F. The reduction in margin costs has been in the range of 30 to 50 per cent. This was designed to increase liquidity for agricultural markets and avoid the transference of transactions to external markets.

FOMA is comprised of BM&F's own resources and has a total of 50 million Brazilian reals (about $26 million) at its disposal. For accounting purposes, FOMA is classified in the BM&F balance sheet under the heading "long-term liability". The sole purpose of FOMA is to insure BM&F against defaults by clearing members, in connection with agricultural derivatives contracts settled through the derivatives clearing house. With the creation of FOMA, some of the risk arising from positions in agricultural contracts has begun to be covered by FOMA resources, and therefore no longer needs to be covered by collateral pledged by market participants.

A second mechanism is BM&F's WebTrading (WTr) platform, an internet platform that was introduced in 2005 to trade mini-contracts – contracts that are one tenth the size of a full-sized contract and are especially designed for retail investors. The objective is to build liquidity in the trading of mini Ibovespa, US dollar, live cattle, and coffee futures. In 2005, just over 1 million contracts were traded. This grew rapidly to 8.8 million in 2006, and to over 5 million in the first quarter of 2007 alone.

When using WTr, orders are placed directly by the customer through the website of one of BM&F's members. One of the innovations of the new system is the pre-deposited collateral mechanism, which consists of a previous pledge of funds to ensure that risk arising from the participant's transactions is adequately covered as soon the position is established. Another innovation is an established position for the arbitrageur. The arbitrageur's role is to provide liquidity for the mini-contracts and to ensure that prices are aligned with the main market by arbitraging away any price differences that appear. These arbitrageurs are designated by their own brokerage houses, and must fulfil a number of conditions in order to qualify. However, after qualification they will receive a reduction in the trading cost for their transactions, among other benefits.

These two mechanisms are potentially important prototypes, which can serve as models to increase the participation of small-scale farmers in futures markets. While the mini-contracts are aimed more at the retail investor, the dedicated platform could potentially provide a useful hedging vehicle for small commodity producers, for whom the full-size coffee and live cattle contracts may be too large. Similarly, while the FOMA is aimed more at international investors and arbitragers, it could alternatively be applied as a way to reduce the margin burdens on small-scale commodity producers. Instead of a fund to which the commodity producers themselves contribute, the Government or public banks might perhaps be alternative sources of fund capitalization.

6.4.4 Facilitation of physical commodity trade

BM&F has made a major innovative step in integrating physical markets and providing a range of services through its Brazilian Commodity Exchange subsidiary**.** Launched in 2002, the Brazilian Commodity Exchange is a dedicated agribusiness exchange that creates a link between agriculture, commerce, industry, finance and Government. The objectives of the exchange are to upgrade and commercialize the agricultural sector and to provide a reliable and transparent mechanism for the exercise of government agricultural policy.

The exchange united the previously separate exchanges from the states of São Paulo, Goiás, Mato Grosso do Sul, Minas Gerais, Paraná and Rio Grande do Sul, and from the city of Uberlândia. A

further exchange from Ceará was integrated into the system in 2004. In the new structure, these exchanges have become regional operation centres whose members trade on an electronic platform accessible via the internet. BM&F provides the clearing and settlement functions. Services offered by the Brazilian Commodity Exchange include trading in physical commodities, forwards contracts, CPRs, agribusiness letters of credit (LCAs), auctions of government inventories, and a secondary market for securities, public tenders and private acquisitions.

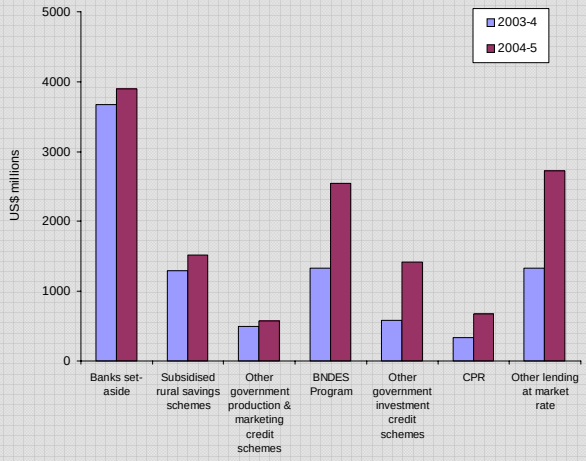
The result has been an integrated domestic market for agricultural commodities. Modern price-discovery mechanisms deliver transparent and neutral reference prices, and an organized marketing structure brings together different stakeholders on an accessible and open platform. Upgrading of sectoral infrastructure has taken place through enhanced warehousing and logistics. Finally, the registering of transactions and the exchange's rule-based framework, which includes arbitration mechanisms and a payment guarantee (or "delivery versus payment" system), have given counterparties greater confidence to enter transactions, stimulating liquidity and new trading possibilities. In 2004, the exchange took part in auctions for the purchase of products in support of the Brazilian Government's Zero Hunger programme, a hunger relief campaign, run in conjunction with CONAB, the public agricultural distribution agency.

6.4.5 Facilitation of financing to the agricultural sector

In the early 1980s, as the worst of the "debt crisis" hit Latin America, the need to reduce the public-sector deficit led to a decline in Brazilian federal budgetary resources for the agricultural sector. The Government was forced to seek other mechanisms to finance agriculture, particularly to provide farmers with working capital. New forms of financing were created. One of the transactions that became popular at the time was the so-called "green-soy" transaction, whereby producers would sell a portion of their production even before the crop was planted. These transactions were forward contracts between producers and trading companies, input industries or crushers. In this type of transaction, the producer would receive the resources or inputs at the time of planting, in order to initiate the production process. Then, at the time of harvest, the producer would pay for the loan either in cash or by physical delivery of the commodity.

The popularization of these contracts was linked to the possibility of obtaining financing for production activities during a period of scarce government credit. These forward contracts allow for producers to plan their activities and for trading companies and processing industries to make their purchases in advance.

Chart 12. Rural credit in Brazil by source, 2003/04 and 2004/05



Source: USDA (2005).

Today, the vast majority of rural credit in Brazil is channelled through government schemes (see chart 12) – approximately 75 per cent of the $13.4 billion resources in 2004/05 (United States Department of Agriculture (USDA), 2005). 45 per cent of the total is delivered through government production and marketing credit schemes, mainly bank set-aside funds and savings facilities at subsidized funds. 30 per cent originates from government investment credit schemes, including the Banco Nacional de Desenvolvimento Econômico e Social (BNDES), which disburses long-term loans to support agricultural production and farm income at subsidized interest rates.

The remaining 25 per cent originates from lending at market rates, much of which is accounted for by standard bank lending facilities. However, special instruments, such as the CPR, are taking up a small but important share of this lending (see box 10).

Issued through the Banco do Brasil – Brazil's leading public bank – and registered and traded in a secondary market on BM&F's subsidiary – the Brazilian Commodity Exchange – these market-based instruments accounted for over 5 per cent of total rural credit in 2004/05 at a value of $678 million, up from 3.7 per cent in 2003/04.

De Almeida and Zylbersztajn (2007), surveying effective interest rates in April 2007, identify those of CPRs at between 12.8 per cent and 28.3 per cent per year (the wide range is accounted for by the diversity of CPR instruments available; see box 10). This compares with the various federal rural credit programmes, which offer credit at 8.75 per cent per year, and the free market rate of between 15.6 per cent and 20.7 per cent per year. Therefore, the CPR – although it is a tax-free security – is almost equivalent to being an unsubsidized credit instrument.

The USDA (2005) further notes the use of CPRs as an export promotion instrument by facilitating access to export finance. In this model, an advance of up to 50 per cent of the total export value of the shipment is issued as a cash advance from the Banco do Brasil, using the CPR as collateral.

Other rural securities traded and registered on the BM&F or the Brazilian Commodity Exchange include the Agricultural Deposit Certificate (CDA) and the Agricultural Warrant (WA). These are financing instruments for the marketing of agricultural products.

Table 3. Transaction levels of Brazilian agribusiness securities, from launch to December 2004

	Number of transactions	*Amount (USD million)*
CDCA	1,599	705
LCA	350	339
CDA-WA	1,928	2,027
Total	3,877	3,071

Source: Custody and Settlement – CETIP, BM&F. *Elaboration:* Secretary of Agricultural Policy (SPA); Ministry of Agriculture, Livestock and Supply (MAPA).

There are also three securities for agribusiness securitization and refinancing: agribusiness credit bond certificates (CDCA), agribusiness letters of credit (LCA) and agribusiness receivables certificates (CRA). Table 3 shows the total number of transactions with the new securities, from their respective launches until December 2004. These securities are collateralized by documents representing previous loans, the so-called receivables issued by rural producers that represent the promise of future payment. Some examples are rural credit notes, rural product notes, rural promissory notes, rural acceptance notes, and the contracts for supply and export (so long as they have been issued by rural producers or cooperatives). The CDCA, LCA and CRA are differentiated by virtue of the issuer – respectively: agribusiness companies (cooperatives, input suppliers and purchasers), banks, and specialized securitization companies. All of these securities are exempt from the Tax on Financial Transactions (IOF). From June 2006, individuals have also been exempted from all income taxes related to these securities, including the CPR.

Box 10. The BM&F and the Cédula de Produto Rural (CPR) rural financing instrument

"In the late 1970s, the Brazilian agricultural sector was characterized by abundant subsidized credit and minimum price guarantees. But through gradual liberalization in the 1990s, the agriculture sector improved by securing outstanding rural debts; repositioning the State, which began to act in a more localized and transparent manner; and privatizing agricultural finance and marketing. Despite these advancements, there were no formal and secure mechanisms and guarantees to securitize agricultural lending. In response to this situation, in 1994 the CPR was created through Law 8,929.

The CPR is a bond that is issued by rural producers, farmers' associations, and cooperatives in order to obtain financing for production. There are three types of CPRs:

1. *Physical CPR:* The producer receives cash or inputs when the bond is issued and must deliver an agreed amount of production at an agreed location and future date.

2. *Financial CPR:* The producer receives cash or inputs when the bond is issued, but settles the debt with cash instead of products.

3. *CPR indexed to futures:* The producer receives cash or inputs when the bond is issued, but the settlement is based on the amount of production established on the bond, multiplied by the agreed-upon reference price at the time of settlement.

The main benefit of the CPR is that it brings new financiers into the agricultural finance markets by reducing their risk. The CPR bond guarantees payment in case of non-performance or breach of contract on the part of the bond issuer, through an out-of-court dispute settlement mechanism. This reduces risk of moral hazard and speeds the recovery of loans when needed.

The evolution of the CPR has also been one of its keys to success. Initially, the physical CPR saw a limited number of investors, because many financiers did not want to risk receiving physical goods. In response, the financial CPR was created, which attracted a greater number of investors because it was cash-settled. The further refinement of the CPR contract – the indexed CPR – allows not only for cash settlement, but also transfers the price risk from the seller to the buyer of the CPR.

In addition, CPRs are negotiated in an environment that guarantees visibility, transparency, and security of operation. The BM&F and seven regional commodity exchanges established the Brazilian Commodity Exchange to create an electronic registration environment and clearinghouse for transactions with agricultural contracts, including CPR operations. This system permits electronic access to information and business opportunities to nearly 400 traders throughout Brazil. Traders can offer and buy contracts, register the operations, and guarantee the custody of bonds. The Brazilian Commodity Exchange system even permits potential investors to see the bonds guaranteeing their operations."

Source: World Bank (2004).

BM&F and its subsidiary, the Brazilian Commodity Exchange, play an important role as the intermediary between the physical market, the agribusiness securities market and the futures market. The liquidity of these new agribusiness securities allows for institutional investors to participate in the agricultural physical market, carrying the stocks at a lower cost, thereby transforming transactions with these securities into fixed-rate transactions, by fixing the futures prices at BM&F. In this way, BM&F provides a bridge for financing the Brazilian agribusiness sector, and has contributed to the modernization of the Brazilian agricultural system, especially financing and commercialization.

In addition, BM&F offers its own Registration System for Agribusiness Securities Custody (SRCA), which allows entities to electronically register and trade their securities in the secondary market. The BM&F derivatives clearing house may accept CPRs registered in the SRCA to meet margin requirements in the derivatives markets, in accordance with predefined criteria. The CPRs registered

in the SRCA can also be traded in the secondary market via the Internet, through the systems made available by the Brazilian Commodities Exchange.

Agro-financing continues to evolve rapidly. As banks are obliged by law to invest a portion of their demand deposits into rural credit, they face risks related to their agricultural exposure. However, since September 2006, Resolution 3403 of the BCB has allowed for financial institutions to finance price-risk management by producers and cooperatives. Therefore, financial institutions are now authorized to grant rural credit to producers and credit cooperatives which they could use to:

- Finance margin calls, additional margin calls and daily variation margins in agricultural futures transactions at national commodities and futures exchanges;
- Finance the payment of premiums in put options contracts on agricultural products at national commodities and futures exchanges;
- Finance the payment of fees to national commodities and futures exchanges.

The loans are limited to BRL 100,000 per beneficiary (about $53,000), with an interest rate of 6.75 per cent per year. Cooperatives are allowed to borrow up to BRL 40,000 (about $22,000) per active participant. The Banco do Brasil is expected to take the lead, due to the high exposure to agricultural risk in its portfolio. In addition, its staff are being trained by BM&F for future engagement as options writers for agricultural producers.

6.4.6 Market development

Education and capacity-building: Through its Institute of Education, its technical body and its external consultants, BM&F is undertaking a series of actions to educate market participants about commodity futures. These actions include short-term courses with a specific focus on the agricultural markets, long-term courses that cover all the products traded at the BM&F, MBAs, e-learning courses, in-company training, seminars in the major production regions, partnerships with companies and financial institutions, and specialized publications such as “Agricultural Market Analysis”, a biweekly publication on the BM&F agricultural commodities.

For the last six years, BM&F has held annual seminars in partnership with the Ministry of Agriculture, Livestock and Supply, which discuss harvest perspectives going forward, covering issues that would have a great impact on agribusiness during the year to come. Special focus is given to eight agricultural products: sugar and alcohol, cotton, rice, coffee, corn, cattle, soy and wheat.

In an effort to raise awareness among Brazil’s rural producers, BM&F and the Banco do Brasil have developed an operational partnership that will:

- Provide the bank’s branch managers with an understanding of BM&F derivatives and corresponding transactions;
- Minimize the credit costs incurred by rural producers through hedging in the options market;
- Promote the culture of hedging among the bank’s branch managers;
- Spread the culture of hedging on a national level, through the training initiatives conducted jointly with the Banco do Brasil’s branch managers.

Training is expected to be provided to 400 managers in 10 classes. The course, developed within the BM&F Institute of Education, would last 40 hours.

International trade facilitation: BM&F has been the most dynamic of the featured exchanges in supporting the internationalization of its commodity markets, incorporating initiatives on export promotion, regional integration and South–South trade.

Export promotion: In August 2003, BM&F opened its first exporter call centre in the State of São Paulo. Further offices were subsequently opened in 2004, in the states of Rio de Janeiro, Minas Gerais and Rio Grande do Sul, and later in Mato Grosso and Mato Grosso do Sul. The exporter call centre is a consultation system for small and medium-sized exporting companies, which provides them with information about the tools available for exporters, and also provides technical advice. Entrepreneurs are assisted by telephone, internet, or in person at the centres' offices. This service is provided for free by the exchange, in partnership with State Governments. The objective is to develop the foreign trade sector, by expanding the number of exporters and the variety of products being exported. The service also offers easy access to foreign trade companies and to the BM&F member brokerage houses, for information on currency hedging or other products. The São Paulo centre assisted about 1,200 companies during its first year, the Rio office assisted 50 companies in three months, and in Minas Gerais, 150 companies were assisted in the first month of operation. A further agreement was signed in October 2004, whereby queries that related to trade financing and other bank services would be forwarded from the centres to the Banco do Brasil, in order to broaden the range of advice and technical expertise available to exporters.

Regional integration: From 2004, the BM&F commenced the process of regionally integrating Latin American soybean and wheat markets. Together, Brazil and Argentina produce more soybean than the United States does. However, the world reference price is discovered on the CBOT. BM&F and the Rosario Futures Exchange (ROFEX) of Argentina agreed in 2004 to work towards establishing a joint electronic soybean futures market operated by both organizations. The objective is to create a market that offers efficient hedging and minimizes basis risk for the Latin American producer community market, and also to bring pricing power to the largest producer markets. In 2007, integration tests between the BM&F's GTS and ROFEX's e-Rofex systems were initiated via the Financial Information Exchange (FIX) protocol, a standard international trading language. This is a key stage in the integration process, and further developments are expected.

South–South trade: BM&F has taken a lead in developing South–South commodity trade between Brazil and China, particularly in the area of soybeans (see box 11).

Industry growth: BM&F initiatives have been active in addressing three dimensions of industry growth: increasing access to markets through its ADD programme, encouraging the organization of the sector through its programme to strengthen brokerages, and new product development through its carbon facility.

Increasing access to markets: In order to expand regional market boundaries and disseminate the use of agricultural derivatives, BM&F created the ADD participant in 2006, with an expected launch date in 2007 subject to regulatory approval. Focused on the agricultural sector, the purpose of the ADD is to increase access to markets across Brazil's vast geography, expanding the base of market users to new areas and types of participants. Qualified and licensed agents would effectively perform the same role as introducing brokers in the United States, acting as the remote operational arm of a brokerage house, and providing sales, support and consulting services to new market participants. BM&F would be supporting the ADDs through training and an incentive programme.

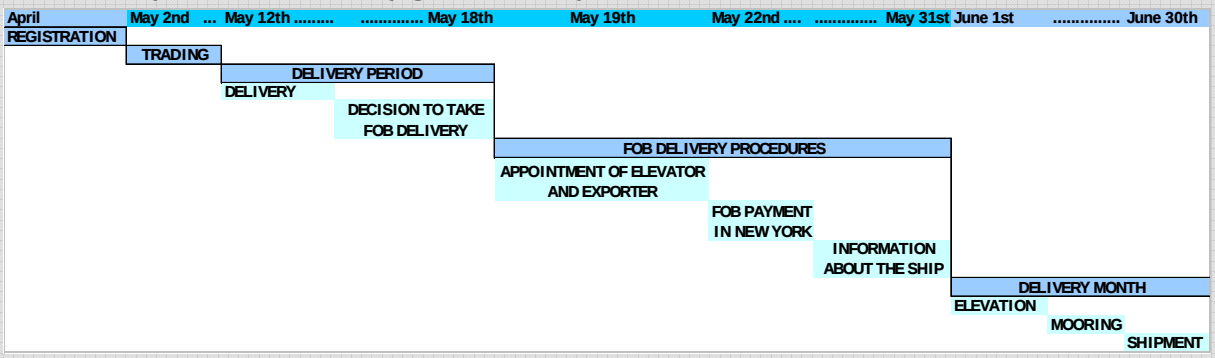
Box 11. The BM&F and export links with China

In 2004/05, Chinese soybean importers were experiencing consistently high prices when they came to market and low prices when China's soybeans were put to market. There was a widespread perception that United States trading companies were dominating CBOT soybean pricing and imports of United States soybeans to China, to the disadvantage of the Chinese industry. While Chinese importers had been purchasing South American as well as United States soybeans, trade had always been routed through United States trading companies at the CBOT. Therefore, in response to increasing exasperation with United States traders, the industry took a strategic decision to establish direct business links with Brazilian and Argentine soybean producers. However, major obstacles existed to large-scale direct trade between Chinese importers and South American farmers. These included a lack of confidence in mutual guarantees, and difficulties in arranging logistics for payment and transportation modalities.

At the same time, Brazilian soybean producers had been aware of China's emergence as the largest market for its soybeans. On behalf of the industry, BM&F established an office in Shanghai in 2004 to facilitate linkages between Brazilian producers and Chinese importers. A number of State Governments have also set up representations in the office from which export delegations and events have been organized. A delegation of Chinese soybean oil processors visited South America in the spring of 2005. BM&F and the DCE established links and engaged in active cooperation in designing a solution to enable the Chinese industry to purchase direct from Brazil. To promote South American soybean trading, BM&F, together with the DCE and ROFEX of Argentina, organized a roadshow in the Chinese cities of Beijing, Xangai, Dalian and Shenzhen in April 2006. This culminated in the China–South America Soybean Trade Forum and Soybean Industry Risk Management International Seminar, which was attended by more than 500 Chinese businessmen, as well as by BM&F brokers and soybean experts. In July 2006, a seminar entitled "Investment in China – the mechanisms available to Brazilian businesses" was held, to discuss legal aspects of the commercial relations between Brazil and China, especially the safeguards and existing legal protections, investment opportunities and challenges, arbitrage, protection of intellectual property, and mergers and acquisitions in China.

Arising from these events, a solution has been established, but it is still under development. Chinese soybean importers will hedge through the BM&F soybean futures contract and take delivery with the FOB (free on board) term at the main soybean export corridor at Paranagua. The settlement value will be equivalent to the settlement value for the futures contract, plus the costs and service charges related to the transfer of the soybeans from the accredited exchange warehouse to a ship indicated by the buyer, and the financial costs determined by the bank. BM&F will guarantee that the quality of the product delivered onto the specified cargo ship is as per the standard Brazilian Soybeans Export Grade. Moreover, the customer will not take Brazilian currency risk, as all deposits will be made in United States dollars at accounts in New York. The process is described in the diagram below.

Brazilian soybean FOB delivery guaranteed by BM&F



Source: China Business Weekly (2005); BM&F.

Market organization and upgrade: BM&F's "Programme for Strengthening the Brokerage Sector" is an initiative to upgrade the industry. The programme commenced in 2005, with the establishment of new requirements for member brokerage houses in respect to capital, organizational structure and professional qualification. A compulsory first phase in 2006 saw all BM&F member brokers meet a series of qualification requirements. A voluntary second phase in 2007 consists of granting qualified institutions seals of quality that correspond to their selected market niches, including agriculture. The goal is to develop a strong brokerage industry that can deliver high levels of excellence, business focus, strategic plans of action and quality customer service.

New product and service development: In September 2005, BM&F launched the Brazilian carbon market, a joint initiative with the Brazilian Ministry of Development, Industry and Foreign Trade. Its main objective is to develop an efficient trading system for environmental certificates, aligned with the principles underlying the Kyoto Protocol. The first of two stages saw the implementation of the BM&F Carbon Facility. This hosts the registration of projects validated by United Nations-recognized certifying agencies according to the Kyoto Protocol's Clean Development Mechanism (CDM) criteria, and generates carbon credits. The facility also hosts registration of "project idea notes" – partially structured emission reduction proposals that aim to qualify for carbon credits. Its purpose is to provide promotional tools for attracting investment in, or trade of, the carbon credits associated with these projects. The facility is also open to expression-of-interest registrations, in which foreign investors intending to purchase carbon credits can register their interest at the exchange by describing the characteristics of the project-based activities they seek. The second stage will see the launch of a web-based platform for carbon credit auctions, scheduled for late 2007. This will enable the trading of carbon credits generated by the CDM projects. A specific forward market environment will be implemented, too, for trading carbon credits that are still in the process of generation and certification.

At the same time, as discussed above in the context of facilitating the physical market, BM&F's Brazilian Commodity Exchange subsidiary uses exchange mechanisms to offer trade and registration services for numerous instruments, including rural securities and government procurement schemes.

7. China

7.1 Historical development of agricultural markets and specific commodity markets under review

7.1.1 Country factfile

GDP (USDb, current prices) 2006:	2,630	*Average annual GDP growth 1990–2006:*	12.7%
GDP per cap. (USD, current prices) 2006:	2,002	*GDP per capita growth 1990–2006:*	490%
Population (millions) 2006:	1,314	*Population growth 1990–2006:*	15%
Inflation rate 1990 (2000 as 100)	50	*Inflation rate 2005 (2000 as 100):*	107
Current account balance (USDb) 1990:	12.0	*Current account balance (USDb) 2006:*	238.5
Agriculture – share of GDP 2006:	13%	*Agro share of export revenues 2005:*	4%
Agriculture – share of employment 2005:	40%	*Poorest 20% – share of national income:*	4.7%
Surface area (millions of sq. km) 2005:	9.6	*Life expectancy at birth (years) 2005:*	72
Adult literacy rate 2006:	91%		

USDb = billions of United States dollars

7.1.2 Historical development

The Cultural Revolution left Chinese agriculture, and its sizable peasantry, in disarray to the point of crisis. Nearly a third of China's 800-million-strong peasantry was impoverished, and the country relied on significant food imports (Runsheng, 2006). As part of wider reforms initiated by Deng Xiaoping in 1978 under the scope of the "Four Modernizations", the era of agricultural reform was ushered in, alongside fundamental restructuring to industry, science and technology, and national defence. Representing a shift away from the radicalism that marked the Cultural Revolution and Mao Zedong's final years, this process became known as the quest to establish a "socialist market economy", or "socialism with Chinese characteristics".

Until the reform period, all of China's rural land and labour resources had been held by people's communes. Private ownership of land and private contracting relationships had been illegal. The objectives of agricultural policy had been rural equity, and the provision of cheap food, capital, and labour to support rapid industrial development. Meanwhile, production, marketing, and trade had been tightly controlled, and procurement prices had been generally held below international prices (Fan and Cohen, 1999).

Box 12. China's "Ten Tasks for Rural Areas", 2000

1. Strategic adjustment.
2. Ensure quantity of grain output (improve yields).
3. Gradually transfer rural labour to other sectors.
4. Reform rural tax and fee system.
5. Increase investment in rural infrastructures.
6. Improve rural education (agricultural science and technology).
7. Reform rural credit co-ops (rural finance).
8. Continue poverty-reduction programmes.
9. Open up to world trade.
10. Promote social progress.

Source: Solot (2006).

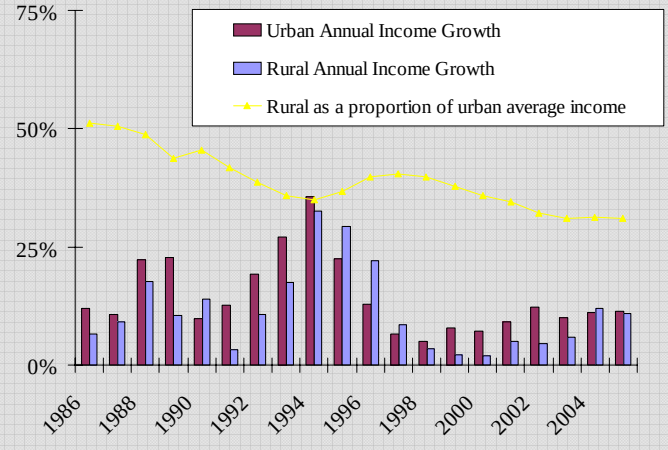
Agricultural reform took place in two phases (De Brauw, Huang and Rozelle, 2004; von Braun, Gulati, and Fan, 2005a). Early reform, from 1978 to 1984, saw the decollectivization of farms and the decentralization of rural decision-making. The Household Responsibility System (HRS) was introduced, whereby individual families could lease land from collectives for a 30-year tenure and sell surplus crops on the open market. This provided farmers with the incentive to increase production and the necessary decision-making power to do so: agricultural productivity growth during this period went from practically zero to 6 per cent per year. The later reforms of 1985–

1995 were characterized by a gradual liberalization of prices and marketing, and the development of market institutions – including the establishment of the first commodity exchanges from 1990. With China's drive to accede to the World Trade Organization (WTO) in the late 1990s, motivated by a broader economic imperative to integrate into world markets, a further round of policies was introduced to adjust China's agricultural protection regime.[25]

Solot (2006) characterizes Chinese agricultural policy from the late 1990s onwards as having three aims, which sit uncomfortably together in what is termed "China's agricultural policy trilemma": raising farmer income levels, maintaining food security and grain self-sufficiency, and trade liberalization and integration with world markets. The policy mix that has been used to simultaneously address these objectives is an awkward mix of liberalization and protection, promotion of market-based tools and government intervention, the nature of which is reflected in the "Ten Tasks for Rural Areas", issued by China's Central Leadership in 2000 (see box 12).

One of these tasks, however – the absorption of a large share of farm labour through strong growth in rural industries – has been key in helping China to succeed in combining "a sharp rise in agricultural production, together with a dramatic fall in poverty and a significant improvement in the amount and quality of food available" (OECD 2005: 1). The rural non-farm sector in China has increased from a near-zero contribution to GDP in the 1950s to more than a third today (von Braun, Gulati, and Fan, 2005a).

Chart 13. Chinese rural–urban inequalities, 1986-2005



Source: China Statistical Yearbook (1996 and 2006).

The success has not been unmitigated, however. Industrial growth has outpaced agriculture for many years, meaning that in spite of significant progress in rural poverty-reduction, rural–urban income inequality has experienced a sustained but potentially unsustainable increase. Average rural income, which was 51 per cent of the average urban income in 1986, had fallen to 31 per cent by 2005 (see chart 13). As a result, agriculture has again become a critical policy priority for the Government. Document number 1 – the highest priority policy area of the Chinese Central Committee – has been on the subject of agriculture and the welfare of the peasantry since 2004. This has renewed a practice that last occurred between 1982 and 1986.

State-owned trading companies still control large amounts of the internal trade, as well as the import and export of commodities from China. Production remains mainly in the hands of smallholders, however. This is the legacy of both the pre-reform commune structure and the HRS system, which did not allow the permanent ownership or sale of land. However, there is a new motivation in Government to consolidate smallholdings into larger entities, including through the formation of cooperatives, and to encourage the growth of commercial agribusiness. Cooperatives exist in China, but at a low level of development. Moreover, the situation varies greatly from region to region. A stimulus to the development of cooperatives is expected in the form of a new law on professional cooperatives of farmers that was adopted by the People's National Congress in October 2006 and came into force in July 2007. This law establishes the legal status and governance procedures of cooperatives, and their role in promoting the management and commercialization of smallholder agriculture, with a view to

[25] The "governor's grainbag responsibility system" handed provincial governors the responsibility of balancing grain supply and demand in their province. The "four separations and one perfection" sought to realign public and private sector agricultural practice in a more efficient manner.

enhancing market participation and increasing overall competitiveness. Importantly, it mandates State assistance through "measures such as fiscal support, tax incentives, financial, technological and human resources support, and industrial policy guidance, to promote the development of farmer professional cooperatives". Moreover, the law encourages research institutions, agricultural extension agencies and other entities active in commodity supply chains to support the cooperatives with policy, technology, information and marketing.

7.1.3 Summary of key agricultural challenges over time

- Transition to a market-based system of agriculture
- Constructing market institutions to facilitate and regulate trade, and ensuring linkages with the wider economy
- Development of value-added downstream (rural non-farm) industries
- Addressing growing inequalities between city and countryside
- Consolidating and commercializing the smallholder sector

7.1.4 Specific commodities under review: soybean, corn

Soybean

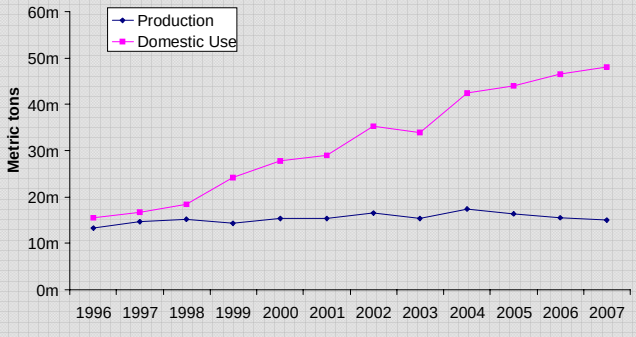
Characteristics and industry process

Soybean, *Glycine max*, belongs to the Leguminosae family, sub-family Papilionoideae. Soybean is classified as an oilseed. The plant is an annual, it grows to a height of 20–180 cm, and it has white or lilac flowers and pods. The pods, which usually contain two or three seeds, are formed in the leaf axils (World Wide Fund for Nature (WWF), 2002). Cultivation is most successful in climates with hot summers, as the plant requires temperatures to rise above 20 degrees. The soybean is crushed to produce soybean oil and soybean meal.

Industry structure and supply chain

In China, domestically produced soybeans are mainly used for direct food consumption. Imported soybeans, which typically have a higher oil content, are mainly used for oil processing and bean curd production. Chinese soybean production is focused largely in the north-east of the country, where it can be rotated with corn. Annual production in 2005 was approximately 27 million tonnes, and yet crushing capacity stands at close to 70 million tonnes. The difference between these two numbers reflects the high volume of imported soybeans that arrives in China. Crushing capacity is shifting gradually towards the port areas, reflecting the increasing proportion of imported soybean in total soybeans crushed.

Chart 14. Soybean supply/demand situation in China, 1996–2007



Source: China National Grain and Oils Information Centre.

Industry development

China has a long experience – perhaps over 6,000 years – of growing soybean. By the seventeenth century, soybean was being grown all around China, and by the early twentieth century, soybean was one of three main export products from the country on world markets (WWF, 2002). Currently, China is the fourth-largest producer of soybean in the world, and the second-largest consumer.

High in protein, soybean forms an important part of the Chinese diet, and is also used to make bean curd (also known as tofu). Soybean is also increasingly used as animal feed, and as a result, demand has grown rapidly with economic growth over the last decade. Derivative products of soybean include soybean meal and soybean oil. Until recently, soybean oil was the most popular vegetable oil used in cooking and for other applications. However, it has now been overtaken, following the rapid expansion of palm oil production in Malaysia and Indonesia.

The Chinese soybean market was liberalized at a relatively early period in China's reform process, and it is therefore a substantially open market that is widely influenced by international market developments. From being a net exporter until the mid-1990s, China has subsequently become a net importer of soybean, often in substantial quantities.

Since the 1990s, soybean has been one of the leading "biotech crops" – crops that have undergone genetic modification. Monsanto introduced its popular "Roundup Ready" variety in 1995. Currently, genetically modified soybean accounts for a large majority of United States soybean production, a substantial portion of which is imported into China. By contrast, China's soybean production is exclusively non-genetically modified, as per Chinese government policy.

Users and uses

Growth in demand for soybeans has closely followed the growth in demand for meat and chicken as China's middle class expands, grows wealthier and develops increasingly sophisticated tastes. Soybean oil is used as a vegetable oil for cooking, among other uses. Soybean is also used to produce soy milk and bean curd.

Corn

Characteristics and industry process

Corn *(zea mays)* is a cereal grain that is grown widely around the world. The white variety is typically used for food, in contrast to the yellow variety which is typically grown as feed.

Industry structure and supply chain

Corn is one of the most important grain products in China, with annual production accounting for over a third of total grain production, and with hundreds of millions of small-scale farmers dependent on the crop for their livelihoods. With an annual production of 120 million tonnes, China is both the second-largest producer and consumer of corn in the world, holding an estimated 17–18 per cent share of global production and consumption.

Thirteen provinces, concentrated mainly in north-east China, account for 80 per cent of Chinese corn production. As a net exporter since the mid-1990s, the main port is in the north-eastern city of Dalian, with the key export markets being Japan, Malaysia and the Republic of Korea. However, if China were to become a net importer of corn, the major importing facilities would likely be located in the south and the east of the country, around the major population centres on the coast.

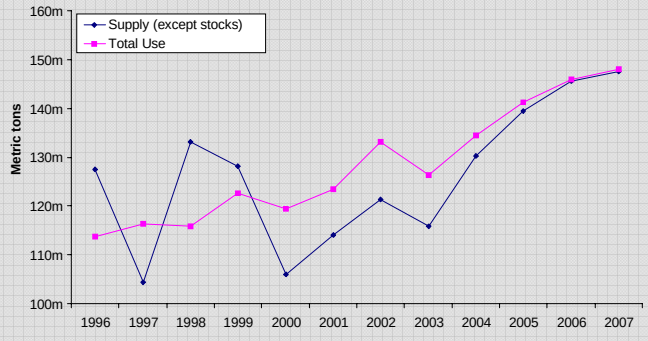
The supply chain for corn is long, and involves many types of participants. This is largely due to its many uses, but also to the large number of intermediaries that are involved in aggregating corn

production from small-scale farmers and distributing the crop to processors and purchasers.[26] Producers of poultry and meat – purchasers of corn for use as animal feed – tend to be split into industrial farms (20–30 per cent of pork production and 60–70 per cent of poultry production), large farms (20 per cent of pork production) and small household farms. Starch and ethanol producers are industrial users who have sourced their product mainly domestically, but given recent price hikes, are starting to import corn from the US and other markets for the first time in a decade.

Industry development

Because corn is a strategic commodity, China's corn market has remained highly controlled by Government long after the initiation of the country's major agricultural reforms. However, the market has undergone remarkable growth over the last decade. Production has been barely able to keep pace with strong domestic demand growth (see chart 15).

Chart 15. Corn supply/demand situation in China, 1996–2007



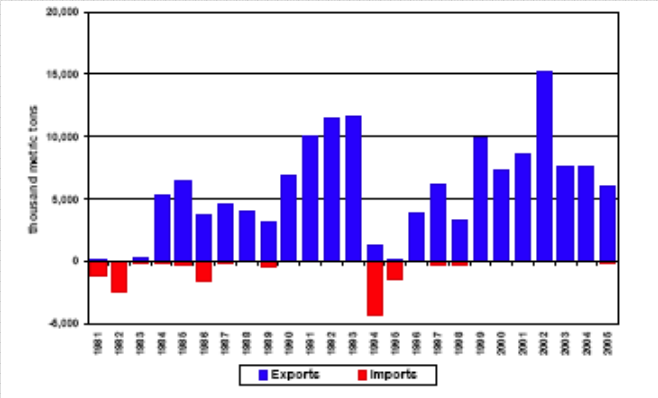
Source: China National Grain and Oils Information Centre.

Price controls on corn were initially relaxed in 1997. However, minimum support prices and other forms of support and protection have continued. Even today, trade is still restricted to State trading companies. This is in line with China's strategic goal of long-term self-sufficiency in foodgrains – rice, wheat and corn. However, a number of factors have induced Chinese policymakers to push for liberalization of the corn market. Firstly, corn is primarily used for feedstuff, rather than for direct human consumption. Secondly, China's WTO accession in 2002 saw a number of new obligations with regard to liberalization of the domestic corn market and removal of its generous export subsidy regime, a regime that was ultimately scrapped in early 2004. Thirdly, China's rapidly increasing domestic demand, and the likelihood that the country will become a net corn importer very soon (China Economic Net, 2006), has propelled the Government to view liberalization as a means to enhance efficiency and reduce the cost of a centrally planned quota, price and support programme for the sector.

Users and uses

Rapid overall economic growth has driven a similarly rapid increase in Chinese demand for corn – an important input for animal feed, sugar and sugar products, beverages, and ethanol. Growth in demand for corn as an ingredient for animal feed and sugar has closely followed the growth in demand for meat, chicken and sugar, as China's middle class expands, grows wealthier, and develops increasingly sophisticated tastes.

Chart 16. Corn trade in China, 1990–2005



Source: China National Grain and Oils Information Centre (2006).

Cornstarch currently accounts for 85 per cent of Chinese starch, although substitutes such as cassava and sweet potato, as well as rice and wheat, may

[26] This paragraph draws heavily from GAIN 2007.

be used too. The same is true with ethanol, and both sectors have been growing by about 15 per cent per year over the last five years (GAIN, 2007). In order to encourage diversification away from corn in recent years, the Chinese Government has eliminated tariffs on imports of cassava chips from countries of the Association of Southeast Asian Nations (ASEAN) since 2006, with imports up 45 per cent in the first year since the change.

The ethanol industry has, until now, accounted for about 80 per cent of China's biofuel production (OECD, 2007). However, in a recent change of government policy motivated by food security concerns, the Chinese Government has indicated that corn will no longer be a focus for biofuel production. Instead, the Government aims to make a gradual switch to other resources, including cassava, sweet potato, sorgo and cellulose (Xinhua, 2007).

Summary: Salient features about the physical market

- Crops that are critical to China's food security and for which demand is growing rapidly
- Largely smallholder production
- Significant needs for infrastructure development and better production practices
- Soybean: different markets split between genetically modified organisms ((GMO) imported soybean) and non-GMO (domestic production)

7.2 Exchange emergence and contract development:

Dalian Commodity Exchange

*Year founded:*1993	*Location:* Dalian, China
Instruments traded: Commodity futures contracts only	*Commodities traded:* 6 – Corn, soybeans (x2), soybean meal, soybean oil, LLDPE
Ownership: Non-profit, membership-owned exchange	*Trading system:* An electronic trading system, custom-developed by an independent software vendor, with electronic trading offered both on an exchange trading floor, and remotely via internet and data connectivity.
Clearing house: In-house clearing and settlement departments	*Regulator:* China Securities Regulatory Commission (CSRC)
Total volume of futures and options in 2006: 120.4 million	*Commodity futures and options volume 2006:* 120.4 million
FIA world ranking 2006 (all futures exchanges, based on total derivatives volumes): 17	*UNCTAD world ranking 2006 (commodity exchanges - commodity derivatives volumes only):* 3

Website: http://www.dce.com.cn.

China had dozens of commodity exchanges at the beginning of the twentieth century. These mostly disappeared during the 1930s. After a long wait, the first commodity exchange – the China Zhengzhou Grain Wholesale Market – was re-established in October 1990, and many others followed. This took place during the later period of Chinese agricultural reform – a period characterized by price and marketing liberalization, and by the development of market institutions. These first exchanges were centres for cash and forwards trade. A commodity futures market was first established, also in Zhengzhou, in May 1993.

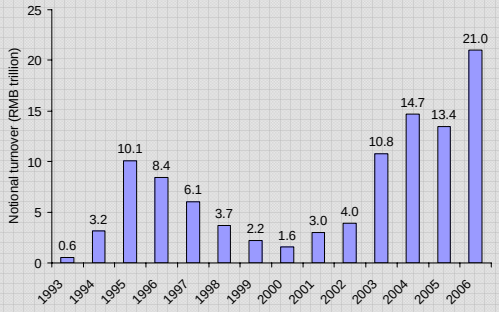
At first, the central Government took a laissez-faire approach to exchange development (discussed further in the section on regulation). More than forty exchanges had appeared by late 1993, as China

accelerated its transformation from a centrally planned to a market-oriented economy. These institutions were often both promoted and regulated by State and municipal government entities. The main commodities traded were agricultural staples such as wheat, maize and soybeans, which have long been considered strategically important by the Chinese Government because of their importance to economic development and the maintenance of political stability.

At least 10 major scandals occurred in domestic exchanges between 1994 and 1997. These scandals, coupled with estimated losses of over $1 billion by Chinese traders active in overseas futures markets (Xueqin and Gorham, 2002), compelled the State regulator – the China Securities Regulatory Commission (CSRC) – to intervene. Its actions are categorized as two market rectifications, but these took place across a lengthy period between 1994 and 2000. The period of the first rectification saw a reduction in the number of exchanges to fifteen, and the second rectification further reduced the number to just three: the Dalian Commodity Exchange (DCE), the Zhengzhou Commodity Exchange (ZCE) and the Shanghai Futures Exchange (SHFE). These are the three commodity exchanges that still exist in China today.

The growth profile of the industry has largely followed its changing regulatory dynamics (see chart 17). After an initial rise, the notional value went into precipitous decline as the market underwent radical restructuring in the mid-to-late 1990s. Since 2000, however, the market has exhibited healthy year-on-year growth, which has propelled China's three exchanges into the ranks of the world's leading commodity exchanges. This has reflected a more secure environment for investor participation in the markets, and the imposition of a robust regulatory regime (discussed further in section 7.3 on the regulatory framework).

Chart 17. Notional value of futures traded on Chinese exchanges, 1993–2006



Source: Exchange data, FIA.

The DCE was established in February 1993 as a non-profit and self-regulating legal entity owned by its members. Trading at the DCE, as at the other Chinese commodity exchanges, has combined screen-based electronic trading with a trading floor. The idea has been to replicate the atmosphere of a trading floor, while benefiting from the efficiencies that electronic trading can bring. The DCE's electronic trading also allows members who are remote from the exchange's premises to participate directly in the markets via internet or data connectivity.

Limited by regulatory constraint, the DCE has offered trade in futures instruments only. Prior to the first rectification in 1994, the DCE traded products including soybean, corn, soymeal, mung bean, red adzuki bean and rice, with a market share that ranked it number nine in China. After the second rectification, as one of the three exchanges that were allowed to continue trading, the DCE was permitted to trade soybeans, soy meal and beer barley. In 2002, the DCE introduced its Number 1 soybeans futures contract, based on non-GMO soybeans. This became the largest agricultural futures contract in China and the largest non-GMO soybeans futures contract in the world. In 2004, the DCE launched its corn futures contract in the month of September, and a Number 2 – or GMO – soybeans futures contract in the month of December. In January 2006, the DCE started trading soybean oil futures, and most recently in July 2007, linear low-density polyethylene ((LLDPE) a raw material used in plastics). Other potential contracts that are currently being assessed at the exchange include live hog, ethanol and palm oil (Li, 2007). Options and a weather index contract are being readied too, in the event that regulatory permission is granted for these instruments. The DCE's volume has been the largest in China since 2000, although the SHFE, which is mainly focused on metals, is the largest in terms of notional turnover.

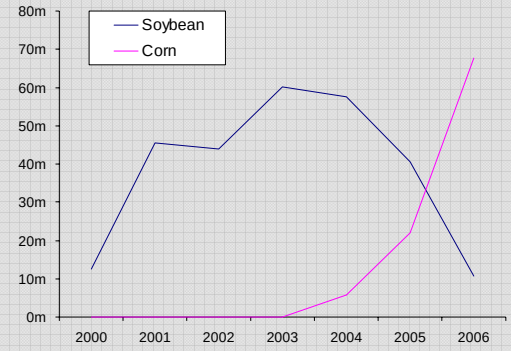
A large proportion of liquidity in the markets comes from State-owned enterprises (SOEs). These have been given permission to hedge both in domestic and overseas futures markets. The DCE has worked

closely with these SOEs to leverage their experience in designing and developing futures markets appropriate for the Chinese context.[27]

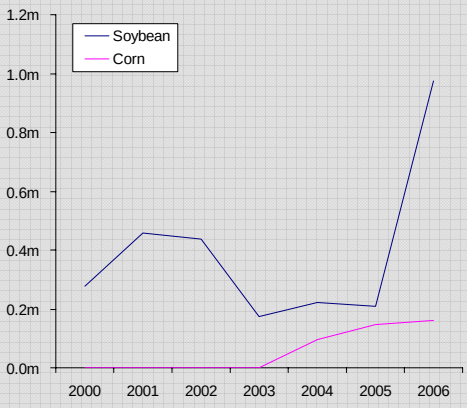
Since 2004, the DCE has been a strong promoter of futures as a means to help small-scale farmer commercialization in a number of dimensions. Most prominently, through its "1,000 villages, 10,000 farmers" educational and capacity-building programme, farmers are trained in modern marketing techniques, including the use of futures information to guide cropping patterns. The same programme is building links between farmers and large trading enterprises to enable the hedging of farmers' risk exposure through the enterprises' activities in the futures market.

Chart 18. DCE soybean and corn performance metrics, 2000–2006

(a) Volume (number of contracts)



(b) Open interest (number of contracts)



Source: DCE.

Soybean

A soybeans futures contract was first listed by the DCE in 1993. By 2001, it was trading in very large volumes – more than 45 million contracts per year. In March 2002, the Government issued its National Management Statute for Genetically Modified Organisms. Imported GMO soybeans were no longer allowed to be delivered on the DCE soybeans contract. In response, the DCE re-specified its soybeans contract, launching its Number 1 yellow (non-GMO) soybeans contract in March 2002, which specified soybeans of domestic origin only for delivery.

However, the Chinese food oil industry depends on imported soybeans for two thirds of its production demand, and therefore it had to rely on the CBOT as a venue for hedging. In this respect, Chinese soybean importers were aggrieved at the perceived dominance of United States traders in the CBOT's soybean markets. This was seen as causing market prices to be consistently high when Chinese buyers came to the market, but low when China's own soybeans were put to market. In late 2003, facing rapidly increasing growth in China's soybean imports, Chinese importers rushed to the CBOT, hoping to buy cheaper soybean futures and avoid the burden of price hikes. However, the CBOT futures price for soybeans doubled between August 2003 and April 2004 – said to be driven by the USDA's prediction of low soybean output in 2004 and increased activity by United States funds. This peak was followed by a sharp fall in both futures and spot prices, due to strong soybean harvests in South America and increased soybean planting in the United States. By mid-June, the price had decreased by nearly 30 per cent. At the same time, China's macroeconomic adjustment saw bank lending tightened. Soybean buyers were unable to access enough funds to pay for the soybeans they had bought at a high price at the CBOT. A group of Chinese soybean importers had to default on their contracts, resulting in serious losses.

It was in this context that DCE launched the Number 2 yellow soybeans contract, which was an attempt to provide Chinese soybean dealers with a more accessible and manageable market in which

[27] It is also noted that China Aviation Oil, a prominent SOE and China's dominant jet-fuel importer with a monopoly of jet fuel supply into nearly all Chinese airports, incurred a $550 million loss from oil derivatives trading in Singapore.

they could avoid the losses they had been incurring at the CBOT. Oil content was set as the quality specification. Both domestic and imported soybeans could be delivered against the Number 2 soybean contract, representing a theoretical physical supply of 200 million tonnes. By contrast, the CBOT soybean contract was only trading on a physical market of approximately 60 million tonnes.

Nevertheless, trade remained sluggish in Number 2 soybean throughout early-to-mid 2005. At the same time, DCE's Number 1 soybean contract was the world's largest agricultural contract by volume in both 2004 and 2005, trading more than double the volume of CBOT soybeans.[28] It became clear that the problem with the Number 2 soybean contract lay in an ambiguous definition of the acceptable delivery grade. Therefore, in October 2005, a new Number 2 soybean contract was launched. Its grading characteristics were much closer to those used by the soybean crushing industry, which was increasingly using soybean of foreign origin, the price of which was becoming more volatile on the international markets. Thus, a well-defined division was enshrined between the DCE Number 1 soybean contract taking domestically produced soybeans as its standard, and the Number 2 contract giving prominence to imported soybeans. Industrial users of soybean were able to access separate but effective price-discovery and hedging mechanisms for their domestic non-GMO soybean transactions and for their imported GMO soybean transactions.

However, volumes on DCE soybean had already begun to decline since late 2004. On the one hand, the Chinese industry faced a period of restructuring as domestic production declined, imports increased and foreign-owned enterprises accounted for a greater share of the market. On the other hand, following price movements on CBOT, soybean prices had reached their highest historical level in April 2004 – over 4,100 RMB/tonne. The price subsequently crashed to less than 2,500 RMB/tonne, and a lot of market participants lost money as a result. Some speculative interest left the market altogether, and some moved into the DCE's newly-launched corn contract. Volumes declined from nearly 60 million traded contracts in 2004, to 40 million in 2005, to 10 million in 2006. However, 2007 has seen a much improved performance in Number 1 soybeans, as industry structure has stabilized. The Number 2 contract has still not yet exhibited the same rapid take-off in volume growth as other contracts launched by the DCE, however. This may be because of rules constraining the spot trade in GMO soybeans.

Corn

The DCE launched its corn contract in September 2004. This was the first futures contract on a staple food commodity allowed by the Chinese authorities since 1998, when government intervention witnessed the delisting of many commodity futures contracts in the country.

Since launch, the growth of volumes in the DCE's corn contract has been phenomenal (see chart 18). By the end of 2004, only three-and-a-half months after launch, over 5 million contracts had been traded. This increased to over 20 million in 2005, and to nearly 70 million in 2006, with daily volume reaching 1.5 million contracts and open interest reaching 1.6 million contracts.

The DCE attributes this rapid growth to a combination of four factors:

- There was significant demand for a price-discovery and risk-management instrument from a sector that is large and diverse;
- There had previously been a successful corn contract in the 1990s, prior to its suspension during the rectification period;
- The DCE had undertaken a significant education and training process with commercial users and brokers in the main production areas for over a year prior to launch;
- Liquidity rapidly shifted from soybean to corn, due to a period of restructuring in the market for soybean.

[28] However, the CBOT contract at 5,000 bushels – which is approximately 136 tonnes – is significantly larger than the 10-metric-ton DCE contract.

More broadly, the launch of the DCE corn futures contract has been an important part of China's strategy for moving towards a liberalized market for corn, meeting its WTO accession commitments to reform the country's support regime for the corn sector. The DCE contract was launched just after government price protection for corn was removed. It also came after the abolition of export subsidies in early 2004. However, unlike the case of the soybean market, import and export of corn trade is still controlled by the Government. Liberalization is expected here soon, as it is anticipated that China will move from its current position of self-sufficiency to becoming a net importer in the next few years. In this way, the introduction of the corn futures contract is seen as an important step on the path to market liberalization (Reuters, 2004).

In the geography of China's domestic agricultural production, corn is cropped in the same areas of north-east China as soybean is. As market pricing has developed for both commodities, it has enabled the futures market – rather than the Government – to act as the source used by farmers to guide their cropping and selling patterns. This is expected to reduce the costs and the risks that the previous system of price support generated for the Government (Reuters, 2004). Consequently, a good deal of the DCE's education and training efforts with China's small-scale farmers – in particular, the "1,000 villages, 10,000 farmers" programme – is focused on assisting farmers to use futures market information to guide effective cropping and selling. The DCE has trained over 30,000 farmers to date, and has also cooperated with SOEs and government institutions to ensure that farmers are able to realize improved income from the new system – an important means of attaining their buy-in to the market-based framework.

The DCE's key achievement in its local context:

- Creating high levels of liquidity for markets in key agro-commodities

Success factors:

- Rapid development of volumes for newly-launched contracts
- Leveraging the accumulated expertise of commercial and institutional interests
- Building a secure environment for retail investor participation

Challenges:

- Securing benefits for small-scale farmers from price discovery and risk management
- Managing within a tight set of political and regulatory restrictions, and with a regulator with a cautious mindset

Future opportunities:

- Development of financing activities that are integrated with exchange services
- Building institutional and foreign investor participation, subject to regulatory permission
- Developing options and index trading

7.3 Regulatory framework:

China Securities Regulatory Commission (CSRC)

The initial development of the Chinese commodity exchanges – from 1990 until the middle of the decade – took place in a context characterized as "regulatory chaos" (Xueqin and Gorham, 2002). The CSRC was not established until October 1992, two years after the first commodity exchange was founded, and with an initial remit to regulate the securities markets only. The first commodity futures contracts started trading in May 1993 and rapidly proliferated in a context lacking a uniform centralized regulatory framework (see box 13).

Only in November 1993 was the CSRC given regulatory responsibility for the commodity futures markets, following a State Council intervention through its "Notice of Firmly Curbing the Blind Development of the Futures Market". In the early period of its existence, however, "the CSRC exerted little direct control over the new futures exchanges" (Peck, 2004: 14).

Box 13. Futures markets in a regulatory vacuum – the early Chinese experience

"China was in the midst of economic reform and exchanges were symbols of that reform. Every community wanted their own futures market. Because there were no overarching laws or regulations for these markets, these exchanges would seek approval by whomever suited their needs. While some approvals were given by the national Government, others came from provincial or even city Governments. In many cases, the provincial government entity approving the exchange was also the entity making the investment to get the exchange started, so it was almost like approving oneself. In this atmosphere of regulatory chaos, the futures industry grew rapidly, and by the end of 1993 there were over 40 exchanges, 300 brokerage firms and 400 exchange member firms.

Many cities had multiple exchanges. Shanghai had seven; Tianjin and Chengdu both had three exchanges. And many of the exchanges traded the same products. Seven exchanges traded sugar, fifteen traded steel products, nine listed copper and aluminium, and eight listed gasoline… Government entities were using public funds to support a very large number of exchanges competing with one another for the same products, often in the same city. This was clearly a huge inefficiency.

Another concern of the Chinese Government was the fact that most brokerage firms traded both for customers and for their own accounts – there was no regulation requiring the segregation of customer and brokerage firm funds. Compounding this was the problem that firms often had insufficient capital. In this early stage, there was no capital requirement for brokerage firms, and firms did not necessarily increase their capital as their customer base increased. So firms with lots of customers were not well positioned to withstand sudden and large market swings…. In addition, there were many outright scams by brokerage firms. For example, the New York Times reported a 1994 incident in which Xinguoda Futures had promised monthly returns of 30 per cent to attract capital, and then suddenly closed its doors, sparking a public protest.

It was not uncommon to have big battles between longs and shorts, with each side attempting to push the market in their direction by continuing to sell or buy more contracts…. Large traders' attempts to squeeze the markets resulted in a series of scandals at various exchanges…. Finally, almost three quarters of the brokers were doing business in overseas futures. One study found that 90 per cent of the customers involved in overseas futures trading lost money. It was estimated that the total losses to Chinese traders in overseas futures exceeded $1 billion."

Source: Xueqin and Gorham (2002: 1).

This situation changed rapidly with two market rectifications. During the period of the first rectification, which lasted until 1998, the CSRC acted to significantly reduce the number of exchanges, to bring the exchanges under the control of members and the CSRC rather than provincial government entities, to impose more rigorous rules and procedures for trading, to streamline and rationalize the contracts traded (including the suspension of trading in financial futures contracts), and to introduce licensing requirements that reduced the number of intermediaries and enhanced their practices. During the period of the second rectification, between 1998 and 2000, the number of exchanges was further reduced, brokers were further controlled – including through the prohibition of proprietary trading, margins were adjusted and standardized, and overseas futures trading was tightly restricted (Xueqin and Gorham, 2002).

The CSRC was first structured as the executive arm of the State Council Securities Commission – the State authority responsible for exercising centralized market regulation. However, in April 1998, the

two bodies were formally merged to become a unified ministry-rank institution operating under the State Council, the chief administrative authority of China.

Today, the regulation of futures markets in China consists of three layers:

- **China Securities Regulatory Commission (CSRC)**, the external government regulator with overall responsibility for market regulation;
- **China Futures Association (CFA)**, an industry self-regulatory body which intermediaries are required to join;
- **The futures exchanges**, which oversee trading, clearing and settlement functions.

The futures market is regulated by the Futures Trading Management Temporary Statute, which was enacted by the State Council in 1999 together with four accompanying measures. These include (i) the Futures Exchanges Management Measure, (ii) the Futures Brokers Management Measure, (iii) the Senior Manager Management Measure, and (iv) the Professionals Management Measure. The most recent update to the regulatory framework, namely the Regulations on the Administration of Futures Trading, was issued by the State Council as decree number 498 in February 2007, coming into effect in April 2007. This update has been introduced to extend the remit of the regulatory framework to financial futures, now permitted in China at the China Financial Futures Exchange (CFFE), inaugurated in September 2006 and located in Shanghai.

The functions of the CSRC are, among others:

- "To establish a centralized supervisory system for securities and futures markets and to assume direct leadership over securities and futures market supervisory bodies;
- To strengthen the supervision over securities and futures business, stock and futures exchange markets, the listed companies, fund management companies investing in the securities, securities and futures investment consulting firms, and other intermediaries involved in the securities and futures business. To raise the standard of information disclosure;
- To increase the abilities to prevent and handle financial crises;
- To organize the drafting of laws and regulations for securities markets. To study and formulate the principles, policies and rules related to securities markets. To formulate development plans and annual plans for securities markets. To direct, coordinate, supervise and examine matters related to securities in various regions and relevant departments. To direct, plan and coordinate test operations of futures markets;
- To exercise centralized supervision of securities business" (CSRC website, 26 July 2007).

By law, exchanges are required to have in place five risk-management mechanisms: a strictly applied margin system; a daily net clearing system; a price limit system; a position limit system and a large open position reporting system; and a risk reserve system. In times of volatility or irregular trading patterns, the exchange may raise the margin level, adjust the price limit, set maximum position limits for members or clients, and temporarily suspend trading. Exchanges must also obtain approval from the CSRC for amending its articles of association or business rules, for listing or delisting new contracts, and for mergers and other structural changes. Furthermore, exchanges are mandated to publicize in a timely manner authentic and accurate trading volume, trading prices, position volumes, highest and lowest prices, and opening and closing prices. Intermediaries are required by law to have minimum registered capital of RMB 30 million, qualified management with proven good character, and effective internal risk-management controls. The intermediary must segregate client funds from its own (State Council, 2007).

There are three important restrictions that have been placed by the CSRC on the Chinese commodity futures markets since the period of the rectifications:

- **Permitted participants:** Financial institutions are not permitted to trade, and SOEs are only allowed to participate in a hedging capacity. Thus, speculative participation has been limited to retail investors and small enterprises. Controls have also largely prevented overseas participation in Chinese markets, as well as Chinese participation overseas.

- **Contracts and instruments:** The CSRC carefully controls the new contracts that each exchange can introduce, and has allowed just a few new contracts per exchange to be introduced in the eight-year period since the rectifications. Options, index trading and financial futures have been prohibited.

- **Brokerage limitations:** Brokers have been limited to trading on behalf of clients in the futures markets. No proprietary trading is allowed. According to Peng, Yong and Suo (2006), this has had two implications; firstly, that many intermediaries are based on low-profit pure brokerage services alone and are struggling to survive, and secondly, that because of the lack of differentiation or value-added services, "price wars" have become a common form of competition.

However, since 2006, regulatory constraints have been loosening as the Government's attitude towards commodity exchanges has shifted "from conservative to positive" (Li, 2007: 6). The commodity futures markets are now seen as a key institution "for serving agriculture, the rural area and farmers, and [for] providing market insight to guide production, stabilize the market and transfer risks" (Li, 2007: 6). This new mindset has been reflected in a number of government notices and policy moves, including "Nine notices on capital market development (2004)" and the Number 1 document of March 2007, entitled "Some attitudes to actively develop the modern agriculture and boost solidly social democracy in new rural-area building".

Most significantly, a new regulatory framework came into effect in April 2007, extending the scope of regulation to financial futures, which were permitted again for the first time since the 1990s. The new framework no longer prohibits financial institutions from futures trading or associated activities, allows intermediaries to provide a broader range of services than pure brokerage, and lays the foundation for the introduction of new products, including index and options trading (China Daily, 2007) The requisite permissions for launching options and index trading are believed to be imminent. This would bring substantial possibilities for exchanges to widen the scope of the instruments and services they provide. For example, a weather index contract planned at the DCE would allow producers to hedge production as well as price risk.

7.4 Impacts

7.4.1 Price discovery

Price dissemination: The DCE disseminates cash as well as futures market information free of charge to producers, village organizations and enterprises active in commodity supply chains in the main producing regions. The exchange also receives and distributes market information on soybean and corn from a number of governmental and private information service agencies, including the National Grain and Oils Information Centre and the Price Monitoring Centre of the Government's National Development and Reform Commission. A range of outlets are used: television, radio, newspapers, websites and the DCE's own publication, "Information Weekly".

The DCE also collaborates with two information partners: China Soybean Net and China Corn Net, to provide telephone consultations free of charge to farmers, 24 hours a day. Analysts at these two organizations meet every morning to analyse the market situation and reach consensus on important information that market participants might require during the day. As of May 2007, over 100,000 free telephone consultations have been provided to farmers. Short message service (SMS) is another important channel; exchange data indicates that as of May 2007, 2,000 members have received Soybean Net and Corn Net SMS services. For the full year of 2006, 410,000 SMS messages were sent containing market information updates.

Using market information: The DCE has placed major emphasis on assisting farmers to use the exchange's futures prices for guiding their selling and cropping patterns, rather than using the prevailing spot price, which had been the traditional approach. The DCE has provided case-study evidence that this has already significantly increased farmer incomes. (A significant portion of the exchange's awareness-raising and educational activity has been carried out under the DCE's "1000 villages, 10,000 farmers" programme, which is discussed at greater length in box 14.)

Changed cropping patterns: Since 2005, soybean prices have been falling, relative to those of corn. Using DCE information on the respective futures prices of soybean and corn, the farmers of Heilongjiang Province – the principal soybean- and corn-producing region in China – have increased the area used for corn production. According to statistics provided by Heilongjiang province, 2006 saw an increase of 5.15 million mu (approximately 0.34 million hectares) over 2005, in the area dedicated to corn production. The exchange believes that this has resulted in an estimated increase of over 1 billion yuan in farmer income ($130 million at the July 2007 exchange rate). The city of Hailun, in Heilongjiang province, is a major soybean-growing centre. During the spring planting season in 2006, the local farmers, faced with sliding soybean prices, were uncertain about which crop to plant. Using DCE price information, the farmers came to understand that planting corn would increase returns. On the basis of soybean unit production at 1750 kg/hectare, and at the running price of 2.4 yuan/kg, the income per hectare would be 4,200 yuan. However, with unit production of corn at 9,000 kg/hectare, and at the running price of 0.9 yuan/kg, the per hectare income would be 8,100 yuan. Considering that the planting cost per hectare of corn was about 700 yuan more than soybean, the switch from soybean to corn would give them a net increase of about 3,200 yuan per hectare. Moreover, to avoid any possible losses from falling prices until harvest in autumn, the farmers also signed orders to sell corn to local enterprises, thereby locking in a profit. The enterprises then sold these orders on the futures market.

Changed selling patterns: At the beginning of 2005, the spot price of soybean at Wangkui county in Heilongjiang was 2.34–2.4 yuan/kg, whereas the futures price at the time was on the rise. The local Government immediately disseminated this information through television and other media. By early March, when soybean futures prices reached 3.0–3.14 yuan/kg, the county Government advised the farmers to sell the produce, with farmers realizing higher incomes as a result. The year 2005 saw soybean prices slide from a historic high. Some farmers in Heilongjiang saw the falling trend of the futures prices, and understood that the total volume of international production would increase by 20 per cent. They immediately sold their stocks, thus avoiding a possible loss. In November of the same year, the relevant departments in Wangkui county, by referring to futures price information, advised the farmers to sell their soybean. The result was that the farmers sold their produce at prices 0.4 yuan/kg higher than was the case in the surrounding regions. As a result, the exchange believes they earned an extra 12 million yuan from their 650,000 mu of soybean.

Reducing information asymmetries: In 2003, the futures prices of soybean reached a seven-year high. As the majority of farmers in Heilongjiang province lacked market information and were still selling their produce at low prices, the DCE suggested that the Party Commission and the Government of Heilongjiang make efforts to disseminate futures price information to the farmers. Various media channels were used to disseminate information on soybean futures prices and to guide soybean farmers to refer to the futures price in selling their produce. The exchange believes this has enabled the Heilongjiang soybean farmers to capture the rising price of soybean and is estimated to have earned them in excess of a billion extra yuan during the year.

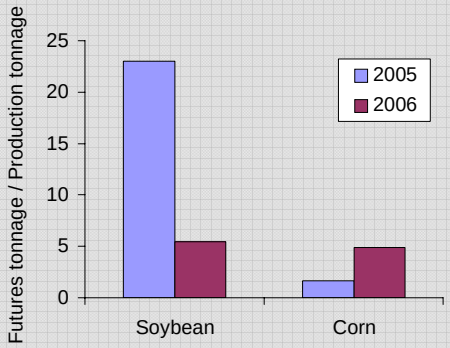
Efficiency of price formation: There have been several effects in this dimension. Firstly, a relatively strong correlation between the spot and the futures market – see chart 20 – suggests efficient alignment of the two markets. Secondly, a local price-discovery mechanism has been advantageous for the domestic industry. This is particularly important for the soybean industry, where domestic production is non-GMO only. The DCE has succeeded in developing the world's most liquid non-GMO soybean contract, which can provide a price reference in non-GMO transactions.

7.4.2 Price-risk management

First of all, it is important to note that for both the corn and the soybean contracts traded on the DCE, the key prerequisites in the trading environment that allow for effective price-risk management are that:

- There are liquid markets – the trading volume of each was equivalent to approximately five times the production volume in 2006 (see chart 19);
- Trading takes place in a regulated, rule-based trading environment under the rules and by-laws of the DCE, and with oversight by the CSRC (see section 7.3);

Chart 19. DCE crop turn, 2005–2006

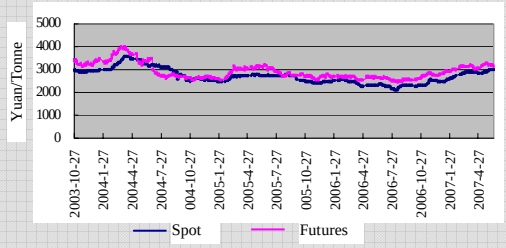


Source: DCE.

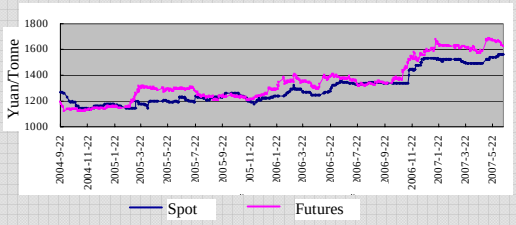
- Market information is disseminated transparently, in order to avoid asymmetries which might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Chart 20. DCE soybean and corn: spot/futures market price correlation, 2004–2007

(a) Soybean



(b) Corn



Source: DCE.

Research on the integration of Chinese commodity spot and futures markets carries some contrasting messages. According to data provided by the DCE, soybean shows a strong correlation between spot and futures, indicating a good relationship between the two markets. There appears to be wider divergence with corn, however (see chart 20). By contrast, Li (2007) found that whereas corn has an 87 per cent correlation coefficient between the futures and the spot price, for soybean that figure is significantly lower, at 62 per cent. Research by Zhang (2006) found a strong correlation between spot and futures prices of soybean, and found that the futures price generally had a lead effect on the spot price. Peng, Yong and Suo (2006: 4), however, conclude that "causality tests suggest that there is no link between changes in the futures price and spot price of soybean". Peng, Yong and Suo further note that the difference in empirical results may reflect the difference in sample periods, with the Peng, Yong and Suo sample apparently reflecting the latest developments. However, it is also noted that Peng, Yong and Suo's analysis was performed on the less liquid DCE Number 2 (GMO) soybean contract, largely used by importers and crushers that use foreign-produced GMO soybean, rather than the more liquid Number 1 contract, which is used by the domestic soybean-producer community.

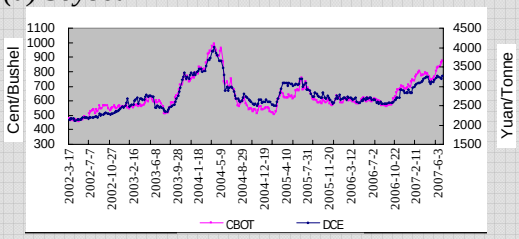
Correlations between price development on DCE and CBOT – the international exchange that generates world reference prices – also differ between soybean and corn (see chart 21). Soybean and corn are both globally traded commodities for which there is a world market price. However, DCE soybean prices follow CBOT soybean prices much more closely than they follow CBOT corn prices.

This is largely explained by the fact that China is self-sufficient in corn and is not (yet) a net importer. Therefore, the DCE price reflects Chinese supply/demand fundamentals, rather than the world situation, although corn prices at both exchanges generally tend to move in a similar direction. For corn, therefore, hedging on an international exchange can bring a wider basis risk, which can be avoided by hedging on a local platform.

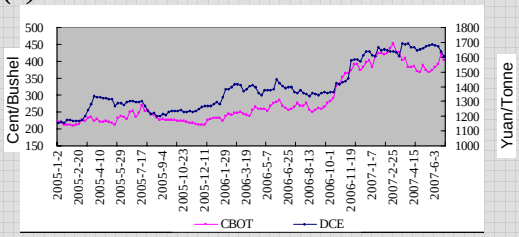
In terms of hedger involvement in the DCE's markets, the exchange has said that most of the major SOE importers and exporters active in the soybean and corn market are using the market for hedging purposes. (SOEs are not allowed by law to perform speculative activities in the market.) This was confirmed in a meeting with trading representatives of SOEs involved across different commodity sectors. Both the exchange and the SOE representatives stated that use of the futures market has contributed to better planning, and helps the orderly importation of commodities, while managing exposure to the price risks associated with international trade. At the same time, arbitrage activities also increase alignment between pricing in the domestic and the international markets. The DCE has identified some of the major SOE hedger participants in the markets as including:

Chart 21. DCE soybean and corn: correlation with CBOT, the international benchmark exchange

(a) Soybean



(b) Corn



Source: DCE.

- **China National Cereals, Oils and Foodstuffs Import and Export Corporation (COFCO):** Founded in 1952, and one of the largest import and export companies in China, COFCO presses about 3 million tonnes of soybean per year, mostly using imported soybean. Owing to long-distance transport, there is a time lag between procurement and processing. In order to avert the risk of falling prices during the transportation period, *all imported soybean* procured by COFCO is hedged with the DCE.

- **China Grains and Oils Group Science and Technology Corporation (CGOGST)**: Over many years of operation on the futures and cash markets, CGOGST has constructed a robust model for risk management, and hedging is now a core part of its enterprise management. The group has a special team that formulates monthly hedging plans according to its total volume of trade. This acts as a guide for the affiliated enterprises in their hedging operations. At present, the group trades about 6–7 million tonnes of corn and soybean per year, of which about 50 per cent is hedged through the futures market.

- **Jilin Grain Group**: Jilin Grain Group is a grain-trading enterprise. In recent years, it has consistently carried out hedging operations through the futures market. For example, in 2006, the group bought over 1 million tonnes of corn, of which 70 per cent had been hedged through the futures market. The operation earned it more than 18 million yuan in profit.

Importantly, the futures market is becoming increasingly relevant to producer communities, mainly small-scale farmers. Due to long production cycles and world market price volatility, Chinese producers face significant price risk. In recent years, the DCE – under the umbrella of its "1000 villages, 10,000 farmers" programme – has actively encouraged farmers and purchasing/processing enterprises in north-east China to take part in a pilot project entitled Company + Farm, Futures + Order, in order to better manage their price risk. In this model, enterprises offer long-term forward contracts to farmers. Prices are fixed in advance of the planting season, and then the enterprises hedge their exposure to price risk through the futures market. The DCE contends that the project has been

successful in helping to secure improved incomes for farmers through hedging by the purchaser, as is illustrated by the following case study.

Before sowing began in spring 2006, the 150 major grain growers from the village of Lazigou in Jilin province sold – through their grain cooperative – the 300 hectares of corn to be harvested in the autumn. The purchaser was the Pingdong Depot in nearby Siping City, and the price was agreed at the reference futures price of 1,200 yuan/tonne. The depot then hedged its risk in the futures market. By means of this operation, both parties were able to stabilize their income: the farmers were guaranteed a basic profit for their crops, and the depot was guaranteed a dependable source of grain, while avoiding the risk of fluctuating prices eating into their margins. Subsequently, corn prices rose to over 1,500 yuan/tonne, and Pingdong Depot sold corn orders in the futures market. As a result, and in accordance with a profit-sharing agreement with the farmers, the depot passed 270,000 yuan from the extra profit it had earned in the futures market to the 150 farmers. China Economic Net (2007) documents a similar model of hedging operating in the ZCE's wheat market.
While many purchasing enterprises are State-run, and therefore face imperatives to assist in national development, it is not clear whether the incentives would be strong enough for a similar model to be applied in a system where private companies predominated. On the one hand, the advantage of developing a stable source of supply – especially one where produce is of consistently high quality – can be a motivating factor. On the other hand, it is unclear to what extent this type of profit-sharing model would be consistent with the profit-maximization imperatives associated with a free market. A key determinant could be the amount of competition among purchasers for procurement from limited sources of supply.

There is some evidence of direct but limited participation by farmers in the futures market. Li (2007) noted that as an adjunct to the "1,000 villages, 10,000 farmers" programme, "more capable" farmers have been enabled to participate directly in the market, although the DCE cannot confirm the extent to which this occurs. The prospective introduction of options may further boost smallholder participation. At present, however, the overall emphasis of price-risk management impacts for Chinese smallholders appears to be through an indirect mechanism whereby the purchaser provides forward pricing to the producer and passes on the benefits.

7.4.3 Venue for investment

First of all, it is important to note that for both the soybean and the corn contracts, the key prerequisites in the trading environment that make the DCE an attractive and secure venue for investment are that:

- There are liquid markets;
- Trading takes place in a regulated, rule-based trading environment, under the rules and by-laws of the DCE and with oversight by the CSRC;
- Market information is disseminated transparently, in order to avoid asymmetries which might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Table 4. DCE market composition, 2006

	Individual	Institutional
Number of participants:	95%	5%
Contract volume:	65%	35%
Open Interest:	60%	40%

Source: DCE.

The data on market composition made available by the DCE shows the breakdown for 2006 across the whole market (see table 4). The data suggest that volume and open interest are well balanced between the "individual" retail investor participants and the "institutional" commercial and State enterprises.

The high number of "individual" market participants – 95 per cent – reflects how speculative participation in the Chinese market largely originates from small-scale retail investors, confirming a similar observation by Peng, Yong and Suo (2006). Until the change to the regulatory framework in

early 2007, financial institutions and foreign participants were prohibited from participation, as was proprietary trading by brokerage houses.[29] According to exchange personnel, retail participation is driven by the lack of alternative venues for investment – bank savings accounts yield a very limited real rate of interest. Although many retail investors do not have a high awareness of commodity futures markets, exchange personnel have said that after opening a trading account, they would receive risk education from their broker.

The conclusion of Peng, Yong and Suo (2006: 8) that the fragmented retail speculative base "explains in part the relatively low liquidity observed in many of the commodity futures products traded on the exchanges" does not follow, however. Exchange volume data suggest that DCE contracts for corn and soybean – in particular, soybean Number 1 – are highly liquid. It is also noted that hedging participants are relatively more concentrated, with a high share of hedging volume originating from the large SOEs.

As far as price development and volatility are concerned, as has already been discussed, both corn and soybeans are globally traded commodities for which there is a world market price. Chinese prices are closely aligned with world prices for soybean, because China is a net importer, but they are less so in the case of corn, in which China is currently self-sufficient. Hence, the DCE corn price reflects local rather than worldwide supply/demand fundamentals. However, both markets tend to move in similar directions. A significant rise in corn prices since late 2005 – partly driven by increased demand for biofuels – has occurred in both DCE and CBOT markets. Therefore, speculative excess cannot be said to drive price rises in the corn market – or in the soybean market – in China.

It is not clear to what extent retail investment in corn or soybeans has been incorporated into investors' portfolios, nor is it clear to what extent retail investors and farmers are speculating in ways that they cannot afford. However, regulatory measures are in place – see annex 2 – which control the level of speculation in the markets, limit the possibility of default, and promote responsible investment practice.

Exchange personnel and market participants have agreed that some arbitrage takes place between the DCE and the CBOT for corn and soybean, aligning domestic prices with international prices. This is not surprising due to the generally close relationship between DCE and CBOT price movements. Although the Chinese markets are closed to overseas participation, and Chinese participation overseas is restricted, there remain two channels for arbitrage: (i) Chinese SOEs have dispensation to hedge on international exchanges, including CBOT; (ii) many soybean crushers in China are joint ventures between Chinese and foreign firms, with the foreign partner active in the CBOT and the Chinese partner active in the DCE.

7.4.4 Facilitation of physical commodity trade

Improved spot pricing: The DCE was founded in 1993, and its markets have evolved alongside the market pricing system in China. A spot pricing system was established in China through polling by government agencies in each of China's provinces. The exchange itself is not directly responsible for providing the spot prices. However, the DCE argues that the introduction of the futures market has provided authoritative price discovery, which has increased the efficiency of the distribution system and integrated the national market.

Guided by information from the futures market, the time lag in the information flow between and within regional markets has been very significantly shortened, reducing the discrepancy in spot prices between and within regions. A few years ago, the transmission of information on price fluctuations from the international soybean market and across regional markets to grassroots retailers would take half a month, with a further week needed for the information to get from the retailers to the farmers. But now, retailers and farmers are able to obtain the soybean prices in the international and regional markets via the futures markets on the same day.

[29] Foreign participation is still not permitted.

From 1997 to 2002, the regional price differences for soybean within Heilongjiang province were relatively pronounced. For example, the difference in soybean prices between Harbin and Jiamusi was nearly 60 yuan/tonne. However, since 2003, the price differences across regions mainly represent transport costs and are sometimes reduced almost to zero. Before 2002, transporting soybean from Harbin to be sold in Dalian, discounting the transport costs, would bring a benefit of approximately 80 yuan/tonne, on average. This has now been reduced to less than 10 yuan/tonne. In the case of corn, before the futures market was instituted, the regional price differences between the provinces of Jilin and Heilongjiang were at least 60 yuan/tonne. Now this regional price difference has almost disappeared.

Reinforces cash market transactions: Data from the exchange shows that significant delivery volumes are recorded at DCE warehouses in both soybean and corn – in the year 2006, 60,000 tonnes of soybean (0.4 per cent of total Chinese production) and 20,000 tonnes of corn (0.01 per cent of total Chinese production) were delivered to the exchange. This suggests that the market accepts the delivery system as a functioning delivery or procurement channel – although one of last resort – the function that futures markets are typically intended to perform. As these deliveries are guaranteed, the exchange has therefore reduced counterparty risk for cash market transactions.

Infrastructure enhancement: The DCE has improved the warehousing infrastructure by putting in place a comprehensive set of requirements that must be met by all facilities that wish to be accredited as a DCE delivery warehouse. These are as follows:

- Holding a licence from the relevant industrial and commercial administration authorities;
- Minimum required fixed assets and registered capital to ensure financial strength;
- A “fit and proper person” test for the management of the warehouse, including three years without serious offences and at least five years of warehouse management experience for senior management;
- Adherence to the exchange rules and delivery procedures;
- Minimum capacity with appropriate conditions for storing the goods listed on the exchange;
- A complete and functioning set of modern equipment, as defined by the exchange;
- A good warehousing and stock management system;
- Proper storage of records and sound warehouse-management regulations;
- Good transport links;
- A strict and comprehensive system for grading goods that are delivered.

Industry participants confirm that DCE warehouses are considered to be of superior quality, compared to other warehousing. However, information has not been available to identify whether this has led to a concrete reduction in wastage.

Quality upgrade: The DCE’s contract specifications mirror those accepted in the physical market. The standard for the DCE’s soybean Number 1 contract is Grade 3 yellow soybean. Its alternatives are Grades 1, 2, and 4. Each of these can be deliverable on the Number 1 contract, but a system of premiums and discounts is in place. Thus, Grade 1 yellow soybean has a premium of 30 yuan/tonne; Grade 2 has a premium of 10 yuan/tonne; and Grade 4 has a discount of 30 yuan/tonne.

The DCE has supplied an illustration to reinforce comments made by exchange personnel that this system of premiums and discounts has stimulated a quality upgrade, by rewarding the delivery of a better quality of soybean. In 2003, the standard Grade 3 soybean took up 56 per cent of the storage among all grades. In 2004, the Grade 2 soybean took up over 50 per cent, surpassing the demand for

the standard grade. According to the DCE, this is an indication that the system of premiums and discounts helped to turn Grade 2 soybean into the most economic item for delivery. It is not clear from these data alone, however, whether the overall quality in the underlying market was affected, or whether the producers delivering on the exchange were those producing better-quality soybean.

As has already been described, the DCE has had a role in developing contracts that reflect the Chinese Government's National Management Statute for GMOs of March 2002. Although the DCE adopted, rather than created, the quality standards required to separate the two markets, it can be said to have played an important role in increasing purchaser confidence in local quality control and certification. As a result, purchasers taking delivery on DCE's Number 1 soybeans contract can be guaranteed to receive non-GMO soybean.

7.4.5 Facilitation of financing to the agricultural sector

Until recently, Chinese law did not permit involvement by banks in the futures market, except for clearing banks used in order to provide basic margin and client account management services. Individuals or companies were not allowed to take any form of bank financing for use in the futures market, and banks themselves were not allowed to perform trading on their own account or on behalf of clients. Changes in the regulatory framework in early 2007 mean that Chinese banks are no longer prohibited from supporting clients in their hedging operations. (Banks are still, however, not allowed to trade directly in the markets.) While this change is very recent, and the developments in this area are nascent, the DCE has described how the Agricultural Development Bank of China (ADBC) is already starting to develop an agricultural lending model that takes advantage of the exchange's physical delivery mechanism and hedging platform to reduce the risk of lending to the agriculture sector.

The ADBC initiated the "farmer + enterprise + ADBC + futures market" model in the major grain-producing regions. This offers a solution pitched as a win-win for all parties, arising from the improved flow of credit to the commodity supply chain. Enterprises obtain loans from ADBC for the future purchase of grain, which are then hedged through the DCE. The DCE guarantees the product through its delivery system, and the futures brokerage company provides an intermediary role in transferring warehouse receipts and cash to enable the exchange of goods at the expiry of the contract. Meanwhile, the bank carries out supervision, over the life cycle of the process. At every link, ADBC signs individual supervision agreements to the effect that every operation requires the bank's approval as well as written proof. Unilateral operation by the enterprise is not allowed. Thus, not only is hedging enabled, but speculative operations are avoided, too. The financing cycle helps to facilitate physical commodity transactions, while the enterprise can also lock in its profit to hedge against the risk of falling prices. This then reduces the credit risk to the bank caused by the enterprise being unable to pay back its loan because of losses due to price decline. This model is in its earliest stages of development, and therefore remains to be validated. However, the potential has been established, and the exchange expects commodity financing models that leverage DCE mechanisms to expand rapidly.

7.4.6 Market development

Education and capacity-building: DCE conducts regular education and awareness-raising seminars. Since 2004, the focus of these has been a major programme known as the "1,000 villages, 10,000 farmers" initiative (see box 14).

On the one hand, this shows the exchange to be a dynamic entity in leading large-scale education activities for Chinese farmers. On the other hand, it also shows the limitations of the exchange. While the education of 40,000 farmers by mid-2007 represents a significant achievement for a relatively small organization that is otherwise focused on commodity trading, this number remains a low proportion relative to the total number of soybean and corn farmers in China. However, the exchange has also been proactive in engaging other governmental and institutional stakeholders that have rural and farmer development as their aim – a potential model for widening the reach of such programmes. It therefore appears that an ideal division of labour would have the exchange as the developer of

appropriate courses and seminars on commodity markets, and as the trainer of trainers. This would also appear to call for better-placed or better-resourced entities to deliver such services on the scale required.

Market access, capacity-building and ICT: While it could not be suggested that the DCE has meaningfully helped to boost the use of mobile phones or the internet in China, it is true that they have leveraged the available ICT to overcome barriers of distance and infrastructure, to reach farmers directly, and to connect farmers to markets. As discussed above, the use of SMS messages to disseminate market information is one dimension. The other is the use of the internet and call centres to allow farmers to put their technical enquiries to experts.

New product and service development: The DCE has been constrained by regulatory restrictions from launching many new products and services. The focus of current product development has been on launching futures contracts for new commodities; an industrial commodity futures contract was launched by the exchange for the first time in July 2007. However, the DCE is examining the possibility of introducing weather and other index derivative products, as well as options, should regulatory approval be given for these types of instruments.

Box 14. The DCE's "1,000 villages, 10,000 farmers" education programme

The DCE's "1,000 villages, 10,000 farmers" initiative is a systematic programme of training for farmers. In cooperation with relevant departments and agencies of the local government, a series of circuit training seminars has been conducted. During 2005–2006, over 300 training seminars were held. These trained more than 30,000 people, covering 44 cities and county districts across three provinces and one district in north-east China. By early-to-mid 2007, over 40,000 people had received training. Trainees have included the major growers, village agents, grassroots village cadres, and cash market enterprises. (Major growers and village agents have accounted for 50 per cent of the total number of trainees.)

The initiative has followed a three-step programme:

- The first phase, starting in 2004, involved a wide-scale education programme for farmers and other market participants on how to use cash and futures market information.
- During 2006, the DCE launched its "Campaign for Serving Rural Households", which was a major exercise in provision of information. Farmers in north-east China were provided with information on the corn and soybean markets. They were encouraged to use this information to form more accurate expectations about future price developments regarding the two crops, and, as a result, to improve their planting, harvesting and selling decisions.
- The final stage was launched in April 2007. The "Market-nurturing Programme" aims to help enterprises to understand and use the futures market, in order to manage risk and to stabilize income. Importantly, enterprises are also being educated about how to incorporate hedging functionality into physical contracts with farmers, thereby passing some of the benefits of risk management along the supply chain.

8. India

8.1 Historical development of agricultural markets and specific commodity markets under review

8.1.1 Country factfile

GDP (USDb, current prices) 2006:	887	Average *annual GDP growth 1990–2006:*	6.7 %
GDP per cap. (USD, current prices) 2006:	797	*GDP per capita growth 1990–2006:*	111 %
Population (millions) 2006:	1113	*Population growth 1990–2006:*	33 %
Inflation rate 1990 (2000 as 100)	42	*Inflation rate 2005 (2000 as 100)*	129
Current account balance (USDb) 1990:	-7.9	*Current account balance (USDb) 2006:*	-19.3
Agriculture – share of GDP 2006:	19 %	*Agro share of export revenues 2005:*	10 %
Agriculture – share of employment 2004:	56 %	*Poorest 20 % – share of national income:*	8.9 %
Surface area (millions of sq. km) 2005:	3.3	*Life expectancy at birth (years) 2005:*	64
Adult literacy rate 2006:	61 %		

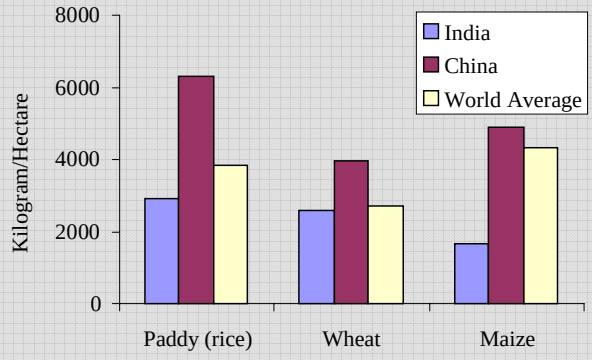
USDb = billions of United States dollars

8.1.2 Historical development

As India embarked on its "tryst with destiny" in 1947, the new nation's emergence was scarred by a legacy of agricultural neglect and famine, in particular the devastating Bengal famine of 1943 in which an estimated five million lives were lost. The Government of India (GOI) thus adopted food self-sufficiency as a primary strategic goal for agricultural and national development.[30] Moreover, the country's high dependence on agriculture for employment and income has ensured that agriculture remains a high priority for policymakers, and that the drive for poverty reduction underlies agricultural decision-making.

The initial post-independence period saw a focus on land reform and irrigation development. This period also saw the foundations of India's highly regulated agro-economy put in place. At the national level, the Essential Commodities Act 1955 mandated a system of licences, permits, price and storage controls, and compulsory purchase and sale orders for commodities deemed to be strategic. At the State level, market regulation acts for agricultural produce were introduced to govern local markets. These were often reinforced by additional instruments, at State discretion (OECD, 2007).

Chart 22. Comparative crop yields in 1999: India, China, and world average



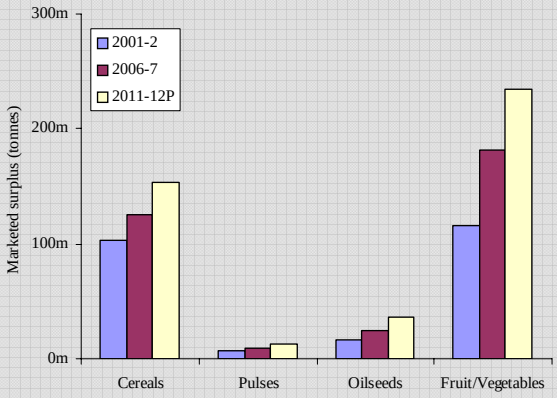
Source: GOI Tenth Five-Year Plan, 2002–2007.

The "Green Revolution" during the 1960s and 1970s saw India make dramatic leaps in production and in farmer incomes (von Braun, Gulati and Fan, 2005a) – a source of great pride in the country to this day. This was brought about by the introduction of high-yield varieties of key commodities generated by agricultural research and extension breakthroughs, and by government-supported drives to increase access to inputs, irrigation, credit and other infrastructure (Mahadevan, 2003).

[30] Amartya Sen, the Indian Nobel laureate in economics, later argued that the famine was caused not so much by food shortages as by rumours of shortages, which provoked hoarding on a large scale. The consequent price appreciation priced a large number of poor people out of the food market.

However, while yields have risen consistently throughout India's post-independence history, they still often remain substantially below world average levels (see chart 22). Some analysts have considered the earlier successes of the Green Revolution to be stagnating (for example, von Braun et al., 2005b), and the quest for a "second Green Revolution" features prominently in aspirations for the sector declared by politicians, agriculturalists, economists and the private sector alike (see, for example, the GOI Economic Survey 2006/07 (published 2007)).

Chart 23. India's actual and projected marketed surpluses, 2001–2012



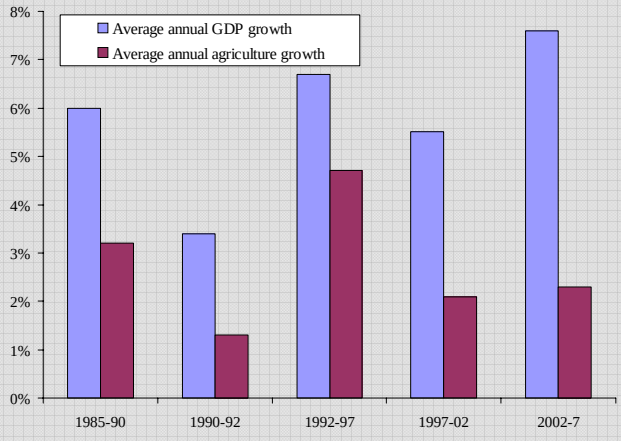
Source: GOI Working Group on Agricultural Marketing Infrastructure, 2007.

Note: 2011–2012 data represents projected levels.

From 1991, the GOI embarked on an economy-wide liberalization programme under then-Finance Minister and current Prime Minister, Manmohan Singh. This is underlined by Indian membership of the WTO since its creation in 1995. This programme combined external reforms in exchange-rate, trade and foreign investment policies, with internal reforms in industrial policy, price and distribution controls, and restructuring of the financial and public sectors (Mahadevan, 2003). In agriculture, tariffs were reduced from 113 per cent in 1990/91 to 26 per cent in 1997/98. However, the reduction of barriers to foreign direct investment and the removal of bureaucratic controls has proceeded at a slower pace. While agricultural growth in the mid-1990s surged to over 4 per cent per annum, it had dropped off again to below 2 per cent by the new millennium.

India has achieved its aim of food self-sufficiency, with regular marketed surpluses of strategic commodities (see chart 23). However, the costs of this achievement have been becoming increasingly evident: often sizable stockpiles of foodgrains have been generated (von Braun, Gulati and Fan, 2005a); subsidy levels have increased, and have been pursued at the cost of reduced public investment in agricultural infrastructure (Jha, 2007); and production has been distorted towards relatively stagnant "essential commodities" and away from the potentially high-value commodities demanded by an Indian middle class and by world export markets with increasingly sophisticated tastes (von Braun et al., 2005a and 2005b).

Chart 24. Indian growth rates for agriculture and GDP, 1985–2007



Source: Economic Survey 2006/07, Ministry of Finance, GOI.

Despite rapid growth in the overall economy that has seen rising incomes and bulging foreign currency reserves, India still has millions of people living below the poverty line. Growth in Indian agriculture lags substantially behind overall growth in GDP (see chart 24), and the GOI has systematically identified a number of formidable challenges that need to be addressed urgently (see box 15).

However, there are also significant platforms on which to build, and opportunities to exploit. These include potential diversification into higher-value products (von Braun et al., 2005b) and more valuable areas of the supply chain (OECD, 2007); an increasingly dynamic and technologically innovative private sector looking for opportunities to develop and serve markets at the "bottom of the pyramid" (Prahalad, 2004); India's well-developed rural institutions that provide information, credit and extension services (von Braun, Gulati and Fan, 2005a) – these include farmer cooperatives, microfinance institutions and rural credit banks. It is in this context that the GOI's radical blueprint for the national multi-commodity exchange framework has been developed, with a view to catalysing development of the agricultural ecosystem.

The Indian agricultural sector is largely characterized by smallholder production, which accounts for about 78 per cent of the total (GOI Tenth Five-Year Plan, 2002–2007). The average landholding in the 1990s was 1.6 hectares, a significant decline on the 1970 average of 2.3 hectares. Limited opportunities for moving out of agriculture, and the system of inheritance, are two factors that reinforce this structure (OECD, 2007), as do limitations on the growth of domestic agribusiness, and restrictions on the entry of foreign companies (von Braun et al., 2005b).

Box 15. Challenges for Indian agriculture

- Declining production and productivity growth rates;
- Lower public investment, and deteriorating quality of public services;
- Increasing scarcity of water;
- Imbalanced use of fertilizer;
- Severe and extensive land degradation;
- Inadequate access to inputs, irrigation and pesticides;
- Insufficient seed availability and replacement rates;
- Unsatisfactory availability of machinery and implements;
- Outmoded extension and information support services;
- Inadequate storage facilities and related infrastructure;
- Poor maintenance of rural roads and canals;
- Inefficiency in market support processes;
- Declining rural credit/deposit ratios.

Source: GOI Tenth Five-Year Plan, 2002–2007.

Indian smallholders are heavily dependent upon – and often dominated by – intermediaries, known as "arthiyas" (GOI Tenth Five-Year Plan, 2002–2007). The reasons for this include the structure of farmer wholesale markets, which deters competition among purchasers, large information asymmetries in the arthiyas' favour, a lack of education among farmers, and infrastructural deficiencies that act as a sizable hurdle for a farmer to directly access markets and storage facilities. The costs of this system are high: an estimated 10–15 per cent of the value of farmers' produce (GOI, 2007b) and there are wide spreads between farm-gate prices and consumer prices (GOI, Tenth Five-Year Plan (2002–2007)).

However, this situation has evolved over a long period, and the farmer–arthiya relationship should not be categorized as being grounded in exploitation alone. The system can be defined as a form of one-stop shop, "wherein the commission agent provides the linkages needed for cultivation as well as buyback… and services in the form of credit, insurance, fixed price, transportation and storage" (GOI, 2007b: 113). As arthiyas are embedded in the rural community, they can often provide the flexibility and speed of response that other institutions struggle to match. On the other hand, India suffers from an alarming incidence of suicide among indebted farmers unable to repay loans.[31] Understandably, the tragedy of farmer suicides is highly sensitive, and keeps agriculture towards the top of India's national and State policy agenda.

[31] Accurate statistics on farmer suicides are not available. However, Hardiker (2006) cites Vidarbha region in north-east Maharashtra State, where a government committee found that 2.8 million of the region's 3.2 million cotton farmers are defaulters and 80 per cent of new lending is used to service old loans. In this region, the State Government records 1,920 farmer suicides between 2001 and 2006, while a farmers' organization records 782 suicides in 12 months between 2005 and 2006 alone, and a further 401 in the first five months of 2007.

Another feature of Indian agriculture is the extraordinarily high fragmentation of physical markets. There are approximately 7,500 wholesale markets, known as agricultural product marketing committees (APMCs) or "mandis", which in turn support over 27,000 primary rural markets. Many of these entities have been described as being "not equipped with basic facilities like platforms for sale and auction, electricity, drinking water, link roads, traders' premises, facilities for post-harvest management etc." (GOI Tenth Five-Year Plan 2002–2007: 550). Liberalization of marketing structures to allow national market integration has been a national priority since 2002 (Sinha, 2002).

8.1.3 Summary of key agricultural challenges over time

- Transition to a market-based economy, and constructing market institutions to facilitate and regulate trade;
- Establishing food security for a rapidly growing population, and reducing rural poverty;
- Integrating fragmented and inefficient physical markets;
- Diversification of agricultural base into higher-value products that are competitive on world markets;
- Building physical and institutional infrastructure;
- Consolidating and commercializing the smallholder sector.

8.1.4 Specific commodities under review: cardamom and mentha oil

The two commodities featured in the study are both traded as futures contracts exclusively and for the first time in India. Cardamom is a spice, for which India is the second-largest producing and exporting country after Guatemala. Mentha oil – an extract from the mentha plant – has a variety of industrial and medicinal applications. India is the world's largest producer and exporter of mentha oil, by a wide margin. Neither of the markets for these commodities features government intervention.

(a) Cardamom

Characteristics and industry process

Cardamom (*elletaria cardamomum*) is one of the most intriguing spices, with its distinctive floral aroma, and its unique, clean flavour. It is a versatile spice that adds a fragrant touch to both sweet and spicy dishes.

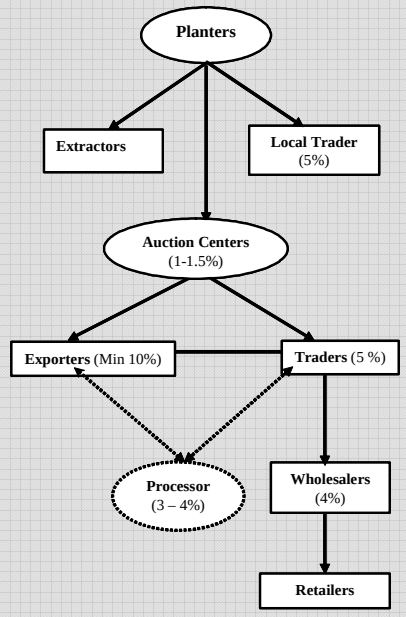
Cardamom thrives best in tropical forests at altitudes ranging from 600 to 1,500 metres, where there is a well-distributed rainfall of over 150 cm and a temperature of between 10°C and 35°C. India cultivates the Malabar variety in Kerala (which accounts for 70 per cent of production), and also in Karnataka (20 per cent) and Tamil Nadu (10 per cent), in the high-altitude regions of the Western Ghats, over a stretch of 1,000 kilometres in southern India. Idukki district in Kerala is the industry's major growing and trading centre. The two major commercial varieties are the Malabar and the Guatemalan varieties. The Malabar variety, traded as Alleppey Green, is considered to be the highest-quality grade of cardamom in the world.

Plant with cardamom seeds

Source: MCX.

The spice is derived from seeds on plants that are characterized by fan-like branches, six to nine feet in length. At the base of each plant, stems yield the ribbed pods that contain the cardamom seeds. Each pod contains between four and six tiny, dark seeds, which are the source of cardamom's aroma and taste. The harvesting season lasts between August and January, although it can sometimes extend until March. Planters pick up the immature green pods just prior to ripening, to prevent loss of colour and splitting. The pods are first cleaned, and then dried in hot-air chambers, either conventionally, or with the help of advanced drying machines that are available in the cardamom-growing areas.

Figure 5. Pre-MCX industry supply chain and indicative margins: cardamom



Source: MCX.

After drying, the produce is sold in bulk, for which planters receive an average price based on the quality of total bulk. Another option is to segregate the bulk into different quality grades defined by the pod length: 7 mm, 6 mm, and remaining bulk. This can help to fetch a higher price for the premium grades, resulting in an improved average price for the total produce.

Traditionally, planters would either take their produce to auction centres, of which there are seven in the growing area, or sell it through local traders (see fig. 5). The Kerala Cardamom Processing and Marketing Company is the biggest auction centre where auctions are held twice a week. Other centres hold auctions on one designated day per week. At auction, samples of each planter lot are distributed among buyers prior to and during the bidding.

Industry structure and supply chain

Cardamom is sold at auction centres. The Spices Board licenses traders, and they participate at the different marketing centres for auction. The farmers bring in their produce to the auction centres, where it is cleaned, graded, packed in polythene bags, and stored in the auction centres' warehouses. After the auctions, the traders who buy the produce bring it to the trading centres in Kochi, from where it is transported to the upcountry markets, or exported.

Industry development

Indian production and yield has steadily increased in recent years. Production stood at over 12,500 tonnes in 2005/06 (see table 5). In the past five years, India has consumed most of the cardamom produced, exporting only around 5 per cent of its total production.

Total world production in 2006 stood at slightly over 30,000 tonnes. The world's largest producer is Guatemala, which had an estimated production in 2006 of 18,000 to 20,000 tonnes (see chart 25).

Table 5. Indian production statistics: cardamom, 2000–2006

Cardamom - Area, Production and Indian Export Details				
Year	Area (Hects)	Production (Tonnes)	Yield (Kgs/ha)	Exports
2000-01	72320	10480	195	1545
2001-02	72663	11365	210	1031
2002-03	73125	11920	218	682
2003-04	73237	11580	210	690
2004-05	73725	11'415		650
2005-06	73795	12'540		875

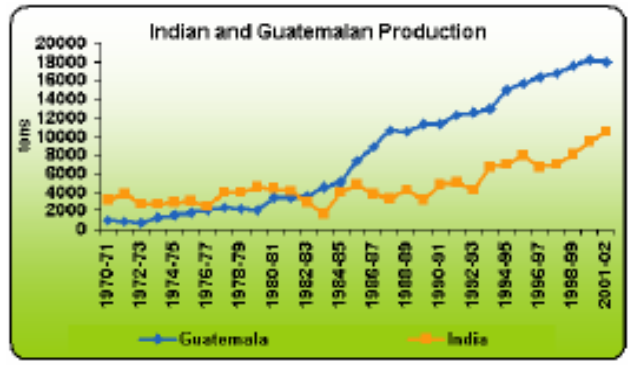
Source: Spices Board.

Cardamom is also grown on a small scale in Cambodia, Mexico, Nepal, Papua New Guinea, Sri Lanka, Thailand, the United Republic of Tanzania, and Viet Nam.

Users and uses

India has been a traditional exporter of cardamom to Middle Eastern countries, where it is used to prepare gahwa – a strong cardamom–coffee drink. The export of value-added cardamom products, such as cardamom oil and cardamom oleoresins, is increasing too, to countries such as Germany, the Netherlands and the United Kingdom. The estimate of Indian exports in 2005/06 was 875 tonnes – 35 per cent higher than the previous year. Arabian countries are the major cardamom importers, accounting for approximately a 60 per cent share of total world cardamom imports. Japan and Saudi Arabia are the major importers of Indian cardamom, specifically.

Chart 25. Indian and Guatemalan cardamom exports, 1970–2005



Source: MCX.

Cardamom spot prices display significant volatility, being affected by domestic and international supply/demand factors. Whereas demand has been displaying a steady-to-positive trend, supply is highly volatile. Peak demand usually occurs during the period of Ramadan on the Islamic calendar. Usually, the crop from Guatemala and India arrives during this period. The crop is highly susceptible to pests, diseases, and the vagaries of the monsoon. These factors also exert a strong influence on the prices. From the point of view of the producers, the local price-influencing factors include the freshness, colour, aroma and size of the capsule; weather conditions in the growing area; the annual production of cardamom in India and other major producing countries; year ending stocks; and export demand.

(b) Mentha oil

Characteristics and industry process

Mentha arvensis is commonly known as menthol mint, corn mint or Japanese mint. India's "mint belt" lies in the country's "breadbasket" – a strip of plains and foothills about 1,500 kilometres long and 250 kilometres wide, located to the south of the Himalayas and comprising the States of Punjab, Himachal Pradesh, Haryana, Uttar Pradesh and Bihar.

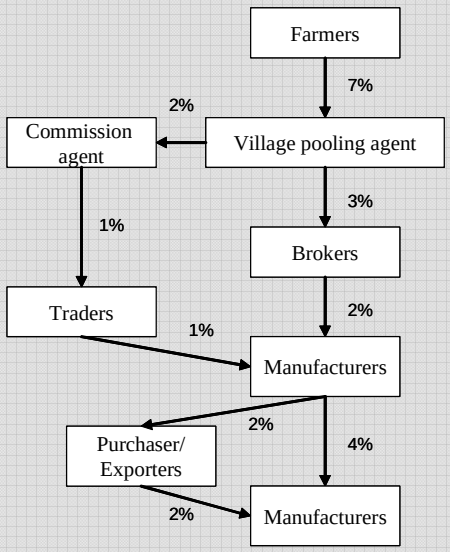
Mentha is a *zaid* – or spring – season crop, with sowing taking place in February and March. The crop is harvested in May–June at the initiation of flowering, when it is said to have maximum oil content. After harvesting, the mentha is sun-dried and the leaves are steam-distillated. The distillation results in the production of mentha oil. Mentha oil is further used as an input for the manufacture of menthol crystals, the crystal form being a raw material used in the preparation of various consumer products.

The mentha plant

Source: MCX.

Industry structure and supply chain

Figure 6. Pre-MCX industry supply chain and indicative margins: mentha oil



Source: MCX.

In India, mint tends to be cultivated by small and marginal farmers. These farmers typically also harvest rice, pigeonpea, maize or soybean in September–October, and then plant potato, mustard, wheat or chickpea in October–November which is harvested between February and April. Weather conditions at the production centres during the harvesting period, the rate of pest and disease infestation, and the volume of area cultivated are the major price-influencing factors, alongside levels of international and domestic demand, and export prices.

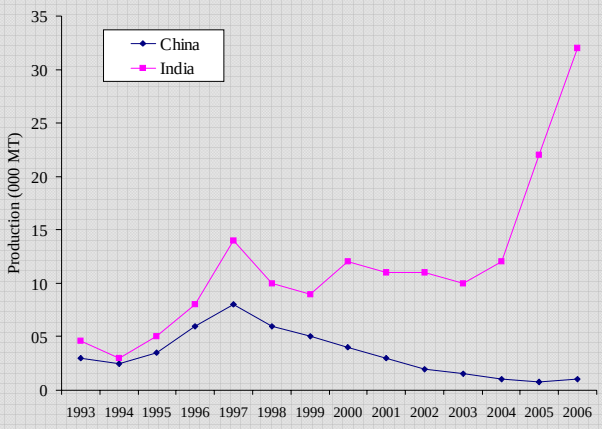
Prior to the introduction of the MCX mentha contract, about 80 per cent of farmers used to take their oil to village-level pooling agents, who decided prices without reference to external benchmarks. Hence the markets operated in a vacuum, and pooling agents realized approximately a 7 per cent margin in the supply chain. Brokers and commission agents purchased oil from the pooling agents. From the commission agents, it was passed on to traders and brokers, who in turn passed it on to the manufacturers of mentha oil crystals. Wholesalers or exporters purchased menthol crystal from manufacturers at a margin of 4 per cent, in order to sell in different domestic and international markets for use in consumer products. In sum, a large margin was incurred as a result of the lengthy supply chain – estimated at about an extra Rs 125/kg (about $3.10) or 11–12 per cent (see fig. 6).

Industry development

Over the past few decades, India's rising population has put more pressure on agricultural land to meet food demand free from pests and diseases. *Mentha arvensis* was identified as a valuable crop in this context. As well as providing farmers with an extra crop every year, the rotation of mentha with other food crops was found to be a good way of helping to control pests and diseases. Worldwide demand for mentha and its derivative products had also begun – and continues – to increase, and the climate and geography of parts of India are ideal for production.

Until about 20 years ago, the bulk of the world's *mentha arvensis* came from Brazil and China. Mentha cultivation was introduced to India in the 1980s. However, farmers' lack of awareness was found to hinder the spread of the crop. The Central Institute of Medicinal and Aromatic Plants (CIMAP) overcame this knowledge gap by holding training seminars for farmers within the mentha belt. CIMAP scientists also used a range of media, including television and radio appearances, to discuss aspects of the mentha production system. As a result, farmers' confidence and willingness to cultivate mentha has increased

Chart 26. Production of natural mentha oil and menthol in India and China, 1993–2006



Source: Industry sources.

substantially. Subsequently, the volume of Indian mentha production overtook first that of Brazil, and then that of China. Today, India accounts for about 80 per cent of total world production (see chart 26).

A notable feature of the mentha market in India has been the propensity for speculation among mentha participants. The MCX reports that prior to the introduction of exchange-traded futures, locals had been speculating in informal mentha cash and forward markets for several decades. Small traders were vulnerable to manipulation by large traders, and farmers were usually on the receiving end. There was also the risk of default, as bets were struck verbally without any margin deposit being paid. In some cases, traders would accept physical delivery against a bet, in the event that the person did not have funds available at the time of expiry, although most bets were cash-settled. In this context, traders often used to manipulate the market to their advantage.

Users and uses

Mentha oil is widely used in the food, flavouring, pharmaceutical and cosmetic industries. Worldwide, approximately 10,000 tonnes of natural menthol and 2,000 tonnes of synthetic menthol are used by the pharma-cosmetic and cigarette industries every year. The range of specific applications is broad and diverse, with menthol used in confectionery, perfumery, mouth fresheners, cough medication, tobacco goods, medicated oils, toothpastes, analgesic balms, lotions, shampoos and chewing gums.

he United States is the major consumer of Indian mentha oil, accounting for 50 per cent of total Indian exports. China, France, other countries of the European Union, Japan, Paraguay and Singapore are other important destinations.

Summary: Salient features about the physical market

- High-value commodities with a range of value-added marketing opportunities
- Sizeable export opportunities to a range of lucrative markets
- Largely smallholder production
- Significant need for infrastructure development and better production practices
- The presence of intermediaries, who take a sizeable proportion of the value of the end commodity
- Cardamom: volatility is a key issue, as it is often the farmers' primary crop and the level of volatility can be high
- Mentha: a crop used to supplement smallholder incomes because of the potential for intercropping with staple crops

8.2 Exchange emergence and contract development: Multi Commodity Exchange of India, Ltd. (MCX)

Year founded: 2003	*Location:* Mumbai, India
Instruments traded: Commodity futures contracts only (a commodity index is displayed but not yet tradable; a national spot exchange is imminent, subject to regulatory approval)	*Commodities traded:* 70 contracts are listed spanning 56 different commodities. These include 2 precious metals contracts, 7 base metals contracts, 5 energy contracts, 3 petrochemicals, 18 oil/seeds, 5 spices, 2 fibre, 3 pulses, 1 cereals, 4 plantation crops, and 6 miscellaneous agriculture.

Ownership: MCX is a privately owned limited company, demutualized since its inception. The Financial Technologies Group – a leading Indian technology developer and solutions provider – is the exchange's parent company and has a majority holding. The exchange is expected to undertake an initial public offering in the near future.	*Trading system:* An electronic trading system, custom-developed by Financial Technologies, the exchange's parent company.
Clearing house: In-house clearing and settlement departments	*Regulator:* Forward Markets Commission (FMC), India.
Total futures and options volume 2006: 45.6 million	*Commodity futures and options volume 2006:* 45.6 million
FIA world ranking 2006 (all futures exchanges based on total derivatives volumes): 31	*UNCTAD world ranking 2006 (commodity exchanges - commodity derivatives volumes only):* 10

Website: http://www.mcxindia.com.

India was one of the first countries in the world to adopt commodity exchanges, with its earliest exchange dating back to the Bombay cotton-trading community in the 1880s. The first organized futures market, for various types of cotton, appeared in 1921, and trading subsequently proliferated. By the time of independence there was a wide array of institutions and commodities in major trading centres. Severe restrictions and an outright ban followed the decades after independence, as India moved towards a planned economy. However, in the latter part of the century, as Indian agriculture evolved beyond self-sufficiency and opened to competitive world markets, the GOI understood that previous interventionist measures to impose controls would be expensive and would limit Indian competitiveness. The development of market-based mechanisms in the commodity sector, including futures markets, was seen as a suitable way forward (Seeger, 2004).

Exchanges made an initial comeback in the latter part of the twentieth century, with a number of small "regional" exchanges that were focused on individual commodities. These were used and operated by local or regional trading communities. Volumes remained low, and market participation was largely confined to prominent trading houses. As agricultural growth continued to lag behind overall GDP growth, and with cash markets fragmented and infrastructure-deficient, the GOI perceived that a more ambitious approach was needed to upgrade and catalyse growth across India's vast and diverse commodity ecosystem.

After a series of detailed investigations, and with support from the international community including UNCTAD, the GOI revolutionized the structure of commodity exchanges in the country. Major legal, regulatory and policy impediments to the development of commodity futures markets in the country were removed. These included the restrictions on long-term party-to-party merchandising contracts and the prohibitions on futures trading for many commodities. Critically, the GOI established criteria for the establishment of a new breed of next-generation national multi-commodity futures exchanges. Tenders were invited from operating companies, which had to comply with three basic principles:

- Exchanges would be required to offer trade across the country (in contrast to the regional exchanges);
- Exchanges would be required to operate under professional management, demutualized since inception and thus separated from vested trading interests;
- Exchanges would be required to offer trading exclusively through electronic trading systems to broaden market access, in particular to rural communities.

In return, the GOI would grant these institutions permanent recognition to trade any permitted commodity. As a result, three new exchanges were established in 2002-2003: the Multi Commodity Exchange of India, Mumbai (MCX); the National Commodity and Derivatives Exchange, Mumbai (NCDEX); and the National Multi-Commodity Exchange, Ahmedabad (NMCE).[32]

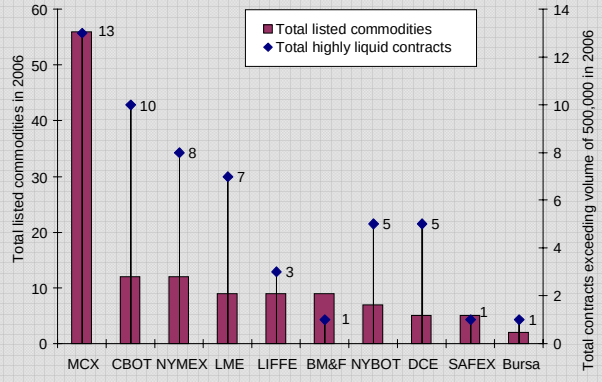
These institutions have undergone rapid growth in their trading volumes, which has seen them become among the world's leading commodity exchanges in only three to four years of operation. Liquid markets have been established in a diverse array of commodities, and these institutions have blazed a trail in the establishment of high-tech, low-cost, web-based trading that provides easy access to the remote or fragmented communities dispersed across India's vast geography.

It should also be noted that the nature of the reform process has generated two related features in the Indian commodity futures markets that distinguish them from almost every other market structure in the world. Firstly, the GOI explicitly encouraged each exchange to launch a broad array of contracts spanning the agriculture, metals and energy sectors. This includes futures markets for "indigenous" products that do not exist anywhere else in the world, including cardamom and mentha oil. It also includes commodities traded extensively on the world market, such as soybeans, wheat, gold and crude oil. The Indian exchanges provide a local platform for trading these commodities, enabling market participants to avoid currency risk and reduce basis risk. Consequently, the three national multi-commodity exchanges offer trade across multiple commodities and commodity sectors; each exchange listing contracts for more commodities than any other exchange in the world.

It is important to note that market breadth has generally not been traded off for market depth. While it is the case that many listed contracts are illiquid, MCX and NCDEX have more highly liquid contracts – defined here as trading more than 0.5 million per year – than any other exchange in the world, and NMCE is not far behind. This situation has largely been facilitated by technology systems that allow for the integration of new contracts into exchange trading and clearing systems at low cost. Meanwhile, India's abundance of educated labour, and its low costs relative to the developed world, have allowed the exchanges to hire numerous competent product-management, business-development and research personnel to support the contract proliferation. However, such a large product portfolio poses significant challenges to ensuring that the physical and regulatory dimensions of futures trading are aligned effectively: the optimal delivery locations; the appropriate quality specifications; speedy and accurate certification at delivery points; the capacity, quality and reliability of warehouse facilities; and the appropriate regulatory oversight.

The second unique feature of the Indian market structure is that competition has been explicitly fostered among the three exchanges. Liquidity for contracts with even the highest volumes on one exchange remains heavily contested by the others. Competition is often fierce and sometimes extreme. This structure has bred a very dynamic approach, in which the contract development process is expedited and the prospective benefits of exchange services are rapidly made available to the participants in India's numerous commodity supply chains – perhaps a key driver of the rapid growth that the exchanges have experienced. A trial-and-error approach is encouraged where more than one contract may be

Chart 27. Portfolio breadth and depth: exchanges featured in the study, and international benchmark exchanges



Source: UNCTAD.

[32] A fourth – the National Board of Trade, based in Indore in Madhya Pradesh State and the largest of the existing regional exchanges – would not demutualize, and thus was not granted the same status.

developed per commodity, and the market can make a "democratic" decision as to which specifications it prefers. Furthermore, arbitrage opportunities abound between contracts on different exchanges, and an alternative trading venue exists, should hitches arise with the most liquid contract for a given commodity. However, the intense competition among the exchanges may occasionally have seen exchange development prioritized ahead of overall market development, in a situation when many market participants were unfamiliar with the benefits and modalities of futures trading. There may also have been occasional over-exuberance in the quest to win volumes from competitors. For example, exchanges have been known to rush new contracts to market in order to win a first-mover advantage, without first carrying out the extensive consultation and education that liquidity-building typically requires. That said, in contrast to other markets – including India's own securities market – the Indian commodity futures industry has not, to date, experienced a major scandal, in over three years of operation.

The GOI was, and remains, particularly ambitious for the commodity futures markets (see box 16). Frustration has repeatedly been expressed that participation by farmers in the futures markets remains at a low level, despite the fact that the exchanges have only been operating for a few years, and despite very limited participation by farmers in markets elsewhere in the developing world. However, increasing participation by farmers is hindered by the prevailing regulatory restrictions. Instruments including options, index trading, and trading on intangibles (such as weather, freight and environmental derivatives) are prohibited. Options would be of particularly high utility as a vehicle for farmer hedging. Financial institutions, including banks, are not allowed to participate in the markets, and neither are foreign investors.

Although substantial investments have been made in the infrastructure for the issuance and trading of electronic warehouse receipts, these remain non-negotiable, due to delays in passing the necessary legislation. To date, such delays have limited investment in the development of warehousing infrastructure, the flow of credit to the rural sector, and the development of value-added contract arrangements that combine various permutations of financing, hedging and cash commodity transactions.

Box 16. Government ambitions for Indian national multi-commodity exchanges, as a relevant mechanism for India's small-scale farmers

GOI Working Group on Risk Management in Agriculture for the Eleventh Five-Year Plan:

"While the arthiya (Indian intermediary) system has been in vogue for a long time, the cost to the farmer is high, as he loses between 10 and 15 per cent of the value of his produce to the agent. Certain services, in the form of credit, insurance, fixed prices, transportation, storage and buyback have, however, kept this system going in the villages. The question is whether or not we can replicate the same facilities with greater efficiency, thereby lowering transaction costs such that the farmer receives a better price, along with the accompanying benefits, within an institutional set-up. The answer lies in the use of commodity exchange platforms to deliver these benefits.

…[However] due to the predominance of small and marginal farmers, lack of awareness, and other restrictions, so far there is negligible participation of Indian farmers in the commodity futures market. Creating conditions for rural farmers to access them is a challenge for agricultural policy planners" (GOI, 2007b: 113).

GOI Working Group on Agricultural Marketing Infrastructure and Policy Required for Internal and External Trade for the Eleventh Five-Year Plan:

"The expanding trade volume in the futures markets is of little significance, in the present, to farmers. No doubt, price discovery function is showing its effect through forward trading. However, the other important expectation, of price-risk mitigation for the farmers through futures trading, is far away from reality.

> The integration of futures markets with spot markets, and the creation of enabling infrastructure, such as warehousing, grading, bulk handling, efficient transport mechanisms etc., coupled with enabling regulatory mechanisms, such as the promotion of grading/standardization, a warehouse receipt system, access by farmers to participation in the forward trading at their doorstep, demystifying futures trading by means of extensive awareness-creation, putting a compulsory minimum requirement of 25 per cent contracted value to be physically delivered in each transaction, and effective regulation, can ensure and achieve the objective of price-risk mitigation for the farmers.
>
> The extension of futures trading will be in the form of electronic national spot markets, by which national markets without barriers can be created. The commodity exchanges have already initiated for creating such spot exchanges. In order to ensure that the farmers are at the focus of the initiative, the following precautions are indicated for the adoption of spot exchange markets. These measures [subsequently listed, but excluded here] are essential to prevent the spot markets from becoming speculative trading hubs" (GOI Working Group on Agricultural Marketing Infrastructure and Policy Required for Internal and External Trade, 2007: 136).

Furthermore, one of the most significant limitations for the exchanges is the fragmented physical market. C.K.G. Nair, the former director of the Government of India's Department of Consumer Affairs – the ministry responsible for regulating its commodity futures market – has commented that "the major stumbling block for the development of commodity futures markets in India is the fragmented physical/spot market" (Nair, 2004: 3). And yet, despite a number of government measures to liberalize bureaucratic control over the sector, and numerous government statements to the contrary, barriers remain in place that impede the development and integration of the physical market. These include "barriers to the free movement of commodities in the form of physical restrictions (under the Essential Commodities Act, the APMC Act, and licensing restrictions) and fiscal hurdles (differential taxes, stamp duties)... The task of improving the spot market conditions is rather difficult, as the list itself is daunting and comes under the mandate of various ministries, departments and agencies, as well as the State Governments" (Nair 2004: 3).

The launch of proposed national electronic spot exchanges by the national multi-commodity futures exchanges is a case in point. In the budget speech made by the Indian finance minister in 2002/03, which is the acknowledged trigger for the launch of the three new national multi-commodity exchanges, the finance minister announced that: "We can now look forward to a countrywide integrated market for agricultural products." Five years later, regulatory restrictions still prevent MCX and NCDEX from launching long-planned spot exchanges. However, that is not to say that there is no recognition of this initiative in Government. One of the key recommendations delivered by the report of the Working Group on Agricultural Marketing Infrastructure for the Government of India's Eleventh Five-Year Plan (GOI, 2007c: 10) was that "for reaching the benefits of commodity futures markets to the farmers, national electronic spot markets should be promoted." The national electronic spot exchanges therefore represent a potentially key step forward in Indian agricultural development.

Despite rapid volume growth and broadening market expansion, the impact of commodity futures trading in India remains contested. On the one hand, commodity market access, information dissemination, the reduction of intermediaries in supply chains, sector infrastructure, price-risk management and financing possibilities have undoubtedly improved. On the other hand, the GOI is examining arguments that the exchanges have been a factor in driving price inflation in essential commodities such as wheat, rice and several pulses. Trading in futures contracts for these commodities was suspended in early 2007. This action has provoked intense debate in the country about whether the exchanges really are the cause of rising commodity prices, or whether recent price rises are a reflection of other trends, such as changing supply/demand fundamentals or a structural shift in commodity pricing after the introduction of the new exchanges.

Cardamom

NMCE, a national multi-commodity exchange, first introduced futures trading for cardamom in February 2004. The grade specified by NMCE falls into the Alleppey Green Bold (AGB) category with 6mm capsules and a litra weight of 415 (see box 17). NMCE's designated delivery warehouse for cardamom is based at Kochi in Kerala. According to participants in the physical market for cardamom in the major growing area, the warehouse facility at Kochi is not well located. It is approximately 150 kilometres away from the growing area, and transportation costs are fairly high. In addition, some market participants claim there have been quality concerns with product received from the NMCE facility. One reason could be the humid climate of Kochi, which is not suitable for long storage periods.

Box 17. Cardamom standard export grades

Grades of cardamom differentiated according to capsule size and litra weight (wt/lt):

AGEB Alleppey Green Extra Bold: *Size 7mm and above, wt/lt 435g → MCX Grade*

AGB Alleppey Green Bold: *Size 6mm and above, wt/lt 415g → NMCE Grade (MCX accept with discount)*

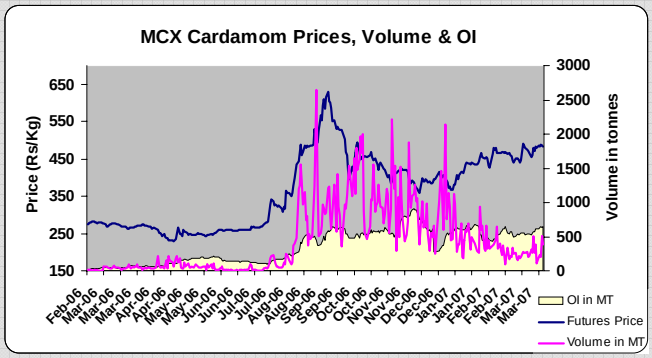
AGS Alleppey Green Superior: *Size 5mm and above, wt/lt 385g*

AGS-1 Alleppey Green Shipment Green-1: *Size 4mm and above, wt/lt 350g*

Source: MCX.

MCX launched its cardamom futures contract in February 2006. The grade specified is the Alleppey Green Extra Bold (AGEB) category, with a capsule size of 7mm and above, representing the premium quality grade. The MCX futures contract is a compulsory delivery contract with a 100 kg trading and delivery unit.

Chart 28. MCX cardamom: performance metrics, 2006–2007

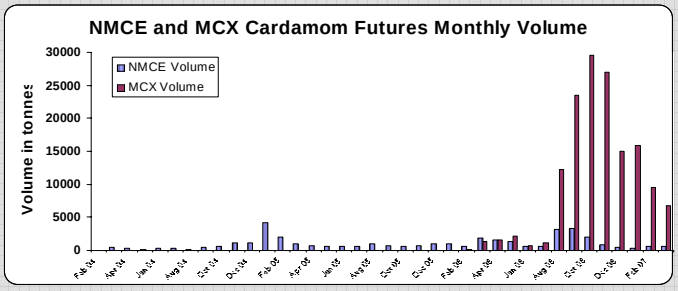


Source: MCX.

Since its launch, cardamom has been an actively traded agro-commodity on the MCX platform. Daily average turnover in the harvesting season (August to January) has reached 884 tonnes, and the highest turnover was 2,642 tonnes, achieved in September 2006. It has also had an overall delivery volume of 120 tonnes to date. Its performance metrics are marked by relatively high levels of open interest (see chart 28). Moreover, MCX cardamom has rapidly overtaken the NMCE contract as the most liquid risk-management instrument for cardamom in the market (see chart 29). For the financial year 2006/07, MCX had a 91 per cent share of cardamom futures trading.

This demonstrates the utility of the multi-commodity exchange structure, which embedded competition among the three exchanges. The MCX contract specifications varied from those of NMCE in the choice of delivery location and quality specification. Ultimately, a democratic choice was expressed by the market, when the MCX contract – introduced two years after the NMCE contract – became the first to establish a high level of liquidity for cardamom.

Chart 29. NMCE and MCX cardamom futures volumes, 2004–2007



Source: MCX.

Based on a survey of 30 market participants located in five growing districts in the major production centre and other participants in the regional trading hub – including a mix of planters, traders, processors, brokers and exporters – the following conclusions were identified:

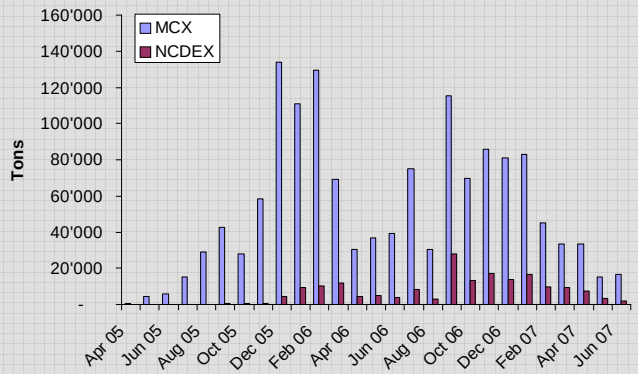
- During the first year of the MCX cardamom futures contract, participation from the planters and traders community has been growing consistently;
- Approximately 5–10 per cent of planters participate in the cardamom futures market. There is more participation from the larger planters than the small planters. Large planters trade directly on the market. Small planters have started forming groups through which to trade;
- Exporters are one of the most important participants in the cardamom value chain, and they are actively involved in the cardamom futures market;
- Since the introduction of MCX cardamom, a consistent decline in price has been stabilized, and the price now shows an upward trend;
- Interaction with planters suggests that they need to spend money regularly on irrigation, fertilizers and pesticides for a better yield of cardamom. This will only be possible if they get better prices for their crop. As the prices are now showing an upward trend, they feel that if the increased prices are sustained into the future, they could invest in order to realize an improved yield.

In a recent move, MCX has decided to accept – starting from the September 2007 contract – onwards deliveries of 6–7mm cardamom. Deliveries of this grade will be accepted at a 15 per cent discount to the currently accepted premium grade cardamom of 7mm and above. While the 7mm and above grade has a deliverable supply equal to 30 per cent of India's cardamom production, the 6–7mm cardamom adds a further 40–45 per cent to Indian production.

Mentha Oil

MCX launched futures on mentha oil in April 2005. A second national multi-commodity exchange – NCDEX – followed suit in August of the same year. The two contracts have specifications which differ on technical grounds.[33] MCX contends that their "packed column" mentha testing is widely accepted in domestic trade by farmers and local traders, and was the standard practice in the market before futures trading was introduced. The "capillary column" method specified by NCDEX is required for the export trade. MCX adopted the packed column method because it was widely prevalent in the domestic market and local participants were comfortable with it. MCX volumes have been significantly higher than those of NCDEX, and MCX has suggested that farmers find it difficult to adopt the capillary column method of testing required by NCDEX. It is also

Chart 30. MCX and NCDEX mentha oil volumes, 2005–2007



Source: MCX.

[33] MCX mentha requires a minimum of 68 per cent menthol content on a packed column basis when analysed by a gas-liquid chromatography (GLC) test; NCDEX mentha requires 74 per cent menthol content on a capillary column basis when analysed by a GLC test. (Packed column and capillary column are different types of test for mentha oil). Put simply, 68 per cent menthol on a packed column basis will equate to 76 per cent menthol on a capillary column test basis.

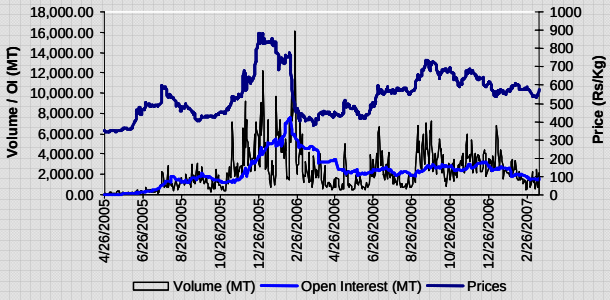
notable that the third Indian national multi-commodity exchange – NMCE – trades in menthol crystals, which are a finished product derived from processing mentha oil.

Even after the introduction of futures markets, informal trading has remained prevalent (Economic Times, 2007a). Taking part in these markets does not require the trader to make margin deposits, as is required with exchange-traded futures. Even though participants run a large counterparty risk by using these markets, the absence of margin requirements makes them attractive. Thus, informal trading still attracts significant volumes. Since the launch of MCX futures, the traders that run these informal markets have imitated and in some cases even benchmarked MCX settlement prices. They have also introduced buyer and seller options through two different contracts, known respectively as "khuli" and "band" in the local language. MCX has been conducting training programmes at the grassroots levels to educate people about the benefits of trading through organized markets, rather than through informal or illegal markets.

From a survey of 45 farmers based in two of the four growing districts, plus a selection of other market participants interviewed, the following conclusions were identified:

- Prices have increased from around 330 rupees per kilogram to 540 rupees per kilogram since the introduction of futures trading.
- With a reduction in the number of intermediaries, farmers have started to realize a higher share of the value of the product.

Chart 31. MCX mentha oil: performance metrics, 2005–2007



Source: MCX.

- Since the launch of mentha futures, farmers have become more aware of prices. About 90 per cent of farmers in the area say that MCX prices have helped them to realize better returns over the period in negotiations with intermediaries. It has also enabled them to make more efficient cropping and selling decisions.
- Since the inception of MCX, market participants believe the market has become more volatile. However, 80 per cent of respondents say they are getting higher prices due to MCX.
- The greatest impact of all, however, has taken place at the national level, as India has become the world's largest producer of an important input for a number of major industries. This has boosted public and government interest in mentha crops.
- A mentha oil farmer interviewed in the survey is quoted as stating that "we have put more acreage under the crop during last two years, as we are getting better prices for mentha oil. We can easily get the price information from the internet in [our] local language through the MCX terminal and take buying and selling decisions on that basis. The commodity is like a liquid gold reserve for us."
- The maximum benefits are believed to accrue at each end of the supply chain, namely for farmers and exporters. An exporter interviewed in the survey is quoted as stating that **"**the monopoly of commission agents in the market has been broken by MCX. MCX has written a success story in mentha oil, not only by providing better prices to farmers, but [because it] has encouraged them to produce more. Now India is the largest exporter of menthol crystals in the world. It is the only commodity where farmers and exporters both benefit through MCX**."**

- Most of the participants in the ecosystem believe that the futures market for mentha oil is very speculative. Many traders and commission agents have lost money – and losses may have been incurred in regulated futures exchanges, as well as in the informal or illegal forwards markets that are unregulated.

MCX's key achievement in its local context:

- Catalyzing development of the wider commodity ecosystem.

Success factors:

- Building liquid markets for indigenous commodities;
- Managing a broad portfolio of commodity contracts;
- Effective deployment of paradigm-shifting technologies;
- Strong residual trading culture in India;
- Educational emphasis.

Challenges:

- To build greater hedger participation (commercial and small-scale farmers);
- To make the delivery mechanism more resilient and consistent;
- To manage within a tight set of political and regulatory restrictions and in the face of recent regulatory uncertainty.

Future opportunities:

- Launch of a national electronic spot exchange to integrate national cash commodity markets;
- Developing trading in options, indices and other intangibles (e.g. weather, freight), once prohibition has been lifted;
- Institutional and foreign-investor participation, once prohibition has been lifted;
- More thoroughly integrating commodity markets with finance, as warehouse receipts become negotiable instruments.

8.3 Regulatory framework: Forward Markets Commission (FMC)

The FMC is the regulatory body charged with overseeing the commodity futures markets in India. It is overseen by the Ministry of Consumer Affairs and Public Distribution, and was established in 1953 under the provisions of the Forward Contracts (Regulation) Act 1952. The functions of the FMC are:

(a) To advise the central Government in respect of the recognition or the withdrawal of recognition from any association or in respect of any other matter arising out of the administration of the Forward Contracts (Regulation) Act 1952;

(b) To keep forward markets under observation and to take such action in relation to them as it may consider necessary, in exercise of the powers assigned to it by or under the act;

(c) To collect, and whenever the Commission thinks it necessary, to publish information regarding the trading conditions in respect of goods to which any of the provisions of the act is made applicable, including information regarding supply, demand and prices, and to submit to the central Government periodical reports on the working of forward markets relating to such goods;

(d) To make recommendations generally, with a view to improving the organization and working of forward markets;

(e) To undertake inspection of the accounts and other documents of any recognized association or registered association or any member of such association whenever it considerers it necessary (FMC website, 10 August 2007).

In recent years, the FMC has also taken on a proactive role in market development and capacity-building, including sensitizing policymakers and other market participants to commodity futures markets. One manifestation of this is the FMC's collaboration with national and regional commodity exchanges in providing awareness and capacity-building seminars. In 2005, for example, it organized 24 such seminars, each with an attendance of 150–200 participants, which included farmers, cooperatives, NGOs, traders, industry, banks, importers/exporters and investors.

The commodity exchanges also have significant self-regulatory powers – see annex 2. Regulatory mechanisms at the exchange level are as per international norms, including the margining system, position limits for speculative participants, and daily price-movement limits. The use of modern electronic trading technology has enhanced the surveillance and monitoring facilities, for example by enabling real-time risk analysis of members' positions.

Given the market structure by which multiple national and regional futures exchanges compete directly by listing contracts for similar products, there is the requirement – which is arguably more pressing in India than in the other markets featured – for exchanges to coordinate closely with the external regulator. In this respect, the reporting of large-trader positions across each exchange, and a regulatory approval process for the launch of new contracts, are important regulatory mechanisms in India.

Market development in India has moved from the prohibition of almost all futures trading in the 1970s, towards a vibrant framework of fast-growing national multi-commodity exchanges operational since 2002-2003. While these moves were driven by "the Government's resolve to put in place a mechanism of futures trade" (FMC website, 10 August 2007), the legacy of the earlier period is manifested in the significant restrictions that still remain in place, which are that:

- Trading on options and intangibles[34] is prohibited;
- Important potential market participants, namely banks and mutual funds, remain barred from using the markets;
- The markets also remain closed to the participation of foreign investors. (Indian participation overseas is permitted, but on a limited basis);
- The physical markets for commodities on which futures contracts are traded still sometimes face restrictions on movement, reflecting the historical fragmentation of Indian wholesale markets.

For a number of years, there have been indications that many of these restrictions – on both futures and physical commodity markets – would be reformed or relaxed. However, progress has been slow, with the required legislation held up or delayed for various reasons.

The capital markets regulatory structure in India is fragmented. Responsibility for futures markets is split between the FMC, overseeing commodity futures markets, and the Securities and Exchange Board of India, which oversees the financial futures as well as the financial securities markets. (Other financial services regulators include the Reserve Bank of India, which regulates the banking industry, the Insurance Regulatory and Development Authority for the insurance industry, and a new Pension Fund Regulatory and Development Authority as per the terms of legislation introduced in 2005.)

[34] In other words, contracts linked to non-physically deliverable phenomena, including indexes, weather/climate derivatives and freight.

Whereas the Securities and Exchange Board of India is an independent agency, the FMC is currently overseen by a GOI ministry. This has provided scope for political involvement in regulatory decision-making.

There has been some debate in India about reform to the regulatory structure in two areas: firstly, about strengthening the autonomy of the FMC to insulate it from political interference; and secondly, about the possibility of converging the commodity and financial futures regulators into a unified agency. A government-appointed committee – the Inter-Ministerial Task Force on Convergence of Securities and Commodity Derivative Markets, chaired by Mr. Habibullah – reported favourably on both possibilities, as well as on the more general need for increased regulatory coherence across India's commodity markets (see box 18).

A major concern, however, is that commodity market regulation might be deprioritized under a converged regime. Specific worries include: the potential loss of expertise on the impact of commodity futures markets on underlying physical markets, from which approximately 600 million Indians draw their livelihoods; that a converged financial services regulator may neglect its "commodity department", and prioritize the allocation of resources to other areas; and that the development of the converged regime itself may be predominantly driven by concerns about other sectors.

Finally, there has been a historic tendency in India for Government to intervene directly in the functioning of the country's commodity markets. Overcoming this tendency has been cited in a prominent 2004 report as one of the major challenges for the development of Indian commodity exchanges (Seeger, 2004: 11). In the same report, one former chairman of the FMC is quoted, in order to illustrate the issue:

> "When I was chairman of the FMC in the 1980s, one year the rains were lean, and in August the futures markets prices for gur (jaggery) in the months ahead were accordingly going up. The Minister of Civil Supplies called me to Delhi to inform me that he was very worried that with the festivals of Ganesh Chaturthi, Navratri, and Diwali all coming up, we simply could not have high gur prices. As chairman of the FMC, I was to, somehow, make gur prices go down" (Seeger, 2004: 11).

The report concludes that "the GOI must remain resolute on its adoption of a market-based, internationally competitive agricultural sector. This will mean that, unlike in the past, when a calamity befalls the agricultural sector, policymakers must remember that price volatility is usually reality-based, caused by supply and demand conditions. The historic urge to ban commodity futures as the putative solution must be resisted" (Seeger, 2004: 11).

Box 18. Recommendations from the Habibullah report on market convergence

4.4 The role of the regulator to develop the market is crucial. The regulator must possess capabilities in terms of expertise, resources, empowerment and operational flexibility to meet the challenges. The structure of the Forward Markets Commission set up in 1953 as a recommendatory body is not fully suited to the challenges of the emerging market. The structure of this commission will need to be totally overhauled to provide it with the autonomy and the resources as has been done in case of many regulators set up in recent times. After examining the various alternative approaches to convergence, trade-offs in their sequencing, and debates on prioritization mentioned above, the Task Force unanimously makes the following recommendations:

1. In the interim, the Department of Consumer Affairs should take administrative decisions, which would strengthen and empower the FMC. Immediately, the FMC should be made independent and autonomous, through executive orders. This should cover personnel and financial autonomy, among other things.

2. The development of commodities derivatives markets is impeded on account of some of the policies relating to cash markets, which have the effect of distorting the market forces of demand and supply. These policies include the minimum support price, the monopoly procurement scheme, the APMC Act, the Black Marketing Act, differential sales tax, differential stamp duties and entry taxes and permits imposed by various State Governments. These market-distorting and fragmenting policies need to be corrected expeditiously.
3. Restrictions on the participation of banking institutions in commodities markets, at least for hedging purpose, for a start, should be removed by amending section 6 of the Banking Regulation Act.
4. The enactment of national-level regulation on warehouses to pave the way for making warehouse receipts issued by the regulated warehouses negotiable and tradable across the country may be expedited. The legal and regulatory framework should be created, through which negotiability and tradability of warehouse receipts is made possible.
5. The new legal framework should widen the scope of futures markets to include the intangibles related to the commodity sector, such as commodity indices, spreads and basis contracts, weather, electricity, and freight. Restriction on the participation of mutual funds and foreign institutional investors also needs to be removed, by changing the relevant regulations of the Securities and Exchange Board of India.
6. The Secretary, Department of Consumer Affairs, should be inducted in the High-level Committee on Capital Markets.
7. In parallel, legal changes should be undertaken, through which the regulation of commodity futures markets and financial markets are placed in a unified entity. This may require amendment/modification/repeal of the Forward Contracts (Regulation) Act, 1952. In this unified entity, there should be one full-time board member who looks after commodity futures markets. This will ensure an adequate focus on the commodity markets in the unified entity.
8. Questions of convergence pertaining to brokerage firms and exchanges, which would harness economies of scope and economies of scale in these areas, should be taken up by the unified entity when it comes into operation.
9. These changes require extreme care and thought in implementation. Hence, a working group should be set up to oversee the post-legislative oversight of commodities futures markets and financial markets under the unified entity, particularly the administrative aspect.

Source: Habibullah (2003: 30).

However, in early 2007, following rises in the price of certain important commodities, and in the context of increasing inflationary pressure, the Government suspended trade on four contracts: wheat, rice, and two pulses. A committee of enquiry on the functioning of commodity futures markets in India is expected to report on the issue in late 2007.

Despite recent government intervention, and as India proceeds through the planning phase in preparation for its Eleventh Five-Year Plan (2007–2012), there remains a fundamental recognition among senior policymakers about the positive role that futures markets can play. Thus, the GOI's Working Group on Risk Management in Agriculture for the Eleventh Five-Year Plan (2007–2012), as previously quoted, envisions commodity exchanges as "the answer" for the efficient delivery to farmers of "credit, insurance, fixed price, transportation, storage and buyback… within an institutional setup" (GOI, 2007: 113). The GOI's Working Group on Agricultural Marketing Infrastructure and Policy Required for Internal and External Trade for the Eleventh Five-Year Plan (2007–2012) also sees an important role for the commodity futures exchanges as delivering price discovery and risk mitigation for farmers, with emphasis on the development of national electronic spot exchanges as a mechanism for further extending these benefits.

8.4 Impacts

8.4.1 Price discovery

Price dissemination: In India, the initial focus of price dissemination has been electronic price screens, or "tickers", set up by MCX and the other national exchanges in farmers' markets ("mandis") and at high-visibility points around the country. Currently, 290 mandis in Maharashtra, 150 in Andhra Pradesh and 64 in Madhya Pradesh are connected electronically to receive MCX prices. Mandis in the State of Haryana will soon be connected, too.

MCX prices displayed at a village post office in Jalgaon

Other channels that are used include television, newspaper, radio, internet, trading terminals and mobile phones. In the 12 months up to end of May 2007, approximately 300,000 SMS messages indicating commodity prices were sent to market users' mobile phones.

MCX prices are also published in about 25 regional and national daily newspapers, with an estimated reach of a quarter of India's farmers. Language is an important factor in India, with many languages spoken across the country: Hindi, Urdu, English, plus a range of regional languages. Therefore, MCX provides market information in a range of languages, in order to increase accessibility to farmers.

In both the mentha and the cardamom surveys, a large majority of producers agreed that they have been more aware of market information since the launch of the contracts, although one respondent to the cardamom survey believed that more electronic display screens should be installed in the production area.

Moreover, MCX has been innovative in overcoming barriers of infrastructure and geography to distribute market information by means of a joint venture with India Post – the country's national postal service (see box 19). To date, 60 villages are receiving end-of-day pricing information in this way.

Box 19. Distribution partnerships to bridge the "last mile" – MCX and India Post

In June 2006, MCX formed a strategic alliance with India Post – India's national postal service. MCX was looking to form partnerships to extend its reach throughout India's estimated 630,000 villages, while India Post has been searching for new revenue streams to sustain its extensive nationwide network that has over 155,000 branches. Thus, the alliance appears to be a natural fit between two very different but complementary service providers. And for a commodity exchange, it represents a ground-breaking initiative to bring remote or marginalized commodity producers into the market.

The product of this partnership is the Gramin Suvidha Kendra, or in English: village facilitation centre (GSK). GSKs currently exist in four districts – Jalgaon, Itarsi, Unjha, and Dhamangaon – spanning three States. In the future, GSKs are likely to be situated in post offices throughout the country.

The initiative integrates technology and existing physical infrastructure in a unique manner. A personal computer – equipped with peripherals and internet connectivity – is installed in a small- town post office. This acts as an information hub for the villages in the surrounding area, which are linked to the hub through daily postal movements. On a daily basis, with information supplied by the hub, postmasters in these villages display the latest price information on blackboards that are easily accessible to farmers. For the Jalgaon district, 16 village post offices are linked in this way, extending exchange services to an estimated 20,000 households.

The GSK platform is being rolled out in two stages. Firstly, farmers are empowered by the GSK through the provision of spot and futures prices, encouraging them to base their cropping and selling decisions on the futures rather than spot market prices. The GSK also uses its internet connectivity to connect farmers with technical centres, in order to provide free advice and answer questions. Secondly, in the future, the platform will be used as a one-stop shop providing a range of services for farmers. As well as online spot and futures trading, these are also likely to include input-supply, weather advisory, crop insurance, demand and supply forecasting, warehousing and quality standards information.

Reducing information asymmetries: Evidence supplied by both the mentha and cardamom surveys suggests that the most profound impact from the introduction of commodity futures contracts has been the transformation of the respective supply chains, as intermediaries are squeezed out (see box 20).

Farmers at an intermediary's office, checking the price of mentha on an MCX terminal

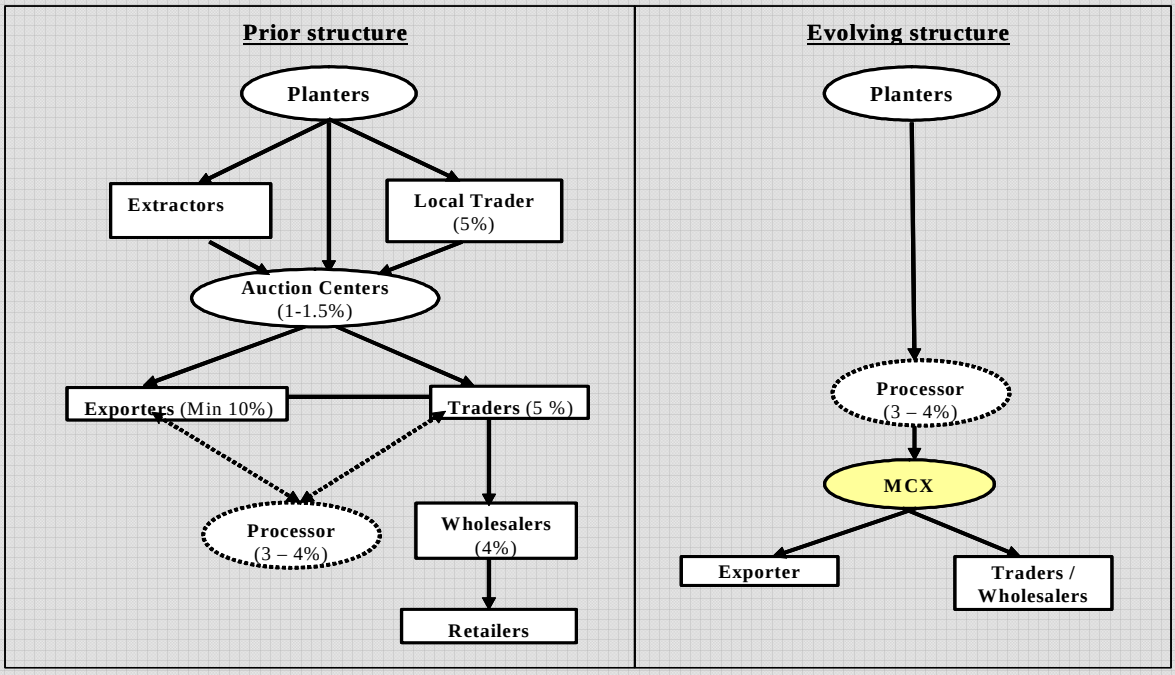
Source: MCX.

Respondents to the cardamom survey noted that planters are getting improved prices from intermediary traders and through the auction centres, as a result of an available price reference. Exporters, traders and wholesalers have the facility to get processed cardamom directly from the exchange platform, with no need to go through the conventional channel of auction centres and/or traders.[35] It was also noted that the availability of futures reference prices is a powerful tool against domination of the market by a few players.

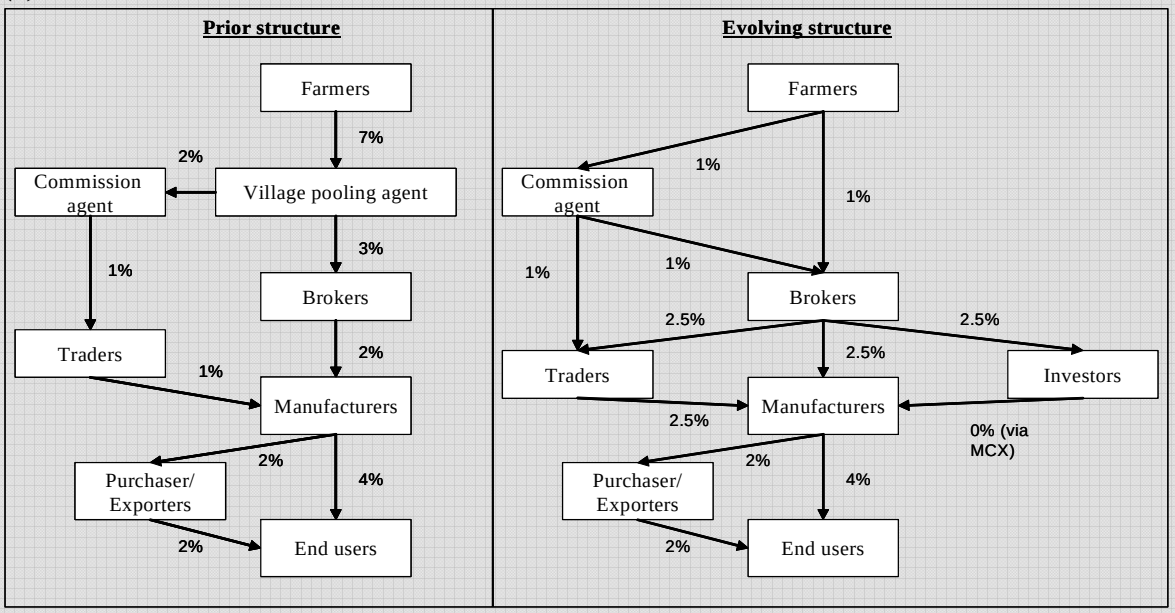
[35] This supply chain transformation is a consequence of MCX's physical delivery channel rather than market information per se; for structural reasons this is presented here and noted later.

Box 20. Supply-chain transformations in Indian commodity markets: cardamom and mentha oil

(a) Cardamom



(b) Mentha oil



Source: MCX.

Respondents to the mentha survey noted that the mentha chain was elongated by the presence of numerous intermediaries. Prior to the introduction of the MCX contract, about 80 per cent of farmers used to take their oil to a village-level pooling agent, who realized a margin of approximately 7 per cent. Traders and brokers purchased oil from the pooling agents. Since the introduction of futures, the survey suggests that farmers can sell directly to the trader or broker. Moreover, the farmer can decide which agent or trader to sell the crop to, based on the prices they offer relative to those disseminated by MCX. It was also stated that the increased competition among brokers and traders has meant that the market is less easy to manipulate.

For both commodities, farmer testimony has revealed a supply-chain transformation since the introduction of futures contracts. While the survey suggests that the elimination of the village pooling agent in the mentha chain is fairly widespread, the extent to which the cardamom procurement model for exporters has been adopted is less clear. Furthermore, while the survey suggests that both larger and smaller farmers are benefiting, the exact distribution of benefits – who benefits the most – also remains unclear.

Spot price volatility: The impact of the introduction of futures contracts on spot price volatility has been uneven (see table 6). In the cardamom survey, market participants perceived that price volatility had reduced since the introduction of MCX futures. The executive director of a cardamom auction centre in Kerala commented that "online futures trading has led to less fluctuation and brought more stability in spot prices". However, the data for both cardamom and mentha oil show that spot price volatility has actually increased – and in the case of mentha, the increase has been substantial. On the other hand, spot price volatility for other commodities, including wheat and three pulses, has reduced. Reasons for this uneven response may include inadequacy of spot-price data collection prior to the introduction of futures exchanges, different constraints and bottlenecks that exist in the physical markets for each commodity, and differences in the market structure for each commodity. In any case, the markets are in their earliest stages of development, and final conclusions should not yet be drawn. Further research is clearly necessary, as changes in spot price volatility can have a critical impact on all commodity sector stakeholders.

Table 6. Indian spot price volatility: before and after the introduction of futures markets

Commodity	Pre Futures (%)	Post Futures (%)
Cardamom	7.66	9.20
Mentha	1.42	13.56
Wheat	4.23	3.03
Gram	11.19	8.90
Tur	5.80	1.70
Urad	5.75	4.06

Sources: Mentha and cardamom – MCX; wheat, gram, tur and urad – Delhi Wholesale Market, Centre for Monitoring Indian Economy (CMIE).

Using market information: The mentha survey provides evidence that Indian farmers are using futures prices to improve their cropping and selling decisions.

Changed cropping patterns: The large growth in mentha oil production since prices began to rise suggests that farmers have been guided by futures prices to make cropping decisions. The area under mentha production has increased from 100,000 hectares in 2004 to 250,000 hectares in 2006. The volume of production has increased from 12,000 tonnes in 2004 to 32,000 tonnes in 2006. The survey further reveals that mentha is typically intercropped with other staples. Because of its versatility, it has even, in certain circumstances, been grown on the roofs of farmers' houses. As a result, mentha has emerged as a pure cash crop for many farmers in the region. They meet their instant and next season's cash needs through crops such as wheat and potato, and they produce mentha oil to meet their contingency requirements. In the case of cardamom, it has been only a year since the launch of the MCX contract, hence there has not yet been any significant change noted in the crop selection for new plantations.

Changed selling patterns: The mentha survey suggests that farmers now check the MCX prices before selling the product. 70–75 per cent of farmers surveyed say they hold stocks, in anticipation of higher prices during periods of high demand. This is verified by data from the Essential Oil Menthol Association, which show that mentha carryover has increased from approximately 3,000–4,000 tonnes before futures to over 8,000 tonnes by 2007.

Efficiency of price formation: An important advantage of the Indian multi-commodity model – whereby each of the three national multi-commodity exchanges trades a wide array of contracts in direct competition with the other exchanges – is that there has been scope to establish, for the first time, a number of "indigenous" commodity derivatives contracts traded nowhere else in the world. This includes the two commodities featured in the study – cardamom and mentha oil. As the world industry develops for these commodities – both are already used in significant quantities by

manufacturers and consumers around the world – the prospect for developing a world benchmark becomes greater. Indeed, the cardamom survey notes that Indian exporters are using MCX prices as a reference when negotiating export deals. For the moment, however, the Indian commodity futures market remains closed to foreign participation, which prevents it from becoming a true world reference exchange in the way that Bursa Malaysia has become for the palm oil industry. Similar commodities for which futures contracts are traded only in India include potato, jute and guar, and a range of spices, pulses, oilseeds and petrochemicals.

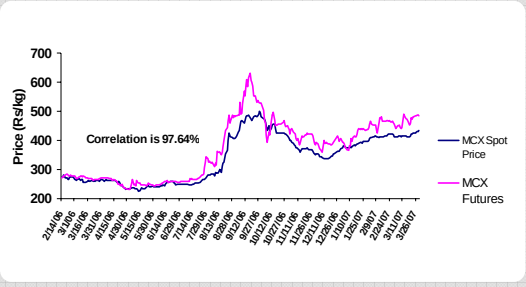
8.4.2 Price-risk management

First of all, it is important to note that for both the cardamom and the mentha contracts traded on MCX, as well as for over 20 other listed commodities, the key prerequisites in the trading environment that allow for effective price-risk management are that:

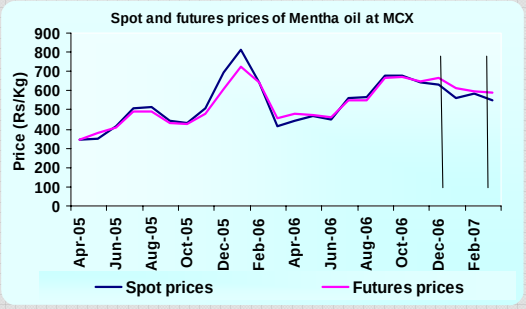
- There are liquid markets – the trading volume of cardamom was equivalent to approximately 10 times the production volume in 2006, and the trading volume of mentha oil was equivalent to 26 times the production in the same period;
- Trading takes place in a regulated, rule-based trading environment, under the rules and by-laws of MCX and with oversight by the FMC;
- Market information is disseminated transparently to avoid asymmetries that might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Chart 32. MCX cardamom and mentha oil: spot/futures market price correlation

(a) Cardamom



(b) Mentha oil



Source: MCX.

Trading at the Indian national multi-commodity exchanges takes place in many "indigenous" products for which no other price-discovery or risk-management platform exists worldwide. This is the case for both cardamom and mentha, although one other Indian exchange offers trade for each commodity. Cardamom shows a strong 98 per cent correlation between spot and futures markets (see chart 32). Mentha is in a similar range.

For many other commodities for which the world reference price is established elsewhere, the Indian exchanges provide a local version of those contracts. (An example of this would be crude palm oil, for which Bursa Malaysia determines the world reference price, and MCX, NCDEX and NMCE each list a palm oil contract that may be used as a local platform.) This helps to overcome the barriers on Indian participation in overseas exchanges and also the credit and exchange rate risks that such participation would bring. While large agribusinesses are likely to participate directly on the overseas benchmark exchange, local contracts provide smaller or less sophisticated industry participants with better accessibility to a risk-management platform. Furthermore, arbitrageurs can align local prices with international prices.

As has already been described, there is a higher expectation in India than in any of the other countries featured in this study that futures markets can be directly used by small-scale farmers. However, at the moment, experience suggests that participation by small-scale farmers is limited. The cardamom and

mentha surveys suggest that only larger-scale cardamom planters and mentha farmers are participating at present. However, the cardamom survey has also shown that the use of the futures market has provided impetus for farmers to organize collectively into groups, for the purpose of trading. Moreover, the model of farmer cooperatives acting as an aggregator on behalf of small-scale farmers has already been demonstrated successfully in India, as documented by Berg (2007) in a study of the HAFED cooperative's activities between 2004 and 2007 in the now-suspended wheat markets (see box 21). Observation suggests that this model is not yet widespread in the country, however. Perhaps one constraint could be that many small-scale farmers, who are too small to engage in markets individually, might also be insufficiently organized to participate collectively.

Responses to the cardamom survey suggest that market participants have started to use futures as a hedging tool. Although at the time of the survey, MCX cardamom futures had only completed one year of trading, 5–10 per cent of planters are estimated to participate in the futures market; greater participation has come from the larger planters than the smaller planters. However, the survey quotes one small-scale planter as saying, "I haven't traded in futures. But I have seen planters around me who have benefited from it, and I feel it would be beneficial for planters in the future too". Another trader commented about the possibility of passing on the benefits of hedging to farmers: "If I get improved prices, I can give better prices to the farmers. Definitely futures have helped me to get improved prices." However, the extent to which traders have voluntarily passed on – or will voluntarily pass on – the benefits of hedging to farmers remains unknown. Their incentive for doing so is unclear. The survey also shows that exporters are using futures as a tool for hedging exposure to price risk.

The mentha survey reveals that just one large-scale farmer out of the 45 surveyed is actively participating in the futures market. For the others, barriers of awareness, capacity and motivation are limiting uptake. Private research conducted by one of the authors in India reinforces these findings, with a number of other bottlenecks that typically impede farmer participation:

- Contract sizes that are much larger than farmers' total volume of production;
- High quality specifications, which farmers may struggle to meet consistently;
- Warehouses situated remotely from farmers' premises, and inadequate transportation links to reach them;
- Regulatory constraints that prohibit options trading and the participation of financial institutions in the futures market.

Some of these constraints may be reduced through innovative practice. For example, mini-contracts may be introduced (see BM&F's web trading facility, for example). An expanded scale of premiums and discounts could be instituted for different levels of quality delivered to exchange warehouses. Margin requirements could be reduced, by the establishment of a guarantee fund (see BM&F's Agricultural Market Trading Fund). Finally, the proposed national electronic spot exchanges may also increase farmer participation in the futures market. They would allow farmers an opportunity to become familiar with electronic trading for transactions they better understand and from which they could benefit significantly. Moreover, if spot and futures trading is integrated into the same system, farmers could easily carry out marketing transactions and hedging strategies at the same time. However, the aggregator model – an illustration of which is set out in box 21 – provides perhaps the most feasible opportunity for delivering price-risk management solutions to India's small-scale farmers. MCX has recognized this, and is working to enable NGOs to act effectively as aggregators for small-scale producers.

Box 21. Case study: cooperative hedging as an aggregator for small-scale farmers in India

"HAFED is an apex cooperative institution of farmers established by the Government in the State of Haryana. Besides acting as a wheat procurer under the Minimum Support Price (MSP) scheme for the GOI, it also acts as a buyer, input supplier and credit extender for wheat producers in Haryana. HAFED began using the NCDEX wheat contract after its launch in July 2004 as a standard "short hedger", that is to say, it sold futures contracts (short) on the NCDEX against its cash (long) purchases from farmers.

HAFED's use of NCDEX wheat futures (non-MSP procurement)

Year	Quantity purchased, metric tons (physical wheat)	Quantity hedged, metric tons (short futures sales)	Quantity delivered, metric tons (against futures short)
2004/05	70,000	4,770	10
2005/06	31,814	35,710	13,300
2006/07	107,043	81,450	20,860

The table reveals that HAFED rapidly increased its use of the wheat futures contract and the delivery mechanism over the three crop years, as it became more sophisticated in its use. During 2006/07, HAFED was able to "lock in" a net profit of Rs. 108 per quintal, after deducting storage, interest, value-added tax (VAT) and transportation charges.

HAFED's use of the NCDEX wheat contract was a textbook case of a "cash long" using a short hedge to guard against losses and lock in an attractive post-harvest price. HAFED successfully used the NCDEX wheat contract, because its wheat purchases met the quality and quantity specifications of the futures contract, it owned accredited warehouses at which it could make delivery, and wheat prices were trading above the MSP. Also, HAFED stuck to the books in designing its hedging strategy: it bought wheat and hedged it in the contract yielding the highest price. Finally, HAFED was hoping to leverage the advantages of the NCDEX futures contract by distributing its gains to farmers. These gains involved more than just profits; they included educational, technological and societal advancements that would enrich the agricultural community of Haryana.

Given HAFED's prudent hedging strategy and the close fit and price correlation between the NCDEX wheat futures and wheat trading in India, this report does not recommend that HAFED use another global hedging mechanism, particularly the CBOT soft red winter wheat (SRW) contract, to manage local wheat volatility. Although the CBOT contract might at times correlate well with white wheat, its basis swing this past year of $70/mt (from a discount to a premium), demonstrates how risky basis levels have become. There are potentially some neighbouring risk-management centres – Australia and Ukraine – which could serve as hedging mechanisms in the future, but these could never replicate the NCDEX mechanism in reaching HAFED's goal as an aggregator, partner to producers and quality-assurance provider. In addition, as most national exchanges tend to target domestic clients, they may not allow foreign participation in these centres."

Source: Berg (2007: 3).

Unfortunately, data are not available to reveal the extent of hedging by Indian commercial commodity users. Prior research by one of the authors indicates that this is one of the major challenges facing the multi-commodity exchanges, particularly for agro-commodities. Many of the largest producers, traders and users of agro-commodities have been permitted for many years to participate directly in international exchanges. Migrating them onto local platforms is often constrained by tight position limits and a bureaucratic regulatory system of exemptions on those position limits for large hedgers. Moreover, where firms are participating in international commodity markets, the world reference price is likely to be the one most frequently used in transactions. It would therefore be more effective to hedge on the exchange that discovers the world reference price, rather than on the local platform. However, for those entities that do not already participate on international exchanges, the challenge of increasing their participation in futures markets may be one of building their awareness, changing their

mindset, and providing them with technical assistance, in order to incorporate price-risk management into their regular business practice.

8.4.3 Venue for investment

First of all, it is important to note that for both the cardamom and the mentha oil contracts, the key prerequisites in the trading environment that make MCX an attractive and secure venue for investment are that:

- There are liquid markets;
- Trading takes place in a regulated, rule-based trading environment under the rules and by-laws of MCX, and with oversight by the FMC;
- Market information is disseminated transparently, in order to avoid asymmetries that might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

The role of speculation in the Indian commodity markets has been a consistent source of controversy. However, data are not available on market composition, as MCX and the other Indian national multi-commodity exchanges do not require clients to register as a hedger or a speculator when they open their accounts.[36] As a result of these gaps in data, it is not possible to identify how speculative the Indian commodity markets actually are.

With recent rises in food prices, in a context of overall inflationary pressure, the GOI has contended that commodity futures trading – and specifically, the impact of speculation within these markets – has been at least partly responsible. Contracts in wheat, rice and two pulses were suspended in early 2007, and a committee of enquiry has been tasked to investigate the impacts of commodity futures trading on prices. As a result, the effect of commodity futures trading on prices has become a highly contested issue in the country.

A number of counter-arguments to the GOI position have been offered by various parties, including the economist tasked to chair the committee of investigation, Professor Abhijit Sen. According to Sen, "even though there is an initial rise in spot prices, the overall impact of futures trading on prices is stabilizing". Professor Sen further argues that the real inflationary drivers are the Indian price support regime for agricultural products and the public distribution system (Mint, 2007 a or b ??). For its part, MCX argues that price rises reflect changing fundamentals in the global commodity economy, and price development in India has been broadly in line with the rest of the world. They also argue that the introduction of commodity futures has made a structural change to the markets for many commodities. Farmers are now able to demand better prices, as a result of increased market transparency that provides them with a stronger negotiating platform. Moreover, a physically delivered contract should enable participants with access to the physical commodity to arbitrage away price movements that are not justified by fundamentals through "cash and carry" arbitrage – simultaneously buying in the cash market and selling in the futures market to lock in a profit at the expense of speculators.

The cause of inflation in India – whether through commodity futures trading or otherwise – requires in-depth economic analysis for which there is not scope in the current report, beyond pointing out the arguments offered by all parties. The Sen committee is scheduled to report back with its conclusions on the issue in late 2007.

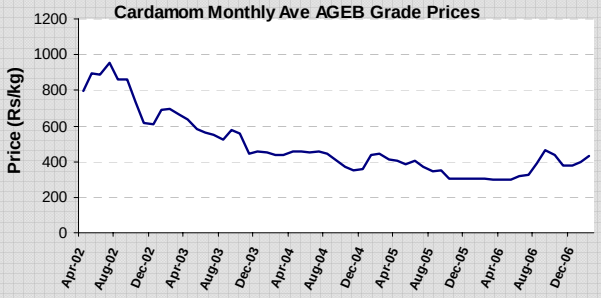
[36] Position limits are applicable to all market participants, varying by commodity. However, exemptions are provided if there is proof of hedging in excess of that level.

Looking at the specific commodities under review, both mentha and cardamom have seen rising prices since the introduction of the MCX futures contract (see chart 33). Cardamom planters and mentha farmers both note that they have received higher incomes since the prices have increased. In the case of cardamom, declining spot prices stabilized after years of decline and have now started to rise steadily since the introduction of the contract. It is notable, however, that cardamom prices remain well below their peak in 2002. In the case of mentha oil, prices have risen particularly rapidly. However, it is also observed that the trend of rising prices began prior to the introduction of the MCX contract, and – as has already been discussed – the driver of these increases remains unclear.

Chart 33. Indian spot price development: before and after the introduction of futures markets

(a) Mentha oil

(b) Cardamom (MCX grade)



Source: MCX.

Respondents to the mentha survey believe that the mentha oil market is highly speculative, and that many traders and commission agents have incurred losses in the market. There is also evidence from the mentha survey and in the Indian media (e.g. Economic Times, 2007b) that some traders, retail investors and small-scale farmers are speculating on mentha oil in ways that they cannot afford. However, it is unclear whether survey respondents and the media are referring to losses incurred in the regulated futures markets or in the unregulated markets that are common in the mentha-growing areas. In MCX and the other national multi-commodity exchanges, regulatory measures are in place to control the level of speculation in the markets, to limit the possibility of default and to promote responsible investment practice. However, it is possible that speculation which has existed for a long time in physical markets may have ebbed into the futures market.

Given the prevalence of informal and illegal markets for mentha, policymakers have to be cautious when deciding how to act. There is a danger that if they impose ever-tighter restrictions on the regulated futures markets, they may push participants towards highly risky unregulated venues. At the same time, perhaps more could be done by the regulators and the multi-commodity exchanges to protect market participants and deter irresponsible behaviour. Measures could include increased education and awareness-raising, a more stringent registration procedure, and higher minimum capital requirements. In summary, the situation is not straightforward, and it reflects broader socio-economic challenges rather than the narrower debate about how tightly regulated a commodity futures market should be.

8.4.4 Facilitation of physical commodity trade

Improved spot pricing: The fragmented structure of India's physical commodity markets has entailed a role for the futures exchanges in generating credible, nationally applicable spot prices. Previously, only some "mandi" prices for specific commodities were available, and no national spot price was calculated and disseminated. Now, MCX polls prices from a selection of the most significant "mandis" in major trading centres for each commodity, and calculates a national spot price by means of a defined formula.

However, the MCX-generated spot prices are not perfect, and remain an interim solution until the launch of a national electronic spot exchange, discussed in box 22. Two issues have been cited. Firstly,

MCX is sometimes unable to disseminate prices for the exact grade specified for its futures contract – feedback in the cardamom survey highlights this as an issue. Secondly, the spot prices provided by the national exchanges remain notional. Farmers cannot be guaranteed to sell at the published rate. Moreover, no evidence has emerged that these spot rates are used as the basis for industry transactions, or that MCX spot prices are used as the reference for "cash and carry" arbitrage between the spot and futures markets. Despite these limitations, producers confirmed to one of the authors, in private research, that the MCX-generated spot price is useful as a neutral price reference that can be used in negotiations with intermediaries. It also enables market participants to calculate a more representative basis – i.e. the difference between the spot and the futures price – in order to understand the effectiveness of hedging.

Spot pricing in India is likely to improve still further when MCX launches its planned national electronic spot exchange (see box 22). This will allow transparent prices to be discovered on the open market. The platform will facilitate the integration of fragmented local markets, as buyers and sellers are brought together from different regions across India. Moreover, with the possibility of integrating cash and futures trade on one platform, there will be greater possibilities for enhancing the alignment of the two markets through easy-to-perform arbitrage.

Box 22. A national spot exchange in India

India's cash commodity markets are extremely fragmented into over 7,500 distinct local markets, known as "mandis". The integration of these markets has been a national priority since 2002 (Sinha, 2002). In September 2007, after a lengthy process to obtain regulatory clearance, this vision is likely to become a reality with the launch of a spot exchange offering trade across the whole of India in multiple commodities through an electronic platform known as the National Spot Exchange.

The platform will trade standardized contracts in a range of commodities for immediate delivery at specified delivery centres. Delivery centres will be equipped with high-quality storage and distribution infrastructure, delivered goods will be subject to rigorous grading and certification procedures, and the platform will be integrated with collateral management services to enable easy access to financing on the basis of electronic warehouse receipts.

Benefits are likely to be widespread. Farmers will obtain direct access to markets, and their dependence on intermediaries will be reduced. These intermediaries will be further squeezed out of supply chains, leading to a likely increase in farmer price realization. Direct bulk procurement by large purchasers and Government will be facilitated without the requirement to purchase in small lots across multiple fragmented mandis. Cohesion between the futures and physical markets will be improved through the transparency of dynamic national spot pricing and a better platform for tendering or taking delivery.

The National Spot Exchange is a joint initiative of MCX, its parent company Financial Technologies, and the National Agricultural Cooperative Marketing Federation – a leading government agency for procurement, distribution and storage.

Reinforces cash market transactions: In India, physical commodity markets are heavily fragmented and infrastructural deficiencies abound. Therefore, a reliable delivery channel offered by a futures exchange would seem likely to attract participants from across the supply chain looking to use it as a regular sales and procurement channel. From the author's private research, this has been the case. A further observation from the same research has been the widely held perception that the national multi-commodity exchanges' delivery systems have performed erratically for some commodities. The exchanges may have been victims of excessively high expectations, bearing in mind the situation in which they were created. The view that the futures markets would offer a better delivery or procurement channel than existing cash channels may have led to delivery volumes that were too high for warehousemen and quality certifiers to handle, especially in a context of infrastructure deficiencies. By contrast, standard global practice considers futures markets to be a delivery channel

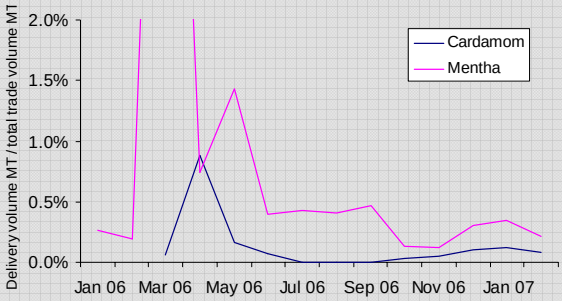
of last resort only. Exchanges typically discourage high volumes of delivery through high handling, certifying and warehousing charges.[37]

It may also be the case that with each exchange listing contracts for more than 40 physically delivered commodities,[38] it has simply proven impossible to develop smoothly functioning delivery mechanisms for each one. Whereas JSE/SAFEX has more than 170 grain delivery points across the major South African growing regions, the Indian exchanges usually have just a single point per commodity, or very occasionally, two. High and erratic transport costs generally reduce the viability of multiple delivery points. Therefore, market participants are sometimes frustrated that the futures exchanges' delivery mechanisms do not perform in accordance with the high expectations.

On the other hand, as will be discussed further on the following pages, the Indian multi-commodity exchanges have often been prolific in introducing quality standards, expanding warehouse capacity, and upgrading the performance of collateral management in a commodity supply chain when a new contract is launched. Evidence also suggests that the delivery mechanism at the three exchanges has been improving and leading to more deliveries (see – for example – Hindu Business Line, 2007.)

For cardamom and mentha, deliveries remain relatively low as a proportion of traded volume (see chart 34). However, exchange delivery data suggests that for the financial year 2006/07, 93.5 tonnes – equating to 6 per cent of all 7mm-and-above cardamom production (and close to 1 per cent of total cardamom production) – was delivered through the MCX platform and taken up by exporters.

Chart 34. Deliveries on MCX mentha oil and cardamom, 2006–2007



Source: MCX.

Note: February 2006 deliveries for mentha reached 7.5 per cent of volume.

Moreover, exporter responses to the cardamom survey suggest that the creation of a reliable procurement hub for high-quality export grade cardamom has removed complexity and intermediaries from the supply chain (see box 20 on supply chain transformations). Premium grade cardamom is readily available for procurement through the MCX delivery system, from where it can be directly exported. One leading exporter commented to the survey: "Now we need not worry about the availability of premium grade variety in the market for our export deals. MCX platform is an assured source of premium quality cardamom. We can simply buy it on the MCX platform and export it without any hassle of getting it processed. We also keep check on futures prices while finalizing our export deals." In the case of mentha, by contrast, there is perhaps some confusion about the role of MCX; small-scale farmers want MCX personnel in nearby locations during the harvesting and extraction season to buy the oil directly from farmers. They are ready to sell their produce to MCX but only if they are paid on the spot. These responses point to the need for further education of farmers about the purpose and functions of a commodity futures exchange.

Infrastructure enhancement: Deficiencies in Indian infrastructure are well documented and have already been discussed. One of the major ambitions for the commodity futures exchanges, and one of the major functions they have fulfilled, has been to upgrade the storage infrastructure in the commodity sector (see box 23). The parent company of MCX founded the National Bulk Handling Corporation (NBHC) in 2005 as an end-to-end solution provider for the warehousing and bulk handling of agro-commodities. By 2007, it had established over 1,200 warehousing facilities supporting 35–40 commodities. The NBHC also facilitates the flow of bank finance to the commodity

[37] Nonetheless, the delivery mechanism is important to ensure convergence between cash and futures prices, and to provide a means of disciplining speculators if they drive prices too far away from fundamentals.
[38] MCX lists commodities for 56 contracts in total, as of July 2007.

sector, with the aim of providing farmers with up to 75 per cent of the value of their produce within two to three days, at a rate of interest that is 2–3 per cent lower than the prime lending rate (discussed further on the following pages). Other services include quality grading, logistics, information reporting on stock flows, and facilitating bank finance for infrastructure construction or upgrade.

The success of the exchange as a direct provider of and catalyst for infrastructure development can be seen in the responses to the cardamom and mentha surveys. For cardamom, the MCX delivery point at Vandanmedu is in the centre of the cardamom-growing area. Therefore, it is easily accessible to the planters. The location of the warehouse has helped the planters to minimize the transport costs they incur when bringing crops to the warehouse. According to feedback from the planters, even if the cardamom is rejected on quality grounds, it does not cause a great inconvenience as it is not far from their farms. The Vandanmedu warehouse is also easily accessible from all the major auction centres.

In terms of storage quality, survey respondents agree that MCX warehouses are better equipped to provide scientific storage to the planters than the warehouses at the auction centres. The warehouses located at Vandanmedu are designed especially for cardamom in contrast to some other facilities. They are created in such a way that cardamom can be stored for a longer period without discoloration or other types of deterioration – for example, the walls and flooring are lined with coir mats, whereas some non-MCX warehouses are just normal storage rooms that are not customized for storing cardamom.

The establishment of the MCX delivery warehouse has also led to the emergence of new grading and processing centres in neighbouring areas. One respondent commented that he started two processing and grading centres at Vandanmedu close to the MCX warehouse. He started his first grading centre after the launch of MCX cardamom futures, when he realized the need for a centre in the vicinity of the major growing area. Following a very good response from the planters, he has started his second processing centre adjacent to the MCX warehouse. A second respondent has also started his own processing and grading centre.

Box 23. MCX and warehousing expansion

"It is in the warehousing sector that India is witnessing another boom these days. Warehouse companies in India are increasing capacity thanks to huge demand for various agricultural products because of the increasing delivery system in futures market and the retail boom that is taking place across the country.

"The Indian farmer will get a much better price for his produce, if he is able to store them well," says Managing Director Anil Choudhary of National Bulk Handling Corp Ltd (NBHC). He said with over 40 commodities being traded and more additions likely, greater investment in warehousing facilities is needed from the farm gate to the delivery point. Choudhary said NBHC, a subsidiary of the leading commodity bourse—the Multi Commodity Exchange of India—will add 5 million tonnes of warehousing capacity in 3-5 years."

Source: Commodity Online. "India to witness warehousing boom" (Monday, 9 July 2007).

As far as mentha is concerned, larger farmers prefer to use MCX-designated warehouses, as they provide more scientific storage and better warehouse practices. There are five approved warehouses in the growing area near Chandausi whose capacity is 3,000 tonnes. These warehouses have better security (including on-site personnel and 24-hour closed circuit television) and appropriate weighing and testing equipment. The mentha oil storage drums are weighed, tested and sealed, along with the lot number and identification code of the party, according to best practices. Smaller-scale farmers typically store mentha at home, as their average quantity of production fits into one or two drums, which does not take up much space. However, farmers responding to the survey would like even more warehouses to be established, in all major producing districts.

Infrastructure development has not been solely the initiative of commodity exchanges. The exchanges have also provided the conditions for other public and private sector warehouse operators to expand. A

further significant boost is expected with the passage of the Warehouse (Development and Regulation) Bill 2005, currently passing through the Indian parliament. This is expected to stimulate further investment with the creation of a proposed warehousing regulator, the Central Warehouse Authority, and a legal framework for the tradability of warehouse receipts. The latter is also expected to provide a significant boost to warehouse-receipt-based financing.

Quality upgrade: By introducing futures for many commodities that have never been traded elsewhere before, MCX and the other Indian multi-commodity exchanges have often defined futures quality specifications for the first time. In some circumstances, established physical market practices could be followed – this was the case with cardamom, where defined grades already existed. In others, such as mentha oil, where there was not an organized physical market, MCX has had to work with appropriate partners. In the case of mentha, MCX collaborated with CIMAP – the research institute that had originally pioneered the development of mentha cultivation – to specify appropriate standards for physical delivery. In this way, the exchange has put in place a transparent and visible benchmark which the physical industry can follow.

According to planter responses to the cardamom survey, MCX has a stringent quality specification and assessment process. This has created a brand in the market for premium-grade quality that is recognized specifically as MCX-grade cardamom. According to exporters, for whom quality is a paramount consideration, MCX has become an assured source of premium-quality cardamom. Exporters further noted that before the launch of the MCX futures contract, procuring premium-grade cardamom from the market was not easy. It required a tedious process of obtaining bulk cardamom, processing it, and then segregating the export-quality spice from the remaining bulk. Furthermore, after the launch of the 7mm-and-above-grade cardamom futures contract on MCX, directly relevant prices became available, which exporters are using as references when negotiating export contracts.

However, the quality specifications have some drawbacks for the planters. There is an incremental cost incurred as a result of the additional grading process required before depositing the goods in the warehouse. The 7mm-and-above grade accounts for only 30 per cent of total production. Moreover, some planters and traders face the risk of getting lower prices than they previously did, as the remaining poor-quality bulk fetches lower prices in the market after segregation of the MCX grade.

The mentha survey reveals that larger-scale farmers are typically aware of MCX quality specifications. The entire crop they grow is usually as per MCX specification, and can be delivered and accepted on the MCX platform. *Mentha arvensis* is the exchange-approved variety. Another variety that was often grown was *mentha pippereta*, a variety with lower resistance to climatic changes, lower yield, higher cultivation costs and lower demand. As farmers learned about the *mentha arvensis* variety, and as mentha futures prices have risen significantly since the launch of the MCX contract, farmers have shifted significantly from *mentha pipperata* to *mentha arvensis.* To a certain extent, therefore, the launch of the MCX contract is one factor that has been responsible for a quality upgrade and the reduction of grade diversity in the sector.

Before the launch of the futures contract, quality testing on mentha was performed by the packed column method or the capillary column method, in which the oil was put in a glass column and shaken in order to discern the purity of the oil. Since the launch of the contract, mentha oil testing has been carried out in a gas-liquid chromatography (GLC) machine – a more scientific and effective method for determining the percentage of menthol in mentha oil. Moreover, survey respondents have said that GLC-certified oil fetches higher prices in the market. Since the launch of the contract, and the subsequent expansion of mentha production, the number of GLC testing labs has increased from only five, before MCX futures, to 40–45 today. As farmers come to know that the oil tested according to GLC standards attracts higher prices, they are keen to have their product tested in this way. This has driven the expansion of GLC facilities. Moreover, as these laboratories only charge about Rs 50 ($1.25) per sample, the testing is affordable, particularly in light of the better returns that the graded product receives on the market.

8.4.5 Facilitation of financing to the agricultural sector

In India, commercial banks have been mandated to set aside 40 per cent of lending for priority sectors, including 18 per cent for agriculture (GOI Tenth Five-year Plan, 2002). However, until recently, mechanisms for agricultural lending have been risky, and the performance of loans to agriculture has been erratic. Consequently, banks are eager to establish more effective and secure mechanisms for lending to farmers and other agro-enterprises.

In the last few years, driven directly or indirectly by the new national multi-commodity exchanges, the infrastructure to enable warehouse-receipt-based inventory financing has been developing rapidly. This infrastructure includes not only warehouse facilities, but also depository services and the systems for issuing and transferring dematerialized (i.e. electronic) receipts. Banks, in conjunction with commodity exchanges, have already commenced warehouse-receipt-based lending to entities in various commodity supply chains.

On the one hand, the scale is impressive. In its first two years of operations, NBHC recorded more than $370 million of warehouse-receipt-based financing to over 100,000 farmers, on the back of 1 million tonnes of commodity (see box 24). On the other hand, bearing in mind the size of Indian agriculture, the potential room for growth is much greater still.

The main bottlenecks to expansion have been regulatory. Firstly, and most importantly, warehouse receipts are not yet recognized or defined by law as negotiable instruments; secondly, banks are prevented from participating in the commodity futures markets, in which they could hedge their exposure to commodities and liquidate collateral seized from defaulters. The first bottleneck could be removed with the passage of the Warehouse (Development and Regulation) Bill 2005 through the Indian parliament, as discussed in section 8.4.4.

The responses to the cardamom and mentha surveys suggest that the penetration of bank lending based on warehouse receipts is currently low. The cardamom survey demonstrates that many planters are aware of warehouse-receipt-based financing. Some have used a system based on receipts issued by the auction centres. However, usage of this facility appears to be low. Moreover, planters have stated that the need for short-term cash to meet pre- and post-harvesting expenses (on irrigation facilities, fertilizers and pesticides, etc.) is a priority. Therefore the cardamom sector is one in which a warehouse-receipt-based financing model, integrating the exchange's warehouses with a bank financing facility, would likely be a success.

The cardamom survey also reveals that non-banking financial corporations, such as Geojit Finance – a financing arm of a large brokerage company, are providing finance at 90 per cent of the value of planters' produce. However, the 14 per cent interest rate offered by Geojit is higher than the 11–12 per cent offered by the commercial banks. MCX notes that Geojit Finance is able to provide this service by hedging a part of its risk through the commodity exchanges. The extent of Geojit Finance's lending, or that of similar companies, is unknown.

Box 24. MCX and the expansion of bank financing to the commodity sector

"Through its existing relationship with 12 banks, NBHC – an associate of the commodity exchange MCX – facilitates warehouse funding of around 1 million tonnes of commodities to the benefit of farmers and traders. This accounts for 50 per cent of the total bulk handling of commodities that NBHC carries out.

Farmers and traders who trade on MCX's futures platform deliver goods at NBHC warehouses, which gives them quality and quantity certificates and a warehouse receipt. Using these receipts as collateral, farmers and traders can borrow from banks. In the case of default, the commodities will be seized by the bank... NBHC hoped to double the volume of commodities used to borrow from banks to 2 million tonnes by March 2008.

"Backed by warehousing receipts, Rs 15 billion ($373 million) of loans have been disbursed through NBHC's collateral support so far. We are quite sure this will cross Rs 35 billion ($870 million)," said Anil K. Choudhary, managing director and chief executive officer.

Banks such as the Bank of India, HDFC Bank, SBI, UTI Bank, Kotak Mahindra Bank and Syndicate Bank have loaned money to farmers and traders against these receipts. "Over 100,000 farmers have indirectly benefited through Rs 10 billion ($250 million) worth of credit extended against warehousing receipts through our bank. What is even more interesting is that in almost two years there has been no instance of default by farmers so far," said a senior official with UTI Bank who did not wish to be identified. Apart from NBHC, UTI Bank also works with National Collateral Management Services Ltd., with an associate of the National Commodity and Derivatives Exchange (NCDEX), with a commodity exchange, and with some other private sector warehousing companies.

The UTI Bank official also said that the bank had been able to extend credit to farmers at a subprime lending rate of 10.5–11 per cent through its approximately 80 branches. The prime lending rate, which is the benchmark rate, is between 12.5–13.5 per cent for most banks…

….The benefit that accrues to the farmer is that he can get a competitive price for produce when he undertakes to sell a particular amount of a commodity at a future date for a future price, which will likely be higher than what he gets while selling during harvest season. The farmer also benefits from grading, packaging, fumigation and auditing of the produce, which is carried out by NBHC.

Banks are happy to extend loans against warehouse receipts, because their lending obligations to the sector are covered. Banks have a mandate to devote 40 per cent of lending to priority sectors, of which 18 per cent has to go to agriculture. In 2007/08, banks have to lend Rs2.25 trillion to the agricultural sector, as mentioned in the Budget. There is a direct correlation between the volume of commodities stored in warehouses and that traded on commodity exchanges. Around 35–40 commodities are handled by NBHC, which has a chain of around 1,200 warehouses. Half of these commodities are traded on the MCX platform. For the others, NBHC just takes care of the bulk handling business."

Source: Mint (2007b).

In the mentha survey, only one large-scale farmer was found to be using warehouse-receipt-based financing. Three other farmers have borrowed from banks through pledging. According to the exchange, the availability of warehouse-receipt-based financing to mentha growers has increased, but the survey suggests awareness remains low. In addition, further potential barriers include small volumes of production and warehouses that are often situated far from farms. The opportunity for financing may also be lower for mentha producers because mentha is often grown as a supplementary crop by wheat and potato producers. Wheat is sold in the market at the government minimum support price, while banks provide finance against cold-storage receipts of potato. Thus, the farmer is able to meet his instant cash needs through these commodities. Mentha oil can easily be stored, as the commodity has a life of up to 20 years. Producers can then take it to market to meet urgent cash needs, or continue to hold on to it until better market prices come about.

8.4.6 Market development

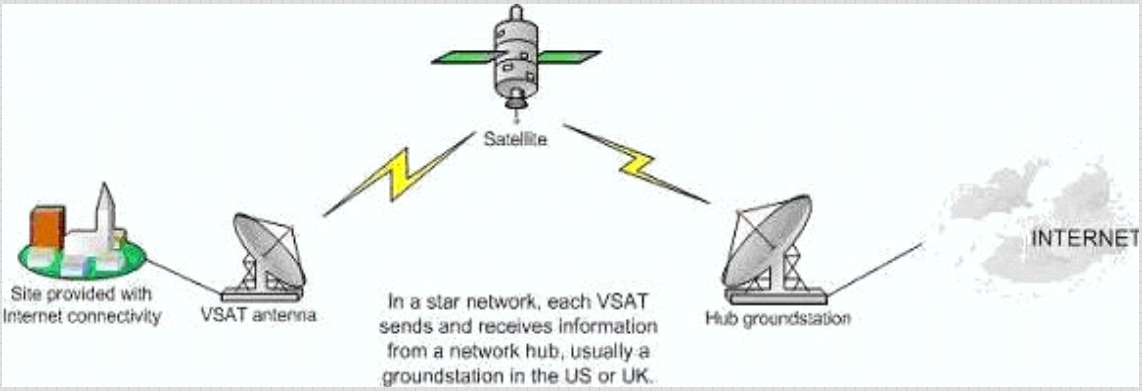
Education: In an effort to increase awareness among farmers about the benefits from commodity exchanges, farmer awareness programmes – which include components introducing futures markets, the process of hedging and the associated benefits – have been conducted at several locations throughout the country. A total of 10 programmes, covering more than 2,500 farmers across five states, have been conducted by MCX in collaboration with various farmers' organizations. About 25 programmes have also been conducted by MCX in collaboration with the FMC, commodity brokers, and industry associations (e.g. the Cardamom Planters' Association), with a reach of approximately 6,000 farmers and other supply chain participants. MCX also conducts educational programmes in association with universities and other academic institutions to build human resources capacity in the industry.

The cardamom and mentha surveys show that awareness about futures markets and price information is strong. However, it also documents that there are still gaps: some farmers remain unaware of futures markets altogether, and other farmers do not comprehend what futures markets are, what they do, or how to participate. This suggests a need for further education, as well as hands-on training and capacity-building seminars.

Market access, capacity-building and ICT: In India, the new national multi-commodity exchanges have been dynamic in using ICT as a means to overcome distance and deficient infrastructure to extend exchange services to rural communities. The initial deployment of ICT by the Indian exchanges saw the installation of price tickers and trading terminals in remote markets by the Indian multi-commodity exchanges. This extended the exchanges' price-discovery function across the country at large, via an integrated electronic network.

Internet trading has been a vital component in extending exchange services to farmers who often are situated in remote areas. However, even where an internet-enabled electronic trading platform exists, there may still be obstacles rooted in deficient telecommunications or power networks. Consequently, the Indian exchanges have pioneered new technologies to overcome these difficulties and ensure that exchange services are accessible to remote users. One example is the use of Very Small Aperture Terminal (VSAT) technology. VSATs link remote users with the exchange on a real-time, interactive and permanent basis, by means of a satellite connection (see fig. 7).

Figure 7: Using a satellite network to link users to a commodity exchange



The equipment is relatively simple, installation and bandwidth costs can be reasonable, and the system can function in difficult environments, with add-ons available to ensure permanent electricity supply.

Data documented by Sahadevan (2007) demonstrate the role of electronic trading in extending market access across India. In December 2005, trade in MCX mentha oil futures had been registered from 154 cities across 17 states. By February 2006 – only two months later – participants located in 183 cities and 20 states were participating in the market. Looking at the growing areas themselves, 60 trading

terminals are located in the cardamom-growing area of Kerala, and 77 are located in the mentha-growing area in Uttar Pradesh. Moreover, through initiatives like the joint venture with India Post (see box 19) and the impending launch of MCX's national electronic spot exchange (see box 22), the exchange is putting in place a platform for access to future services providers.

For many farmers, accessing information or trading commodities through exchange systems is their first exposure to modern forms of technology. The exchange can therefore be at the forefront in building familiarity and comfort among farmers with modern computing and internet applications. This is confirmed by the respondents to the mentha survey. At the same time, the survey also demonstrates how illiteracy remains a significant barrier to the uptake of technology and exchange services.

It should be noted that the parent company of MCX is a company dedicated to financial technology solutions development. In this respect, there have been notable synergies between ICT businesses and the exchange businesses. Low-cost, streamlined and customized ICT solutions designed to facilitate market growth in India's fragmented and infrastructure-deficient agricultural markets have been born of a company familiar with its local context and the challenges it poses. However, it should be underlined that the exchanges are not alone in diffusing ICT to rural populations. Other organizations are similarly using technology to the benefit of rural populations, such as ITC's E-Choupal initiative.

New product and service development: MCX has been prolific in developing and launching futures contracts for many commodities. As has already been described, the three Indian exchanges each offer trade in contracts for more commodities than any other commodity exchange in the world. Many of these contracts have been launched for the first time in India. Moreover, contracts that have struggled to gain liquidity elsewhere – such as steel or potato – have often been launched with some degree of success in India. This brings the benefits of commodity futures markets to numerous commodity sectors and producer communities. However, new product and service development is constrained by an Indian regulatory regime that does not yet permit options, index trading, trading in other "intangibles" such as weather derivatives, or the national electronic spot exchange which MCX has been ready to launch for some time.

Other market development impacts: A number of further impacts were documented in the cardamom and mentha oil surveys, which are reflected below:

Industry development: Exchange data reveals that by March 2007, MCX had over 7,000 trading terminals and a further 12,000 licensees situated in almost every State around the country. Its collateral management sister company, NBHC, manages a network of around 1,200 warehouses for between 35 and 40 commodities (Mint, 2007b). In response to severe human resources shortages in the industry, MCX has provided academic and technical training courses – either directly, or in partnership with other institutions – that created 4,700 new industry professionals in 2006 alone, and aims to create a further 10,000 in 2007 (Business Standard, 2007). This suggests that the exchange has directly stimulated industry development on a significant and nationwide scale.

International trade facilitation: In response to the cardamom survey, exporters commented that premium-grade cardamom readily available through the MCX platform has enabled them to expand their businesses and secure increased volumes of international business. Moreover, MCX prices are typically used as reference prices when negotiating prices with international partners. The mentha survey has documented how – driven in part by incentives for farmers to increase production in a situation of high and rising prices – India has established itself as the world's largest producer of a high-value crop that is an important input for a number of major industries.

Organization of small-scale farmers: The cardamom survey found that two sets of planters have organized themselves into groups for the purposes of futures trading. While these groupings appear to be informal, and the survey cannot shed light on how prevalent this trend is across India as a whole, it does suggest that farmers have been stimulated to better organize themselves, in order to participate effectively in markets.

Employment and tax generation: Exchange personnel at MCX estimate that an industry of over 300,000 people has built up around the commodity futures industry. This includes people employed by warehouses operators, people employed in quality-grading and certification services, and logistics providers, as well as those people employed directly by exchanges and brokers around the country. While this number remains unproven, it has already been pointed out above that MCX created 4,700 new industry professionals in 2006 alone. The cardamom survey suggests direct employment of over 200 people since MCX introduced the contract – with 60 trading terminals and a number of new processing centres, each of which employs 15–20 people. The mentha survey suggests that new jobs have been created in the hundreds – this includes the personnel needed to operate 77 trading terminals; plus the employment generated as the result of expansion in the production of a labour-intensive commodity (the exact quantification is hindered by a lack of availability of data). There is also an associated but very small effect on generating tax revenues for Government from the taxation of commodities that are physically delivered through the exchange.

9. Malaysia

9.1 Historical development of agricultural markets and specific commodity markets under review

9.1.1 Country factfile

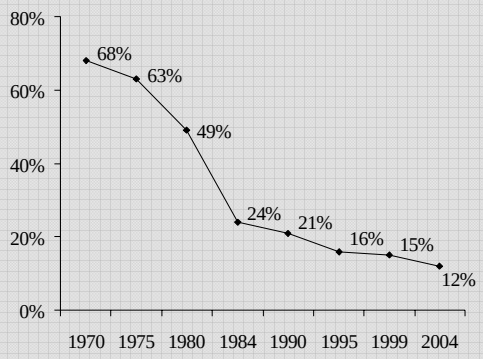
GDP (USDb, current prices) 2006:	151	*Average annual GDP growth 1990–2006:*	8.0 %
GDP per cap. (USD, current prices) 2006:	5718	*GDP per capita growth 1990–2006:*	135 %
Population (millions) 2006:	26	*Population growth 1990–2006:*	46 %
Inflation rate 1990 (2000 as 100)	71	*Inflation rate 2005 (2000 as 100)*	109
Current account balance (USDb) 1990:	-0.9	*Current account balance (USDb) 2006:*	23.8
Agriculture – share of GDP 2006:	8 %	*Agro share of export revenues 2006*	10 %
Agriculture – share of employment 2005:	12 %	*Poorest 20% – share of national income:*	4.4 %
Surface area (millions of sq. km) 2005:	0.3m	*Adult literacy rate 2006:*	89 %
Life expectancy at birth (years) 2005:	74		

USDb = billions of United States dollars

9.1.2 Historical development

At independence in 1957, Malaysian agriculture faced several critical imperatives. The first was to reduce its heavy dependence on rubber and tin through commodity diversification; over 50 per cent of GDP at the time was derived from the production and export of these two commodities. The second was to address the colonial legacy, which saw a concentration of ethnic Malays, or "Bumiputeras", in traditional subsistence agriculture, dislocated from the formal economy and suffering a high incidence of poverty. This stood in contrast to an industrial and plantation economy dominated by ethnic Chinese and foreign interests. Thus, the simultaneous challenges of poverty reduction and ethnic integration, or nation-building, had to be addressed through a rural and agricultural development prism.

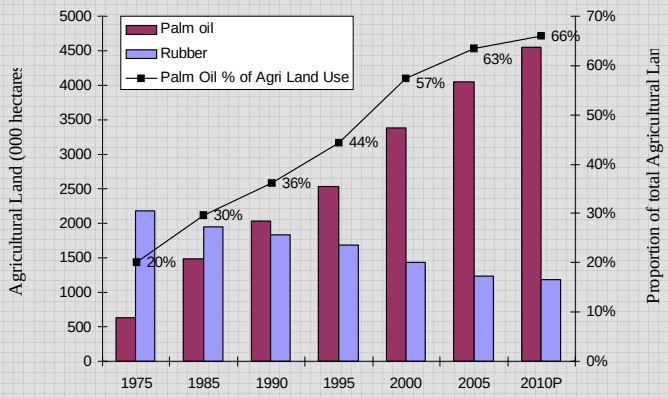
Chart 35. Incidence of rural poverty in Malaysia, 1970–2004



Source: Malaysia Plans.

Early measures in the First Malaysia Plan, which covered the period 1966–1970, to improve Bumiputera economic participation did not reduce this inequality. Social grievances became exacerbated, culminating in a series of bloody race riots in the late 1960s. The Government therefore introduced its New Economic Policy in 1971, setting out the terms of a new socio-economic contract for achieving national unity through economic growth, particularly in the agricultural sector. By spurring growth on a scale large enough to increase the absolute value of all ethnic groupings, but to increase the relative share of the Bumiputera within the total, the Government of Malaysia aimed to reduce ethnic inequalities without creating a new round of grievances.

Chart 36. Malaysian diversification into palm oil, 1975–2010(p)



Source: Malaysian Palm Oil Board, Malaysian Rubber Board, Economic Planning Unit, Ministry of Agriculture.

This vision was crystallized in the Second Malaysia Plan 1971–1975. The Plan ascribed a critical role to palm oil cultivation in addressing both the economic and social dimensions of the Government's vision. Malaysia was abundant in derelict or uncultivated land and cheap underemployed labour. These became the focus of government-driven land development and smallholder resettlement schemes, implemented chiefly by the Federal Land Development Agency (FELDA). A major consequence of this approach, boosting growth of smallholder production alongside the established commercial plantation sector, is that an entrenched duality has developed in Malaysian agriculture (Ahmad, 2001). A further important aspect of the Government's approach during the First and Second Malaysia Plans was to embed sector development within a laissez-faire framework in which pricing was determined by the market and "the private sector was assigned the role as engine of growth, in contrast to the government sector which undertook investment in social and physical capital" (Arshad and Shamsudin, 1997). By 1980, when the Kuala Lumpur Commodity Exchange first introduced its crude palm oil futures contract, the physical market was well established, and had experienced rapid expansion within a robust framework of government-led physical market governance.

Box 25. Objectives for agriculture in the Ninth Malaysian Plan 2006–2010

- Increasing agricultural production, including by venturing into new sources of growth with greater private sector participation
- Expanding agro-based processing activities and product diversification
- Strengthening marketing and global networking
- Enhancing incomes of smallholders, farmers and fishermen
- Improving the service delivery system

Source: Ninth Malaysia Plan (2006).

The Government introduced its first National Agricultural Policy (NAP) in 1984, focusing on further rapid expansion of crop acreage and on supporting infrastructure for palm oil and other plantation crops as a means of reducing poverty and increasing employment and foreign exchange. A review in 1992 saw the formulation of NAP II 1992–2010, which shifted the emphasis to increasing the productivity, efficiency and sustainability of agricultural production, and creating linkages with the other faster-growing sectors of the economy. Agricultural and financial trade liberalization, combined with the impacts of the Asian financial crisis, prompted a further review in 1997 which led to the current NAP III 1998–2010. Paradoxically, however, during the initial decade of the NAPs, the importance of agriculture to the Malaysian economy declined significantly, with the growth of the industry and services sectors (Harron et al., 2001).

With the new millennium, "interest in agriculture is returning in a big and passionate way" (Wong, 2007). During the Eighth Malaysia Plan 2001–2005, the focus was on commercializing the smallholder sector, including by adopting modern farm management techniques to increase income and productivity. The Ninth Malaysia Plan 2006–2010 is more ambitious. The agriculture sector will be revitalized "to become the third engine of growth… [with a] reorientation towards greater commercialization and the creation of high-income farmers as well as the promotion of greater private sector investment including foreign investment" (Ninth Malaysia Plan 2006–2010, 2006: 81).

9.1.3 Summary of key agricultural challenges over time

- Diversification of the agro-economy
- Sustainable increase to land cultivation and to production
- Expansion of export markets as a source of foreign exchange
- Poverty reduction, employment creation and livelihood generation, through smallholder development, and later, through smallholder organization/commercialization
- Development of value-added downstream industries and applications that retain their global market share in the face of increased production elsewhere

9.1.4 Specific commodity under review: crude palm oil (CPO)

Characteristics and industry process[39]

The first Malaysian commercial palm oil (*elaeis guineensis*) plantation was established in 1917, forty years after the species was brought to the country as an ornamental tree. It has now become a truly national industry, cultivated in all 13 Malaysian states. In 2005, 57 per cent of the area producing palm oil was located in the 11 states on Peninsular Malaysia, with the remainder in Sabah and Sarawak – the two Malaysian states located on the island of Borneo (MPOB).

Harvesting of palm oil

Source: WWF (2002).

Harvesting commences approximately 24–30 months after the planting of the palm. Each palm can produce between 8 and 15 fresh fruit bunches per annum for about 25 years, before replanting becomes necessary. Once harvested, fresh fruit bunches need to be delivered to mills within 24 hours, otherwise they face the risk of significant deterioration in quality. The mill physically extracts crude palm oil and crude palm kernel oil from the fresh fruit bunch. Crude palm oil is subsequently refined to meet industry standards in a number of significant combinations – the resulting products being olein (liquid) and stearin (solid).

Industry structure and supply chain[40]

Land ownership displays very clearly the dual structure of Malaysian palm oil production – split on a 60/40 basis between plantation estates and smallholder schemes (see table 7). Plantation estates can vary in size between a few hundred and over a hundred thousand hectares of oil palm under cultivation. The larger firms are often vertically integrated operations which directly own, or are sister companies with, mill, refinery and manufacturing assets. Some, such as Sime Darby Berhad or IOI Corporation Berhad, are diversified conglomerates with significant activities outside the palm oil chain altogether. Many Malaysian plantation companies have been expanding into Indonesia, and are responsible for driving much of the growth in this neighbouring country.

[39] This section draws heavily from WWF (2002). Detailed information about the supply chain process and participants can be found in this report.

[40] For further information about Malaysian palm oil industry structure, see WWF (2002). For smallholder structures specifically, see: IIED (2006).

Table 7. Structure of the Malaysian CPO industry

	Share of Malaysian area under palm oil	
	1980	2005
Private Estates	52%	60%
Government Schemes		
FELDA	30%	16%
FELCRA	2%	4%
RISDA	2%	2%
State Schemes	8%	8%
Independent Smallholders	7%	10%

Source: MPOB.

Three types of smallholder schemes operate in Malaysian palm oil production: supported smallholder schemes, independent smallholders, and collective landowners' schemes (International Institute for Environment and Development (IIED), 2006). FELDA is by far the largest of the three Malaysian government-supported smallholder schemes. The others are the Federal Land Consolidation and Rehabilitation Authority (FELCRA) which rehabilitates land from unsuccessful State-managed schemes, and the Rubber Industry Smallholders Development Authority (RISDA) which provides funds to rubber smallholders wishing to switch to palm oil. All three authorities support smallholders by means of input subsidies, infrastructure development, and in the case of FELDA – a managed supply chain, through provision of credit, inputs, advisory services, technology provision, and guaranteed sales to FELDA-operated mills.

Independent smallholders, by comparison, have much more flexibility in their choice of purchaser, standing to gain both the upside and downside of price volatility, and with more freedom to intercrop. However, they face price, production and market risks. Mills often reject fresh fruit bunches on quality or capacity grounds. Choice among purchasers is often severely restricted by the need to deliver fresh fruit bunches to the mill within a day of harvest, and by a lack of availability of transport. There is a role for intermediaries who can perform a value-added role between independent smallholders and the mill, performing aggregation and logistics functions, and assuming some of the risk of rejection by the mill. However, smallholders often receive below-market prices that may sometimes be considered exploitative.

A third form of smallholder scheme is the collective landowner scheme known in Malaysia as *konsep baru.* These schemes establish partnerships between private plantations, Government, and indigenous communities, for the purposes of land development held under the country's Native Customary Rights provisions (IIED, 2006).

The downstream industry consists of mills and refineries, and of manufacturers and exporters of vegetable oils, specialty oils and fats, oleochemicals and margarines. There is significant vertical integration in the industry, so that private plantations and FELDA account for a high proportion of downstream activities. FELDA operates seven palm oil refineries, six kernel-crushing plants and two margarine plants. However, there are also independent manufacturing companies, as well as subsidiaries or associates of multinational companies (WWF, 2002).

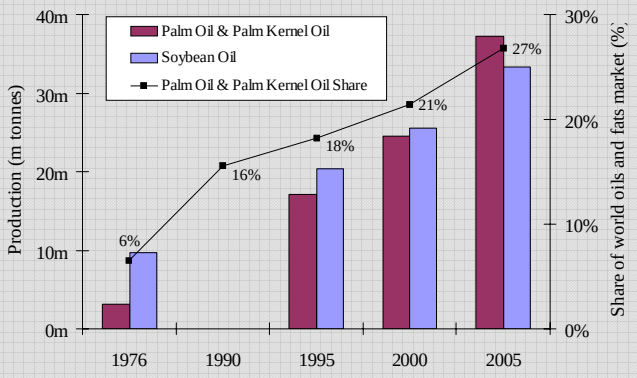
Industry development

As has already been discussed, the palm oil industry in Malaysia experienced rapid growth after Malaysian independence. The growth and success of Malaysian palm oil was reflected in its rapidly increasing share of total Malaysian agricultural land use, displacing rubber to become Malaysia's "golden crop" (see chart 36). There was stellar growth in the areas producing palm oil as well as in levels of production volume and in export revenues. Whereas in 1970 palm oil's share of agricultural exports was only 8 per cent, this had risen to 29 per cent by 1985, and to 51 per cent by 2005. By contrast, the share of rubber in agricultural exports stood at 51 per cent in 1970, falling to 21 per cent by 1985, and then to 15 per cent by 2005.

Palm oil formed the basis of a fast-growing world industry, and Malaysia soon became the leading producer and exporter – a position it retains to this day (although Indonesia is catching up fast). In 1995, Malaysia accounted for 51 per cent of the 15 million tonnes of global palm oil production, and for 64 per cent of the world's 10 million tonnes of palm oil exports. By 2005, it accounted for 45 per cent of the 33 million tonnes of global production, and 51 per cent of the 26 million tonnes of palm oil exports.

The dynamism of the Malaysian palm oil industry has also been powerfully reflected in palm oil's growing share of the world oils and fats market (see chart 37).

Chart 37. Palm oil share of world oils and fats market, 1976–2005



Source: Malaysian Palm Oil Board (1990 production not available)

A further dimension of success has been the expansion into the more value-added parts of the supply chain, "evolving from a mere producer and exporter of CPO into a more diversified entity, creating new downstream and supporting industries" (Yahya, 1995: 2).

Growth has been driven by private plantations, State agencies and public authorities (Simeh and Ahmad, 2001). Of the latter, the role of FELDA has been key (see table 8). Formed prior to independence in 1956, its first land development and smallholder resettlement schemes were with rubber from 1958, and only later with palm oil from 1961. It was in the 1970s that rapid land development and resettlement started to take place, with the expansion of palm oil cultivation taking on extraordinary proportions. Growth was also supported by the regulatory, research and development, and marketing functions of three dedicated government agencies, namely the Palm Oil Registration and Licensing Authority (PORLA), the Palm Oil Research Institute of Malaysia (PORIM) and the Malaysian Palm Oil Promotion Council (MPOPC).[41]

Users and uses

Malaysian palm oil is exported to a wide and geographically diverse range of global markets (see chart 38). This in part reflects the work since the 1980s of MPOPC, and its predecessor organization the Palm Oil Promotion Fund, to market palm oil around the world. It also reflects the wide range of potential uses for palm oil and its associated products. In this respect, the role of PORIM in developing new and value-added applications for palm oil products must not be overlooked. About 80 per cent of palm oil is used in food-related applications. Food uses include cooking and frying oil, shortenings, margarine, vegetable ghee, ice cream and biscuits, to name but a few. Non-food uses of palm oil include feedstuff, soap, cleaning products, candles and various applications using oleochemical derivatives of palm oil (WWF, 2002).

Table 8. Expansion of FELDA, 1965–2000

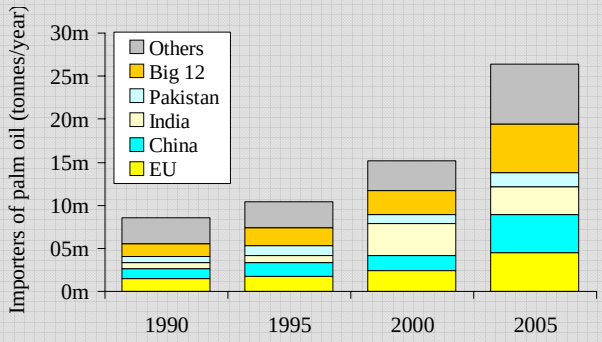
Year	FELDA cumulative area under palm oil production (hectares)
1965	1,083
1975	85,257
1985	306,887
1995	675,392
2000	685,520

Source: Simeh and Ahmad (2001).

Critically, biofuels are now one of the industry's highest priorities. In 2005, the Government released its National Biofuels Policy. This emphasized the role of palm oil in a four-point strategy that included developing a biodiesel blend of 5 per cent processed palm oil with 95 per cent petroleum diesel. The National Biofuels Policy has, as an explicit aim, the promotion of further sources of demand for palm oil, both in Malaysia and overseas.

[41] PORLA and PORIM were merged in 2000 by Government statute to form the Malaysian Palm Oil Board (MPOB), which continues the functions of the legacy agencies.

Chart 38. Malaysian CPO export markets, 1990–2005



Source: Malaysian Palm Oil Board (Big 12 refers to twelve importers that imported over 0.1m metric tons of palm oil in 2005).

Another of its explicit aims is to ensure remunerative prices for palm oil growers, both large and small. A palm oil biodiesel plant is to be established. This will also include a demonstration mill for the production of biofuel for cold climates, which is aimed at strengthening the appeal of Malaysian biofuel in export markets. The biofuel policy announcement is believed by market participants to have triggered a sharp structural increase in the price of the physical commodity, and also in the price of existing and potential land suitable for palm oil cultivation. In this respect, concern has been expressed about the environmental impact resulting from the destruction of forests, as plantations expand their palm oil cultivation in Malaysia and Indonesia.

Summary: Salient features about the physical market

- A physical market that has been growing fast and functioning smoothly, with highly developed relations among market participants, backed by effective, efficient and accepted regulatory bodies
- A broad array of commercial interests at every stage of the supply chain with exposure to price risk in the market
- A wide and geographically diverse set of export markets that source a large share – if not all – of their palm oil from Malaysia, the world's leading producer and exporter
- A significant presence of smallholder agriculture, which can be categorized into supported smallholders within government-backed schemes such as that of FELDA, and independent smallholders with greater exposure to market, price and production risks

9.2 Exchange emergence and contract development: Bursa Malaysia Berhad

Year founded: 1973 (Bursa Malaysia); 1980 (Kuala Lumpur Commodity Exchange)	*Location:* Kuala Lumpur, Malaysia
Instruments traded: Equities, financial futures and options (equity index, single stock, interest rate), commodity futures and options, OTC commodity futures clearing, Islamic capital market products.	*Commodities traded:* Two commodities are traded: crude palm oil, and crude palm kernel oil
Ownership: Demutualized company, publicly listed on Bursa Malaysia's own Main Board	*Trading system:* Fully electronic trading via a system custom-developed by an independent software vendor
Clearing house: In-house clearing house	*Regulator:* Suruhanjaya Sekuriti (Securities Commission)

Total futures and options volume 2006: 4.2 million	*Commodity futures and options volume 2006:* 2.2 million
FIA world ranking 2006 (all futures exchanges based on total derivatives volumes): 49	*UNCTAD world ranking 2006 (commodity exchanges – commodity derivatives volumes only):* 19

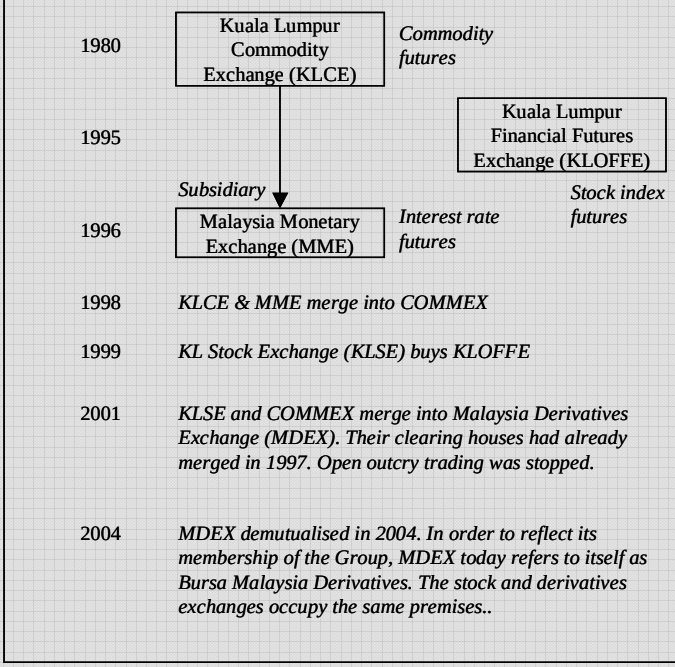
Website: http://www.bursamalaysia.com.

Bursa Malaysia is the product of multiple mergers; it has ultimately brought together cash equity, financial and commodity derivatives in one institution (see fig. 8).

The Kuala Lumpur Commodity Exchange (KLCE) was founded in July 1980 and was the first futures exchange in South-East Asia. Trading commenced with crude palm oil futures (FCPO) on an "open outcry" trading floor. Contracts were subsequently launched for rubber, palm kernel, tin, cocoa, RBD palmolein and crude palm kernel oil. All except FCPO and crude palm kernel oil futures (FCPKO) have since been delisted.

In December 1995, the Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) was established to trade stock index futures contracts on an electronic platform. The following year, in May 1996, the Malaysian Monetary Exchange (MME) was set up as a subsidiary of KLCE to facilitate the trading of the Kuala Lumpur Interbank Offered Rate (KLIBOR) futures contract, which is a three-month interest rate futures contract. In December 1998, KLCE merged with MME, and became known as the Commodity and Monetary Exchange of Malaysia (COMMEX), a name that reflected the diversity of its products. In January 1999, an agreement was reached between the Kuala Lumpur Stock Exchange (KLSE)[42] and KLOFFE. As a result, KLOFFE became a subsidiary of the KLSE group of companies. Finally, the merger between KLOFFE and COMMEX in 2001 led to the formation of the Malaysian Derivatives Exchange (MDEX) – an integrated derivatives exchange incorporating commodity, interest rate and stock index futures. This saw MDEX become a subsidiary of the KLSE, and FCPO trading migrate from the floor to KLOFFE's electronic platform.

Figure 8. Evolution of Malaysian futures exchanges



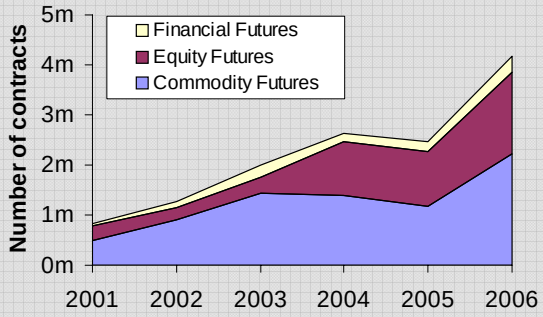
In 2004 KLSE demutualized, which led to it being renamed Bursa Malaysia. MDEX was renamed Bursa Malaysia Derivatives. Structurally, KLSE, limited by guarantee and owned by its 64 members, became a holding company limited by shares, with the exchange-operating entities – including Bursa Malaysia Derivatives – becoming 100 per cent owned subsidiaries. In 2005, Bursa Malaysia was listed on its own main board.

[42] The KLSE was founded in 1973 as the national stock exchange of Malaysia.

This pattern of merger and integration was replicated in the clearing and regulatory fields (concerning the latter, see the section on regulation). Initially, KLCE had been cleared by the Malaysia Futures Clearing Corporation (MFCC), an independent entity in which KLCE had a 28 per cent stake. After the formation of MME and KLOFFE, the Malaysian Derivatives Clearing House (MDCH) was created to clear financial futures traded at both exchanges; each exchange had a 50 per cent ownership stake. In 1997, MFCC and MDCH merged to form an integrated futures clearing house. It is notable that the common clearing house formed four years prior to the integration of the various futures exchanges. In 2001, MDCH became an in-house subsidiary of KLSE, and also changed its name with demutualization in 2004 to Bursa Malaysia Derivatives Clearing.

Bursa Malaysia Derivatives currently offers eight futures contracts, including two commodity contracts – FCPO and FCPKO. The palm oil commodities contracts have consistently accounted for over 50 per cent of exchange volume since the formation of the integrated derivatives exchange (see chart 39), and the exchange provides the price reference for the world palm oil industry. It is also notable for being one of a small number of developing-country exchanges open to international users. For Bursa Malaysia, and KLCE before it, attempts to develop other commodity futures contracts, as well as new instruments such as options, have been unsuccessful to date.

Chart 39. The share of commodity futures in Bursa Malaysia derivatives volume, 2001–2006



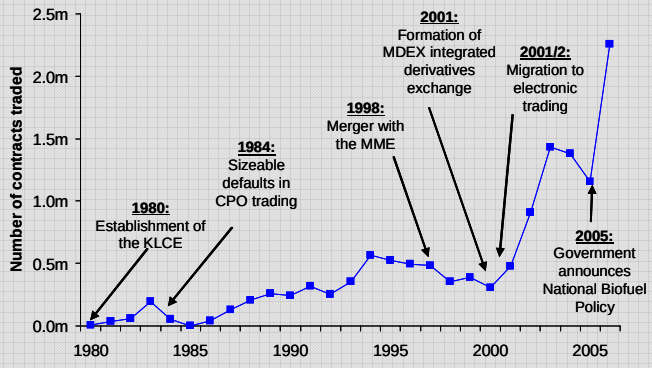
Source: Bursa Malaysia.

New initiatives being planned in the commodity arena seek to focus development on products complementary to the core FCPO contract. These include United States dollar-denominated products, and a commodity index. Bursa Malaysia has also licensed the FCPO specifications to MCX of India, and is collaborating with DCE on the prospective development and launch of a palm oil contract in China.

Crude palm oil

The FCPO contract emerged with the founding of KLCE in 1980. The contract was established on the back of a successful and well-regulated physical market. The organizations that later became MPOB played a significant role in industry development and regulation, including compiling and disseminating spot prices, defining industry-accepted quality standards, licensing participants, and certifying shipments prior to export.

Chart 40. Growth of FCPO volume and key milestones, 1980–2006



Source: Bursa Malaysia.

The Government of Malaysia had taken a laissez-faire approach to pricing in its development plan for the palm oil industry. Thus, in contrast to exchanges in other parts of the developing world, and specifically those featured in this study, the futures contract did not emerge as an adjunct to or corollary of a liberalization process, but as an add-on to a well-developed cash market.

Unlike other contracts that KLCE subsequently launched, its FCPO contract was the first of its kind anywhere in the world. Until then, pricing had been determined in the Rotterdam OTC forwards market. OTC markets do not create transparent price discovery, nor do they provide assurances about the reliability of counterparties with whom to trade. Thus, palm oil trade in Rotterdam was non-transparent and often generated disadvantageous pricing terms for Malaysia's producer community, as well as a significant risk of default by the counterparty to the transactions. At the time of launch, Malaysia was already the world's largest producer and exporter of palm oil, with growth in production matched by increasing industry sophistication along an extensive commodity supply chain. Thus, a diffuse community of plantations, millers, refiners, downstream manufacturers and exporters – regulated and licensed by the MPOB's predecessor organizations – were in need of a local and transparent price-discovery mechanism and a secure platform for price-risk management.

In 1984, the KLCE FCPO market was rocked by a sizeable default, when a client refused to accept a trade executed on its behalf by a member. Serious legal repercussions followed. However, the exchange overcame these early troubles to exhibit steady year-on-year growth through the 1980s and to the mid-1990s, to a level of 0.5 million contracts per year. A plateau was reached in the mid-1990s. The founding of MME and KLOFFE absorbed some liquidity, although FCPO remained liquid throughout.

Since the turn of the millennium, FCPO has received three significant boosts to trading: first, in 2001, with the formation of MDEX as an integrated derivatives platform; second, in 2001–2002, with the migration of trading to a more accessible electronic trading platform; and third, in 2005, with the launch of the Malaysian Government's National Biofuels Policy. This policy – placing a heavy emphasis on use of palm oil as a source of biofuel production – has generated substantial new interest in the market, with significant uplift of volume and volatility.

Bursa Malaysia's key achievement within its local context:

- Bringing pricing power to Malaysia for its key export commodity

Success factors:

- Alignment with an established, well-regulated physical market
- No established palm oil futures contract elsewhere in the world
- High growth in the underlying physical market

Challenges:

- Overcoming a large default in 1984
- Developing liquidity in the options market

Future opportunities:

- Further physical market growth – particularly spurred by the Government's National Biofuels Policy, which places a strong emphasis on palm oil
- Developing products that are complementary to the core FCPO contract – United States dollar-denominated products, and a commodity index

9.3 Regulatory framework: Suruhanjaya Sekuriti (Securities Commission)

Established on 1 March 1993 under the Securities Commission Act 1993, the Securities Commission is a self-funding statutory body with investigative and enforcement powers that reports to the Minister of Finance.

In the mid-1990s, capital market regulation in Malaysia had to contend with a proliferation of exchanges. KLOFFE, trading stock index futures, and MME, trading interest rate futures, emerged alongside KLCE, trading commodity futures, and KLSE, trading securities. Regulation of KLCE's commodity futures markets was originally provided by the Commodity Trading Commission, operating under the Ministry of Primary Industry and governed by the Commodities Trading Act 1985. The financial futures markets at MME and KLOFFE were regulated by the Securities Commission of Malaysia, operating under the Ministry of Finance (MOF) and governed by the Futures Industry Act 1993 and the Securities Commission Act 1993. In this way, there was a dichotomy between commodity and financial futures regulators.[43] In 1997, the Government decided to bring about regulatory convergence, and introduced the Futures Industry (Amendment and Consolidation) Act. As a consequence, the Commodities Trading Act 1985 was repealed and the functions of the two regulators were merged into the Securities Commission operating under the MOF.

Under this structure, the Securities Commission's regulatory functions include:

- "Supervising exchanges, clearing houses and central depositories;
- Registering authority for prospectuses of corporations, other than unlisted recreational clubs;
- Approving authority for corporate bond issues;
- Regulating all matters relating to securities and futures contracts;
- Regulating takeovers and mergers of companies;
- Regulating all matters relating to unit trust schemes;
- Licensing and supervising all licensed persons;
- Encouraging self-regulation; and
- Ensuring proper conduct of market institutions and licensed persons" (Securities Commission website, 26 July 2007).

The Securities Commission also has a role specified by law to encourage and promote the development of the securities and futures markets in Malaysia. Arguably, this role has been seen most clearly in its work to enhance Malaysia's Islamic Capital Market, a range of Shariah-compliant financial instruments.

The evolution of this structure since 2001 – including the merger of all entities into KLSE, and KLSE's subsequent demutualization that saw it renamed Bursa Malaysia – has fallen under the scope of the Malaysian Government's' "Capital Market Masterplan". Announced in 1999 and launched in 2001, the Capital Market Masterplan – a comprehensive blueprint for the long-term development of the Malaysian capital markets – set out 152 recommendations covering 11 categories, one of which is derivatives. The implementation of the Capital Market Masterplan is a three-phase process taking place between 2001 and 2010. The first phase was to strengthen domestic capacity and develop strategic and nascent sectors, the second phase was to further strengthen key sectors and gradually liberalize market access, and the third phase is to further expand and strengthen market processes and infrastructure and to enhance international positioning in areas of comparative and competitive advantage.

The strength of Bursa Malaysia Derivatives as a benchmark exchange for palm oil may be attributed at least partly to the facilitative regulatory environment in which it operates. The market is open and accessible to overseas participants. Market oversight functions are largely concentrated at the exchange clearing house, which operates as the front-line self-regulator. Moreover, the Securities Commission operates a "principles-based" regulatory policy, which focuses on upholding broad

[43] This was in contrast to the United States structure, where a dichotomy exists between securities (Securities and Exchange Commission) and futures (Commodity Futures Trading Commission) regulators.

principles concerning investor protection, market risk management and internal compliance, as opposed to laying down prescriptive rules.

It is also noted in the case of Malaysian palm oil, that the Malaysian Palm Oil Board (MPOB) has a prominent role as a regulator of the physical market for the commodity. MPOB was created in 2000 with the merger of PORLA and PORIM. MPOB's Licensing and Enforcement Division – which has assumed PORLA's responsibilities – performs the following functions:

- To register, regulate, coordinate and promote all activities relating to the planting, supply, sale, purchase, distribution, movement, storage, surveying, testing, inspecting, export and import of palm oil products and the milling of palm oil fresh fruit bunches;
- To check product quality through a series of quality inspection, control, sampling, testing and enforcement programmes;
- To establish monitoring at critical control points, including the seed producers and nursery operators, and during all stages of production and processing – raw material, storage, handling, and point of export including ship tanks;
- To stipulate and enforce regulatory functions as per relevant legislation;
- To gather information and maintain records of all relevant matters relating to the palm oil industry.

9.4 Impacts

9.4.1 Price discovery

Price dissemination: As an integrated exchange offering trade across multiple asset classes, Bursa Malaysia has commercialized its information provision. Sixty subscribers, including large international data vendors such as Reuters and Bloomberg, are licensed to provide Bursa Malaysia market information via multiple distribution channels including the internet, dedicated terminals, television, handheld devices, SMS messaging and electronic display boards. At the same time, Bursa Malaysia disseminates free of charge, via its website, important market data relating to its FCPO contract. These include monthly statistics, historical data, a daily trading summary, market demography and the FCPO spot month average settlement price. The Bursa Malaysia website receives approximately 600,000 page hits per month, and approximately 4,000 terminals or devices receive market information through data vendors.

An international price discovery platform: The price discovery impacts arising from Bursa Malaysia's palm oil contracts have been focused at the international level. Industry participants have confirmed that Bursa Malaysia generates the reference price for the world palm oil trade. In other words, the FCPO contract provides a pricing reference for international transactions between the Malaysian industry and purchasers or trading houses situated in export markets.

The experience of Bursa Malaysia in establishing a benchmark exchange[44] in the developing world is unique. Reference prices for every other exchange-traded global commodity are generated on exchanges situated in the developed world, often far away from the producer markets. In Malaysia, however, the largest country producer of palm oil is also the location for the exchange which generates its reference price.

This is important because it ensures that the producer country has pricing power – as a price maker rather than a price taker – for its key export commodity on the world market. This compares with the previous structure, where world pricing was generated on the Rotterdam OTC market. This forum is non-transparent and is argued to have privileged some large trading houses to the disadvantage of the

[44] A benchmark exchange may be defined as one that generates the reference price for a globally traded commodity.

producer community. Thus, Bursa Malaysia has reduced information asymmetries at the international level. It has also improved the efficiency of price formation, by ensuring that pricing reflects the supply/demand fundamentals of the Malaysian palm oil industry – the world's largest producer and exporter. Moreover, by freely allowing overseas participation, the global demand from refiners and users of palm oil and its derivative products are fully reflected in price formation.

As the world reference market, Bursa Malaysia has licensed its settlement prices to MCX in India and is working with the DCE in China on the development of a Chinese palm oil contract. Trade of palm oil on MCX, on the basis of Bursa Malaysia specifications and using its settlement prices, has provided a local risk-management platform for importers, manufacturers and users in this large purchaser market. This enables them to avoid currency risks and regulatory restrictions on participation in overseas markets. A local platform in China is likely to assist Chinese users of palm oil in reducing the risks associated with price volatility, too. Arbitrage between Bursa Malaysia, MCX and DCE could enable the alignment of prices across these international markets. This would ensure that an even greater proportion of the industry fundamentals is reflected in the price formation of Bursa Malaysia's FCPO contract, while allowing for the specific fundamentals of the local market to be reflected in the Indian and Chinese prices.

Finally, with surging demand for palm oil as an input in biofuel production, the FCPO market acts as a barometer to reflect the shift in fundamentals, providing transparency and a level playing field to ease the adjustment. This effect has been reflected in the rapidly increasing FCPO prices, which industry experts believe was sparked after the announcement of the Malaysian Government's national biofuels policy, in which palm oil was heavily promoted.

Domestic impacts: Bursa Malaysia futures prices appear to have made a more limited impact in the domestic market. Industry representatives suggest the MPOB daily average spot price is more widely used as the basis for domestic physical market transactions. It is also noted that smallholder palm oil planters in Malaysia were already price-aware prior to the introduction of the FCPO contract. MPOB daily average spot prices are published and widely disseminated throughout Malaysia by radio, newspaper, television and SMS. According to the representative body for independent smallholders – those smallholders operating outside of government schemes – independent smallholders use MPOB prices as references in negotiations with intermediaries. However, it is noted that intermediaries often take large margins – as much as 10 to 15 per cent – by bearing some of the risk of product rejection by palm oil mills, and also by bearing costs associated with transportation and aggregation functions.

9.4.2 Price-risk management

First of all, it is important to note that for Bursa Malaysia's FCPO contract, the key prerequisites in the trading environment that allow for effective price-risk management are that:

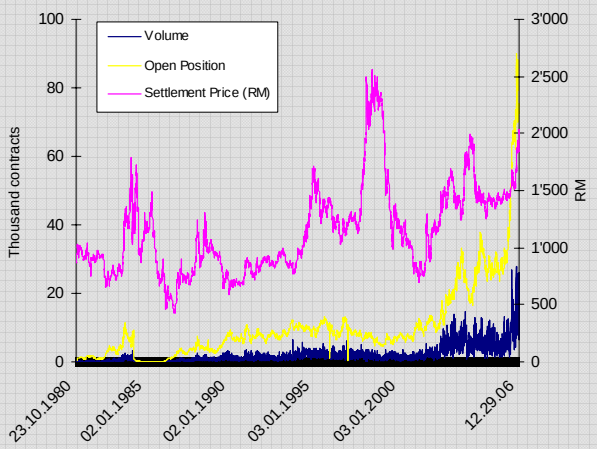
- There are liquid markets – the trading volume was 3.5 times the physical production in 2006 (a marked increase on 1.9 times in 2005);
- Trading takes place in a regulated, rule-based trading environment, under the rules and by-laws of Bursa Malaysia, and with oversight by the Securities Commission;
- Market information is disseminated transparently, in order to avoid asymmetries which might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Discussions with the exchange and with a number of palm oil industry representatives and market participants have suggested that most major commercial plantations, processors and exporters are active in Bursa Malaysia's market to hedge their price risk, and also to use the platform on an occasional basis for making or receiving delivery. However, with palm oil prices rising rapidly due to the new demand from the biofuel industry, plantations are using the market less; in other words,

confidence about rising prices has convinced some plantations that there is less need to hedge (see chart 41). Conversely, refiners have an increasing incentive to hedge, as a means of controlling their costs as prices rise.

One integrated plantation and refiner set out how the company uses the futures market to facilitate forward sales of crude palm oil three years – and occasionally even five years – down the line. Bursa Malaysia's platform is used to hedge the price risk during this period (although contracts are rolled over, as Bursa Malaysia offers contracts a maximum of 24 months ahead). This has significantly enhanced marketing and contracting flexibility in the industry, and has underlined the appeal of palm oil in world export markets.

Chart 41. Bursa Malaysia performance metrics: FCPO, 1980–2006



Source: Bursa Malaysia.

Refiners also typically use the market to offer forward pricing to plantations. In this model, a forward sale is made from plantation to refiner, with the refiner hedging its exposure to price risk on the futures market. Thus, a profit is locked in for the plantation on a season-by-season basis, while the refiner stabilizes the cost of its key input. In turn, this allows for improved business planning, budgeting, and investment decision-making for each party.

The presence of a local platform has brought important advantages to the Malaysian palm oil industry, compared to the previous situation in which forward pricing and risk management were conducted through the Rotterdam OTC forwards market. The costs and risks associated with market access are now lower. By better reflecting the fundamentals of the Malaysian industry in market price formation, the basis risk is reduced too.

Smallholders are not currently involved in the futures market, however. The majority of Malaysia's smallholders find many of their risks mitigated through participation in government-backed schemes such as that of FELDA. Furthermore, "a major motivation for smallholders in Malaysia to enter into or remain part of supported schemes is guaranteed sales into international markets, which have greater price stability than local markets" (IIED, 2006: 17).

For independent smallholders, production and farm management issues are a more fundamental concern than price-risk management, according to their representative body, the National Association of Smallholders (NASH). As a result of low-quality inputs, underdeveloped farming techniques and low investment due to insecure land tenure and natural risk aversion, volumetric risk also appears to be a greater concern than price risk: "Once palms are mature and production is up and running, smallholders do not achieve uniform or predictable harvests. Two studies have found surprisingly high variation in productivity among palm oil smallholdings in the same vicinity – of as much as 50 per cent around the mean" (IIED, 2006: 15). Moreover, lack of concern about price risk is reinforced by the current situation in which prices are high and believed to be rising.

However, co-operative development is a major priority for NASH; currently the level of organization in the sector is very low. Once the level of organization increases, and basic production issues are addressed,[45] smallholders will have the scale to participate in Bursa Malaysia's markets. Better market access is a major driver of cooperatization, according to the president of NASH, as it will be

[45] Improving yields is the key issue for palm oil producers, through mechanization and professionalization of farm management, better replanting inputs, better fertilizer and pesticide application etc.

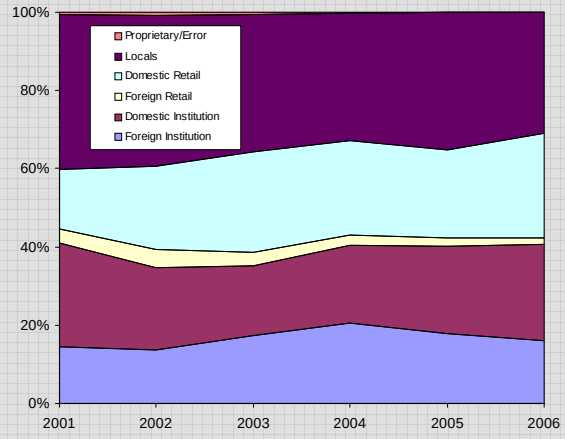
"absolutely important for the smallholders to become price makers – rather than price takers, as they currently are – through engagement in Bursa Malaysia markets."

9.4.3 Venue for investment

First of all, it is important to note that the key prerequisites in the trading environment that make Bursa Malaysia's FCPO contract an attractive and secure venue for investment are that:

- There are liquid markets;
- Trading takes place in a regulated, rule-based trading environment, under the rules and by-laws of Bursa Malaysia and with oversight by the Securities Commission (see section 9.3);
- Market information is disseminated transparently, in order to avoid asymmetries which might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Chart 42. Bursa Malaysia market composition: FCPO, 2001–2006



Source: Bursa Malaysia.

Data show that over the period from 2001 to 2006, the market composition of Bursa Malaysia's FCPO contract included a consistent 40 per cent of hedgers (see chart 42 – hedgers are labelled as "institutions"). Of the hedger participants, just under half are foreign. This stands in comparison with speculators (who are labelled in the chart as "retail" and "locals"), of whom only a small fraction are from overseas.

Prices have been volatile over recent periods, with rising prices in recent years subsequent to the announcement of the Government's national biofuels policy. As palm oil is not a large-consumption product within Malaysia, and most of it is exported, price rises are not generally seen as harmful, rather they are seen as benefiting the national economy and those involved in the palm oil supply chain, including farmers.

It is unclear to what extent investment in palm oil has been incorporated into domestic or international investors' portfolios, and also to what extent retail investors and farmers are speculating in ways that they cannot afford. However, regulatory measures are in place (see section 9.3) that control the level of speculation in the markets, limit the possibility of default, and promote responsible investment practice.

9.4.4 Facilitation of physical commodity trade

The cash markets for palm oil were already well-developed and regulated by the predecessor organizations of MPOB when the FCPO contract was introduced in 1980. Consequently, there was limited scope for the commodity exchange to stimulate further development of the physical markets. Quality specifications are referenced from established industry grades and have followed cash market practices as they have evolved. Three delivery points rely on existing port tank facilities located in the north (Penang/Butterworth), south (Johor) and centre (Port Klang) of peninsular Malaysia. Spot reference pricing is provided by MPOB and accepted by all market participants.

However, Bursa Malaysia, and KLCE before it, have created a reliable delivery channel of last resort for CPO. Exchange personnel, market participants and industry representatives have affirmed that the

industry regularly uses the Bursa Malaysia FCPO contract as a reliable channel for making and taking delivery. However, market participants have noted two limitations that constrain some industry participants from using the delivery process: (i) the absence of a delivery point in East Malaysia, i.e. in the states of Sabah and Sarawak on the island of Borneo, which accounted for 43 per cent of the area producing palm oil in 2005; and (ii) that delivery may be assigned at any one of the three port tank facilities, with potential costs and uncertainty incurred as a result. Delivery data have not been available to validate these comments.

9.4.5 Facilitation of financing to the agricultural sector

At the present time, exchange operations do not appear to be linked with financing for the Malaysian palm oil sector. Smallholders are not directly involved with the palm oil itself, which is a refined product. In any case, many smallholders operate through government schemes, which provide subsidized lines of credit. That said, there may be an important unfulfilled need for finding better ways of channelling finance to independent smallholders. "In terms of access to capital… international domestic banks provide large loans to estates, but do not target smallholders, for the following reasons: lack of creditworthiness, limited deal sizes – hence applicable risk premiums are too high for smallholders" (IIED, 2006: 19). Fresh fruit bunches of palm have to be delivered to mills within 24 hours in order to avoid deterioration of quality, and therefore a warehouse-receipt-based model of inventory financing would not be feasible for smallholders. Perhaps a securitization model – akin to that practised in Brazil using the CPR – could be more appropriate.

9.4.6 Market development

Education and capacity-building: Bursa Malaysia partners with intermediaries in organizing monthly seminars at selected venues around Malaysia to promote and educate investors on its products. The exchange also organizes the Annual Palm and Lauric Oils Conference and Exhibition and Price Outlook for Palm Oil, which is the leading event in the oils and fats calendar. Bursa Malaysia and DCE jointly organize the China International Oils and Oilseeds Conference. Bursa Malaysia also participates in international conferences and palm oil promotional roadshows organized by the Malaysian Palm Oil Council.

Other market development impacts: Indirectly, the provision of a global price discovery and risk management platform has – in the eyes of the industry and Government – further facilitated the development of the Malaysian palm oil industry and the growth of important export markets. The licensing of FCPO settlement prices to MCX and the cooperation with DCE for the development of a Chinese palm oil contract (discussed earlier) may also be a contributing, if secondary, factor in facilitating the expansion of key export markets. A second indirect impact has been highlighted by NASH, the representative body for independent smallholders in Malaysia. The highest priority of NASH – and government policy towards the smallholder sector – is commercialization and cooperatization. The president of NASH has commented that one of the driving factors behind increasing the organization of small-scale farmers is to facilitate greater access to markets, including for price-risk management.

10. South Africa

10.1 Historical development of agricultural markets and specific commodity markets under review

10.1.1 Country factfile

GDP (USDb, current prices) 2006:	255	*Average annual GDP growth 1990–2006:*	5.3
GDP per cap. (USD, current prices) 2006:	5384	*GDP per capita growth 1990–2006:*	77 %
Population (millions) 2006:	47	*Population growth 1990–2006:*	29 %
Inflation rate 1990 (2000 as 100):	42	*Inflation rate 2005 (2000 as 100):*	128
Current account balance (USDb) 1990:	1.5	*Current account balance (USDb) 2006:*	-16.4
Agriculture – share of GDP 2006:	3 %	*Agro share of export revenues 2005:*	10 %
Agriculture – share of employment 2003:	10 %	*Poorest 20% – share of national income:*	3.5 %
Surface area (millions of sq. km) 2005:	1.2	*Adult literacy rate 2006:*	82 %
Life expectancy at birth (years) 2005:	48		

10.1.2 Historical development

Box 26. Characteristics of South African agriculture during the apartheid regime

- High costs, resulting from extraordinary institutional duplication in regulation and marketing
- Vast differences in access to land and support services
- Regular export of food "surplus", despite widespread malnutrition among the population
- Farm input prices rising significantly faster than product prices
- Severe environmental damage both in commercial farming areas and in the African "homelands"
- High rates of growth in farmland prices due to subsidies and distortions arising from price policies
- Vulnerability to drought, such as the one that struck the subcontinent in the early 1980s
- A high level of uncertainty among individual farmers, both black and white, about legal protections given forced removals and consolidation of the "homelands".

Source: Vink and Kirsten 2000.

South Africa possesses the largest economy in Africa, with the highest GDP per capita on the continent, at four times the average African level. However, this relative prosperity disguises vast inequalities in distribution of and access to resources – the legacy of the apartheid system of racial segregation. The same legacy can be seen in the dualistic structure of South African agriculture, within which a well-developed commercial farming sector co-exists alongside smallholder and subsistence production that is known as the "emerging farmer" sector.

After 1945, South African agriculture was marked by a tightening of apartheid legislation alongside increasing levels of State intervention. Intervention was characterized by a two-track approach. On the one hand, the commercial farming sector was boosted by generous subsidies, price support, protection from foreign competition, and government-supported commercial-lization within an import-substitution framework (van Zyl, Fenyes and Vink, 1987 and 1992). On the other, the black "homelands" experienced increased pressure on food production through "large-scale centrally managed projects with little or no community participation" (Vink and Kirsten, 2000: 11).

While the apartheid system in agriculture generated well-developed infrastructure for storage and logistics, the distortions and inefficiencies arising from this structure were vast (see box 26). By 1980, well before the democratic transition, stuttering agricultural performance underlined the urgency of reform. Following South Africa's financial liberalization in the early 1980s, a first period of partial agricultural liberalization saw some relaxation of price controls and reduction of government support.

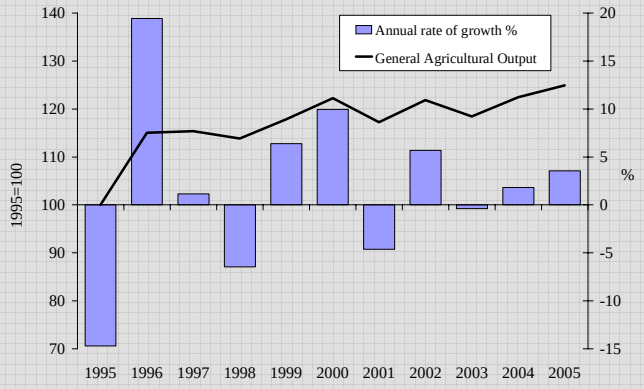
However, the most dramatic period of reform came about in the 1990s after the collapse of the apartheid system. The transition in South African agriculture reflected that in wider society and thus has been subject to many of the same post-apartheid imperatives, "including land redistribution, agricultural support programmes to disadvantaged farming communities, and a broad-based programme of economic empowerment of the black population (AgriBEE)" (OECD 2006: 1). The established instruments and institutions of agricultural intervention had been associated with structural bias to the commercial farming sector. Therefore, the new democratic Government looked at deregulation as a means to overcome the apartheid legacy.

Consequently, sudden and broad deregulation in the mid-1990s brought about significant reductions in import tariffs, removal of export controls, and further sharp cuts in support to the commercial sector. The key legislation was the 1996 Marketing Act, which had four objectives:

- Increasing market access for all participants;
- Promoting the efficiency of agricultural marketing;
- Optimizing export earnings from agricultural products;
- Enhancing the overall viability and resilience of the agricultural sector.

Furthermore, while government intervention is permitted in the new institutional framework, it is allowed only under strictly defined parameters, and after taking consultations from all affected parties. The Act also charted a path for the rapid abolition of State marketing boards. Fourteen were abolished between April and December 1997, including those for maize and wheat. Some of these were subsequently re-established under a participatory process set up by the Act, albeit without the monopoly marketing and export powers they had enjoyed prior to 1996. However, this has not occurred in the grain industry.

Chart 43. Volatility in South African agriculture, 1995–2005



Source: OECD (2007).

The Marketing Act formed "part of a careful government strategy to restructure the South African economy in the post-apartheid era. Government provided the framework and allowed individual sectors to choose their own course of action within the policy framework. A timeline for deregulation was put in place, and a national agricultural marketing council representing interested partiers defined in the legislation was established to facilitate the transition" (Scrimgeour and Sheppard, 1998: 16). In particular, the transparency and certainty embedded in the new institutional framework has been hailed as a particular strength, with Government taking a strategic decision to play an oversight role rather than to direct involvement in commercial decision-making. This discipline was reinforced by South Africa's decision to join the WTO at its foundation in 1995.

The effect of the Government's strategy – a well-defined process, sudden yet transparent, that reserved a role for each industry interest – was to force previously opposed groups to co-operate in designing a

new set of structures and procedures for a market-orientated agricultural sector exposed to a highly competitive global market.

The removal of price controls, an export-led approach to economic development, a volatile currency, and high variability in South Africa's natural and climatic conditions generated an agricultural environment marked by high levels of volatility in output (see chart 43) and prices (see chart 44). Within this environment, building capacity among the emerging farmer sector has remained a key imperative, and land reform remains high on the policy agenda.

10.1.3 Summary of key agricultural challenges over time

- Transition to a market-based system of agriculture
- Constructing market institutions to facilitate trade
- Building an internationally competitive agricultural sector
- Addressing the widespread inequalities and entrenched duality in the sector
- Consolidating and commercializing the smallholder sector
- Enabling income stabilization in volatile commodity markets

10.1.4 Specific commodities under review: white maize, bread milling wheat[46]

White maize

Characteristics and industry process

Maize (*zea mays)* is a cereal grain that is grown widely around the world. White maize is typically used for food, converted by maize millers into maize meal for human consumption. By contrast, yellow maize is typically grown as animal feed. (JSE/SAFEX trades contracts in both variants.)

Maize

Source: Grain SA.

Industry structure and supply chain

White maize is South Africa's most important grain crop. It accounts for the largest volume and value of production, and is both the major feedstock and the staple food for the majority of the South African population (Food Pricing Monitoring Committee (FPMC), 2003). In 2006, maize accounted for 42 per cent of the gross value of field crops and 10 per cent of the gross value of total agricultural production.

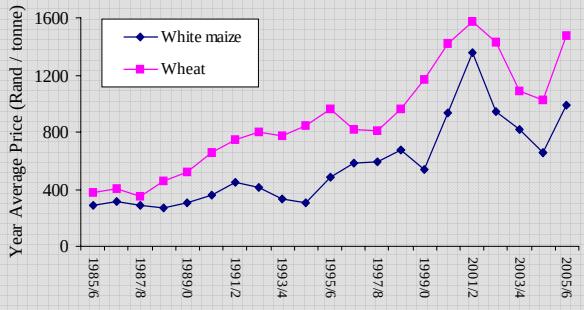
Commercial farms exist alongside informal and "emerging" farmers – farmers with smaller land lots, or shared access to common land – who typically were disadvantaged during the apartheid era. In 2003, there were approximately 9,000 commercial maize farmers, employing some 150,000 farm workers. Over 80 per cent of production is focused in Free State, in North West Province and in Mpumalanga in the north of the country, with smaller volumes elsewhere.

Grain silos are also concentrated in the north of the country, with most of the silos owned by cooperatives or former cooperatives that have converted into agribusinesses since industry deregulation. Storage and transportation infrastructure is generally of a high standard, with the apartheid-era Government having prioritized its development in earlier agricultural strategies. Furthermore, the flow of financing into rural areas is efficient, particularly to the commercial farming sector.

[46] This section draws heavily on part 4 (Analysis of selected food value chains) from *Final Report: Food Pricing Monitoring Committee*, FPMC (2003).

The grain milling industry is highly concentrated; four companies account for a 75 per cent market share. This structure has been a heritage of the controlled marketing system in which selective access to maize stocks "effectively reserved the bulk of white maize for industrial millers, distributors and retailers" (FPMC, 2003). However, there has been a significant rise in informal milling, with an estimated 190 millers employing approximately 5,300 people.

Chart 44. South African price development: white maize and wheat, 1985–2006



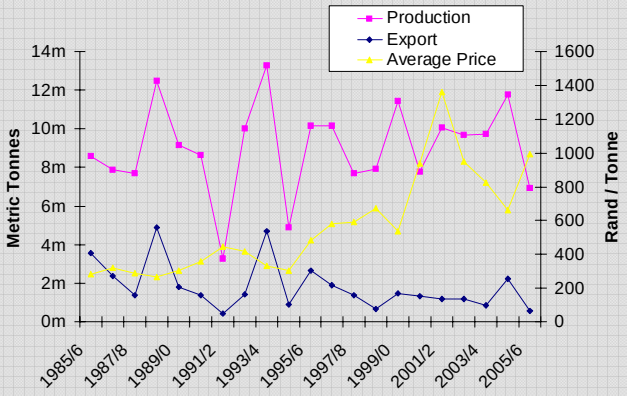
Source: Abstract of Agricultural Statistics (December 2006).

Industry development

As has been described in the previous section, the grain industry experienced rapid deregulation in 1996-1997 as part of wider agricultural reform. South African grain markets are now free and open, with South Africa an aggressive participant in highly competitive global markets.

The world grain trade is conducted in United States dollars, and the rand–dollar exchange rate has fluctuated wildly in recent years. When combined with significant year-on-year differences in South African climatic conditions, this situation has led to a market characterized by high levels of volatility in prices, output and exports (see chart 45). Furthermore, prices fluctuate rapidly between import and export parities: respectively, the levels at which it becomes cost-competitive to import foreign grain or export South African grain. Given competitive world markets, and the active presence of domestic and multinational grain trading companies, transparency into import and export parity price levels is a critical signal to the industry.

Chart 45. South African market performance: white maize, 1985–2006



Source: National Department of Agriculture. Abstract of Agricultural Statistics (December 2006).

Users and uses

White maize in South Africa is used predominantly for human consumption and features prominently in African cuisine. When South Africa has a maize surplus, it typically exports maize across southern Africa, as well as to Japan. South Africa does not yet have a biofuels industry of significance. However, the Government is taking consultations on the future direction and legislation required. Maize and sugar are both potential inputs for the development of biofuels. Maize is seen as an attractive input for biofuels, as it would provide an additional source of income for subsistence farmers. However, food security concerns have been raised, given that South Africa has scarce water supplies and substantial output volatility (AllAfrica.com, 2007).

Bread milling wheat

Characteristics and industry process

Wheat (*triticum spp*.) is a cereal grain that is grown widely around the world. Wheat is milled to produce flour, an ingredient for the baking industry.

Industry structure and supply chain

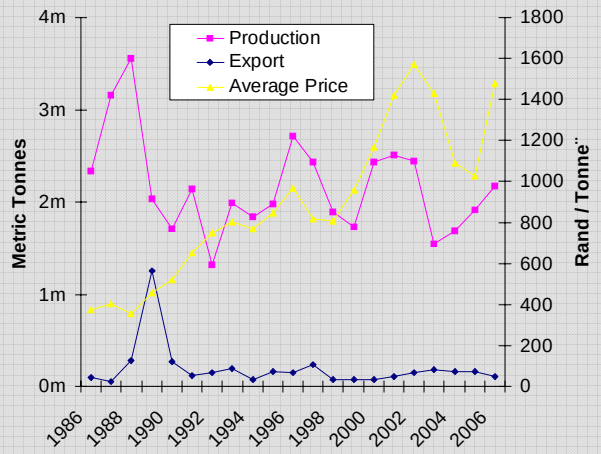
Wheat is the second most important field crop in South Africa after maize, accounting for 10 per cent of the gross value of field crops, and 3 per cent of the gross value of total agricultural production in 2006.

There are approximately 5,000 to 6,000 commercial wheat farmers in South Africa, with a much larger number of smallholder producers. Wheat production is divided into two main production areas: one in the central part of the country centred on Free State, and another in the Western Cape in the far south-west. These two areas are approximately 750 kilometres apart. As is the case with maize, silos are concentrated in the north of the country. Western Cape producers are therefore disadvantaged by being located far away from major markets.

Because milling is more expensive for wheat than for maize, the wheat-milling industry is even more heavily concentrated. The top four millers account for 87 per cent of the market share. However, a number of small-scale millers have entered the market since deregulation, increasing the level of competition. However, capacity utilization has decreased and average costs have risen. The larger-scale millers hold a number of advantages over smaller-scale new entrants. Typically, they are vertically integrated into the baking business, and have developed specialized skills in procurement and risk management.

Bakers are categorized into four groups: wholesale bakers operating on an industrial scale; independent bakers operating on a stand-alone basis; retailers who do baking in-store; and emerging bakers from previously disadvantaged groups, who typically operate on a small scale. Since deregulation, the number of bakers is believed to have increased significantly from 3,000 to over 7,900 today. There are also estimated to be over 50,000 informal bakers. Consequently, the downstream industry for wheat represents a significant source of employment in the country.

Chart 46. South African market performance: wheat, 1985–2006



Source: National Department of Agriculture. Abstract of Agricultural Statistics (December 2006).

Industry development

As with maize, wheat underwent rapid deregulation in 1997, leading to a free and open market. Wheat exhibits similar high levels of volatility as maize, arising from similar levels of currency and output fluctuation (see chart 46).

Users and uses

The majority of wheat grown in South Africa is used for human consumption. Much smaller volumes of lower-quality wheat are used for feed. Milled wheat in the form of flour is used to produce bread and cake products.

Summary: Salient features about the physical market

- High volatility, arising from climatic variation and exchange rate fluctuation
- Free and open markets, with high sensitivity to import and export parity price levels
- Highly developed physical infrastructure – silos, logistics, certification
- High degree of integration with the financial sector
- Duality between commercial producers using sophisticated marketing strategies and the emerging farmer sector that is still acquiring basic professional production and marketing techniques

10.2 Exchange emergence and contract development – JSE Ltd. / SAFEX Agricultural Products Division (JSE)

Year founded: 1995 (SAFEX AMD) / JSE (1887)	*Location:* Johannesburg, South Africa
Instruments traded: Equities, financial futures and options (equity index, single stock, interest rate, currency), commodity futures and options	*Commodities traded:* Six contracts on five commodities – white maize (x2), yellow maize, wheat, sunflower seed, soybean
Ownership: Demutualized company, publicly listed on the JSE	*Trading system:* Fully electronic trading via a system custom-developed by an independent software vendor
Clearing house: In-house clearing house	*Regulator:* Financial Services Board (FSB)
Total futures and options volume 2006: 105 million	*Commodity futures and options volume 2006:* 1.9 million
FIA world ranking 2006 (all futures exchanges based on total derivatives volumes): 19	*UNCTAD world ranking 2006 (commodity exchanges – commodity derivatives volumes only):* 20

Website: http://www.safex.co.za/ap/

The South African Futures Exchange (SAFEX) was established as a financial futures exchange in 1988 after South Africa's financial liberalization in the 1980s. The Agricultural Markets Division (AMD) was established in 1995 as a separate division of SAFEX. SAFEX was, and remains, the only active commodity futures market not just in South Africa but on the entire African continent.

The fact that financial futures preceded commodity futures in South Africa stands in contrast to other markets in both the developed and the developing world, where financial derivatives typically arose as a result of applying to the financial sector what had already worked in commodities. This situation occurred in South Africa because the financial sector was liberalized prior to agriculture.[47]

A new membership base was established within SAFEX specifically for the AMD, with the sale of 84 seats providing start-up capital for the division. The AMD made use of the same clearing member structure and electronic trading platform that already existed for SAFEX's financial division. The

[47] This section draws heavily on Sturgess (2005).

market was launched with beef and potato futures contracts – both contracts being traded on a cash-settled basis. These contracts attracted little interest, and after two years were delisted. Instead, the flagship contract that would ultimately facilitate the success of the AMD was introduced in May 1996 – the white maize futures contract (see below), launched together with a yellow maize futures contract.

The timing was good. The maize contracts were launched just prior to the passage of the 1996 Agricultural Marketing Act, which came into effect on 1 January 1997. The Act led to the wide-scale deregulation of South African grain markets, including the abolition of the marketing boards. A new set of industry practices and procedures needed to be created. The exchange was therefore well positioned to play an important role in coordination with industry representatives and financiers. In a highly collaborative process involving industry stakeholders, a robust delivery system was designed for the exchange, including a system of transferable silo receipts. This has ensured integration of the cash and futures markets, given confidence to market participants that there exists a secure channel for making and receiving delivery, and enabled a high level of cohesion between the commodity and financial sectors.

Since the free-market environment was a new concept to South Africa's agricultural sector, there was a requirement for in-depth education for farmers, millers and traders about exchange services and how to use them effectively. Exchange personnel travelled extensively, attending farmers' meetings around the country to educate producers on the advantages of price-risk management using futures contracts. The members of the exchange – already committed to the process since they had purchased AMD seats – also assisted with the education effort. The presence of international grain traders in South Africa provided another source of learning – local traders had the opportunity to discover new trading methods, making use of spreads and basis trading to improve profits and reduce risks.

Not everyone accepted the futures market with open arms. Many meetings with farmers were cancelled or short-lived, due to scepticism that a free market could work in South Africa. Many producers and millers feared the price volatility that came with a free-market environment. Global competition has been tough, particularly as the competition is often subsidized whereas South African farmers are not. Therefore, the participants who adapted the most quickly to using the new marketing and risk-management instruments typically benefited the most.

In 1998, the futures market for white and yellow maize had matured to such an extent that options could be introduced. Another intensive education campaign was conducted to ensure the advantages of using options to manage price risk were understood by hedgers. Options added further liquidity to the existing futures contracts and afforded smaller players the opportunity to participate in the derivatives market. Today, both hedgers and speculators utilize complex option strategies. Through active marketing, the exchange aims to further increase the number of option writers in the market and ensure competitive pricing. Futures and options were both introduced in 1999 on sunflower seeds – a market that remains limited by the small size of the underlying market, but nevertheless a functional risk-management tool for farmers and crushers in the oilseeds sector.

In August 2001, the members of SAFEX, incorporating both the financial and agricultural markets, accepted an offer by the JSE Securities Exchange – South Africa's national stock exchange – to buy them out. The buyout involved a lump sum payment to all members and automatic membership of a newly created division within the JSE. The Agricultural Products Division of the JSE Securities Exchange was established to take over the functions of the old AMD. The SAFEX brand name was maintained, particularly since the agricultural market recognized and acknowledged SAFEX as an efficient and transparent price-discovery mechanism for South Africa and the region. Moreover, the move to the new JSE offices afforded members access to a larger infrastructure with greater resources, particularly in the surveillance department.

The agricultural derivatives market has relied on its members to assist in increasing the number of participants in the market. From an initial total of five brokers active in the market, membership has increased to 52. These members service some 12,000 clients, who consist of supply-chain participants including producers, millers, traders, banks, cooperatives and agricultural companies. All members have registered compliance officers who ensure that the rules and regulations of the exchange are

adhered to. The commitment of the members, and the good relationships between the members and the exchange, have been important components in driving the growth of JSE/SAFEX.

The Division has five clearing members, which guarantee all the transactions and positions of their respective trading members and clients. The guarantee process has been tested in the past: a few individual members have been placed in default. However, in all instances the clearing member has assumed all the defaulter's positions and risks, with no additional risks passed on to the counterparties. The process works extremely well, and for this reason a number of market participants also prefer to process their physical deliveries through the exchange, therefore removing counterparty risk from the physical transaction.

The exchange uses an automated trading system designed and built locally to match and process all trades. Since no open outcry trading floor exists, members are not required to have a presence close to the exchange. Many prefer to have offices close to their clients. The agricultural market trades every business day from 9 a.m. until 12 noon. An afternoon trading session has been recently debated. However, there has been limited interest for such a session.

Free-market pricing has presented many opportunities and challenges. Prices can be extremely volatile – driven by climatic conditions and currency fluctuations – which opens opportunities for the exchange to offer not just price but also weather and currency-risk management instruments. Since the maize contracts were introduced, the market has seen pricing extremes in both directions. In 2002, record highs of over R2,100 per tonne were experienced, resulting in increased pressure on consumer price inflation. After allegations of price manipulation, an independent audit by the Food Pricing Monitoring Committee found that the maize price had reacted justifiably to the underlying fundamentals. The 2004/05 season presented a totally different picture, with maize prices at an all-time low since market deregulation. This was driven by huge surpluses and stockpiles, excellent growing conditions, average yields that were expected to be the best ever, and the rand's relative stability against the dollar. During both sets of circumstances, the Government has been watchful and cautious in its reaction, but has honoured its commitment during the deregulation process to respect the pricing mechanism. That commitment has cemented market development, by providing conditions of certainty within which market participants can engage with confidence in the market.

JSE/SAFEX today is widely recognized as the price-discovery mechanism for grain in the Southern African region. Its prices are quoted in several neighbouring countries. Its regional relevance was further underlined recently, when the Government of Malawi agreed a transaction with a South African bank, based on JSE/SAFEX market mechanisms (see box 27). Regional grain market integration through greater participation by Southern African producers in JSE/SAFEX markets has been identified as an opportunity for the future, but this must first overcome legal, policy-related and regulatory barriers in order to succeed.

The most important market development challenge in South Africa itself is to replicate the early post-deregulation imperative of education and capacity-building in commercializing small-scale farmers and then integrating them into the market system. This is the current focus of the industry's and the exchange's educational activities.

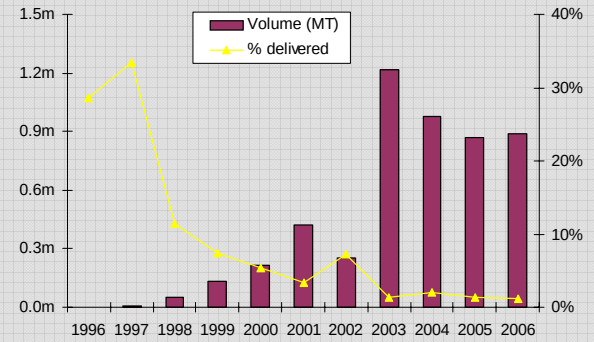
White maize

The white maize futures contract was launched in March 1996, together with a yellow maize contract. Randfontein was traded as the basis point on both contracts. As the grain boards deregulated, so the opportunity to introduce grains on the futures market became a reality. It was very easy to standardize the two maize contracts: the existing quality standards accepted by the industry were adopted.

A key challenge was to find silo operators to store the product and guarantee its quantity and quality, as indicated on the silo receipts they would issue. At the start, 13 silo operators registered, accounting for a network of approximately 35 delivery points. Although there was resistance in the beginning, over time all the major silo operators have come on board, and JSE/SAFEX now has a network of 190 delivery points.

In the first year, 217,900 tonnes of white maize were traded. Over time, the percentage of physical deliveries fell from a high of 56 per cent to 0.08 per cent (see chart 47). Options were introduced on white maize futures in March 1998, and a constant month contract was introduced in April 1999 – the exchange having started out by listing five main hedging months, namely March, May, July, September and December. However, to provide the spot market with a transparent pricing mechanism, the exchange decided to list the other calendar months as they approached. This allowed for a "standardized" spot price to be referenced from the near-month contract.

Chart 47. JSE/SAFEX white maize: performance metrics, 1996–2006



Source: JSE/SAFEX.

A second white maize contract was introduced in July 2000 with different quality specifications. The contract was introduced because grading problems existed in the market. There appeared to be a need for a product that would allow for price-risk management and at the same time provide a transparent mechanism to discover the discount between two grades traded. In July 2002, maize of any origin was accepted onto the second contract. White maize of any origin could also be delivered onto the original contract, provided it met the grading requirements and was not subject to any containment conditions. The second grade contract was ultimately discontinued in November 2002, due to limited demand from the market. However, the same contract was reintroduced in July 2006 after another season of poor-quality deliveries.

In October 2003, position limits for non-hedgers were introduced. This was done because the open interest on the contract had grown significantly larger than the available crop in South Africa, speculative fund participation had increased, and there was a need to prevent potential manipulation of the underlying market. Non-hedgers are therefore restricted to an exposure of 15 per cent of the net delta open interest.

In 2007, the white maize contract continues as the most liquid on the exchange, representing around 60 per cent of total contracts traded. Approximately 1 per cent of all contracts traded result in physical delivery. Today, South Africa still has the only exchange-traded white maize futures contract in the world.

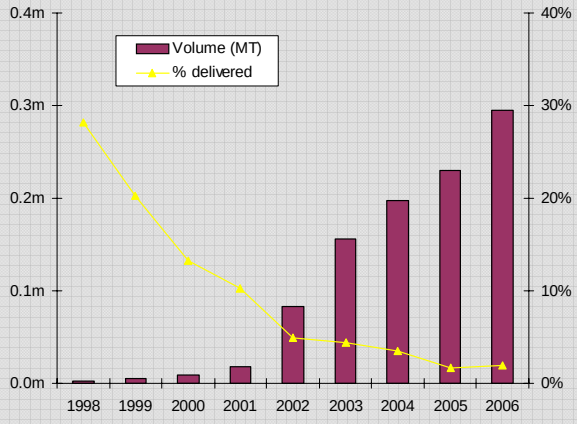
Bread milling wheat

The bread milling wheat futures was first traded in November 1997. It was launched as a 100-tonne contract, with Randfontein as the basis point. Unlike maize, wheat is not a zero-rated value added tax (VAT) product, therefore it attracts VAT on delivery. This is facilitated by the exchange, with special exemptions from the tax office to trade on a VAT-exclusive basis and only to apply the 14 per cent VAT rate on physical deliveries. Options were subsequently introduced on wheat futures in August 1998.

The bread milling contract mirrored the grading standards as per the National Department of Agriculture, and were amended a number of times. At first, the contract traded nine different grades, based on protein and weight. However, this has been simplified in recent years to only three grades. The exchange currently trades the premium grade product (B1), with discounts applied to two lower grades should they be delivered (the current discount for B2 is –R75 per tonne, and for B3 it is –150 per tonne). In 1999, the contract size was reduced to 50 tonnes to assist smaller-scale producers to hedge, and also because the many grades made it difficult to ensure that the same standardized quantity could be met with the same grade.

Because the two main wheat production areas are so far apart, it was decided in February 1999 to introduce a separate wheat contract with a reference point in the Western Cape, which would be called the Cape Wheat Contract. However, only a limited number of contracts were traded on the Cape Wheat Contract, as buyers showed little interest and most of the liquidity remained on the Randfontein contract. Consequently, the Cape Wheat Contract was discontinued in March 2000.

Chart 48. JSE/SAFEX wheat: performance metrics, 1998–2006



Source: JSE/SAFEX.

The origin of the wheat was not originally specified in the contract, meaning that foreign wheat meeting the contract's quality specifications could be delivered onto the exchange. After the importation and delivery onto the exchange of large quantities of Hungarian wheat, which met the grading standards but did not suit buyers' milling and baking quality requirements, it was decided to identify certain origins of wheat acceptable for delivery. For this reason, wheat from five countries was listed as being acceptable, i.e. wheat from South Africa, Argentina, Australia, Canada and the United States.

The grading methodology in South Africa has always sparked debate, because producers are required to plant prescribed cultivars, which results in wheat yielding very specific milling characteristics. Producers argue that they are not adequately rewarded for this quality, while buyers – who are allowed to import wheat from any origin in the world – can blend with the local product in order to obtain maximum efficiencies. For the above reason, an "origin discount" was introduced in 2005 for any foreign wheat delivered in completion of a futures contract. This took account of the fact that the milling characteristics could not easily be included in the grading specifications of the wheat. It was seen as a compromise to ensure the JSE/SAFEX-traded price represented South African wheat but still allowed for foreign wheat from specified origins to be delivered at a published discount.

The wheat contract – although it is a complex contract with many grades and different discounts – currently represents 19 per cent of all the agricultural contracts traded, with physical deliveries at around 2 per cent of contracts traded. The standardized contract specifications remain under review, particularly the reference point – Randfontein – and the use of location differentials applicable to the Western Cape delivery points. Today, there are around 140 delivery points from both northern and southern production areas.

JSE/SAFEX's key achievement within its local context:

- Filling the void left by sudden government deregulation of the grain markets

Success factors:

- High level of trust and cooperation among industry participants
- Benign and constructive government role in setting the framework and abstaining from intervention
- Strong existing storage, logistics and quality infrastructure
- Development of a robust delivery mechanism integrated with financing solutions
- Early development of a liquid options market

- Educational emphasis

Challenges:

- Overcoming the "mindset gap" with farmers who are accustomed to an interventionist framework and a government support system
- Managing high natural levels of price volatility generated by climatic factors and exchange rate fluctuations
- Engaging with and capacity-building in the emerging farmer sector
- Maintaining the supportive political environment

Future opportunities:

- Regional integration, in order to extend exchange solutions throughout the Southern African region
- Strengthening linkages with other emerging market geographies: Argentina, China and India
- Mini-contracts, in order to allow greater participation by smaller-scale producers
- Risk management solutions for climate and exchange rate risks

10.3 Regulatory framework: Financial Services Board (FSB)

Founded in 1990, the FSB is an independent body established by statute to oversee the South African non-banking financial services industry in the public interest. This includes insurers, reinsurers, pension funds, intermediaries/financial advisers, and investment institutions. The latter category includes capital market institutions such as the JSE, and by extension the agricultural commodity markets operated by JSE/SAFEX.

The legislation under which the market operates is the Securities Services Act (SSA) 2004, which came into operation on 1 February 2005. The Act consolidated previously disparate legislation, namely the Stock Exchanges Control Act 1985, the Financial Markets Control Act 1989, the Custody and Administration of Securities Act 1992 and the Insider Trading Act 1998. The SSA sets out the functions and requirements that an exchange must fulfil, defines the status and scope of self-regulatory organizations, and defines market abuse and the penalization for market abuse.

The JSE has regulatory responsibilities under the SSA. It is responsible for approving all listings, regulating trading on its markets, authorizing market users, and regulating users' conduct. The JSE's regulation is aimed at protecting the integrity of its markets by ensuring fair and transparent trading, and at protecting the interests of investors through the trading and clearing processes. Systems are in place to monitor the activity on JSE markets. The SSA requires the JSE to have a guarantee fund or insurance to compensate investors in the event of default by authorized users.

In addition, a range of specific mechanisms is in place to ensure orderly trading on JSE/SAFEX commodity futures markets. A major change at the end of 2003 saw position limits for speculators introduced on white maize futures contracts. This was done because the open interest on the contract had grown significantly larger than the available crop in South Africa, and also in order to prevent manipulation of the underlying market. Non-hedgers are restricted to an exposure of 15 per cent of the net delta open interest. Other long-time standard regulatory mechanisms include minimum capital requirements, fitness/good character requirements for members, daily price movement limits, and an extensive margining system (including special margins during the delivery month and during periods of high volatility) – see annex 2 for further details.

Within this structure, the scope within which JSE/SAFEX operates is broad. The market is open and accessible to overseas participants. Market oversight functions are largely concentrated in the exchange clearing house and surveillance departments. The exchange is at liberty to introduce new contracts, and no major prohibitions exist on common trading instruments such as options or index trading.

Two other pieces of legislation are relevant in governing the activities of market intermediaries. The Financial Advisory and Intermediary Services Act 2002 seeks to promote consumer protection and enhance the professionalism of intermediaries. This Act makes provision for intermediaries to be licensed and authorized by the FSB, and requires financial service providers to pass a "fit and proper person" test ensuring sufficient qualifications and experience. The Financial Intelligence Centres Act 2001 is anti-money-laundering legislation that imposes a "know your customer" requirement on financial service providers. Compliance with the regulations of the Financial Intelligence Centres Act 2001 has afforded members the opportunity to more fully understand their clients' business, and in so doing, to better understand their risks.

10.4 Impacts

10.4.1 Price discovery

Price dissemination: Currently JSE/SAFEX disseminates all its price information at no cost. This includes end-of-day files, and delayed prices from the trading system every 15 minutes, as well as all price-history and physical-delivery information. While the exchange is committed to the continued provision of core data free of charge, there is a debate about what information might be made available on a paid-for basis. This, in part, reflects developments in other JSE markets – such as cash equities – in which the worldwide norm is for exchanges to develop data-vending as a revenue source in its own right.

JSE/SAFEX supports other channels for market data dissemination. These include radio, television, and dedicated websites. Members also send emails and daily SMS messages to their clients with market closing prices. A quick survey revealed that approximately 2,500 SMS messages are sent daily. Exchange members also play an active role in disseminating price information to their clients, supplying daily market reports with value added information. Furthermore, the exchange provides live trading information via registered data providers, such as Reuters and Bloomberg, who sell this information to their subscribers.

Efficient price formation: JSE/SAFEX markets provide the regional price benchmark for the grain industry in southern Africa. Southern African grain markets are driven by factors different from those driving international price movements, especially on CBOT – the international price benchmark. Therefore, a local platform reflecting domestic and regional fundamentals provides more effective signalling for the regional grain industry.

Price discovery at JSE/SAFEX also has an important role to play in the context of South Africa's internationally open grain markets.[48] The prices at which imports and exports become cost-efficient is calculated with reference to import and export parity price levels. For example, if grain millers can buy imported maize more cheaply than locally produced maize, they will do so until local producers are able to supply maize as cheaply. This is called the import parity price. The reverse situation is also true: if South African maize producers can sell their maize to foreign millers at a better price than local millers are prepared to pay, South African maize will be exported until local prices have increased to the level of the export price. This is the export parity price.

Therefore in theory, the price of maize on the domestic market can go no higher than the import parity price, as millers will merely increase imports at this point. Thus, the import parity price is a maximum price. In the same manner, the export parity price is the minimum price. The import and export parity prices form the upper and lower band, and the domestic price will fluctuate between these two levels.

[48] The following paragraphs draw heavily on FPMC (2003).

The actual level of the domestic price within this range will depend on the Southern African supply/demand fundamentals, recognizing that demand is relatively stable in the short-to-medium term.

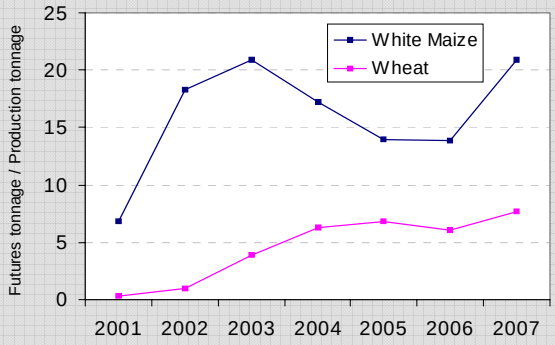
Reducing information asymmetries: Futures markets in grain were introduced during the deregulation process. In the previous institutional structure, the grain marketing board – rather than intermediaries – compulsorily purchased grain at predetermined prices. Today, industry sources – including farmer representatives – suggest that intermediaries play a value-added rather than an exploitative role. These intermediaries are typically large agribusinesses that have established themselves in the market as managers of integrated supply chains. They offer farmers a range of services, including flexible marketing terms, input supply, logistics, storage and financing. Specifically, intermediaries in South Africa typically tend to use the price references provided by JSE/SAFEX to provide a range of forward pricing possibilities embedded in physical contracts.

Using market information for cropping and selling decisions: Industry representatives have suggested that almost all farmers are aware of JSE/SAFEX prices, as they are used as the basis for pricing in physical contracts. Indeed, because contracts are deliverable on a daily basis, the JSE/SAFEX near-month price is also used as the effective spot rate in the South African grain market. Industry representatives have suggested that farmers use futures prices for cropping and selling decisions – particularly commercial farmers, although smallholders are increasingly being educated about using futures pricing information. An example was provided by industry representatives of how farmers, on the advice of banks, have been able to secure better returns using futures market information to plant less and hold their produce longer.

10.4.2 Price-risk management

First of all, it is important to note that for both the white maize and the wheat contracts traded on JSE/SAFEX, the key prerequisites in the trading environment that allow for effective price-risk management are that:

Chart 49. JSE/SAFEX crop turn, 2001–2007



Source: JSE/SAFEX.

- There are liquid markets – the trading volume of maize has been 15–20 times the production volume since 2001. For wheat, the crop turn stands at 8, with a trajectory that should take it towards 10 (see chart 49);
- Trading takes place in a regulated, rule-based trading environment under the rules and by-laws of JSE and with oversight by the FSB (see section 10.3);
- Market information is disseminated transparently, in order to avoid asymmetries that might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

Information supplied by a range of market participants reveals perhaps most clearly for South Africa among all the featured countries the range of possibilities for dynamic commodity marketing that a platform for risk management can offer. A leading rural banking services provider estimates that approximately 70 per cent of South African commercial producers use JSE/SAFEX in some capacity as a hedging or marketing tool for their physical product, which is a remarkably high number. Exchange personnel believe that about 20 per cent of commercial farmers are directly involved in hedging. Industry representatives suggest that much of this high rate of participation is driven by trust in JSE/SAFEX's guaranteed delivery system. Counterparty risk is reduced, not only for futures trading

but also for cash commodity transactions – the exchange offers a source of guaranteed quality product at numerous silos around the major growing areas.

South African farmers typically prefer to use options rather than futures for price-risk management. This is primarily because options entail a one-off payment upfront (the options premium) rather than margin deposits which may be burdensome and unpredictable because of high volatility in the market. Also, options are relatively easy to use. However, the cost of option premiums can also be high – as much as 20 per cent of total production costs – because of a limited number of option writers, and because of the high levels of volatility. That said, the options market in South Africa is a dynamic market, with farmers using more complex strategies to reduce premiums even though the upside potential may be restricted. A commercial farmer who has also diversified into broking and ethanol production described his hedging strategy as follows:

> "In South Africa we need to hedge both the production and price risk. The production risk is hedged by going long new crop the minute you complete harvest in a season. This way, if the crop fails you harvest on the market, and if it doesn't, your peace of mind costs you the call premium and you have a good crop to pay for it anyway. On the day that I put away my harvester, I buy call options for the intended tonnage produced in the new season. This is an "at the money" call in the delivery month of the new crop. The "at the money" call will cover the production risk, because if the crop fails the price will move up, and the income you lose in the fields you will make in the market. At the same time I buy an "import parity" call for the same month. This call is normally "out the money" and doesn't cost too much. What for, you may ask? Why don't farmers take the import parity prices in January when they usually are there? There is no crop in the field yet and what is planted still has all the risk, so it is not possible for them to make the decision to short what they don't have. To short and buy a call is costly at this point, because the price is high and you will need to buy the "at the money" to cover your position. The call I buy at the onset that is "out the money" hasn't cost too much and I now can short my crop at the call level without hesitating. At this point I can also close the "at the money" call and watch the crop grow. I have a crop growing that is priced. If it fails, the call covers the short and the inputs are covered by the "at the money" call. If it is a great crop, it is priced well."

Where a farmer's cash flow is highly constrained, and the farmer wishes to avoid uncertain margin requirements on futures contracts and the sometimes high cost of options premiums, trading companies and financial institutions effectively intermediate between the farmer and the futures markets. These firms typically offer forwards contracts structured on the back of a futures contract. This provides an efficient hedge alternative, with the intermediary responsible for all margins. By using this instrument, farmers ensure they have more cash available to use elsewhere in their business.

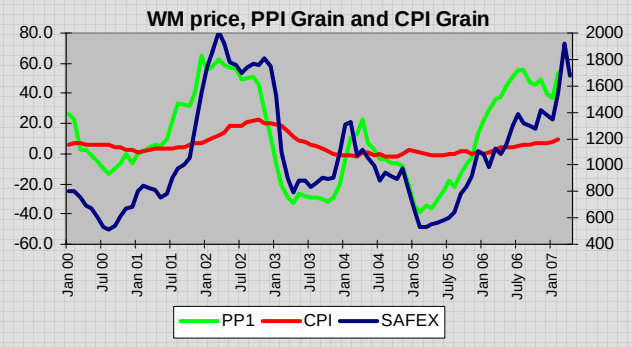
Typically, the use of the futures market is limited to commercial farmers. Small and emerging farmers are generally not participating directly in the markets, although they typically use the market indirectly for its pricing information and as a reference in physical contracting arrangements. Farmer representatives agree that emerging farmers should only engage in the futures markets after building fundamental production and farm-management skills and developing the necessary collateral and expertise that would enable them to participate sustainably; in other words, after a certain degree of commercialization has taken place. On the other hand, education programmes for emerging farmers raise awareness and understanding about the futures market and how to use market information advantageously, so as to empower small-scale farmers with greater marketing capacity. The exchange is also examining the use of mini-contracts, i.e. contracts with a smaller quantity specification, as a means of making the futures markets more relevant to small-scale farmers.

Industry representatives confirm that grain millers in South Africa are also heavily engaged in JSE/SAFEX markets. A leading broker who conducts futures trade on behalf of millers explains a strategy that millers typically use for hedging:

> "Generally the miller will be going long futures (for whatever expiry) from early in the season. The trader (ultimate seller of physical stock to the miller) will commence with a book-building exercise. The trader will purchase certain stock at strategically selected locations for delivery to millers with whom business is anticipated (or for delivery to certain areas where demand is assured – without having any idea as to the ultimate purchaser of that stock). The trader sells short as the stock is secured, thereby hedging flat price and leaving exposure only to basis. In other words, the basis may change – the cash price in that location relative to futures – but the pure flat price fluctuation is eliminated. The miller then, at some point, invites tenders for delivery of the commodity to his mill (the so-called milldoor contract). This is a delivered price contract, with all logistics outsourced to the trader. The tenders are to be submitted on a "basis futures" price. For example: Delivered to JSE Mill, Sandton, at R50 over July SAFEX futures for July and R25 over September SAFEX futures for delivery August. The contract is awarded, but hedges are left in place. Basis has been fixed – the miller knows what his price is relative to futures each day. As flat price is hedged too, the miller and trader know at any time what the stock will trade at, relative to their hedges. When the contract is "priced", the parties will simply cross futures in the market by way of an arranged transaction, i.e. at the same price and with each other and the basis contract can be priced and calculated at the price of that trade plus the basis premium (or discount, as the case may be) previously agreed."

Of particular interest from a development perspective is the use of JSE/SAFEX markets for international risk management by Governments. A successful risk management exercise was carried out as an OTC transaction between the Government of Malawi and a South African bank, based on JSE/SAFEX white maize futures (see box 27).

Chart 50. Consumer price stability in South African grain markets, 2000–2007



Source: National Chamber of Milling, South Africa.

This exercise is an important demonstration of the potential for Governments to use market-based risk management instruments to secure food security objectives in a sustainable manner. Arising from this case study, two points can be emphasized. Firstly, it is clear that direct participation on the market is not required in order to benefit from futures market-based risk management. In this case, the bank acted as an intermediary to structure a solution customized to Malawi's requirements. The same holds true for other users – including small-scale farmers – where the presence of an intermediary to aggregate and structure risk-management solutions may often be a more appropriate approach than direct participation by small-scale farmers in the markets. Secondly, the Malawi example demonstrates the power of options as a mechanism for risk management without distorting local markets, and for providing the flexibility that Governments require to respond to situations as they develop. In this case, the indeterminacies included not just the price level but also the local food availability and the volume and speed of humanitarian assistance.

The effectiveness of JSE/SAFEX markets for risk management can be further demonstrated through several supporting information sources. A comparison of producer and JSE/SAFEX maize price levels with the consumer price level reveals that prices for consumers have remained relatively flat, while the cash and futures markets have suffered from high levels of volatility (see chart 50). Without an effective hedging tool, price volatility would likely have been passed on to consumers in order for the grain supply chain to remain profitably in business.

Chart 51. JSE/SAFEX white maize: correlation with CBOT (the international benchmark exchange), 1999–2005

Source: JSE/SAFEX.

Secondly, there is a relatively weak correlation between JSE/SAFEX white maize and the international benchmark exchange – CBOT (see chart 51). This reflects how South African market conditions differ significantly from those in the United States, resulting from variations in climate, planting times, the political environment and regional supply/demand factors. The basis risk faced by South African participants using CBOT would be further exacerbated by exchange rate fluctuations and differences in quality specification. This underlines the importance of a local risk management platform, to make hedging more effective and accessible for South African market participants.

Box 27. Case study: the use of call options by the Government of Malawi, based on JSE/SAFEX prices

Malawi has faced repeated food crises since 2003, and vulnerability to food insecurity is increasing. Many households are unable to meet their food needs, and are highly susceptible to volatility in the price of staple foods, especially maize. In the 2005/06 agricultural season, final food estimates indicated that Malawi would face a food gap of around 400,000 tonnes. In response, the Government secured additional supplies of maize at a capped price from South Africa, via an options contract based on JSE/SAFEX white maize prices. As a way of ensuring the availability of food at acceptable prices, this approach has significant implications for donors and humanitarian agencies, particularly those involved in the distribution of food aid.

In September 2005, the Government of Malawi signed an options contract with Standard Bank of South Africa, giving it the right, but not the obligation, to buy additional maize at a price fixed at the time that the contract was signed. The contract allowed for the purchase of a maximum of 60,000 tonnes of maize at a cost of approximately $18 million – enough to meet the food gap if donor and private sector commercial imports did not reach anticipated levels. The United Kingdom's Department for International Development provided the financing to pay the options premium upfront, and the World Bank provided technical support.

The options contract provided the Government with a mechanism to trigger additional imports at short notice, put a price cap on the cost of maize from South Africa, and provided protection against the risk that prices would move higher. Finally, agreeing an "over the counter" contract meant that the cost included delivery to Malawi, reducing uncertainty over transport prices. Previously, examination of the scope for using risk management tools such as futures and options to help manage price volatility in food-insecure countries was limited by a concern about basis risk – the risk that prices on the exchange would not move in a correlated way with prices at the local level, for example in a different country geographically far away from the exchange. This risk was removed in the "over the counter" call option contract used by the Malawian Government, since it was structured to include price protection both on the SAFEX white maize futures price and for transport to Malawi.

In response to continued evidence of shortages in the market and concern about rising local prices, the Government exercised the first tranche of the options contract on 7 October 2005, buying 30,000 tonnes of maize. It exercised the second tranche on 15 November 2005, when it bought the remaining 30,000 tonnes. Again, this was in response to continued shortages and concern about rising prices.

Malawi's early experience with options contracts was largely positive. The majority of the maize purchased was used to meet humanitarian needs and did not reach the commercial market. It was thus not possible to test the effect of the options contract on retail prices. At the same time, the maize bought under the contract had the best delivery performance of all the maize imported into Malawi, and helped to avoid severe shortfalls in the humanitarian pipeline. Additionally, by the time of delivery in December/January, prices had risen by between $50 and $90 a tonne above the ceiling price of the contract. Without the options contract, Malawi would have paid significantly more to secure South African maize in late 2005, since both the JSE/SAFEX white maize price and transport costs had increased. It became clear that taking an "over the counter" option was more cost-effective than a contract that did not include delivery.

The options contract approach is also a step towards ensuring that responses to food shortages and food insecurity do not jeopardize longer-term growth by distorting prices and incentives and disrupting private sector activity. One of the key challenges that the private sector in Malawi faces is uncertainty about when the Government will intervene in maize markets. To address this problem, the options agreement was made public via a government press release, to ensure the least possible disruption to commercial markets. This release of information eliminates uncertainty about government actions, since the private sector now knows when and at what price the Government will bring in maize, and can make informed decisions about commercial imports. Private sector traders in Malawi and in the region are supportive of this approach, and look forward to an opportunity to be involved commercially.

Source: Slater and Dana (2006)**.**

10.4.3 Venue for investment

First of all, it is important to note that the key prerequisites in the trading environment that make JSE/SAFEX's grain contracts an attractive and secure venue for investment are that:

- There are liquid markets;
- Trading takes place in a regulated, rule-based trading environment under the rules and by-laws of JSE and with oversight by the FSB;
- Market information is disseminated transparently, in order to avoid asymmetries that might privilege some interests over others;
- The exchange clearing house acts as a central counterparty to guarantee the performance of every contract agreed through the exchange.

There are no data available on market composition, as JSE/SAFEX does not require clients to register as a hedger or speculator when they open their accounts. However, the exchange unofficially estimates that approximately 60 per cent of total open positions are hedger-related. There are also a number of intraday speculators that participate when the market is particularly volatile. Position limits of 3,000 contracts per month are applicable to all market participants, however exemptions are provided if there is proof of hedging in excess of that level.

Speculative trading activity as a possible cause of inflation was a pertinent issue in South Africa when the 2001–2002 JSE/SAFEX grain price increased sharply (see chart 52). From 794 rand per tonne in March 2001, prices peaked at 2,140 rand per tonne in March 2002, before returning to 763 rand per tonne in March 2003.

Maize is a particularly sensitive commodity, as it is a staple food in the African diet. The price rises triggered concern across society and the political spectrum. Some cited speculative activity as a possible cause of the price rises. This led to the formation by the Ministry of Agriculture and Land Affairs in January 2003 of the FPMC. The FPMC made its conclusions and recommendations in a report issued in December 2003. Firstly, the report identified the strong contribution that food price

Chart 52. JSE/SAFEX white maize: price development, 1998–2007

Source: JSE/SAFEX.

inflation made to total inflation. Secondly, building on an earlier report, it identified as the cause of the price rises a "unique combination of five factors" – the increasing world price, a lack of competition in domestic markets, a depreciating currency, a regional grain shortage, and a general climate of uncertainty.

The FPMC also investigated the functioning of JSE/SAFEX, and in particular, the suspicion of irregular trading activity in the grain market as a potential cause of food price inflation. Although noting reports of alleged irregularities, it first observed the measures taken by the exchange to protect market integrity in the wake of such occurrences, notably the structural improvements to exchange procedures, including the introduction of position limits in the market. More broadly, it concluded that "despite these reported irregularities… the Committee is […] satisfied that there is sufficient evidence that much of the producer price trends accurately reflected the market fundamentals for most of the period under review, which suggests that, apart from certain periods, manipulation had minimal effect on the broader price trends. The Committee is also satisfied that the necessary regulations are now in place to prevent abuse of the futures market" (FPMC 2003: 144). In 2004–2005 the reverse problem occurred, when prices fell as low as 471 rand per tonne.

A notable feature of JSE/SAFEX grain futures is that grain of foreign origin can be delivered in fulfilment of a contract. Originally, any grain meeting the contract specifications could be delivered, but wheat – as has already been discussed – is now limited to coming from five countries with an "origin discount" applied. A key reason for allowing foreign grain deliveries is to limit the possibilities of cornering the market, given that the South African deliverable supply is relatively small. Foreign wheat was received in 2005 in completion of a JSE/SAFEX futures contract, consisting of some Hungarian wheat, plus 10,000 tonnes of Argentinean wheat and a few thousand tonnes of United States wheat. Since the origin discount was introduced, however, no foreign grain has been delivered onto JSE/SAFEX. Nonetheless, the possibility of foreign-origin grain deliveries may be argued to be an important deterrent against a squeeze on the market and a safety valve in times of large price rises.

It is unclear to what extent investment in JSE/SAFEX grain futures contracts has been incorporated into domestic or international investors' portfolios. However, examples have been provided of financial players – clients and small funds – investing in the maize market when the returns on the equity market have been limited. The exchange notes that this occurred particularly in 2002–2003, when currency volatility provided many opportunities in the maize market. However, as the equity market opportunities returned, the financial players left the agricultural market and returned to the markets of first preference. Furthermore, during this period, one of the banks created a special purpose vehicle account for attracting financial clients to invest in the spread of maize from one month to the next. This was first used in 2003, and a similar arrangement may be repeated in 2009.

It is also unclear to what extent retail investors and farmers are speculating in ways that they cannot afford. On the one hand, various investigations into activity at the client level, coupled with testimony from industry representatives, have revealed that a limited number of producers and retail investors have speculated excessively. On the other hand, regulatory measures are in place – see section 10.3 – that control the level of speculation in the markets, limit the possibility of default and promote responsible investment practice.

10.4.4 Facilitation of physical commodity trade

Improved spot pricing: JSE/SAFEX plays an important role for the industry in generating spot price data. As there is no transparent or formal cash market for grains in South Africa, the industry uses the futures market to derive a spot price. With a JSE/SAFEX contract expiring in every calendar month, there is a constant delivery month contract; that is to say, there will always be a contract ready for delivery. This means that producers can always find a contract on JSE/SAFEX against which they can deliver immediately. Therefore, the price of the delivery month contract effectively represents the market spot price.

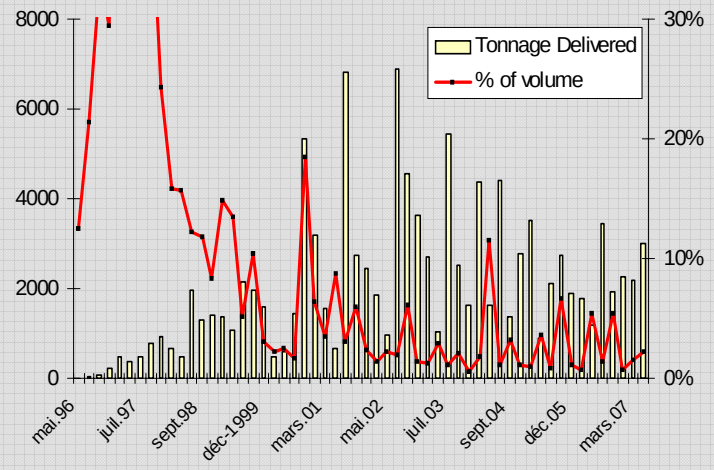
The South African market was not fragmented prior to reform, as a pan-South African national price prevailed under the regulated system. Since deregulation, however, agreement about transportation costs has become an important variable in the contractual terms and conditions negotiated between buyers and sellers from across the country. JSE/SAFEX has made a concrete impact in this area, through the creation and dissemination of transparent "location differentials".

JSE/SAFEX grain contracts use Randfontein as the reference price. Producers who deliver products at various silos across the country must deliver at a discount to the traded JSE/SAFEX price, reflecting the transportation costs between that silo and Randfontein. This discount – or location differential – is calculated annually for each delivery point and is published by JSE/SAFEX.

However, if a producer wants to sell maize at a location or silo that is not registered with JSE/SAFEX, and therefore does not have a published location differential, the producer will have to negotiate directly with the buyer to establish a fair price. This applies particularly to maize producers in the Eastern Cape Province.

While the location differentials have helped to provide effective local pricing, the role of JSE/SAFEX in setting the differentials has been questioned by some farmers. Some feel that JSE/SAFEX-determined location differentials may not always reflect the true transportation costs.

Chart 53. JSE/SAFEX white maize: monthly deliveries, 1996–2007



Source: JSE/SAFEX.

Reinforces cash market transactions: Industry representatives and market participants are unanimous in their agreement that the JSE/SAFEX delivery system is a highly developed and widely accepted mechanism for delivering and procuring grain in South Africa. This is backed up by the data (see chart 53). Although average deliveries stand at about 2–3 per cent of total traded tonnage, this rises to over 7 per cent at certain periods of the season. Moreover, in absolute terms, JSE/SAFEX was handling volumes of white maize of approximately 2,100 tonnes per delivery month in 2006. There is little doubt that this signifies substantial market confidence in the JSE/SAFEX delivery mechanism.

Infrastructure enhancement: Warehouse and logistics infrastructure in South Africa was already highly developed prior to industry deregulation. It has been argued that since deregulation there may even have been a slight deterioration in logistics, due to a reduced train service between silos that were no longer profitable for the rail operator. However, the haulage industry has to a large extent compensated for these reductions. Similarly, according to data from South Africa's grain silo industry, warehousing capacity has remained reasonably constant at around 15 million tonnes since 1990. Some silos have closed in areas where it has not been economic to maintain them. However, this loss has

been more than compensated for by the introduction of silo bags that enable portable grain storage in the field. Silo bags now provide approximately 0.4 million tonnes of storage capacity in South Africa.

However, JSE/SAFEX has made a significant impact, albeit indirectly, in two respects. Firstly, it has been a key party to the development of a robust warehouse/silo receipt system which integrates the futures market with the physical market, and the commodity sector with the financial sector (see box 28). It is important to emphasize that, with over 200 accredited delivery points and daily delivery for its core white maize contract, JSE/SAFEX operates one of the most sophisticated and extensive delivery systems of any commodity exchange, anywhere in the world. The scale of JSE/SAFEX's warehouse network enables the widespread participation of producers from across the grain-producing regions of South Africa. Very few producers are excluded on account of remoteness from a delivery point. Furthermore, the JSE/SAFEX delivery system has arguably stimulated the development of world-class collateral management systems, including pioneering grain storage and distribution management software.

Quality upgrade: The quality standards applied by JSE/SAFEX have been adopted from standards developed by the industry. However, compared with previous arrangements in the era of government regulation, premiums are now in place that reward the delivery of higher-quality grain. This has provided incentives for farmers to increase the quality of their production**.** The National Chamber of Milling has observed that since the JSE/SAFEX discount between first- and second-quality grades was increased to R75, producers have started to apply additional fertilizer to their wheat crop in order to achieve the better standard. It has also noted that the transparency regarding quality grading helps emerging farmers to know the quality of produce that is expected from them when they make production and farm-management decisions.

Box 28. The JSE/SAFEX delivery mechanism and silo receipts

Building on well-developed physical infrastructure at the time of deregulation, the South African grain industry developed a robust system for physical delivery that integrates the futures with the cash market (including silo owners), and the commodity with the finance sector. As well as the infrastructure in place, two elements were key to developing this system: a legal framework for the issuance and transferability of the silo receipt, and the collaboration of all parties - the exchange, the silo owners, the financiers and the grain industry participants - in designing a system that addressed industry requirements. As a result, JSE/SAFEX provides a guaranteed channel for physical delivery and procurement, ensuring that spot and futures markets are highly correlated, and that farmers and other grain industry participants have easy access to finance using their grain as collateral. The main elements of the system are as follows:

Delivery period: On JSE/SAFEX, physical delivery can take place anytime during the particular delivery month (i.e. a futures position in the July contract can only be delivered during July). With the introduction of constant month contracts, this means that maize and wheat can be delivered during every month of the year.

Delivery process: Physical delivery on the exchange takes place over a two-day period - the notice day followed by the delivery day. From the exchange's perspective, delivery is fulfilled when a JSE/SAFEX silo receipt representing 'good delivery' is presented in completion of a futures contract. Good delivery can be further defined as a silo receipt which allows access to the product as defined on the face of the receipt by the silo operator.

Issuing a JSE/SAFEX silo receipt: To be issued with a JSE/SAFEX silo receipt, a farmer must deliver the amount specified on the standardized futures contract to one of the 200+ approved delivery points (silos) in South Africa. This is unique in terms of world standards - for example, the CBOT has only four delivery points. Upon request, the silo owner issues a JSE/SAFEX silo receipt in the farmer's name. This is a highly secure document, issued in triplicate, and there have not been any forgeries to date. The receipt is freely transferable, but not negotiable, and represents title to a specified quantity of a specific quality product, free alongside rail, at a registered JSE/SAFEX silo. A silo receipt may also be issued electronically, as these have become recently accepted by certain clients and issued by a limited number of the large silo operators.

Performance guarantee: Delivery or procurement of any listed commodity is always guaranteed on the exchange. Should a market participant default on a contract, their broker would assume the position. If the broker is unable to assume the market participant's position, the broker's clearing member would stand in and assume the position. This system ensures that the market participant on the other side of the contract is always guaranteed fulfillment of their position.

Transfer of the receipt: Once the JSE/SAFEX silo receipt is received by the exchange, properly signed off by the previous owner, it will be handed over to the new buyer who will sign and accept ownership of the receipt. This transfer of ownership takes place on the back of the original JSE/SAFEX receipt. As the receipt is tradable, transfer of ownership may take place many times before the product is finally out-loaded.

Financing through silo receipts: A number of institutions offer financing using the silo receipt as collateral. In this case, the silo receipt is handed over and transferred in the name of the financing institution which will keep the silo receipt as security. Should the client default on the transaction, the institution will trade the silo receipt in the marketplace to settle the loan.

Out-loading the physical stock and canceling the receipt: Once the owner of the silo receipt has decided to collect the physical product represented by the receipt, the original silo receipt is presented to the silo owner who issued it. The silo owner will check the validity of the silo receipt and once all outstanding storage has been paid, out-load the product as per the final buyer's instructions. At this point in time the silo receipt is cancelled and cannot be traded any longer.

10.4.5 Facilitation of financing to the agricultural sector

One of the strengths of the JSE/SAFEX model is the integration of the commodity sector with the financial sector. A key aspect of this is the smooth, secure and extensive JSE/SAFEX delivery system discussed above. Bank representatives have confirmed that they can better provide credit to the sector at reduced rates of interest. This reflects the lower risk of lending to agricultural producers, because JSE/SAFEX silo receipts can be accepted as collateral with confidence by banks. They have certainty that the silo receipt will give them access to the commodity in case of default. Furthermore, the exchange provides an easy channel for valuation of the commodity and liquidation of the collateral should default arise. As a result, the physical and financial aspects of grain marketing have become highly integrated with a suite of bundled marketing, financing and risk management services available to the producer (see box 29). A leading bank estimates the total annual value of warehouse-receipt financing in South Africa to be R5.5 billion (or $775 million at August 2007 rates). The only danger that has been cited is that because of the minimum tonnage specified on JSE/SAFEX contracts, small-scale market participants might find the financing needed to purchase raw materials problematic (FPMC, 2003).

10.4.6 Market development

Education and capacity-building: The agricultural futures markets at JSE/SAFEX commenced in 1995, two years before the Grain Marketing Board was abolished. Industry representatives have indicated that in the early days of the market JSE/SAFEX took the lead in educating market

participants, with numerous seminars held around the country. In 1999, Grain South Africa (Grain SA) – a voluntary, independent grain producers' association – was founded, and has subsequently assumed the major role in education efforts pertaining both to the cash and futures markets for grain.

The structure of market education for farmers in South Africa is informal in nature, with farmers forming study groups among themselves to share knowledge and experience. This has been described by one South African farmer in the following way:

> "I think that of all the agricultural organizations, the study group is the one that is closest to the farmer and that adds value to him or her. In my experience, study groups have filtered out all the noise; they focus on what is important to its members. As a result, you find that specific needs come up and the group will find ways of addressing those needs. I don't believe that providing marketing services that make it easier to trade adds value, since the farmer will tend to go with the group and not learn how to use the market well. What JSE/SAFEX can do is make available to the study groups the opportunity to get direct access to the exchange's knowledge base. In other words, when the need arises at a study group, it must be easy for them to get the answers from the exchange or have someone from the exchange who can come to their level and address the need."

Until 2005, Grain SA provided regular basic introductory grain marketing courses to producers in the different grain-producing regions. In 2005, pre-scheduled courses were discontinued, but courses are conducted on demand from study groups, farmer unions, etc. As the commercial farming industry grows increasingly sophisticated in its use of the futures markets, more advanced training and education may be required by farmers.

Most agribusiness and grain-trading companies also provide courses for producers. These companies often visit a group of producers before the new planting season to give them an overview of the prevailing market conditions, and also to offer advice on good marketing and hedging strategies for the new crop.

Box 29. Integration of the commodity and finance sectors in South Africa: the First National Bank Grain Hub product package, based on JSE/SAFEX instruments

Spot contract:

- Outright purchase of SAFEX grain commodities

Pre-plant contract:

- Grain input finance against crop insurance and grain-trading (hedged) position
- Trading encompasses a combination of SAFEX, OTC and risk-management positions
- Physical delivery of grain is compulsory

Repo contract:

- Financing of grain against silo certificate as collateral, and purchasing 25 per cent of out of the money SAFEX puts for financing period. Limited to 75 per cent of daily market value.
- Client responsible for storage and interest during the financing period
- Bank should preferably purchase grain on expiry of the repo contract

Advanced price contract:

- Spot purchase of grain at advance payment
- Long future and put option. Final payment at expiry of contract if long position in the money.
- Storage and interest not for the client's account (differs from repo concept)

Fixed-price forward purchase contract:

- Forward purchase of SAFEX grain commodities subject to:
- Grain in hard dough stage, maximum 65 per cent of total crop, financial and risk record, emerging and crop-estimate reports
- Physical delivery of contracted grain compulsory

Average minimum/maximum forward purchase contract:

- OTC option
- Minimum and maximum price guaranteed over contracted period
- Physical delivery of contracted grain compulsory

Weighted average forward purchase contract:

- OTC option
- Client to share in rising market on average basis
- Minimum price guaranteed for contracted period
- Physical delivery of contracted grain compulsory

Minimum forward purchase contract:

- SAFEX put option
- Minimum price guaranteed for contracted period
- Client allowed to fix price during contract period
- Physical delivery of contracted grain compulsory

Average call option contract:

- OTC transaction. Client to share in rising market on average basis within contract period.
- Cash settlement if in the money at option closure
- No physical delivery of contracted grain required
- No cash margin. Premium payable upfront.

Broking:

- Trading of SAFEX futures and options through a bank broker

SAFEX training:

- One-day training course on SAFEX. Outsourced to third party.

FNB grain trading account:

- Facility to be marked for grain trading purposes only.
- Account to cover option costs, force majeure costs and other administrative costs

Source: First National Bank, South Africa.

In recent years, education and training have been most strongly focused towards small-scale or emerging farmers. This effort is being led by Grain SA. Its "Developing Producer Programme" aims to empower emerging farmers towards "sustainable, self-supporting commercial production, and to promote the principles of AgriBEE among Grain SA members" (Grain SA website, August 2007). JSE/SAFEX supports this programme in the area of marketing and price-risk management, through training seminars directed to farmer study groups. Grain SA also has in-house experts who are highly versed in futures market operations.

South African grain industry representatives agree that training in the use of futures markets for price-risk management is a second priority which comes after more fundamental production and farm-management issues. However, even the most basic smallholder education course typically features awareness-raising about the role of JSE/SAFEX and how to use the market information it generates in decision-making regarding production and marketing. This demonstrates how the commodity exchange is relevant and important to the livelihood of small-scale producers.

Other market development impacts: The following impacts have been documented from discussions with South African grain industry representatives.

ICT: An indirect impact arising from JSE/SAFEX has been the enhancement of ICT infrastructure. In particular, the exchange's extensive and well-functioning delivery system has encouraged software developers to build best-in-class grain and silo management systems that further enhance the functionality and ICT infrastructure in the industry.

Facilitation of international trade: By virtue of providing a reference for southern African grain markets, JSE/SAFEX can also be said to have played a role in integrating the South African market with its regional neighbours. This was seen when the Government of Malawi structured options to purchase grain via a South African bank based on JSE/SAFEX prices (see box 25). However, further regional integration – for example, by establishing JSE/SAFEX delivery points or trading terminals throughout the region – faces barriers related to actual or potential controls on the free flow of goods and capital. A second impact arises from the transparency of import and export parity pricing that JSE/SAFEX enables (discussed earlier). This provides effective signalling to exporters and importers about the appropriate conditions in which grain can be traded internationally.

An emerging farmer study group

Source: Grain SA.

Access to markets and service providers: JSE/SAFEX has broadened access to and usage of markets by farmers since deregulation in the latter part of the 1990s. Currently it is mainly commercial farmers who are accessing the markets, but smallholders are expected to benefit indirectly via cooperatives and after commercialization. Due to the integration between the commodity and financial sectors through the exchange's delivery system, JSE/SAFEX has facilitated access for producers to financial institutions, in particular because the JSE/SAFEX silo receipt is accepted as collateral by all major banks in the country.

Part Three: Summary of findings and development implications

11. Summary of findings

11.1 Historical development of agricultural markets and specific commodity markets under review

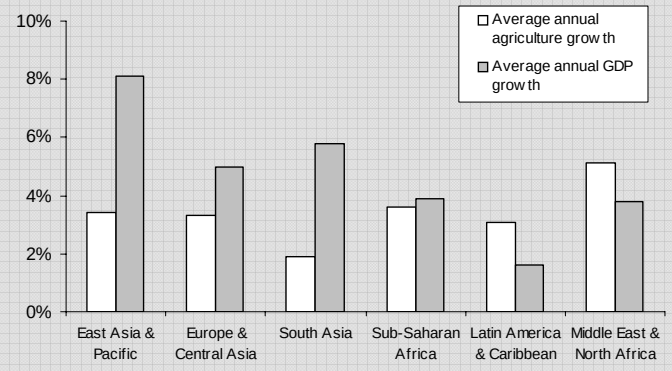
11.1.1 Country situation

The five countries featured in the study may be considered as middle-income developing countries. However, their situation varies in many ways (see fig. 9). There are three "giants", namely Brazil, China and India, whose large surface areas and population sizes dwarf Malaysia and South Africa in comparison. On the economic front, Brazil, Malaysia and South Africa have per capita GDP levels of over $5,000 at current prices – significantly higher than China (which has $2,002) and India (which has $797). However China, and to a lesser extent India, are growing the most rapidly. China's 12.7 per cent average GDP growth rate between 1990 and 2006 is far ahead of second-placed India at 6.7 per cent, although it is noted that India has recently stepped up its annual growth rate to nearly 9 per cent. Furthermore, top-level economic data mask the huge social and income inequalities that exist within the three wealthier countries. As will be discussed in further detail, this inequality is reflected in the agricultural sectors, which are marked by a sharp duality between well-developed commercial operations and less-developed smallholder farming communities, with a high concentration of poverty in the latter.

11.1.2 Importance of agriculture to the economy

In each of the countries featured, with the partial exception of India, agriculture is a small and declining contributor to national GDP. In South Africa, the contribution is as low as 3 per cent. This reflects the economic transformation brought about by often-rapid industrialization. In these scenarios, the manufacturing sector – and in certain circumstances, the mining, minerals and services sectors – have been the catalysts of growth. By contrast, agriculture has often been constrained by government policy to channel sufficient quantities of cheap food to urbanizing populations within a framework of heavy controls and an import substitution trade strategy to drive national development.

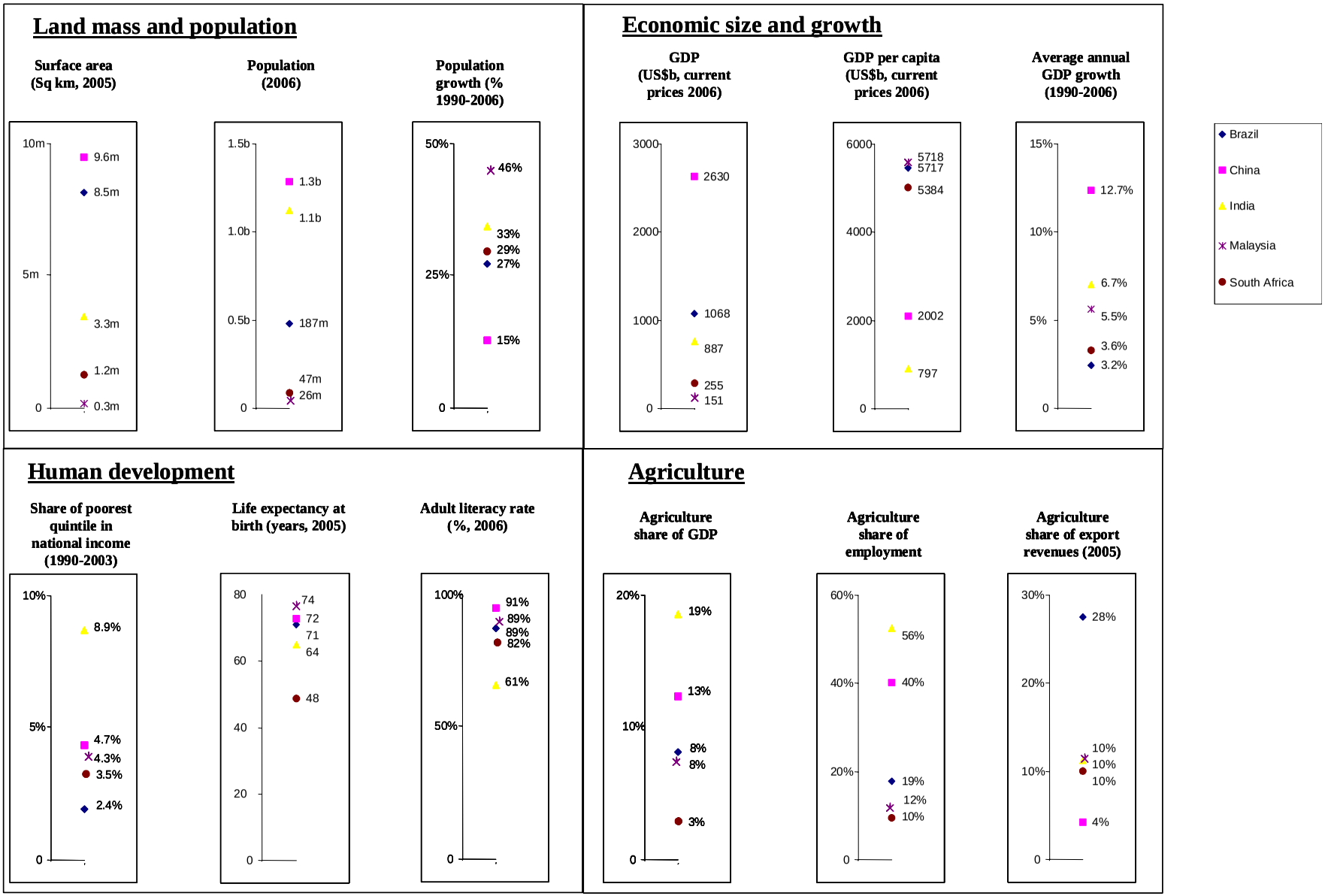
Chart 54. Comparative average annual growth rates: agriculture and GDP by region, 2000–2004



Source: World Development Indicators (2006).

Nevertheless, in spite of the small contribution to GDP, agriculture retains a position of vital importance in each of the five economies. In India and China, agriculture accounts for 56 per cent and 40 per cent of employment respectively – a large share of the total workforce, and one that reflects the fragmented smallholder structure of agriculture in each country. An important corollary of this is that smallholder farmers form a large constituency to which political leaders must pay careful attention. In both countries, therefore, stimulating development and growth in agriculture remains a key priority, especially as agricultural growth has lagged far behind overall levels of economic growth (see chart 54).

Figure 9: Comparative profiles of the featured countries



Sources: IMF World Economic Outlook Database April 2007; OECD 2007; World Bank World Development Indicators 2005 & 2006
Note: Agriculture data - source for Malaysia to be identified; agriculture share of GDP and employment using most recent available data varying between 2003 and 2005 – see country factfiles for precise year

In Brazil, Malaysia and South Africa, agriculture accounts for between 10 and 20 per cent of the total workforce and thus remains important, especially as in each case it also contributes 10 per cent or more of national export revenues. Brazil – at 28 per cent of total exports – is particularly noted in this respect. Indeed, agriculture is growing faster than the economy in general in Latin America – a sign of the continent's rising importance as a breadbasket for the rest of the world, particularly Asia, where land and water are becoming increasingly scarce.

11.1.3 Reforms

A large-scale reform programme has played a key role in the development of agricultural markets in four of the countries featured in the study. However, there have been different motivations for reform. In Brazil and South Africa, agricultural reforms arose as the corollary of a transition that was primarily political in nature. There was a need to break with old practices and an imperative to address inequalities entrenched by the previous regime. In South Africa, for example, the interventionist machinery was heavily associated with apartheid structures that were strongly biased in favour of commercial "white" farming at the expense of the "black" smallholder sector. In these countries, land reform and the empowerment of formerly disadvantaged communities are critical imperatives for Government.

By contrast, agricultural reforms in China and India were part of a wider transition that was primarily economic in nature and carried out by the existing political regime.[49] In these countries, the focus has been on upgrading productivity and infrastructure, and also, more recently, on consolidating and commercializing fragmented smallholder production structures.

Malaysia is an exception, with neither a transition nor reforms featuring in the country's economic or agricultural development. Instead, a relatively steady development path has been pursued by the Government since the country's independence in 1957. This has been marked most prominently by land development and resettlement programmes on the one hand, and careful development of core export markets on the other.

The speed of reforms has varied from country to country, too. In China, reform took place gradually and in two phases: the initial reforms were to producer incentives and productivity, and later reforms concerned market liberalization. By contrast, while South Africa underwent an earlier phase of mild reform in the 1980s, the substantial change occurred in a "big bang" reform package stimulated by the 1996 Marketing Act. Among other things, this heralded the abolition in 1997 of fourteen marketing boards that had tightly controlled the markets for key commodities.

There are also differences in the sequencing of reform. Von Braun, Gulati and Fan (2005a) draw a contrast between China and India. In China, structural reform to agriculture occurred ahead of reform to the wider economy. In India, however, reform commenced with macroeconomic and non-agricultural reform. It is argued that the Chinese approach generated far greater poverty reduction as a result. Brazil and South Africa may be considered to have followed a model similar to that of India, where macroeconomic reforms in the 1980s came before the land reform agenda, which commenced in the mid-1990s.

11.1.4 Key challenges for agriculture

The development curve that each country has faced has been in many ways specific to the country's individual situation. The political transitions in Brazil and South Africa were rooted in a unique history. The economic reforms made by China and India occurred in countries whose circumstances could justifiably be considered exceptional, given their size and post-1945 development experience.

[49] Although it is recognized that reforms in China were made possible with the passing in 1975 of Mao Zedong, who had opposed many of the policies later introduced by Deng Xiaoping and his successors (Runsheng, 2006).

However, certain challenges arising from the situation of each country do bear similarity. These include:

- Transition to a market-based economy (China, India, South Africa);
- Constructing market institutions to facilitate trade (China, India, Malaysia, South Africa);
- Addressing widespread inequalities and entrenched duality in agriculture (Brazil, Malaysia, South Africa);
- Consolidating and commercializing the smallholder sector (Brazil, China, Malaysia, South Africa);
- Stabilizing volatile or sensitive domestic markets (China, India, South Africa);
- Constructing competitive and dynamic export markets (Brazil, India, Malaysia, South Africa).

For each one of the countries featured, new challenges have arisen as a result of structural changes in the global economy. These include, but are not limited to: the globalization of trade, capital and labour flows; the liberalization of markets and the creation of the WTO as an international rule-setting and enforcing entity; the development of new international specializations and trading requirements within and across countries and regions; and consolidating global supply chains which concentrate value in downstream parts of the chain and impose increasingly rigorous conditions on producers and processors.

As a result, governments can no longer concentrate only on the internal dimensions of reform, but must also focus on the external, dynamic context which has thrown up new imperatives for each of the featured markets:

- **Brazil:** Becoming an agricultural export powerhouse that is one of the key suppliers to the large emerging Asian economies
- **China:** Ensuring food security in globalizing commodity markets characterized by tighter supply constraints and higher prices
- **India:** Diversifying its agricultural base into high-value products that can be competitive on world export markets
- **Malaysia:** Finding new and increasingly value-added applications and/or markets for palm oil (such as biofuels and oleochemicals) that allow Malaysia to retain its share of global volume and revenue in the face of increasing challenge from other exporters
- **South Africa:** Managing the extremely high levels of price volatility as an aggressive participant in open and competitive world grain markets

11.1.5 Specific challenges for the featured commodities

For each of the featured commodities, a different set of challenges arises from the market conditions in which production and trade takes place:

- **Patterns of production:** Some markets are characterized mainly by smallholder production (China, India); whereas other markets have a commercial/smallholder dichotomy (Brazil, Malaysia, South Africa). Each has attendant issues – in the former case, consolidation of production, absence of suitable intermediaries, improving resilience to risk; in the latter, commercializing smallholders in order to increase productivity and competitiveness, integrating smallholders within new or existing supply chains.
- **Patterns of trade:** Some crops are mainly produced for the domestic market (grains and soybean in China, grains in South Africa); other crops are produced mainly for export markets

(coffee and live cattle from Brazil, cardamom and mentha from India, palm oil from Malaysia). Production for the domestic market brings concerns about food security and price inflation; production for export brings concerns about global supply-chain integration, meeting stringent quality requirements and attaining international competitiveness.

- **Openness of the economy:** Some markets are closed or restricted (China, India); other markets are open and international (Brazil, Malaysia, South Africa). Governments in each of these countries are trying to balance concerns about food security with concerns about international competitiveness, efficiency and growth. As market circumstances change – for example, China's edging towards becoming a net importer of grain – so does the framework within which agricultural policy is conducted.

- **Condition of infrastructure:** Some of the featured commodities operate in a well-developed physical market (Malaysian palm oil, South African grain); others operate in a physical market with infrastructure development requirements (Indian mentha oil and cardamom, Chinese grains and soybean). The former situation brings challenges in terms of maximizing the benefits of strong infrastructure for the many smallholders in these countries; the latter brings challenges in integrating new investments in infrastructure within a coherent strategy for equitable sector development.

11.2 Exchange emergence and contract development

11.2.1 Exchange emergence and market structure

Attention can be drawn to a number of contrasting features in exchange emergence and market structure across the featured countries. Firstly, three of the countries – Brazil, China and India – have a legacy of trading that goes back a long time. Both China and India had flourishing exchanges and futures trading operating in the early part of the twentieth century (and in the case of India, in the late nineteenth century as well), prior to a period in which exchange trading became prohibited by law. Testimony from exchanges and market participants suggests that these earlier experiences may have played an important role in driving the rapid acceptance of exchanges and exchange trading in these countries after they became permitted again – perhaps due to the memories passed down from generation to generation, perhaps because "grey markets" continued to exist after formal prohibition, or perhaps on account of other cultural factors. In Brazil, exchange trading has remained legal ever since it first originated at the BMSP in the early twentieth century. However, the fluctuating level of government intervention in agriculture has provided varying amounts of scope for exchange activity over time. As has been the case elsewhere in Latin America, the exchanges' quest to find a niche in commodity markets that are often squeezed by government intervention has spurred the development of innovative applications for exchange mechanisms.

A second contrast can be drawn between countries where the Government was the primary driver of the exchange development curve (China, India) and those that were driven largely by private sector initiative (Brazil, Malaysia, South Africa). In China, following an initial laissez-faire approach to exchange development, the Government stepped in on two occasions to focus commodity futures trading in three exchanges, each one trading a small number of contracts. This formed the basis for a period of consolidation prior to rapid growth in market activity. In India, the GOI set out a master plan for the development of three new national multi-commodity exchanges, setting in place the criteria that each new exchange had to fulfil: demutualized from inception, nationwide and multi-commodity in scope, and offering electronic trading only. The result has been enormous growth in volumes, with each of the three exchanges in – or close to – the top 10 leading commodity exchanges in the world. In the other three countries, the Government has played a supporting role in providing the regulatory framework, and in the case of Brazil, the Government has used exchange mechanisms for carrying out its policy. However, it has been the private sector that has driven forward development and growth.

A third contrast is the number of exchanges in each country. In Brazil, Malaysia and South Africa, commodity futures trading activity has been focused in one exchange institution per country. In the

case of Brazil, there have also been local cash market exchanges, a number of which have now been integrated into the BM&F's physical market subsidiary, the Brazilian Commodity Exchange. However, commodity futures activity – and many of the advances in physical market trading – are focused in the BM&F. Moreover, in each of these three countries, the commodity exchange has integrated with financial futures and cash equity markets, among others, to offer trading across a wide range of asset classes.

Both China and India have three commodity futures exchanges,[50] each of which is focused purely on commodity futures and is prohibited by law from offering trade in other instruments or asset classes. The immediate reason for this contrast is that the exchange structure in China and India has arisen from a government-directed plan for market development after a long period of prohibition on commodity futures markets, as discussed earlier. This may further reflect factors including the size and diversified nature of each country's resource base, and the large geographical area and population.

India is characterized by two features that are almost unique to its markets. Firstly, contracts on a very broad array of commodities spanning the agriculture, metals and energy sectors are traded at each exchange. This has led to each exchange listing contracts for more commodities than any other exchange in the world. While a significant number of these are not traded with significant liquidity, the Indian exchanges nevertheless trade among the highest number of liquid contracts of any exchange in the world. Secondly, the structure was set up to explicitly foster competition among the three exchanges. Liquidity for contracts with even the highest volumes on one exchange remains heavily contested by the others. A dynamic contract-development process and the extension of benefits to a wide range of commodity sectors have arisen as a result.

11.2.2 Exchange structure

Breadth of portfolio: The two extremes to portfolio breadth are represented on the one hand by India – with each of the national multi-commodity exchanges offering contracts for over 50 commodities, and on the other hand by Malaysia – where Bursa Malaysia has focused almost entirely on crude palm oil futures. Brazil, China and South Africa lie somewhere in between. In part, this reflects the potential offered by India's diversified resource base. It also reflects the large proportion of the country's population with exposure to commodity markets, whether in the capacity of producers, consumers or other types of commodity supply-chain participants. China has similar potential, but the Government has taken a more cautious regulatory approach, limiting each Chinese commodity futures exchange to just a handful of commodities, and not allowing exchanges to compete with each other by offering contracts for the same commodity at two or more exchanges.

Instruments/services: All five exchanges offer trade in commodity futures. JSE/SAFEX has also developed a liquid options market, and small volumes of options are traded at BM&F as well. The DCE, MCX and Bursa Malaysia remain focused on futures contracts, with the Chinese and Indian exchanges restricted by regulatory constraints on the type of instruments that can be traded.

Despite this, India – along with Brazil – has been most active in developing initiatives or services to meet the needs of the physical market. This reflects the legacy in both countries of fragmented physical markets and infrastructure in need of upgrade. The exchange has had an important role to play in addressing these issues. BM&F's Brazilian Commodity Exchange subsidiary is the most advanced manifestation, having developed markets for a whole range of cash, forwards, and financial securities instruments dedicated to agribusiness. In South Africa, although infrastructure was well developed, deregulation left the agricultural sector in need of a new framework of practices and procedures within which the free market could function. In this situation, JSE/SAFEX became a pivotal institution around which efficient pricing, delivery and risk management mechanisms were structured. This enabled a smooth transition to free-market operations and integration with the financial sector to facilitate the flow of finance to commodity supply-chain participants. By contrast, Bursa Malaysia was born into an environment with a well-developed physical market, established

[50] India also has over twenty smaller regional exchanges. See http://www.fmc.gov.in for details.

practices and support structures, an integrated national market and good infrastructure. This left only limited scope for the exchange to play a role, beyond the exercise of its core price discovery and risk management functions.

Table 9. Summary of structural features of exchanges

	Trading System	Ownership structure	Clearing house
BM&F	Open outcry and electronic trading	Membership-owned (but demutualizing)	In-house
DCE	Fully electronic, but with a physical trading floor	Membership-owned	In-house
MCX	Fully electronic	Privately owned	In-house
Bursa Malaysia	Fully electronic	Demutualized, publicly listed	In-house
JSE/SAFEX	Fully electronic	Demutualized, publicly listed	In-house

In summarizing the experience across each of the featured countries, it can be concluded that the exchanges have demonstrated versatility in catering for the specific needs of their market contexts. Where significant market development needs have existed, exchange institutions have been at the forefront of fulfilling those needs with new and innovative services to upgrade sector performance.

Box 30. Exchange trading floors

(i) BM&F open outcry trading floor

(ii) DCE electronic trading floor

Trading system: A movement towards electronic trading has taken place in recent years. This has been driven by technological advances and by the advantages in speed, cost, transparency and functionality that such trade typically offers over the established "open outcry" form of trading, which brings traders together on a trading floor. Electronic trading typically brings a number of other potential advantages. These include limiting informational asymmetries between trading interests, allowing potentially longer trading hours, and increasing access to markets regardless of one's geographical location. However, supporters of open outcry argue that it ensures greater liquidity during trading hours because of the activities of "locals" and because the longer trading hours that were brought in with electronic trading sometimes create moments where markets can become illiquid. They also point to the lengthy historical experience with open outcry systems and the comfort level that such systems provide to traditional trading communities. All the exchanges featured in this study now offer electronic trading. BM&F alone retains its trading floor. However, this now operates alongside an electronic trading system that carries over 50 per cent of exchange volume and turnover. The DCE

retains a trading floor, but all trading is electronic, in line with the other two Chinese commodity futures exchanges.

Ownership structure: Many commodity exchanges were created as institutions to serve the interests of their members. Hence, exchanges have often tended to be structured as mutual organizations owned by those members – typically, individuals or entities with significant trading interests. However, demutualization – the separation of exchange management from ownership and trading interests – has been one of the most persistent trends in commodity exchanges around the world over the last five years. This has largely been motivated by concerns about good governance, self-regulation, the confidence of market users, and facilitating access to investment capital.

On the other hand, the mutual ownership model may have some merits for a young exchange. In particular, members may agree to cover the substantial costs typically incurred during the early stages of exchange development. An alternative approach, with the State as owner of the exchange, may be beneficial if it draws in investment and participation, and clears bureaucratic hurdles. At the same time, the Government would need to convince trading interests that it would not use the exchange for political purposes and that it would manage the exchange in the best interests of the market as a whole.

Three of the five exchanges featured are already demutualised, and BM&F is in the process of demutualization. (In India, demutualized management was a condition of national multi-commodity status and therefore MCX has been demutual since its launch.) Only the DCE will remain in mutual ownership for the foreseeable future. However, the Chinese exchange ownership structure is different from the standard mutual exchange model. While formally owned by its members, the State – through the CSRC – has important rights in appointing management and in decision-making.

Clearing house: A clearing house performs two critical functions in clearing and settling contracts agreed on the exchange: managing the systemic risk arising from exchange transactions, and protecting the integrity of the marketplace. Some of the world's leading commodity exchanges use an independent clearing house. Others use in-house clearing houses. There are also those that use clearing houses common across two or more exchanges. This diversity of structure suggests there is little consensus about which is the preferable model. Instead, the choice appears to depend on the specifics of the exchange's situation. Independent clearing houses may be seen to assure increased market integrity by providing a clear separation between trading and clearing functions. This may be an advantage for an exchange that has not yet attained the full confidence of the investment community. It also has the advantage of ensuring that clearing and settlement does not become subordinated to other aspects of exchange operations: for instance, an independent clearing company would have independent capital-raising powers and a wider possible market for its services. On the other hand, an in-house clearing house appears to offer better collaboration between trading and clearing functions when, for example, new contracts or new trading instruments are introduced. Furthermore, in markets where the exchange holds a very high level of trust, it may make little sense to have a separate clearing house structure. All five exchanges featured in this study have an in-house clearing house. The only nuanced distinction is that BM&F – offering trade in numerous asset classes – has separate clearing houses for derivatives, foreign exchange and securities specialized by asset class.

11.2.3 The exchange's key achievement within its local context

Each exchange has made a strong contribution that has fitted in with the local context (see table 10):

BM&F: providing instruments and services that have supported the commercialization of the Brazilian agro-economy. This has occurred, among other reasons, by enabling the efficient flow of capital into the sector by providing secondary markets for financing instruments; by hedging against price risk via futures markets; by enhancing the efficiency, transparency and sustainability of government policy by providing transaction mechanisms for government procurement and financing interventions; by integrating the domestic physical market through its Brazilian Commodity Exchange subsidiary; and by facilitating the development of the key export market for soybeans through its various activities in cementing links with China.

Table 10: Summary of key exchange market development factors

	MCX	Bursa Malaysia	JSE / SAFEX	BM&F	China
Key achievement within local context	**Catalyzing development of the wider commodity ecosystem**	**Bringing pricing power to Malaysia for its key export commodity**	**Filling the void left by sudden government deregulation of grain markets**	**Boosting commercialisation of Brazil's agro-economy**	**Creating high levels of liquidity for markets in key agro-commodities**
Success factors	• Building liquid markets for indigenous products • Managing a broad portfolio of products • Effective and efficient deployment of technologies • Strong residual trading culture in India • Educational emphasis	• Aligned with established/ well-regulated physical market • No alternative established palm oil contract elsewhere • High growth in the underlying physical market • Government commitment to respect the pricing mechanism	• High level of trust and cooperation amongst industry • Government commitment to respect the pricing mechanism • Strong existing infrastructure • Development of a robust delivery mechanism integrated with financing solutions • Early development of a liquid options market • Educational emphasis	• A broad-based approach to market development, incorporating futures, spot and financing instruments • Development of innovative applications for exchange mechanisms • Working relationship with the Government & Banco do Brasil • Educational emphasis	• Rapid development of volumes for newly launched contracts • Leveraging the expertise of commercial/ institutional interests • Building a secure environment for retail investor participation
Challenges	• Building greater hedger participation • Making the delivery mechanism more resilient and consistent • Managing within a tight set of political and regulatory restrictions and uncertainty	• Overcoming large default in 1985 • Developing liquidity in the options market	• Overcoming the mindset 'gap' from previous system • Managing high volatility • Engaging with, and capacity building in, the emerging farmer sector • Maintaining the supportive political environment	• Expand geographical presence through Brazil • Broadening participant mix in the market • Developing liquidity in the options market	• Securing benefits to small farmers from price discovery and risk management • Managing within a tight set of political and regulatory restrictions and cautiousness of regulatory mindset
Future opportunities	• Institutional and foreign investor (FII) participation • Developing trading in options, indices and other intangibles • More thoroughly integrating futures and physical market • Launch of a national electronic spot exchange	• Further physical market growth - expected biofuels impact • Complimentary products - index & USD-denominated FCPO • Licensing of FCPO to overseas exchanges • Engaging with a more organised smallholder sector	• Regional integration in Southern Africa • Strengthen linkages with other emerging market geographies • Mini-contracts to allow greater participation of small producers • Risk management solutions for climate and exchange rate risks	• Regional integration strategies in Latin American commodity markets • Consolidate and deepen export linkages with China	• Development of financing possibilities • Institutional and foreign investor (FII) participation • Options and index trading

DCE: creating high levels of liquidity for key agro-commodities. Over a short period of time, the DCE has launched commodity futures contracts which have generated significant volumes of trading in commodities considered vital to the country's food security. This has enabled purchasers to better plan their business activities, while providing farmers with better incomes through improved transparency in the futures market. Both the contracts featured in this study have also shown the role of an exchange in adapting to emerging dynamics in important markets. The evolution of the soybean contract into two distinct contracts – for domestic, non-GMO soybean, and for imported, GMO soybean – reinforced the GMO policy of the Chinese government and catered to the industry's needs, in which different entities use each variety. The launch and rapid development of the corn contract has played an important first step in liberalizing the Chinese corn market, as the country comes into compliance with obligations made upon WTO accession, and as the country moves towards becoming a net importer of corn.

MCX: catalysing development of the wider commodity ecosystem. In many of the commodities that it trades, MCX has not only introduced a futures mechanism for price-risk management. It has also dramatically improved the flow of information to remote and marginalized commodity participants, facilitated the development of physical infrastructure in major trading centres, and established reliable and accepted quality standards that give purchasers and exporters the confidence to step up their activities in emerging commodity supply chains. A national electronic spot exchange to further integrate and boost the efficiency of the cash commodity markets in India will be launched imminently.

Bursa Malaysia: bringing pricing power to Malaysia for its key export commodity. Bursa Malaysia is unique in having established a benchmark exchange in the developing world – one that generates the reference price for a globally traded commodity. Reference prices for every other exchange-traded global commodity are generated by exchanges located in the developed world, often far away from the producer markets. In the case of Malaysia, however, the country that produces the world's largest quantities of palm oil is also the venue for the exchange that generates its reference price. This is important, because it ensures that the producer country has pricing power – as a price maker rather than a price taker – for its key export commodity on the world market. In many ways, this represents the consummation of the Government's successful palm oil diversification strategy, which was first initiated in the 1960s. Moreover, with surging demand for palm oil as an input for biofuel production, the CPO futures market acts as a barometer to reflect shifts in fundamentals, providing transparency and a level playing field to ease the adjustment.

JSE/SAFEX: filling the void left by sudden government deregulation of the markets. JSE/SAFEX has become a core institution in the deregulated South African grain markets, following the sudden withdrawal of the Government after many years of heavy State control. Not only does JSE/SAFEX provide a mechanism for hedging, it also supports trade in the physical markets, provides transparency on import/export conditions, supplies pricing information, facilitates access to credit for the commodity supply chain, and smooths the integration of South African grain into world grain markets through an efficient pricing mechanism.

Two important conclusions emerge as a result of this understanding about the exchanges' contribution in each of their local contexts. The first is that the commodity exchange is a versatile institution that has played a constructive role in a diverse set of circumstances: in economic transitions (China, India) and in political transitions (Brazil, South Africa); in fragmented or infrastructure-deficient cash markets (India, Brazil) and in highly developed export-oriented markets (Malaysia, South Africa); in smallholder production systems (China, India) and in commercialized commodity chains (Brazil, Malaysia, South Africa).

The second important conclusion is that exchanges are dynamic entities that not only address existing challenges, but also can help to meet the new challenges that emerge over time: for example, developing new high-value crops (India, Malaysia) and important export markets (Brazil, India, Malaysia); meeting WTO commitments to liberalize (China); helping the industry adapt to changing situations where a country swings between being a net exporter and a net importer (South Africa, and

potentially China); and addressing more rigorous quality standards demanded by Governments (e.g. China's GMO policy on soybeans) or by exporters/purchasers (e.g. for exporters of cardamom and mentha oil in India).

11.2.4 Success factors, challenges and opportunities in each market

Further to the previous section, it has also become apparent that each exchange has experienced a unique mixture of success factors and challenges, and faces different opportunities for future growth. (See table 10 for a structured representation of these.) Six broad themes can be highlighted:

Educational emphasis: The education of market participants has been a critical ingredient in powering an exchange's growth trajectory. As the senior personnel of one participating exchange have stated,[51] it is important to take a "free of charge, anywhere at anytime" approach. Education is key, not just to expanding use to a wider range of participants, but also to ensuring the sustainability of increased participation, through responsible user behaviour grounded in a thorough understanding of how the markets can work to the mutual gain of hedgers, speculators and arbitrageurs alike.

Infrastructural challenge: There is a contrast between markets that have developed in situations where good physical infrastructure is in place (Malaysia, South Africa) and those that have operated in suboptimal conditions (India in particular). In the case of the latter – but also to a certain extent in the case of the former – the exchange has shown itself to be a catalyst for rapidly stimulating development of the trade-supporting infrastructure in which the market functions.

Political environment: The political–regulatory environment in which an exchange operates has a large bearing on the range of impacts it can offer. The Government has an important enabling role to play: through the regulatory framework, through the wider legal–economic environment, and through the physical infrastructure. Government can further boost the markets by being demonstrably committed to upholding the integrity of the exchange-pricing mechanism and directly using it for its own agricultural policy interventions, as the Government of Brazil does with BM&F's Brazilian Commodity Exchange. Government can also impose a tight set of political and regulatory restrictions which may constrain an exchange's potential scope for impact. While this may at times be necessary and beneficial, on occasion it may also yield suboptimal or even adverse consequences for an exchange looking to increase its utility to the underlying commodity sector.

Smallholders: Broadly speaking, two types of environment are identified among the five featured countries: those in which production is dominated by smallholders (China, India) and those in which there is a duality between commercial and smallholder production (Brazil, Malaysia, South Africa). In the former case, and especially in India, there has been a strong imperative for the exchange to make itself highly and directly relevant to the trading and marketing needs of small-scale farmers. In the latter case, the exchange has taken a more distant role, typically due to the existence of government-backed structures that provide support for smallholders. Even here, though, the exchange's information, financing, and market development activities, as well as the Government's ability to use the exchange to carry out its smallholder support schemes, have been indirectly beneficial. Moreover, as Governments in these countries are pursuing smallholder consolidation and commercialization as a policy priority, the potential exists for exchanges to assume much greater direct relevance in the future for a more organized, commercialized smallholder sector.

Options: Of the five exchanges, only JSE/SAFEX has succeeded in developing a liquid options market. Small volumes are also traded at BM&F. While the DCE and MCX are prevented from launching options due to government restrictions, Bursa Malaysia and to a lesser extent BM&F have not been able to build liquidity in their options markets. However, options may be an important instrument for enhancing the utility of the exchange to farmers – they tend to be easier to use and more affordable. They also allow a more sophisticated array of marketing and risk management possibilities for all market participants.

[51] Gravelet-Blondin R and Sturgess C, writing in UNCTAD (2006b).

Regional economic integration: While China and India have large domestic markets which are still at least partially closed, Brazil, Malaysia and South Africa are smaller markets which are open and export-orientated. Brazil and South Africa are the leading economic powers in their region, with the most developed commodity markets. Strong potential exists for BM&F and JSE/SAFEX to act as instruments of integration, extending the benefits of efficient commodity futures markets to less developed economies in the region and improving the flows of commodities and capital between them. The opportunity for Bursa Malaysia is slightly different, although the potential for integration within the ASEAN region may also be attractive. The licensing of its palm oil contract to exchanges in other countries can cement its position as the world benchmark exchange for palm oil.

11.3 Regulatory framework

The study has documented that the three objectives of regulation are the protection of investors; ensuring that markets are fair, efficient and transparent; and the reduction of systemic risk. It has further shown that each of the featured commodity futures markets is a highly – although not necessarily heavily – regulated environment. As is shown in annex 2, there is a wide array of mechanisms and instruments to regulate markets in each country, applied at the level of the external regulator, an industry self-regulatory body, and/or the exchange itself in a self-regulatory capacity.

The role of Government within this structure is typically twofold: an oversight role – disciplining those who try to manipulate the markets for their own benefit, and ensuring the sanctity of contracts; and an enabling role – providing the necessary legal and regulatory framework, and in certain circumstances, providing elements of physical infrastructure without which market actors cannot function properly (e.g. warehousing, logistics, telecommunications and information networks).

The balance between the benefits and the costs of regulation is an important one, in which it is critical to tailor the regulatory framework and procedures to the needs of the local context. On the one hand, a regulatory framework that is too weak – or, as was the case in China in the early 1990s, absent altogether – creates the conditions for chaotic and disorderly markets in which most parties will lose out. On the other hand, regulatory constraints may sometimes become counterproductive as the market situation evolves. In China, as the Government has become more confident about the performance of the markets, it has also become less conservative in its approach. New contracts have been permitted, and a new regulatory framework introduced in early 2007 reverses some of the earlier prohibitions imposed when the markets were disorderly. Similarly in India, a challenge for the GOI is to align its high expectations for direct farmer usage of futures markets with a regulatory framework that facilitates rather than impedes this goal. A major obstacle to usage by farmers is the prohibition of options. Another obstacle is the prohibition on the participation of financial institutions in commodity futures markets: banks can act as an aggregator of small-scale farmers' trading needs, a financier for the costs of market participation, and a provider of a range of integrated finance and risk management solutions (as occurs, for example, in South Africa).

The role of speculation is a key issue. Two of the countries featured – India and South Africa – experienced price rises in critical commodities that triggered government enquiries. In both cases, speculation or manipulation was cited as a possible cause. While the South African experience of 2001–2003 commenced with an investigation before the Government decided how to act – in that instance, deciding not to act at all – the Indian experience of 2007 has seen this sequence reversed. Trade in four commodities has been suspended, prior to the report from the committee of enquiry which is expected in late 2007.

Speculation provides liquidity, without which markets cannot function. However, without appropriate regulation, speculation may become excessive and destabilizing – as demonstrated by China in the 1990s. Differentiating between speculation, excessive speculation and manipulation is important, as is the need for dispassionate analysis prior to regulatory intervention. At the same time, commodity markets are often volatile. Such volatility can often be justified by the fundamentals – as the South African government enquiry concluded in the circumstances of 2001–2003. Appropriate actions for dealing with periods of volatility induced by supply/demand conditions can be developed without the

need for direct ad hoc government intervention in the market. At the level of the exchange, margins can be raised, position limits can be tightened, and surveillance for suspicious trading patterns can be stepped up. Wider structural or infrastructural challenges may also be addressed. For example, the South African investigation concluded that some of the volatility in 2001–2003 arose as a result of market participants' uncertainty, due to a "lack of proper market information" about the situation in the physical markets.

11.4 Impacts

11.4.1 Summary of impacts

A broad range of development impacts – on farmers as well as other entities – emerge from the assessment of the five featured exchanges. Impact hypotheses were categorized according to six broad functions. Three of these can be considered as core functions: price discovery, price-risk management and a venue for investment. The other three can be considered as wider functions, arising from the performance of the core functions: facilitation of cash commodity markets, facilitation of commodity finance, and broader industry development (including capacity-building, market internationalization and use of ICT). In total, 81 impact hypotheses were examined in the study: 37 that are specifically or mainly for the farmer, and a further 44 pertaining to the wider commodity sector or the overall economy. Five hypotheses yield potentially negative impacts (see annex 3).

Table 11. Summary of impacts identified in the study

	Farmer impacts identified	Other impacts identified	*Total impacts identified*	Impacts that feature in only one country
Price discovery	8	5	*13*	4
Price risk management	4	4	*8*	0
Venue for investment: Positive impacts	1	6	*7*	1
Venue for investment: Negative impacts	1	2	*3*	0
Facilitation of physical trade	4	9	*13*	4
Facilitation of financing	4	3	*7*	3
Market development	9	9	*18*	5
Total Positive	***30***	***36***	*66*	***17***
Total Negative	***1***	***2***	*3*	***0***

The study found evidence to support 66 out of 76 positive impact hypotheses as occurring in one or more of the featured markets (see annex 4). Thirty of these were farmer-related, and 36 related to the wider sector or economy. Moreover, impacts were generated across all six broad functions. Only two positive impact hypotheses were opposed on the basis of experience in the featured markets to date – no evidence was found in the featured markets that exchanges have enabled hedging against inflation or that quality improvements generated by the exchange have reduced dependence on imports if the local crop better meets requirements. For a further 10 positive impact hypotheses, insufficient evidence was found, either in support or in opposition. Further research remains necessary in these areas. Of the 66 positive impact hypotheses for which evidence was found in support, 38 were based on non-quantitative data – stemming from testimony or secondary literature. Some of these impacts are non-quantifiable in nature. Others require further work on designing an appropriate means of measurement and collection. Also, of the 66 positive impact hypotheses for which evidence was found in support, 17 occurred in only one of the featured markets. This suggests potentially important sources of learning for the other featured markets, as well as for commodity exchanges in geographies not covered by the study.

The study found evidence to support three out of the five negative impact hypotheses in one or more of the featured markets. One of these was farmer-related, and two related to the wider sector or economy. For a further two negative impact hypotheses, insufficient evidence was found, either in support or in opposition. Further research remains necessary in these areas. Of the three negative impact hypotheses for which there is evidence in support, all were based on non-quantitative data stemming from testimony or secondary literature. Given the sensitivity and importance of these

impacts, related to occasions of excessive speculation, it is imperative that more work be done in these areas. It is also crucial that the conclusions drawn here are not misinterpreted. In each of the situations where negative impacts were identified, these impacts were neither uniform nor universal. Therefore, it would be false to conclude that commodity exchanges cause excessive speculation. In some cases, for example mentha oil in India, speculation that existed for a long time in physical markets has ebbed into the futures market. However, the futures market offers a much more highly regulated environment with greater investor protection. Thus, the conclusions to be drawn ought to be appropriately nuanced.

All five exchanges generate impacts in the core functions of price discovery, price-risk management, and as a venue for investment. Each exchange offers liquid markets, a central counterparty that all but eliminates counterparty risk, market data that are freely and transparently disseminated, and futures markets that are well correlated with spot markets to enable effective price-risk management. Moreover, Bursa Malaysia has established itself as a benchmark exchange for the world palm oil industry, the only situation in which pricing power has been brought to the developing world for a globally traded commodity.

There is variation in the extent to which these impacts are distributed. Only in India is there an expectation that small-scale farmers directly engage in futures markets for price-risk management solutions. However, while significant efforts have been made to this end, direct farmer participation remains limited. This may be due to a number of regulatory and structural bottlenecks: the prohibition on options and index trading; the restrictions on participation in the market by banks; further requirements for education, awareness-raising and capacity-building among small-scale farmers; and physical markets that still largely remain fragmented and infrastructure-deficient. In China, the other featured market characterized by a predominance of smallholder production patterns, other supply chain participants – purchasers, traders, distributors and exporters – hedge their exposure to price risk in the market and are encouraged to pass on the benefit to small-scale farmers. In Brazil, Malaysia and South Africa, price-risk management instruments are used by many commercial farmers and plantations, but not by smallholders. Part of the reason is that small-scale farmers often operate within government-backed support programmes which already mitigate some of the major risks they would otherwise typically face. Another reason is that commercialization of small-scale farmers is seen in these countries as a precondition to direct participation in markets.

On the other hand, small-scale farmers in each of the featured markets do benefit from the dissemination of market data. Each exchange cooperates with its members and with the media to disseminate information through a range of channels, including to small-scale farmers. The increasing use of SMS messages sent for free directly to farmers' mobile phones is an important trend in this respect. Activities at two exchanges are worth noting in particular. In China, price dissemination has been the focus of efforts to help small-scale farmers benefit from futures markets. A major educational campaign run by the DCE, and with support from Government at all levels, encourages farmers to use futures market information to determine cropping patterns for the next season. The futures market has also helped farmers to negotiate better prices from intermediaries. In India, MCX and the other national multi-commodity exchanges have invested substantially in disseminating market information through electronic price display screens in "mandis" and at other highly visible locations. Moreover, MCX's partnership with India Post to disseminate market information to rural villages is a ground-breaking initiative. Information is now reaching small-scale farmers in remote areas that sometimes lack even basic transportation and telecommunications infrastructure. In India, as in China, farmers are receiving better prices from intermediaries, and are becoming increasingly aware of futures market information to determine cropping patterns for the following season.

Even greater variation among exchange performance is discerned in the three wider functions: facilitation of the physical commodity trade, facilitation of financing, and market development. Bursa Malaysia is perhaps the exchange most focused on its core functions, the result of well-developed and well-regulated cash markets that have left limited scope for it to deliver impacts in the wider functions.

Conversely, BM&F and MCX have perhaps had both the widest scope and the greatest incentive to deliver impacts in the wider functions. Operating in a context of fragmented cash markets, which it has

sought to integrate through its Brazilian Commodity Exchange subsidiary, BM&F has developed a range of innovative and relevant solutions to catalyse performance in the sector: offering a range of cleared and settled cash, forwards and options instruments, and registration for OTC contracts; working alongside other dynamic entities in providing registration services and secondary markets for a range of financing instruments; building links and facilitating trade with key export markets; and very importantly, providing a transparent and efficient mechanism for the execution of government policy in support of agriculture in general and the smallholder sector in particular. MCX was founded in a situation where cash markets were fragmented and infrastructure-deficient. It has become a significant actor in catalysing development in the physical markets, improving the flow of credit to agriculture and stimulating market development, especially through the innovative application of ICT. Further potential impacts are expected, with the rollout of a national electronic spot exchange and subsequent legislation that fortifies warehouse-receipt financing in the country.

JSE/SAFEX and the DCE lie somewhere in between. The agricultural markets of JSE/SAFEX were launched during the period of sudden deregulation of the grain market in the country. These markets already had well-developed physical infrastructure. Acting in concert with industry representatives, JSE/SAFEX has become a central institution in developing a widely accepted delivery system. This system – and particularly the transferable silo receipt – has seamlessly integrated the commodity and financial sectors to enable the smooth flow of credit to market participants. The DCE has played a role in developing infrastructure relating to the exchange delivery system. This includes upgrading warehousing facilities, developing quality standards that adequately reflect and promote government GMO policy for soybeans, and providing extensive market education.

The facilitation of commodity finance is perhaps the area where there is greatest scope for exchanges to learn from each other's experiences. Facilitation of effective financing mechanisms for farmers has been one of the most important impacts generated by JSE/SAFEX and BM&F. However the mechanisms employed – silo receipt-based financing in South Africa, and the registration and trading of agricultural securities in Brazil – have been entirely different. In India, where significant progress has already been made in this area, evidence suggests that there remains huge untapped potential, subject to the removal of legal–regulatory obstacles. Legal constraints have impeded the development of commodity financing in China, too. There has been some loosening of these constraints in 2007, but China remains far behind India in this respect. In Malaysia, facilitation of financing has not arisen as a consequence of exchange activities. However, the Government's emphasis on commercialization of the smallholder sector may provide a need that the exchange could address in the future.

Looking at potentially negative impacts that may arise from market operations, insufficient evidence was found to suggest whether exchanges contribute to price inflation and volatility in the physical markets. India, with the recently introduced national multi-commodity exchanges, has perhaps been the best testing ground for both hypotheses. There has been a trend of rising prices for both cardamom and mentha since the introduction of MCX futures contracts for these commodities. However, it is unclear to what extent this has been the result of shifting fundamentals, the result of changes to the market structure that have arisen from improved price transparency for producers, or a consequence of "speculative excess". Although the Government took the pre-emptive step of suspending trading in four contracts, dedicated empirical research on this subject is required. Without such research – for which there has not been sufficient scope within this study – it would be inappropriate to draw conclusions. However, a government investigating committee is expected to report authoritatively on the subject in late 2007.

Perhaps a precedent may be found in the experience of South African grain markets between 2001 and 2003. White maize experienced a price spike that saw the cash rate triple, before later returning to its original level. A government investigating committee into the operation of the futures market during this period found that the price rise was largely justified by fundamentals, citing a "unique combination of five factors" (FPMC, 2003). Concerning reports of alleged irregularities in the futures market during the period, it is important to note three aspects of the subsequent response: first, the exchange's surveillance programmes were able to detect unusual market patterns; second, steps were taken by the exchange to upgrade the market mechanism in order to prevent a repeat of the situation –

in this case, through the introduction of position limits for each market participant (steps about which the investigating committee expressed satisfaction in its report); and third, the Government waited for the investigating committee to report before deciding on what to do – in this case, to take no action. Subsequently, prices returned to their previous level by 2003, and in 2004–2005, the reverse phenomenon occurred – a severe dip in prices.

The impact of futures markets on spot price volatility is another contentious phenomenon that can best be appraised in India – only in India has a futures market been recently introduced into a situation of freely functioning markets. Although the markets are young and final conclusions should not yet be drawn, preliminary observation at this early stage suggests an uneven impact, which has seen spot price volatility reduce for some commodities and increase for others. Reasons for this uneven response may include the inadequacy of spot price data collection prior to the introduction of futures exchanges; different constraints and bottlenecks that exist in the physical markets of each commodity; and differences in the market structure of each commodity.

Data gaps preclude the collection of adequate information to report on the level of farmer or investor default or indebtedness as a result of participation in futures markets. Data on client defaults typically resides at the broker rather than the exchange level. Testimony and secondary literature from India and South Africa suggest that this may be a concern for some market participants, but the extent is unclear. However, each futures market has a range of regulatory features designed to limit the possibility of default: minimum capital requirements for users to participate in the markets; daily margining so that maximum daily loss can be covered by funds deposited; limits on the maximum amount of open positions held in the market; and maximum limits on the daily price movement.

Even so, two questions remain open: (i) whether these regulatory checks are sufficiently stringent to protect a small-scale or cash-poor participant (options – where the maximum cost of holding a position is known upfront – may be a more appropriate instrument than futures to protect market participants in this respect), and (ii) even without default, a market participant may be diverting funds into futures market participation that would otherwise be needed for important household expenses. Without a micro-level study of market participants, it would be difficult to test this hypothesis.

11.4.2 Distributional effects, and in particular the impacts on small-scale farmers

The impact assessment analysis has distinguished between commodity exchanges' impacts on farmers and their impacts on the wider commodity sector or the overall economy. Where applicable, it has also appraised the impact on commercial farming sectors compared with the impact on smallholders.

Small-scale farmers typically face proportionally the steepest transaction costs if they look to participate in markets. This is driven by factors including poor infrastructure for transportation, storage and communications, a lack of access to information and expertise, and limited access to financing rooted in a lack of collateral. It is this predicament that often confines such producers to subsistence livelihoods. Conversely, commercial farmers typically have much larger-scale and better infrastructure and connectivity to markets, and market information. Their operations are more sophisticated, with an equally sophisticated understanding of the risks and challenges posed by the agricultural market.

Firstly, the study has noted the structural differences between the agricultural sectors of China and India, which are characterized by a predominance of smallholders, and those of Brazil, Malaysia and South Africa, which are characterized by a duality between the commercial and the smallholder sectors. Different imperatives arise for each exchange, as a result of this fundamental difference in market structure.

Secondly, for commercial farmers and plantations, experience in Brazil, Malaysia and South Africa demonstrates that the commodity exchange and price-risk management tools do provide an important mechanism for hedging exposure to price risk. Other proven impacts include the use of market information to enhance marketing and business decision-making, the facilitation of greater access to finance, and the stimulation of international trade.

Thirdly, the study has noted that the national multi-commodity exchanges in India appear to be the most attuned to the needs of small-scale farmers; these exchanges have made the most extensive efforts towards making their services relevant to them. Although the direct participation of small-scale farmers in futures markets remains limited, there have been impacts for small-scale cardamom planters and mentha farmers arising from MCX's facilitation of physical market development and dissemination of market information. Dissemination of market information is also the key impact for small-scale farmers in China. The DCE has been proactive in helping farmers to better use futures market information to enhance their production and marketing decisions. In both China and India, education has been important, increasing awareness by small-scale farmers of the market-based system for agriculture and enhancing their capacity to function within it. There are also indications that small-scale farmers' indirect use of hedging tools is a feasible and successful model, whether through farmer cooperatives (as in India), as a result of hedging strategies by purchasers (as in China) or through banks and trading houses (as in South Africa).

Box 31. Relevance of the commodity exchange to smallholders: summary of the countries featured

- **Brazil:** Government schemes support many smallholders. BM&F has an indirect impact on smallholders by providing market mechanisms to support the Government's rural policy objectives – for example, running auctions to support government procurement, and providing a secondary market for CPR rural financing instruments. Potential for further relevance includes extension of its other innovative instruments – especially through the Brazilian Commodity Exchange – to smallholders.
- **China:** Direct participation by smallholders is neither encouraged nor expected. The DCE is using market information to help smallholders improve cropping and marketing decisions. Also, the DCE is encouraging downstream partners to pass on hedging benefits to smallholders.
- **India:** The GOI and the national multi-commodity exchanges encourage and expect direct participation by small-scale farmers in markets; current usage is low, but indirect impacts from information and from physical market enhancements are high; indirect participation by small-scale farmers via cooperatives has been documented (Berg, 2007). Obstacles to smallholder participation include the prohibition on options and the prohibition on participation by financial institutions in the market.
- **Malaysia:** No observed smallholder focus – its development impact has been elsewhere. In addition, government schemes support many smallholders. Smallholders themselves see organizing themselves better as a precondition before using the markets, and identify a future relevance for the commodity exchange after commercialization.
- **South Africa:** JSE/SAFEX supports smallholder capacity-building programmes in partnership with other agencies. Indirect usage of the exchange's market information has been encouraged.

Fourthly, the study has shown that with the innovative application of ICT, the potential now exists for long-standing infrastructure barriers to be overcome and small-scale producers to be better integrated into commodity markets. India is the most dynamic market in this respect, and specific examples highlighted in the report include:

- Online, electronic nationwide trading to integrate fragmented markets and improve price formation;
- Electronic price dissemination networks to reduce information asymmetries and empower farmers;

- Satellite-enabled exchange connectivity to overcome infrastructure deficiencies;
- Technology-enabled distribution partnerships to deliver exchange services to hard-to-reach commodity producers;
- Integrated collateral management – including electronic warehouse-receipt systems – to improve logistics efficiency and reduce handling costs;
- Interactive remote-learning programmes for capacity-building and human resources development.

Fifthly, the extension to smallholders of exchange-supported commodity financing arrangements, as works very successfully at present in Brazil and South Africa, offers further possibilities for enabling smallholders to benefit from futures markets. With an enhanced legal framework, improvements to infrastructure and connectivity, and the engagement of the commercial banking sector, India has significant further potential in this respect. Similar potential exists in China, although it starts from a much less advanced position than India. This is in large part explained by the almost complete prohibition on banks' engagement with commodity exchanges – the very first experimental steps in this area were only taking place in 2007.

Sixthly, although the direct impacts on small-scale farmers in Brazil, Malaysia and South Africa have been limited, two factors should be highlighted. Firstly, significant portions of the smallholder sector often function within a framework of government support – for example, the FELDA land development and resettlement scheme in Malaysia. In Brazil, China and India, Governments operate wide-scale minimum support prices for key commodities, as well as subsidized credit programmes (OECD, 2007). In this way, small-scale farmers may remain protected from some of the risks associated with freely operating markets. Secondly, commercialization programmes and stimuli for greater smallholder organization are important features of the policy mix in these countries, and also in China. In many of these schemes, the fundamentals of production and farm management are seen as a prerequisite to greater participation by farmers in the markets.

Following from this, one may conclude that the commodity exchanges' core hedging function is not yet widely relevant to small-scale farmers in most countries. However, as demonstrated by the experiences of China and India, as well as the emerging farmer education programmes conducted in South Africa, the advantageous use of market information disseminated by commodity exchanges is an important component of even the most basic smallholder commercialization scheme. The same can be said for education about appropriate exchange quality specifications. Other wider functions – development of cash markets and facilitation of financing – have also been shown to benefit small-scale farmers.

11.4.3 Summary of exchange impact performance

11.4.3.1 Price discovery

Price dissemination: All five exchanges featured in the study place a strong emphasis on the dissemination of market information, the most important of which is distributed without charge. Information is channelled directly from exchange to recipient, and also indirectly via information aggregators/distributors, through a range of media: newspapers, television, radio, internet, and increasingly, mobile phones. Mobile phones specifically are becoming an important direct means of connecting farmers with futures information – for example, in China, 410,000 SMS messages were sent out by the DCE in 2006. In India, electronic price screens have been set up by MCX and the other national multi-commodity exchanges in key farmers' markets and at other points of high visibility in the country. MCX has been particularly innovative in overcoming barriers of infrastructure and geography to distribute market information via a joint venture with India Post, the country's national postal service. In Brazil, BM&F – the only featured exchange still to offer trading by open outcry – hosts a range of facilities and services that enable on-site correspondents from a range of television channels to send live broadcasts from the exchange's trading floor. Currently, information is provided free of charge by all exchanges. However, a potential threat is that exchanges may impose fees for

market information – a model widely used by exchanges that offer trade in other asset classes such as equities and financial futures. This approach has also been adopted fairly widely by the large United States commodity exchanges. The exchanges that are under the most pressure to move to a pricing model for data-vending services are the for-profit exchanges, and the exchanges that also trade other asset classes in which data vending has already been successfully established.

Using market information: The DCE provides evidence that futures market information has empowered farmers to make better selling and cropping decisions. Selling decisions have been made on the basis of spot and futures projections. Cropping decisions have been made on the basis of comparisons between the relative futures prices of corn and soybean at the time of the next harvest. Chinese farmers in the north-east of the country can switch between these two crops, and evidence suggests that the production of corn has increased as its futures price has become relatively more attractive. Industry representatives in South Africa indicate a similar occurrence. In India too, mentha oil farmers in particular are using market information to improve decision-making; crop production has increased in anticipation of significant price rises. In Brazil, there is secondary evidence to suggest that the systematic use of futures market price information by farmers has enabled them to make better production and marketing decisions, including crop diversification based on a comparison of relative prices. In Malaysia, market information was already disseminated and used prior to the launch of the palm oil futures contract.

Reducing information asymmetries: India provides strong evidential support of reduced margins to intermediaries arising from the introduction of the cardamom and mentha oil futures contracts. Within two years of the contract launch, the supply chains have already shrunk for both commodities, and the farmer is able to secure increased returns. In China, the effect has reportedly been similar, with the DCE supporting this claim by case study. In South Africa, industry sources – including farmer representatives – suggest that intermediaries are playing a value-added rather than exploitative role, through the provision of services including flexible contracting, input supply, logistics, storage and financing. In Malaysia, MPOB-disseminated spot prices were widely disseminated prior to the introduction of palm oil futures, and remain the current reference source for smallholders in transactions with mills and intermediaries. However at the international level, palm oil trade was previously centred in the non-transparent Rotterdam OTC market, which often generated disadvantageous pricing for Malaysia's palm oil industry. By establishing a local price-discovery platform, Malaysia has become a price maker rather than a price taker for palm oil, reducing information asymmetries at the international level. In Brazil, no conclusion has been reached.

Spot price volatility: Among the markets featured, India provides the most effective case study. A comparison can be drawn on how commodity prices that are determined through a free and open market act, both before and after the introduction of an exchange-traded futures contract. The data suggest that the introduction of futures contracts has had an uneven effect on spot price volatility. On the one hand, both cardamom and mentha oil have experienced increased spot price volatility since the introduction of futures; in the case of mentha, the increase has been substantial. On the other hand, spot price volatility for other commodities, including wheat, refined soy oil and chickpea, has reduced. Reasons for this uneven response may include the inadequacy of spot price data collection prior to the introduction of futures exchanges, different constraints and bottlenecks that exist in the physical markets of each commodity, and differences in the market structure of each commodity. In Brazil, China and South Africa, government pricing controls existed prior to the introduction of the futures markets. Moreover, pricing for these commodities is generally driven by world rather than local market conditions, meaning that volatility is generally not a function of domestic structural factors, such as the introduction of a commodity exchange.

Efficiency of price formation: First of all, it is noted that each of the featured futures markets is highly liquid and incorporates a range of market participants from across its respective supply chains. Within the scope of this study, the possibility of examining the impact of exchange-traded futures markets on the efficiency of price formation and resource allocation has been limited – detailed econometric analysis is required and recommended. For Malaysia in particular, though, Bursa Malaysia's FCPO contract – easily accessible to the largest producer market – ensures that pricing

reflects the supply/demand fundamentals of the Malaysian palm oil industry. Moreover, by freely allowing overseas participation, the global demand from refiners and users of palm oil and its by-products is also reflected in the exchange-generated price. DCE has established the world's most liquid non-GMO soybean contract – an important reference for Chinese domestic producers who grow a non-GMO crop. MCX mentha and cardamom are new contracts which have the potential to become world benchmarks. However, barriers to overseas participation and controls on capital and currency flows restrict this potential at present. JSE/SAFEX grain prices have become a regional – although not a world – benchmark, used as a reference for the southern African grain industry. It is also noted here that JSE/SAFEX prices provide transparency on the conditions when imports and exports would be cost-effective in the context of South Africa's open grain markets.

11.4.3.2 Price-risk management

First of all, it is important to note that each of the featured exchanges is characterized by four critical prerequisites for effective price-risk management:

- Liquid markets;
- A regulated, rule-based trading environment;
- Transparent dissemination of market information;
- Clearing houses that act as central counterparties to guarantee the performance of every contract agreed through the exchange.

Secondly, the markets in Brazil, China, Malaysia, and South Africa appear to be established venues for price-risk management. Commercial entities are using these markets to hedge their exposure to price risk. Futures markets also enable commercial producers and plantations to offer forward pricing to customers, enhancing the marketing arrangements in the sector. The increased certainty allows market participants to better manage, budget and plan investments in their businesses. This includes commercial grain farmers in South Africa, ranchers in Brazil, SOEs in China and palm oil plantations in Malaysia. Notably, it also includes the indirect usage of JSE/SAFEX's grain futures markets by the Government of Malawi.

In India, the markets are at a nascent stage. There is evidence that hedgers are participating in the market. However, based on the information supplied, the extent of hedger participation and the consequent impacts remain unknown. At the same time, there are a number of regulatory restrictions which appear to limit hedger participation – the prohibition on options trading and bank participation seem likely to restrict the participation of small-scale farmers, and a bureaucratic system of hedger exemptions on tight position limits has been cited by several corporate commodity purchasers as bottlenecks that hinder their participation.

On the subject of the appropriateness of price-risk management instruments for small-scale farmers, a divergence in viewpoints can be seen across exchanges and markets. Some – BM&F, Bursa Malaysia and JSE/SAFEX in particular – see small-scale farmers as unsuitable for direct participation in futures markets. However, commercialization and cooperatization programmes in Malaysia and South Africa aim to better integrate small-scale farmers into markets, including increased access to price-risk management instruments. By contrast, both the Indian Government and the country's national multi-commodity exchanges are determined to make their services relevant to small-scale farmers, including through direct farmer participation in futures markets. However, direct participation by small-scale farmers appears to remain at a low level at present. In China – the other country characterized by a predominance of smallholder production – there has been a focus on helping farmers to benefit indirectly from price-risk management. DCE has encouraged purchasers to offer fixed forward prices to farmers, and in turn, to hedge their exposure to the ensuing price risk on the futures market.

This study suggests two conclusions about direct participation by small-scale farmers in futures markets. On the one hand, minimal direct usage by small-scale farmers at present and the viability of

indirect access to risk management instruments via purchasers (China), cooperatives (India) and trading intermediaries or financial institutions (South Africa), suggest that the indirect model may be more sustainable. On the other hand, as farmers become more sophisticated, they can also expect to become more directly engaged. Moreover, the distributional impacts of the indirect access models described are unclear – do these models typically benefit the larger and more prosperous farmers, or are they also viable solutions for smaller-scale cash-poor producers?

A key challenge may be to develop delivery models that can broaden access for the poor to price-risk management solutions in the same way that microfinance has broadened poor people's access to finance. Circumstantial evidence presented in this study suggests that:

- Intermediaries can act as a viable aggregator of small-scale producers' requirements;
- Finance and risk management services can be integrated into a bundled package;
- Facilitating access by the poor to service providers is a critical requirement for them to use financial services.

Therefore, there may be potential for microfinance organizations – with large existing rural networks and a track record of tailoring financial services solutions to the poor – to act as vehicles for channelling price-risk management solutions to the poor, perhaps through micro-options solutions.

Other innovative services or instruments at the BM&F – the Agricultural Market Trading Fund and the web trading facility – may also be potentially relevant for increasing farmer participation in markets. However, these initiatives are focused on other market segments at present.

One potential constraint is the prohibition on or limited usage of options in most of the featured markets. Out of the featured exchanges, only JSE/SAFEX operates a liquid options market, although there is some options trade in BM&F, with growth in volumes in recent times. The World Bank-led ITF–CRM programme has focused on options as the best risk-management tool for farmers. And yet, in China and India – countries in which agriculture is characterized by a predominance of smallholder production – options are currently prohibited by law. There appears to be progress on the regulatory front in both countries, however. It is believed that options trading in China may soon be imminent. There has also been strong pressure on regulators in India to remove the prohibition on options. For example, the Government of India's Working Group on Risk Management in Agriculture, in its paper for the Eleventh Five-Year Plan (2007b: vii) argued that "the Government should permit options trading. Hedging through options is considered to be more convenient to farmers, as compared to futures."

Finally, the experience of the DCE and JSE/SAFEX demonstrates the advantage of a local platform for price-risk management. In both cases, there are divergences between price formation in the domestic market, and price formation on the international exchange which generates the price reference for the world market. Prices generated on the local platform better reflect the conditions of the domestic market, providing a lower basis risk and thus a better hedging platform. Furthermore, a local platform allows for efficient delivery of the physical product. This can keep spot and futures prices closely aligned, and enable market participants to fully benefit from the functionality of a physically delivered futures contract. A local platform can also overcome some of the obstacles faced in particular by smaller entities when accessing international markets: basis risk, foreign currency risk, know-your-customer rules, large contract sizes and cashflow management challenges.

11.4.3.3 Venue for investment

First of all, it is important to note that the same four characteristics that are present in each featured exchange and that enable effective price-risk management, also provide an attractive and secure venue for investment:

- Liquid markets;

- A regulated, rules-based trading environment;
- Transparent dissemination of market information;
- Clearing houses that act as central counterparties to guarantee the performance of every contract agreed through the exchange.

For those markets where the market composition is visible – BM&F, DCE, and Bursa Malaysia – the data suggest that there is a strong speculative presence, but one that is well balanced with hedgers. However, it is important to bear in mind that no easy classification can be made between hedgers and speculators. This is true even in countries with a highly advanced market-reporting system, such as the United States. Many types of market participant perform both hedging and speculation activities, and participations are therefore not easy to categorize.

BM&F and JSE/SAFEX provide non-quantified evidence that investors are using commodities in developing countries to diversify their investment portfolios – the former through the financing of rural securities issued by coffee producers, and the latter through greater involvement in agro-markets when equity market performance has been limited. However, no significant insight has been yielded about whether any of the commodity exchanges are being used by investors to hedge against inflation. Indeed, the portfolio of commodities traded by four of the exchanges in this study is perhaps too narrow to enable such a strategy – although perhaps their contracts might be incorporated within an international commodity index to achieve this effect. However, MCX and the other national multi-commodity exchanges in India do allow potential for such a strategy, owing to the breadth of the commodities traded. However, trading on indices – the most appropriate method for hedging against inflation – is currently prohibited in India. There is perhaps a double irony here: first, despite being cited by Government as a cause of inflation, the national multi-commodity exchanges potentially offer a solution for mitigating the impacts of inflation; and second, despite the Indian Government's concern to relieve inflationary pressures, the possibility of hedging against inflation is foreclosed in these markets by the current regulatory structure.

Looking at the potential negative impacts of commodity futures trading on price levels and inflation, this issue has been most contested in India, where trading on four commodities was suspended in early 2007. Without an in-depth analysis – for which there is not sufficient scope in this study – it would be inappropriate to draw conclusions. However, a government committee is expected to report on this issue in late 2007. A similar issue arose in South Africa 2001–2003, in which a government investigation cited fundamentals and some structural factors as the principle cause of price rises in JSE/SAFEX markets. While there were reports of alleged irregularities, in the eyes of the investigating committee these were satisfactorily addressed by actions taken by the exchange. Palm oil in Malaysia has also exhibited sharply rising trends over the last two years, although this is widely considered to have been triggered by the Government's biofuel strategy, which caused a surge in liquidity, and increased volatility and rising price levels on the exchange. In this way, the exchange was recognized as being merely the messenger, rather than the cause.

Data gaps preclude the collection of adequate information to report on the level of farmer or investor default and indebtedness as a result of participation in futures markets. Data on client defaults typically resides at the broker rather than the exchange level. Testimony and secondary literature from India and South Africa suggest that this may be a concern for some market participants, but the extent is unclear. In Brazil, China and Malaysia, there has been insufficient information to draw any conclusion. However, it has been noted that the regulatory environment of the exchanges featured in this study contain a number of mechanisms to control the level of speculation in the markets, limit the possibility of default and promote responsible investment practice.

11.4.3.4 Facilitation of physical commodity trade

The Malaysian palm oil market followed what might be termed the orthodox approach to futures market development, with the futures market established on the back of a well-functioning physical market.

The other exchanges, to varying extents, have broken with this orthodoxy. China introduced commodity exchanges during its economic transition, and in the case of corn, prior to the opening and liberalization of the market. This provided the exchange with the scope to play a role in integrating national markets. It has also made some improvements to warehousing infrastructure and quality performance in the underlying market. South Africa made the transition to a deregulated market with a strong storage, logistics and grading infrastructure already in place for the commercial farming sector. The exchange has developed a world-class delivery mechanism, which is widely accepted by the market. However, it has faced the dual challenge of getting a freely functioning spot market right and extending similar levels of market infrastructure to the emerging farmer sector.

Brazil and India are arguably the two countries whose exchanges have made the greatest impact. BM&F's Brazilian Commodity Exchange initiative has integrated previously fragmented physical markets, and provided a mechanism for the efficient trading of a range of instruments, including spot, forwards, options and rural securities. It has also provided market mechanisms to support the conduct of government agricultural policy. MCX has made a far-reaching and fundamental improvement in the warehousing infrastructure and quality-grading processes in the sector. This has not only extended farmers' access to storage and provided greater quality assurance for purchasers, but has also facilitated a link with financiers to dramatically improve the flow of finance to the commodity sectors. In the future, MCX is also likely to play a major role in integrating India's fragmented agricultural markets, subject to the launch of its national electronic spot exchange initiative.

11.4.3.5 Facilitation of financing to the agricultural sector

In Brazil and South Africa, successful models for integrating commodity exchanges and commodity finance have been developed. In both countries, models appropriate for local market conditions facilitate provision of significant volumes of credit to commodity producers. The delivery mechanism of JSE/SAFEX was explicitly developed to integrate the commodity and the finance sectors in the mid-1990s after the markets were deregulated. The large banks played a role in designing the JSE/SAFEX silo receipt system, in collaboration with the exchange, with collateral managers, silo operators and other interested parties. By contrast, development of the Brazilian financing system was led by the Banco do Brasil in 1994, which launched the CPR rural financing instrument. Over time, BM&F has established mechanisms to enhance the functionality and liquidity of CPRs through exchange trading mechanisms, particularly through its Brazilian Commodity Exchange subsidiary.

With enhancements to the legal framework, improvements to infrastructure and connectivity, and the engagement of the commercial banking sector, India has significant potential in developing commodity financing based on warehouse receipts – a potential that is only just starting to be realized. Similar potential exists in China, although it starts from a much less advanced position – the very first experimental steps in this area were only taking place in 2007. In Malaysia, indications from exchange personnel and market participants to date suggest no substantive connection between the exchange and financing mechanisms.

11.4.3.6 Market development

Education and capacity-building: It is important to note that the exchanges featured in the study place a high value on the education and training of market participants. In particular, the educational programmes run by BM&F, DCE, MCX and JSE/SAFEX explicitly target farmers. For example, the DCE's "1,000 villages, 10,000 farmers" programme seeks to extend benefits from the futures market to farmers that are not otherwise encouraged to participate directly in the markets. Instead, the emphasis is on familiarization with futures market information, primarily as a means to guide decisions about planting the next season's harvest and decisions about when the optimum time is to sell in the physical markets. In South Africa, JSE/SAFEX provides support to education and capacity-building programmes led by other agencies. These include smallholder commercialization programmes, in which indirect use of the exchange's market information is encouraged.

International trade facilitation: This is an area of high impact in two of the exchanges featured: Brazil and Malaysia. BM&F has played a leading role in building trade links between Brazil and China, particularly for the soybean industry. It is also active in export promotion and regional integration activities. The provision by Bursa Malaysia of a transparent and accessible global price-discovery mechanism and risk-management platform has facilitated the development of the Malaysian palm oil industry and the growth of important export markets. JSE/SAFEX's role has been less pronounced, although it provides the price reference for the southern African grain trade. For India and China, however, restrictions on the international dimensions of their markets have curtailed the impacts made in this area to date. That said, the cardamom and mentha oil surveys suggest that MCX futures trade has played a role in facilitating expansion in the exports of these two commodities.

Information and communications technology (ICT): Impact in this area has been seen most clearly in India. This has partly been a function of the national multi-commodity exchanges proactively targeting smaller and more remote farming communities. It has also been a function of the imperative to overcome infrastructure deficiencies that would otherwise impede market growth. It may also be important that the parent company of MCX is a dedicated financial technology solutions provider, which has been able to leverage synergies between its ICT and exchange businesses.

Industry growth: The impacts in this area have been multifaceted. BM&F and MCX have been prolific in developing new products and services. Each exchange has sought to expand trading facilities throughout its respective geographies. BM&F is currently looking to increase its regional presence through the launch of mobile regionally based brokers. JSE/SAFEX has facilitated access to financial institutions through the integration of the commodity sector with the financial sector via its delivery mechanism. MCX has driven significant employment generation through the launch of its cardamom and mentha oil contracts.

New product and service development: BM&F's Carbon Facility uses exchange mechanisms to facilitate use of the Kyoto Protocol's Clean Development Mechanism. Subject to regulatory permission, DCE and MCX seek to introduce weather derivatives to enable producers to manage exposure to production risk. It is also noted that other instruments exist in international markets that may be applied in developing countries, such as freight derivatives for managing transportation risks.

11.4.4 Summary of innovative practice

During the study, a number of innovative practices have come to light, which are summarized in table 12. An overview of each can be found in the appropriate section of the report.

Table 12: Summary of innovative practice

	Brazil	China	India	Malaysia	South Africa
Price discovery	• ..	• ..	• Distribution agreement with India Post • Supply chain transformations	• Establishing a global price discovery platform	• Import / export parity pricing
Price risk management	• ..	• "Company + farm, futures + order" programme	• Cooperative aggregator model	• Long-term forward pricing models	• Options market • Sophisticated farmer hedging strategies • Government hedging
Venue for investment	• Agricultural Market Trrading Fund (FOMA) • WebTrading system	• ..	• ..	• ..	• ..
Facilitation of physical trade	• Brazilian Commodities Exchange, including market-based government procurement	• GMO and non-GMO soybean contract adaptation	• Infrastructure develop-ment • National electronic spot exchange	• ..	• Delivery mechanism and silo receipts
Facilitation of finance	• Cédula de Produto Rural (CPR)	• ..	• Expansion of warehouse receipt-based financing	• ..	• Financing / hedging integration
Market develop-ment	• Exporter Call Centre • Links with China • *Planned: Derivatives Distribution Agent*	• "1,000 villages, 10,000 farmers" programme	• ICT deployment • Industry development	• ..	• ..

12. Development implications

Message 1: Conditions for commodity exchange success

Commodity exchanges do not always succeed. Even within successful commodity exchanges, contracts for specific commodities do not always succeed. Understanding the conditions in which exchanges can successfully contribute to the realization of development gains is an important step for stakeholders considering whether to establish a commodity exchange.

Two papers provide relevant insight into this question. UNCTAD (1997) describes the key elements that determine the likelihood of success for a commodity exchange initiative. In particular, this paper analyses the key strategic choices faced by stakeholders when establishing a commodity exchange, appraising what kind of exchange structure, user focus, instruments and contracts are appropriate under different market conditions.

In the area of commodity futures exchanges specifically, Shim (2006) provides a thorough recent investigation of the conditions necessary for success, with reference to seven exchanges across the developing world. Five of these have more or less established good levels of liquidity; two have not. The conclusions are worth quoting at some length:

> Macroeconomic stability and government regulations that are favourable to futures trading were almost prerequisites for successful local futures exchanges. Meeting these preconditions, a contract that is significantly different from existing ones or with a large basis risk backed by a large physical market was an essential element for a new exchange to attract a viable level of liquidity. Even with all these set and subset of conditions (sic), a market could fail if well-developed financial intermediaries were not present. Financial intermediaries are the distribution channels of futures markets, and when these channels are blocked, the market extension was hard to accomplish (Shim, 2006: 46).

This study reinforces some of those conclusions, and adds further insights about foundations for success. First of all, it is necessary to establish that a high volume of transactions – "liquidity" – is the key indicator of success. Without liquidity, the market price level can be moved relatively easily with a single transaction, thus leaving it exposed to potential manipulation. Also, without liquidity, market participants may not easily enter or exit from positions in the market, due to a lack of available counterparties. In such conditions, participants may have to accept unfavourable prices in order to transact in the market. Finally, liquidity is a prerequisite for effective hedging, and thus for the participation of commodity sector participants. Without liquidity, the futures price for a commodity will not correlate with the underlying cash markets. In these circumstances, hedging would become a futile and perhaps expensive waste of resources.

The study confirms that regulation has been a key condition for success. The initial years of exchange development in China in the early 1990s provide the clearest manifestation of the dangers arising from the lack of a central, stabilizing regulatory framework. Although Chinese exchanges developed liquidity within this regulatory vacuum, it was a liquidity that was neither orderly nor sustainable. The markets were characterized by fragility and instability, widespread improprieties, severe losses for market participants, and wild proliferation of exchanges and contracts that impeded proper price discovery and risk management. In the other countries featured, and in China after the government-led market rectifications, a coherent regulatory framework has underpinned exchange development and liquidity growth. This framework has been characterized in each country by dividing responsibility between the exchange as a self-regulatory organization, and an agency accountable to Government as an external regulator.

However, the report also highlights some areas where regulation has hindered market development. In both China and India, prohibitions on certain kinds of instrument – in particular, options – and on the participation of certain categories of market participant – in particular, banks – have restricted the utility of commodity exchange services, in particular for small-scale farmers. A comparison may be made with South Africa, where a relatively high proportion of farmers – albeit farmers who are

typically more commercialized than the average Chinese or Indian farmer – have participated in futures markets using options instruments. As has been described in section 5, options are typically more conducive to farmer participation than futures contracts are. Moreover, South African banks have often played a facilitative role in structuring risk management solutions for farmers, usually offered in conjunction with contracting agreements for purchase of the physical commodity and the provision of finance. This is not to say that such restrictions have been mistakes in China and India – there may be good reasons for Government to restrict the instruments traded and the type of entity that can participate in the markets, at least in the earliest stages of market development. However, as markets have developed and grown in these two countries, it has become clear that some of the benefits that a commodity exchange can offer have been precluded by maintaining these regulatory prohibitions.

To a large extent, the study also confirms Shim's view that exchanges require "a contract that is significantly different from existing ones or with a large basis risk backed by a large physical market". This has certainly been the case with Bursa Malaysia, which has only established good levels of liquidity for its FCPO contract – the first exchange-traded palm oil futures contract in the world – but not for other commodity contracts that they have attempted to develop. Indian futures contracts for cardamom and mentha oil are also the first of their kind in the world. In Brazil, China, and South Africa, there are large physical markets. In the commodities surveyed, there may also be basis risks that would arise if domestic users were to hedge on global reference exchanges. This would stem from a variety of factors: climatic conditions and different seasonal timings (South Africa), restrictions on international and domestic trade (China), and differences in quality specifications and the difficulty of delivery to overseas markets (Brazil).

However, in conflict with Shim's conclusions, Indian exchanges have developed liquid contracts for commodities traded elsewhere in the world, such as gold, crude oil and wheat. This achievement may be attributable jointly to the large domestic physical market and to significant speculative interest, and also to the provision of a local platform that is more convenient to use than a world reference exchange. For some globally traded commodities, Indian exchanges have licensed the specifications and settlement prices from the world reference exchange and offered the same contract denominated in local currency. This has made delivery feasible for domestic market participants, while avoiding foreign-exchange risk and currency controls. Arbitrage between Indian and world reference exchanges ensure that domestic and world prices are kept in alignment.

Research in the Shim study should be consulted concerning the importance of macroeconomic stability and the presence of financial intermediaries. However, this report sheds light on three other elements that have supported exchange growth in the markets featured: the participation of a wide range of entities acting in both hedging and speculative capacities, an educational emphasis in market development, and the condition of market infrastructure.

A wide range of entities to act in both hedging and speculative capacities has been an important component in each of the featured markets. Many of these countries can draw liquidity from large physical markets. This may come mainly from national participants, as in India and China, where restrictions currently prevent the participation of foreign entities. It may also come from foreign participants, as in Malaysia, where Bursa Malaysia's FCPO contract is recognized as the reference exchange for the world palm oil industry. Liquidity may be easier to build when supply chains incorporate a diverse set of industries and interests with exposure to the underlying commodity. This is the case with most of the commodities featured in this study. For example, the commodity chain for Brazilian cattle includes ranchers, slaughterers, meat processors and exporters, food manufacturers, and retail and restaurant chains, as well as leather and hide producers and purchasers. Finally, a range of speculative market participants – including trading companies, banks and investment funds – has been another ingredient of success in four of the countries featured. However in China, the prohibition on institutional investor participation has been compensated for by a large amount of speculative volume originating from individual "retail" investors.

An educational emphasis in market development, incorporating awareness-raising and capacity-building, has also been an integral element to liquidity-building in each of the countries featured. Where commodity exchanges and the services they offer are new and unfamiliar, market participants require education to overcome not just a lack of knowledge but also to facilitate the shift in mindset that is often necessary. Furthermore, education is key to ensuring that benefits arising from the exchange are equitable and inclusive, by building capacity for smaller and more resource-constrained entities to use the markets advantageously. Thus, farmers have often been specifically targeted by the exchange or its partners. This is especially the case in China and India, the two countries in which production is characterized by a predominance of smallholder farming. Education programmes may also be built into the small-scale farmer commercialization and cooperative development programmes that have become policy priorities in each of the markets featured.

Effective market infrastructure is an important component of futures market success. However, the study has shown that market infrastructure need not be well developed prior to the introduction of an exchange in order for it to be successful. The orthodox theory argues that futures markets evolve on the back of a well-developed physical market (Nair, 2004). The exchanges in Malaysia and South Africa were born into markets where infrastructure was already well developed. Particularly in the case of South Africa, there was already an expansive network of warehouses at the time of the exchange's creation, and at an early stage in its development, the exchange drove the creation of an integrated warehouse-receipt system that quickly earned the acceptance of warehouse operators, commodity-chain participants and financial services providers alike.

However, the study has also shown how commodity futures markets can be introduced in fragmented or infrastructure-deficient physical markets and help to integrate and upgrade them. In these circumstances, the exchange may be considered as an "island of excellence", extending the high levels of performance in its core trading functions to the physical commodity markets it serves. This has been the case in Brazil and India, where the futures exchange has been: driving the creation or enhancement of market infrastructure such as warehouses, introducing or enhancing quality standards, generating improved spot reference prices, and establishing delivery channels to reinforce cash market transactions. While these countries demonstrate that well-developed infrastructure is not a prerequisite for exchange success, it is nonetheless important to emphasize that market infrastructure must improve in parallel with market growth in order for the exchange to be sustainable – a commodity futures exchange must rapidly prove it has an effective delivery system which in turn ensures convergence between spot and futures prices.

Attention is also drawn to two other operational prerequisites in the trading environment that enable commodity futures markets to be effective and sustainable: market information that is disseminated transparently to avoid asymmetries which might privilege some interests over others, and a clearing house that acts as a central counterparty to guarantee the performance of every contract agreed through the exchange. Both are present in each of the featured exchanges.

In summary, developing-country Governments looking to establish a commodity futures exchange are advised to consider carefully whether their markets offer the potential for building sufficient liquidity before embarking upon its creation. If not, two alternatives can be pursued.

The first is to take a regional approach to exchange development. This can offer increased potential for generating liquidity sourced from across a number of different national commodity markets. However, while a regional approach may overcome the limitations imposed by small physical markets and a narrow range of potential market participants, it would not necessarily overcome the challenges posed by poor market infrastructure. It may also prove challenging to build a regionally applicable regulatory framework. This must not only be effective but also consistent and cohesive across participating national markets.

The second alternative is to develop commodity exchanges that initially offer trade in less sophisticated instruments than futures contracts, such as spot trading or even a service for registration only. Such institutions may then be in a position to develop more complex instruments – including futures – as local market circumstances allow. The conditions for success of an exchange offering spot

or forwards trade would be significantly less onerous than those for a commodity futures exchange. Liquidity would not be a paramount concern. Though higher volumes would be preferable, such an exchange could survive even on the basis of infrequent trading. The regulatory requirements would also be much less burdensome, as could be the requirement for intermediary presence.

Message 2: Versatility to work in a variety of local developing-country contexts

The study demonstrates how exchanges have been established under a range of conditions, each one playing an important role specific to its local market conditions. The conditions have varied significantly across the five countries. Two have undergone economic transition, two have experienced political transition, and one has experienced no transition at all; two are characterized by predominantly smallholder production, three by a duality between smallholder and commercial production; some are prioritizing the expansion of export markets, others the stabilization of domestic markets, and others still a combination of both. Exchanges have functioned in economies that are open, but also in economies that are restricted. While many exchanges operate in countries where market infrastructure, institutions and procedures are highly developed and national markets are integrated, the study shows they have also been successfully established in countries where markets are in need of substantial further development and integration. Therefore, commodity exchanges may be said to be versatile institutions capable of adapting to and being useful in a range of situations.

Versatility applies in several dimensions. It means that the exchange has typically made the greatest impact in those areas where it has had the widest scope to do so. Thus, the extent to which the exchange has catalysed development of the cash commodity markets has been largely dependent on the status of those markets when the exchange commenced operations. The contrast between Malaysia on the one hand, where cash markets were already highly developed and well regulated, and Brazil and India on the other, where cash markets were fragmented and infrastructure-deficient, is perhaps the clearest example. However, Bursa Malaysia has made a significant impact in another dimension in which it has had the greatest scope. Being the first exchange in the world to establish a liquid contract for CPO provided it with the scope to succeed for the first and only time in bringing pricing power to the developing world for a globally traded commodity.

A similar conclusion might be drawn about the exchanges' respective relevance for smallholders (discussed further in message 4). Where production is characterized by a predominance of smallholder farming, the exchange has had the greatest scope to become directly relevant to smallholders, as in China and India. Where a duality between smallholder and commercial farming exists, and where the smallholder sector operates within a framework of government support, as in Malaysia and Brazil, the scope for exchanges to become directly relevant to smallholders is lower. However, with the commercialization of smallholders prominent on the policy agenda in most of these countries, it should be expected that exchanges will become of greater relevance to smallholders as their knowledge, resources and capacity to participate in markets increase.

Versatility also applies to the services that an exchange provides. The exchange caters for a need, and that need might not always or only be price-risk management. Thus, BM&F's Brazilian Commodity Exchange subsidiary is offering a broad range of services, including trade in physical commodities, forwards contracts, rural securities, agribusiness letters of credit, auctions of government inventories, public tenders and private acquisitions. MCX is soon to launch a national electronic spot exchange for cash commodity trading – an initiative intended to integrate India's fragmented markets. For the South African grain industry, JSE/SAFEX plays a crucial role in enabling the smooth flow of credit to commodity sector participants. DCE is developing weather derivatives, as there is a perceived need for Chinese producers to hedge exposure to production as well as to price risk.

Furthermore, versatility means that the services offered may vary across different constituencies within the same country according to their needs. Brazil is a case in point. There is a duality in Brazilian agriculture in which commercial and smallholder sectors have different needs. On the one hand, the commercial sector needs to manage exposure to high volatility and increasing competition for export markets. In the face of these challenges, BM&F's price-risk management, price discovery and export facilitation services fulfil an important need. On the other hand, smallholders – particularly

those in the Government's land reform programme – are benefiting from government assistance packages, including price support, government procurement and subsidized credit. BM&F mechanisms are used by Government to provide these facilities, increasing the efficiency of their delivery and reducing the fiscal burden on budgetary resources.

The development implication of exchange versatility is that an exchange can be a useful policy instrument in a diverse set of circumstances. It is therefore *potentially* relevant to all developing countries. Although all five exchanges featured in the study operate in middle-income developing countries, the local conditions, and the challenges posed by those conditions, are broadly representative of conditions faced by other developing countries – large and small, rich and poor. As will be discussed further below, this does not mean that every developing country should necessarily introduce a commodity exchange, nor that a commodity exchange is a panacea that alone can tackle all the challenges that a developing-country commodity sector typically faces. However, it does mean that an exchange is a potentially important institution within a country's commodity strategy.

Message 3: Relevance to Least Developed Countries (LDCs)

LDCs are those countries that are least able to integrate advantageously into the globalized economy. They are often dependent on the production and export of a limited number of commodities for their income, employment and foreign exchange. Conversely, volatility in the prices of critical commodity imports – staple foods or crude oil, for example – can severely challenge fiscal stability and exhaust limited reserves of foreign currency. Therefore, protection against sudden commodity price movements is a critical imperative for LDCs. A range of policy options exists to help them do so, one of which is price-risk management (see section 2).

It may be suggested that a study featuring five middle-income developing countries may not yield insights of relevance to LDCs, due to differences in economic performance, condition of infrastructure, and integration into the world economy. These differences exist and must be recognized. However, each of the featured countries also contains wide inequalities: in per capita income, in access to land and opportunities, and in livelihood patterns. Each has a large sector of smallholder farmers – sometimes as the dominant mode of production (China and India) and sometimes co-existing alongside a large commercial farming sector (Brazil, Malaysia and South Africa). The lessons about how commodity exchanges are relevant – or potentially relevant – to smallholders in these countries are important for other developing countries – including LDCs – to learn and apply. The relevance of exchanges to smallholders specifically is discussed further below.

An LDC would not need to set up a domestic futures exchange to access price-risk management instruments, and nor should it, in almost all cases. However, to the extent that liquid international risk management markets already exist for the commodities upon which LDCs depend, entities with requisite managerial and technical capacity – Governments, producer cooperatives, financial institutions – should be trained in how to use these instruments advantageously. The World Bank-facilitated grain procurement by Malawi using an OTC options solution structured around JSE/SAFEX's white maize contract is a good example of this.

A second path could see a regional approach to exchange development spanning a number of small or LDC markets. A proposed pan-African exchange is perhaps the leading example of this. In 1991, the African Union's predecessor organization recognized that a commodity exchange could act as an instrument of integration for Africa.[52] UNCTAD has worked with the African Union, national governments and the private sector in the development of a pan-African commodity and derivatives exchange. A hub in Botswana would link together local exchange platforms and also warehouses in various countries. The local exchanges would all use a common trading system and "back office". Apart from enabling domestic trade, this shared platform would make it possible to match trades from commodity exchanges in different participating countries. This hub and spoke "franchising" model would overcome the problem of high set-up costs that small African markets may struggle to recuperate, while a common technology platform can generate greater liquidity and price discovery to

[52] Abuja Treaty establishing the African Economic Community, 1991.

better enable African commodity producers to market their commodities and manage their risk. A similar regional approach is now in its preliminary stages in Central America, also with UNCTAD support.

Finally, there may be realistic scope for an LDC-based commodity exchange that offers trade in contracts other than commodity derivatives. Such an exchange could focus on facilitating trade in the cash commodity markets, perhaps through auctions or a registration service. This could provide an important means to reduce the transaction costs associated with locating a suitable counterparty. Other services could be gradually established on the back of the cash market transactions to tackle other important costs and risks associated with commodity trade in LDCs. These may include quality grading and certification services, and arbitration mechanisms for settling disputes. An example of such an exchange would be the Agricultural Commodity Exchange for Africa, established in Malawi in late 2006.

Message 4: Relevance to smallholder farmers

Smallholder producers play a major role in the agricultural structure of each country featured in this study. In China and India, "smallholder agriculture is predominant… and farmers can be excessively penalized because they do not possess sufficient capital and information to manage the risks inherent in agricultural activities" (von Braun, Gulati and Fan, 2005a: 9). In both countries, addressing the situation of smallholders is central to the debate on addressing not only challenges specific to agriculture, but also the overarching challenges of poverty reduction and building an equitable growth path.

The other three countries – Brazil, Malaysia and South Africa – have agricultural structures characterized by a duality between the commercial and smallholder sectors. In these countries, smallholder development is also a critical policy priority with roots in earlier injustices: in South Africa, broad-based black economic empowerment in agriculture (AgriBEE) lies at the heart of addressing the iniquities of the apartheid regime; and in Brazil, land reform to address extreme inequalities has been a top priority since the Cardoso Government of 1995, and it continues today under President Lula; in Malaysia, smallholder development is viewed by the Malaysian Government as the key to transforming agriculture into a "third engine of growth". In these countries, addressing the situation of smallholders lies at the core of building national solidarity, cohesiveness and inclusiveness.

In four of the featured countries, small-scale farmers are not expected to participate directly in futures markets – at least, not until they build up the necessary knowledge, resources and capacity. However, the study has documented how indirect access to futures markets can be provided by farmer cooperatives (as documented here with regard to India), as a result of hedging strategies by purchasers (as documented here with regard to China) or through banks and trading houses (as documented here with regard to South Africa). In this way, the small-scale farmer can receive the benefits of price-risk management, without needing to devote the considerable time and resources that direct involvement in commodity futures markets would require.

In India, the ambition of encouraging participation by small-scale farmers in the markets – whether through aggregators or direct engagement – is greater. MCX's proposed electronic national spot exchange could act as a catalyst for improving farmer participation in futures markets. By familiarizing farmers with an electronic trading platform that offers market access, transparent pricing and smooth delivery, the subsequent integration of cash and futures markets onto one platform could facilitate farmer participation in futures markets.

Price-risk management is often not the most important benefit for farmers arising from commodity exchanges. The study has documented that some of the most important impacts arise from an exchange's price discovery, physical market development and finance facilitation functions. Perhaps the most far-reaching of these is the dissemination of price and other market information. This has been a critical mechanism to increase farmers' capacity and resilience, as long as farmers are trained how to make proper use of the information. In China, the DCE launched in 2004 the "1,000 villages,

10,000 farmers" educational programme. By early 2007, over 40,000 farmers had been educated how to use futures prices to improve cropping decisions. In India, access to markets, market information and technical assistance has been provided through MCX's innovative partnership with India Post, and through the deployment of new forms of ICT. In both countries, information asymmetries have been reduced and farmer negotiating power with intermediaries has improved. Other impacts on smallholders include integrating and upgrading the physical markets in which they trade (Brazil, India), facilitation of financing mechanisms (Brazil and India, with potential in South Africa and China), and education and training programmes (Brazil, China, India and South Africa).

The potential for further development in this area should also be underlined. Two key points emerge from the study. Firstly, as smallholders become commercialized and organized into cooperatives, more commodity exchange services – including price-risk management – are likely to become relevant and accessible to them, as they are already accessible to commercial farmers and plantations in Brazil, Malaysia and South Africa.

Secondly, there appears to be scope for the development of instruments and delivery mechanisms that can address small-scale and cash-poor farmers in their current state. In general, the study suggests that futures markets remain at a relatively low point on the development curve in making market-based instruments accessible for smaller-scale farmers to use in an advantageous manner. Moreover, there remains a barrier of scepticism, even among some technical experts, that an appropriate delivery model for such instruments can be developed (e.g. Furness, 2005). The prevailing views about the relevance of these instruments for small-scale farmers may be compared with the prevailing views about the relevance of finance for the poor prior to the microfinance breakthrough made by Professor Yunus and Grameen Bank in the 1970s. Despite widespread doubts in the mainstream banking sector that finance could be channelled sustainably to poor people lacking collateral, a solution was found that has made a proven and lasting poverty reduction impact (Morduch, 1999; Morduch and Haley, 2002). This study presents strong circumstantial evidence that a similar breakthrough can be made for market-based commodity marketing and risk management solutions. For entrepreneurs willing to invest in developing appropriate instruments and an effective delivery model, the opportunity – both commercial and developmental – could be substantial.

Message 5: A dynamism to address emerging challenges posed by globalization

Exchanges are dynamic entities which not only address existing challenges, but can also help to meet new challenges that emerge over time. Each institution has made a strong contribution – often in partnership with the public and private sector – to helping its country meet some of the new opportunities, and overcome some of the pressing challenges it faces, in adapting to the fast-changing globalized commodity economy. A range of examples have been documented in the study:

- *Enabling industry participants to cope with extreme price movements:* The price of white maize in South Africa tripled in 2001–2002, going from 730 rand per tonne to 2140 rand per tonne, before returning to earlier levels. In 2004–2005 it fell very sharply, to 410 rand per tonne. Without access to effective risk management instruments, South African farmers would find it extremely difficult to survive in such a volatile market.

- *Developing the market for new high-value crops:* Testimony from market participants suggests that Bursa Malaysia's platform for transparent price-discovery and accessible risk-management instruments has played a significant role in driving the development of the world palm oil industry. Testimony also suggests that MCX has played a role in facilitating the development of production and export of cardamom and mentha oil in India.

- *Developing important export markets:* Evidence from Brazil shows that BM&F has supported the development of export markets for Brazilian producers, including through its exporter call centres, as well as through various activities aimed at linking Brazilian soybean producers with purchasers in China.

- *Meeting WTO commitments:* The DCE corn futures contract has been heralded as an important step towards the liberalization of China's corn market (Reuters, 2004).

- *Assisting industry to adapt to changing situations where a country swings between net import and net export:* Testimony from market participants has demonstrated that the transparency of grain futures prices on local and world markets, together with the acceptance of foreign grains for delivery through JSE/SAFEX, acts to guide the flow of grains in and out of the country. Potentially, if China is to become a net importer of corn, DCE's corn futures contract provides a local platform for Chinese importers and foreign exporters to hedge their exposure to price risk.

- *Adopting more rigorous quality standards demanded by governments:* Following the Chinese Government's National Management Statute for GMO in 2002, DCE adapted its soybeans contract to reflect the new regulations, establishing a market that has become the world's largest price-discovery platform for non-GMO soybeans.

- *Providing quality assurance for purchasers and exporters:* The cardamom contract launched by MCX in February 2006 has adopted a quality standard that has become known as MCX-grade cardamom. Because exchange-deliverable cardamom is specified as the highest grade in the market, purchasers and exporters are assured receipt of a premium product when they take delivery through the exchange. The standard has become widely accepted and used in physical market transactions, particularly in lucrative export markets where guaranteed high-quality product is an essential prerequisite for business.

- *Introducing new tools and solutions to meet emerging challenges:* The study has documented development of new services by exchanges. BM&F's Carbon Facility uses exchange mechanisms to facilitate use of the Kyoto Protocol's Clean Development Mechanism. Subject to regulatory permission, DCE and MCX are seeking to introduce weather derivatives to enable producers to manage exposure to weather risk. Other instruments exist in international markets that may also be applied in developing countries, such as freight derivatives for managing transportation risks.

Message 6: A wide range of impacts

As discussed previously, the study has established that commodity exchanges in developing countries can yield a wide range of actual and potential impacts for farmers and other entities in the developing economy – including Government, the private sector and individual households.

Impact hypotheses were categorized according to six broad functions. Three of these can be considered as core functions: price discovery, price-risk management and a venue for investment. The other three can be considered as wider functions arising from the performance of the core functions: the facilitation of cash commodity markets, the facilitation of commodity finance, and broader industry development (including capacity-building, market internationalization and the use of ICT). Eighty-one impact hypotheses were examined, and the study found evidence to support the occurrence of 69 impacts in one or more of the featured markets. Thirty-one of these impacts are specifically or mainly for the farmer, and a further 38 are for the wider commodity sector or the overall economy. Sixty-six of these impacts are positive in nature, and three are negative.

Evidence was found to support positive impacts arising from the use of exchange risk-management instruments – such as futures and options contracts – at each participating exchange. However, these instruments are typically used by commercial farmers, and sometimes indirectly by small-scale farmers via contracting arrangements with cooperatives, banks or purchasers. More remains to be done in this area, however, and the appeal has already been noted of incorporating risk-management solutions into the microfinance toolkit, alongside credit, savings and insurance services.

However, it is also emphasized that price-risk management may not always be the most relevant benefit for farmers – and especially for smallholders – that arises out of a commodity exchange.

Particularly in China and India, where smallholder production is the predominant pattern, the study finds that exchanges can yield other critical impacts: broadening access to markets; empowering farmers to make better cropping and selling decisions; reducing information asymmetries that have previously advantaged more powerful market actors; upgrading storage, grading and technology infrastructure; and expanding access to cheaper sources of finance. Consequently, many of the positive impacts arising from commodity exchange are *not* dependent upon farmers directly participating in futures markets.

Furthermore, many of these impacts could arise from a commodity exchange that does not offer futures contracts. This is important for countries in which the level of development in the enabling environment and the needs of market participants do not support futures trading. Such countries need not be excluded from realizing the other positive impacts of commodity exchanges, however. These include impacts related to the development of cash commodity markets and market information systems, and certain aspects of finance facilitation and broader industry development. For example, a commodity exchange trading cash commodities that performs quality grading and certification, accredits warehousing and offers performance guarantees, could lead to the upgrade of physical market infrastructure and the integration of national cash commodity markets. Price formation and transparency could be improved if the prevailing spot prices discovered on such an exchange are disseminated widely to farmers. A reliable system of warehouse receipts and a physical delivery channel for liquidating collateral could facilitate the development of commodity finance solutions, as could the use of exchange mechanisms for the trading of agricultural securities.

Finally, it should be underlined that commodity exchanges affect the performance of sectors upon which substantial developing-country populations are dependent for their livelihoods. Therefore, stakeholders are advised to be watchful in their approach to exchange establishment and development. Historical experience suggests that futures markets are stabilizing. However, in the short term, especially after the introduction of an exchange or the launch of a new contract, there may be a period of adjustment and adaptation. Education is key to ensuring that the benefits that arise from exchange activities are equitable and inclusive. Therefore, it is critical to ensure that all stakeholders are extensively educated about the markets and trained in how they may be constructively used. It is similarly important that exchanges collaborate closely with government and regulatory agencies in the development of an effective legal–regulatory framework. This should provide the space for the markets to grow, while protecting investors who will be initially inexperienced and sometimes irresponsible when faced with the new opportunities offered by an exchange.

Message 7: The role of Government is crucial

Exchanges operate in highly – but not necessarily heavily – regulated environments. Governments are responsible for establishing the legal–regulatory framework and for providing ongoing oversight. In each of the five countries featured in the study, the Government has played an important role in market and exchange development:

- *Brazil:* The Government has made use of market mechanisms for many of its procurement, support and credit policies aimed towards the smallholder sector. This has included the use of BM&F's Brazilian Commodity Exchange subsidiary as a vehicle for implementing government policy.

- *China:* The Government stepped in to rectify market chaos twice in the early 1990s. The commodity futures markets were restructured to channel liquidity into secure and reliable institutions, and into vertical commodity markets in need of a platform for transparent price discovery and secure price-risk management.

- *India:* The Government established the structure within which the three new national multi-commodity exchanges were established in 2002–2003. It has provided the expectation that these institutions would address deep-rooted challenges in India's agriculture sector, including the condition of the country's numerous small-scale farmers, who are often excluded or marginalized from markets.

- *Malaysia:* The palm oil industry has successfully developed within the context of the Government's national development strategy. From the start, the Government made the strategic decision to allow pricing to be determined by the market, realizing that this would better provide the conditions for growth, resilience, and integration with the private sector. Likewise, the establishment and development of Bursa Malaysia has taken place within the context of the Government's Capital Market Masterplan, which is designed to increase Malaysia's international competitiveness and to tap sources of comparative advantage.

- *South Africa:* In the words of Scrimgeour and Sheppard (1998: 1), "the reforms in South Africa have in many ways been a textbook model of carefully considered action". The Government set the framework, committed to a policy of non-intervention except in certain tightly defined circumstances, and allowed the agricultural sector to develop in line with the considered views of the industry, guided by market pricing mechanisms.

While government intervention in the commodity markets – physical and futures – may be necessary and can be beneficial, governments may wish to give careful consideration to the modalities and purposes of such intervention. It is also strongly noted that a high level of self-regulatory responsibility is vested in each of the featured exchanges. Therefore, fostering close and constructive relations between exchanges, regulators and other governmental stakeholders is a crucial imperative for all parties concerned.

Message 8: The exchange does not stand alone

A commodity exchange cannot be created in isolation. An exchange is predicated – and depends for its continuing functional existence – upon a strong set of supporting or complementary organizations, institutions and structures. These include regulatory bodies; brokers; financial institutions; warehouse, logistics and collateral management service providers; quality-grading and certification agencies; and information collection and dissemination organizations focusing on both cash and futures markets. An appropriate legal–regulatory framework is critical, too, in order to protect investors, uphold market integrity and manage systemic risk. This framework should comprise laws of general application (e.g. laws on property, contracts, torts, banking, insolvency, and general commercial law) and also laws of special application directed towards market operations (e.g. laws defining the legal relationships between clients, brokers, exchanges, clearing houses, and settlement banks; the property and contractual rights and interests held through the market; and the insolvency of a market participant) (Corcoran et al., 2002).

The exchange is also only one part of the commodity policy framework, albeit a dynamic part. Therefore, it should not be seen as a panacea for tackling all the problems facing developing-country commodity sectors. Government investment in infrastructure, market institutions and farmer capacity-building is fundamental. The study has outlined how commercialization and cooperatization programmes for small-scale farmers have become a policy priority in the featured economies, and are often seen as a precondition to successful participation in markets by smallholders. Agricultural research, development and extension agencies are proven policy instruments for upgrading commodity sectors and farmer livelihoods. Export promotion agencies and the framework governing international agricultural trade are important determinants of market development. Other policy interventions that have been used to protect and boost farmer income levels include minimum support prices and government procurement; subsidized credit, inputs and equipment; agricultural insurance; commodity diversification schemes; and tax incentives or exemptions.

Message 9: There is scope for further research

This study sets out a framework for understanding the development impacts of commodity exchanges in the developing world. As this field is developing rapidly, and its importance is only just starting to be recognized, further steps to deepen understanding in this field are recommended: increasing the level of monitoring, assessment and analysis of exchange impacts in diverse developing-country environments; establishing forums within which experiences and perspectives can be shared by stakeholders from various organizational backgrounds – governments, exchanges, the private sector,

civil society and academia; generating policy ideas and initiatives for application elsewhere in the developing world; and continued awareness-raising about and demystification of commodity exchanges.

In particular, this study has encountered a number of data gaps in its assessment of impacts arising from commodity exchanges. Many impacts have been affirmed from the testimony of market participants or from secondary literature. Out of 66 positive impact hypotheses for which evidence was found in support, 38 were based on non-quantitative data (as shown in annex 4). Consequently, questions remain unanswered about their breadth, depth and distribution.[53] For a further 10 impact hypotheses, insufficient evidence of any kind was found in the featured markets, either in support or in opposition. For the 38 impacts based on non-quantitative data and the 10 impact hypotheses lacking evidence altogether, there is significant scope for further research: particularly micro-level studies at the level of the farmer or the investor. This would include, as a first step, the design of an appropriate means of measurement and collection. However, it is accepted that not all impacts may be feasible or easy to measure.

It is also noted that evidence was found to support 17 of the positive impact hypotheses in only one of the featured markets. In other markets, either evidence was found that opposed the occurrence of these impacts, or insufficient evidence was found either in support or in opposition. Therefore, there remains a need for further research to be performed to verify whether these impacts happened elsewhere, or whether they were unique occurrences. If the latter case, further work could be performed to identify the reasons why certain impacts occurred in only one country – perhaps because of a particularly innovative approach by one of the exchanges, the lessons of which could be discerned and disseminated to other exchanges in the developing world with a view to replication; perhaps because local conditions – social, economic and geographical – were market-specific and drove a unique approach to exchange development.

[53] In this context, breadth refers to the number of beneficiaries from a positive impact. Depth refers to the scale of positive impact generated for each beneficiary – for example, the amount of income uplift or the reduction in risk exposure. Distribution refers to who the beneficiaries are – for example, which social strata, or what type of farmer etc.

13. Recommendations

For developing-country Governments:

- Where a commodity exchange (or commodity exchanges) do not exist already, appraising the feasibility of establishing a commodity exchange (or commodity exchanges); determining whether to perform registration and trade facilitation services or to provide markets for cash, forwards, financing and/or futures instruments;
- Ensuring an overarching regulatory framework that upholds the transparency and integrity of commodity markets, protects market participants from unscrupulous practices, and effectively manages the risks that arise from market operations;
- Ensuring that the wider legal–economic framework provides legal certainty for exchange operations and is free of impediments that unduly restrict exchange functions, except where superseded by other fundamental or strategic national development imperatives;
- Developing elements of physical infrastructure that support commodity exchange and market development – including information and communications technology, electricity, storage and logistics;
- Recognizing that a rules- or principles-based approach to regulation – as opposed to a discretionary or ad hoc approach – is an essential foundation for market development and exchange success;
- Aligning other elements of commodity policy to support the extension of the positive benefits arising from commodity exchanges across agricultural sectors, including to small-scale farmers, for example by integrating an understanding of market functions into smallholder commercialization and cooperatization programmes;
- Promoting the integration of the commodity and financial sectors, by removing undue restrictions on participation by financial institutions in markets and on support for market development;
- Signalling support for the market, thereby providing confidence for other entities to participate in the exchange. One strong signal could be to channel the Government's own food security policies through exchange mechanisms. Another strong signal could be to mandate State organizations to hedge exposure to price volatility using the exchange's price-risk management mechanisms.

For established exchanges in the developing world:

- Increasing awareness of the actual and potential development impacts arising from commodity exchange services in developing countries, and recognizing that pursuit of these impacts represents a win–win solution for both the exchange and the wider economy;
- Educating key stakeholders about exchange functions, operations, services and benefits – including market users, commodity sector participants, government, the media, academia and civil society;
- Deepening and broadening the exchange's development impact through the innovative application of products, services, technologies and capacity-building programmes;
- Partnering with other entities that are well placed both to deliver exchange services to market users and also to enhance impact on market users, especially rural communities. Such entities may include farmer cooperatives/associations, government agencies, research institutes, extension agencies, financial and microfinance institutions, and civil society organizations;

- Sharing experiences and best practices with other commodity exchanges in the developing world;
- Supporting further research into the role and the benefits of commodity exchanges in developing countries.

For farmers' cooperatives/associations in the developing world:

- Advocating commodity exchange services to their members and to Government, and supporting their creation where they would be viable;
- Raising awareness, educating and building capacity among farmers on the subject of commodity exchange functions, operations, services and benefits – including (where applicable) appropriate usage of price-risk management, market information and financing mechanisms;
- Exploring the feasibility of intermediating between exchanges and farmers, in particular to aggregate small-scale farmers' requirements and to execute through the exchange;
- Evaluating their own scope for managing price risk, especially where the organization provides inputs, credit, marketing or processing services to its members;
- Monitoring and reporting on the impacts of commodity exchanges on rural communities, filling some of the data gaps that currently exist. This would be done with a view to informing exchanges about how they can best improve the relevance and impact of their services to producer communities.

For civil society organizations in the developing world:

- Recognizing the great opportunity for the involvement of civil society organizations in multi-stakeholder partnerships in the establishment and development of commodity exchanges in the developing world;
- Raising awareness, educating, and building capacity among farmers on the subject of commodity exchange functions, operations, services and benefits;
- Providing a channel for disseminating market information to small-scale or remote farmers;
- Exploring the feasibility of intermediating between exchanges and farmers, in particular to aggregate the requirements of small-scale farmers and to execute through the exchange;
- Monitoring and reporting on the impacts of commodity exchanges on rural communities, filling some of the data gaps that currently exist. This would be done with a view to informing exchanges about how they can best improve the relevance and impact of their services to producer communities.

For the private sector in the developing world:

- For operators of supporting or complementary institutions (such as banks, brokers, warehouse operators, grading agencies), collaborating with commodity exchanges in market development;
- For trading houses, financial institutions and entrepreneurs in general, recognizing the potentially great opportunity – both commercial and developmental – from providing small-scale commodity producers with access to exchange-traded instruments, and from developing effective instruments and delivery channels to enable their advantageous usage.

For the international community:

- Awareness-raising and advocacy to governments, civil society, academia and the private sector;
- Offering a balanced view on the merits and limitations of commodity exchanges and the services they offer, driven by applied empirical research;
- Providing targeted support and technical assistance to countries looking to establish and develop a successful commodity exchange and a successful regulatory framework;
- Facilitating the sharing of information, best practice, experience and expertise, both within the developing world and between the developing and developed worlds;
- Considering commodity exchanges as worthy recipients of funding support from bilateral and multilateral donor agencies, and also from implementing agencies.

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Annex 1. Relevant contract specifications

	Contract size	Summary of quality definitions	Trading months	Number and ownership of delivery locations
BM&F Arabica coffee	6,000kgs (100 bags of 60kg each)	Green coffee beans produced in Brazil, variety *coffea arabica*, type six or better (inferior grades will not be accepted), good cup or better, to be delivered in the city of São Paulo, State of São Paulo, Brazil.	5 months: March, May, July, September and December	Physical delivery only at 64 accredited warehouses. Whenever a delivery is made in a city other than São Paulo, freight costs shall be deducted when the cash settlement value is calculated.
BM&F live cattle	330 net arrobas (1 arroba = 15kg)	Live cattle finished-weight for slaughter. **Type**: Male, castrated, well finished (convex carcass) in pasture or under confinement. **Weight**: Ranging from a minimum of 450kg to a maximum of 550kg, verified on the scale at the delivery point. **Maximum age**: 42 months.	All months	No physical delivery; cash settlement only
DCE corn	10 tonnes	Par grade specified with substitute grade accepted at specified discount: (i) gram/litre - >685 (discount for >660) (ii) Impurity: <1 per cent (iii) Moisture: <14 per cent (iv) Mouldy kernel: <2 per cent (discount for <4 per cent) (v) Total unsound kernel: <8 per cent (vi) Normal smell and colour (vii) Packaging requirements	6 months: January, March, May, July, September, November	DCE warehouses: 14 exchange-accredited warehouses
DCE soybean	10 tonnes	**Number 1 soybean:** Par grade is number 3 soybeans (national standard), non-GMO only, with minimum standards for seed coating, impurity content, moisture content, with premiums and discounts defined according to national standard, moisture content and	6 months: January, March, May, July, September, November	DCE warehouses: 21 exchange-accredited warehouses

	Contract size	Summary of quality definitions	Trading months	Number and ownership of delivery locations
		impurity content **Number 2 soybean:** GMO allowed, with standards as above plus crude fat content, crude protein content, broken and damaged kernel content, with premiums and discounts also defined according to crude fat content, crude protein content and damaged kernel content, but not impurity content		
MCX cardamom	500kg	(i) Minimum size of the capsules: 7mm size**.** (6 mm size will incur 15 per cent discount from September 2007.) (ii) Accepted colour and not discoloured capsules (iii) Free from blacks and fruits (iv) Immature cardamom: 5 per cent maximum (v) Split cardamom: 5 per cent maximum (vi) Thrips: 3 per cent maximum (vii) Immature, split, shrivelled, and thrips taken together shall not exceed 7 per cent (viii) Weight in grams per litre: 400+	All months	At one exchange-designated warehouse at Vandanmedu
MCX mentha oil	360kg (two drums)	Numerous quality specifications, including but not limited to: appearance, odour, colour, solubility, GLC rank, chemical composition, sediment presence, fats and oils, congealing point, and packaging	All months	At one exchange-designated warehouse at Chandausi

	Contract size	Summary of quality definitions	Trading months	Number and ownership of delivery locations
Bursa Malaysia crude palm oil	25 tonnes	Crude palm oil of good merchantable quality, in bulk, unbleached, meeting the following further specifications: (i) Free fatty acids (FFA) not to exceed 4 per cent. (ii) Moisture and impurities shall not exceed 0.25 per cent. (iii) Deterioration of Bleachability Index (DOBI) minimum of 2.5 when delivered.	Spot month and the next five succeeding months, and thereafter, alternate months up to 24 months ahead	To one of three port tank installations approved by the exchange, located – at the option of the seller – at Port Kelang, Penang/ Butterworth and Pasir Gudang (Johor).
JSE/SAFEX white maize	100 tonnes	(i) White maize from any origin, of the grade "WM1" as defined in the South African grading regulations, that meets all phyto-sanitary requirements and import regulations. (ii) As per above, but of "WM2" standard	All months	Physical delivery of JSE/SAFEX silo receipts giving title to maize in bulk storage at one of 177 approved silos, at an agreed storage rate.
JSE/SAFEX bread milling wheat	50 tonnes	Bread milling wheat of fair and merchantable quality, fit for human consumption and complying with the "South African rules for the classification and grading of wheat", and originating in South Africa, Argentina, and specified United States, Canadian and Australian varieties. Discounts will apply to grades B2 and B3 and for wheat of imported origin.	All months, with March, May, July, September and December listed one year in advance	Physical delivery of JSE/SAFEX silo receipts giving title to wheat in bulk storage at one of 140 approved silos, at an agreed storage rate.

Annex 2. Summary of the main regulatory features in each market

Regulatory agent	Regulatory feature	BM&F	DCE	MCX	Bursa M.	JSE/ SAFEX
Exchange	Minimum capital requirements for members	✓	✓	✓	✓	✓
Exchange	Fitness/good character requirements for members	✓	✓	✓	✓	✓
Exchange	Licensing / qualifications required for members	✓	✓	✓	✓	✓
Exchange	Initial margin deposit required	✓	✓	✓	✓	✓
Exchange	Positions marked-to market daily and variation margin charged	✓	✓	✓	✓	✓
Exchange	Time-stamped audit trail of all trading activity	✓	✓	✓	✓	✓
Exchange	Audio/video surveillance of trading floor activity	✓		N/A	N/A	N/A
Exchange	Transparent, free dissemination of market information	✓	✓	✓	✓	✓
Exchange	Constant monitoring for suspicious trading patterns	✓	✓	✓	✓	✓
Exchange	Real-time risk analysis of members' positions	✓		✓		
Exchange	Position limits for speculative market participants	✓	✓	✓	✓	✓
Exchange	Special margin during periods of high volatility	✓	✓	✓	✓	✓
Exchange	Circuit filters / daily price movement limits	✓	✓	✓	✓	✓
Exchange	Higher margin or position limits during the delivery month	✓	✓	✓	✓	✓
Exchange	Strict quality grading of goods delivered	✓	✓	✓	✓	✓
Exchange	Accreditation and monitoring of delivery facilities	✓	✓	✓	✓	✓
Exchange	Defined penalties for failing to meet delivery obligations	✓	✓	✓	✓	✓
Exchange	Clearinghouse guarantee fund	✓	*	✓	✓	✓
Exchange	Binding arbitration mechanism for dispute settlement	✓	✓	✓	✓	✓
Intermediary	Know-your-client' requirements for brokers	✓	✓	✓	✓	✓
Intermediary	Client fund segregation requirements for brokers	✓	✓	✓	✓	✓
Regulator	Exchange and clearinghouse licensing	✓	✓	✓	✓	✓
Regulator	Intermediary licensing	✓	✓		✓	
Regulator	New contract approval process	✓	✓	✓		
Regulator	Position reporting of large traders across markets	✓		✓	N/A	N/A

* Operates a risk default fund, which runs on a similar basis.

Annex 3. Impact hypotheses

Code	Function	Farmer/ other?	Impact
PD1	Price discovery	Farmer	Farmer more likely to find a market for crops when true level of demand reflected in price signals
PD2	Price discovery	Farmer	Better alignment of spot and futures markets by enabling arbitrage between the two markets
PD3	Price discovery	Other	Local price discovery mechanism reflects fundamentals of the domestic industry
PD4	Price discovery	Other	Facilitates industry transactions (because availability of reference price)
PD5	Price discovery	Other	Avoid shortages, gluts and other market pricing distortions/anomalies because better price signals
PD6	Price discovery	Farmer	Farmers become more informed about market and pricing information
PD7	Price discovery	Farmer	Improved price from intermediaries because of availability of neutral/authoritative reference price
PD8	Price discovery	Farmer	Increases returns to farmers as better enables them to hold until price level is good
PD9	Price discovery	Farmer	Cropping based on futures rather than spot price increases likely returns
PD10	Price discovery	Farmer	Facilitates crop diversification where farmers can better appreciate price and ultimately income differentials
PD11	Price discovery	Farmer	Empowers farmers to make marketing decisions
PD12	Price discovery	Other	Squeezes out rent-seeking intermediaries from supply chains
PD13	Price discovery	Other	Reduces inter-season price volatility (cobweb effect)
PD14	Price discovery	Other	Reduces intra-season price volatility
PR1	Price risk management	Farmer	Helps farmers avoid serious losses when prices fall
PR2	Price risk management	Farmer	Can enable farmers to receive guaranteed price from purchaser or intermediary
PR3	Price risk management	Farmer	Facilitates more effective planning and investment because of greater income predictability
PR4	Price risk management	Farmer	Reduces transaction costs compared with other risk management methods
PR5	Price risk management	Other	Commodity users' control of input costs enables more stable pricing of end products
PR6	Price risk management	Other	Enables greater flexibility in contracting/marketing (contract terms, pricing formulas)
PR7	Price risk management	Other	Enhances business planning, budgeting and forecasting
PR8	Price risk management	Other	A local platform avoids costs and risks associated with accessing international markets
IV1	Investment	Farmer	Liquid markets in which to effectively hedge
IV2	Investment	Farmer	Speculation may lift price and therefore farmer return
IV3	Investment	Farmer	Speculation can increase futures market volatility making effective hedging more challenging
IV4	Investment	Farmer	Tendency for farmers to speculate in ways which they cannot afford
IV5	Investment	Other	Enables more diversified investor portfolios reducing exposure to risk
IV6	Investment	Other	Enables hedging against inflation
IV7	Investment	Other	Can provide positive returns when other established asset clases are bearish
IV8	Investment	Other	Reduces counterparty risk in derivatives transactions
IV9	Investment	Other	Provides a robust regulatory framework in which investment takes place
IV10	Investment	Other	Increases fairness and transparency of trading environment
IV11	Investment	Other	Arbitrageurs can better align domestic and international prices
IV12	Investment	Other	Speculation can add inflationary pressure
IV13	Investment	Other	Encourages speculation in place of productive activity
IV14	Investment	Other	Tendency for retail investors to speculate in ways which they cannot afford
PT1	Physical trade	Farmer	Improved price from intermediaries because of availability of neutral/authoritative reference price
PT2	Physical trade	Other	More efficient geographic mobility of goods (national market integration)
PT3	Physical trade	Other	Facilitates industry transactions (because availability of reference price)
PT4	Physical trade	Other	Enables PRM because of transparency about the basis (risk)
PT5	Physical trade	Other	Better aligns spot and futures markets through arbitrage possibilities between the two markets
PT6	Physical trade	Other	Acts as a reliable delivery/procurement channel of last resort
PT7	Physical trade	Other	Reduces counterparty risk in cash market transactions
PT8	Physical trade	Farmer	Reduce need for distress sales
PT9	Physical trade	Farmer	Access to more distant markets through better logistics
PT10	Physical trade	Farmer	Collateral management systems facilitate new sources of commodity finance
PT11	Physical trade	Other	Expands export opportunities because of better export-facilitating infrastructure
PT12	Physical trade	Other	Avoids wastage because of better storage possibilities
PT13	Physical trade	Other	Introduces better or more 'scientific' storage hardware and practices
PT14	Physical trade	Farmer	Increase crop suitability to end user requirements
PT15	Physical trade	Farmer	Improves quality of production by rewarding better quality and consistency of crop
PT16	Physical trade	Other	Reduces grade diversity
PT17	Physical trade	Other	Increase purchaser confidence in local quality control & certification
PT18	Physical trade	Other	Reduces dependence on imports if local crop better meets requirements
FF1	Financing	Farmer	Increases farmers' access to finance
FF2	Financing	Farmer	Reduces cost of borrowing by reducing risk to both borrower and lender
FF3	Financing	Farmer	Provides working capital to cover important expenses and avoid distress sales
FF4	Financing	Farmer	Ultimately enables greater capital for investment
FF5	Financing	Farmer	Financing becomes more organised and predictable for the farmer
FF6	Financing	Farmer	Cash and carry arbitrage provides an alternative cheap source of financing
FF7	Financing	Other	Investments lead to performance upgrade and growth in the agri-sector
FF8	Financing	Other	Deepen the engagement of financial institutions in agri-sector
FF9	Financing	Other	Substantial business opportunity for financiers
MD1	Market development	Farmer	Increased awareness, education and training provision in hedging and crop marketing more broadly
MD2	Market development	Farmer	Builds new skills and enhances capacity for income diversification
MD3	Market development	Farmer	Encourages farmers to organise collectively to access and benefit from exchange services
MD4	Market development	Other	Raises awareness about commodity markets and their impact
MD5	Market development	Other	Promotes regional integration of commodity markets
MD6	Market development	Other	Facilitates export promotion and South-South commodity trade linkages
MD7	Market development	Other	Enhances transparency of conditions for import and export
MD8	Market development	Farmer	Increased IT literacy/comfort empowers farmers - capacity, productivity, independence
MD9	Market development	Farmer	Platform is put in place for future service delivery to rural users
MD10	Market development	Farmer	Integrates remote users, overcoming previous barriers of distance
MD11	Market development	Other	Enhances ICT infrastructure enabling wider productivity gains
MD12	Market development	Other	Provides opportunities for other product / service providers
MD13	Market development	Farmer	Increased access to markets (trading, pricing, other financial & marketing services)
MD14	Market development	Farmer	Increased access to service providers (brokers, banks, etc)
MD15	Market development	Farmer	New product and service development to meet evolving needs
MD16	Market development	Other	The industry generates employment
MD17	Market development	Other	The industry generates government tax revenues
MD18	Market development	Other	Encourages moves from informal to formal sector - a more organised economy

Annex 4. Impact performance at each exchange

Code	Farmer/ other?	BM&F	DCE	MCX	Bursa M.	JSE/SAFEX
PD1	Farmer	?	?	?	?	UQ - S
PD2	Farmer	Q - W	Q - W	Q - W	?	Q - S
PD3	Other	UQ - S	UQ - S	Q - S	Q - S	Q - S
PD4	Other	UQ - W	UQ - S	?	UQ - S	UQ - S
PD5	Other	?	?	?	Q - S	X
PD6	Farmer	UQ - S	Q - S	Q - S	X	Q - S
PD7	Farmer	?	Q - S	Q - S	UQ - S	X
PD8	Farmer	?	Q - S	Q - S	X	UQ - S
PD9	Farmer	?	Q - S	Q - S	X	?
PD10	Farmer	UQ - S	Q - S	Q - S	X	Q - W
PD11	Farmer	UQ - S	Q - S	Q - S	X	UQ - S
PD12	Other	?	?	Q - S	X	X
PD13	Other	X	X	?	X	X
PD14	Other	X	X	UQ -W	X	X
PR1	Farmer	UQ - S	UQ - W	UQ - W	UQ - S	UQ - S
PR2	Farmer	UQ - S	UQ - S	UQ - W	UQ - S	UQ - S
PR3	Farmer	UQ - S	UQ - S	?	UQ - S	UQ - S
PR4	Farmer	?	X	?	UQ - S	UQ - S
PR5	Other	?	?	X	UQ - S	Q - S
PR6	Other	Q - W	X	?	UQ - S	UQ - S
PR7	Other	UQ - W	UQ - S	?	UQ - S	UQ - S
PR8	Other	Q - S	Q - S	Q - S	UQ - S	Q - S
IV1	Farmer	Q - S	Q - S	Q - S	Q - S	Q - S
IV2	Farmer	?	?	?	?	X
IV3	Farmer	?	?	?	?	?
IV4	Farmer	?	?	UQ - S	?	UQ - W
IV5	Other	Q - S	?	?	?	UQ - W
IV6	Other	X	X	X	X	X
IV7	Other	?	?	?	?	UQ - W
IV8	Other	UQ - S	UQ - S	UQ - S	UQ - S	UQ - S
IV9	Other	UQ - S	UQ - S	UQ - S	UQ - S	UQ - S
IV10	Other	UQ - S	UQ - S	UQ - S	UQ - S	UQ - S
IV11	Other	?	UQ - S	X	X	UQ - S
IV12	Other	?	?	?	X	X
IV13	Other	?	?	UQ - S	?	UQ - W
IV14	Other	?	?	UQ - S	?	UQ - W
PT1	Farmer	X	X	UQ - S	X	?
PT2	Other	UQ - S	Q - S	X	X	UQ - W
PT3	Other	?	X	?	X	UQ - S
PT4	Other	?	X	UQ - W	X	UQ - S
PT5	Other	?	X	X	?	?
PT6	Other	UQ - S	Q - S	Q - S	Q - S	Q - S
PT7	Other	UQ - S	UQ - S	UQ - S	UQ - S	UQ - S
PT8	Farmer	X	X	?	X	X
PT9	Farmer	X	X	?	X	X
PT10	Farmer	UQ - S	X	Q - S	X	Q - S
PT11	Other	UQ - S	X	UQ - S	X	X
PT12	Other	?	?	?	X	X
PT13	Other	?	UQ - S	UQ - S	X	X
PT14	Farmer	?	?	UQ - S	X	X
PT15	Farmer	?	?	UQ - S	X	UQ - S
PT16	Other	?	X	UQ - S	X	X
PT17	Other	?	UQ - W	UQ - S	X	X
PT18	Other	X	X	X	X	X
FF1	Farmer	UQ - S	UQ - W	Q - S	X	UQ - S
FF2	Farmer	?	X	Q - S	X	UQ - S
FF3	Farmer	?	X	?	X	UQ - S
FF4	Farmer	?	X	?	X	UQ - S
FF5	Farmer	UQ - S	UQ - W	UQ - S	X	UQ - S
FF6	Farmer	?	X	?	?	?
FF7	Other	?	X	?	X	UQ - S
FF8	Other	UQ - S	X	Q - S	X	UQ - S
FF9	Other	UQ - S	X	UQ - S	X	Q - S
MD1	Farmer	UQ - S	Q - S	Q - S	X	UQ - S
MD2	Farmer	UQ - S	Q - S	UQ - S	X	UQ - W
MD3	Farmer	?	UQ - W	UQ - W	UQ - S	UQ - W
MD4	Other	UQ - S	?	UQ - W	UQ - S	UQ - S
MD5	Other	X	X	X	X	UQ - W
MD6	Other	UQ - S	X	UQ - S	UQ - S	X
MD7	Other	UQ - S	X	X	X	Q - S
MD8	Farmer	X	?	UQ - W	X	X
MD9	Farmer	?	X	UQ - S	X	X
MD10	Farmer	?	UQ - W	UQ - S	X	X
MD11	Other	?	?	UQ - S	X	UQ - W
MD12	Other	?	X	UQ - W	X	X
MD13	Farmer	?	X	UQ - W	X	UQ - S
MD14	Farmer	?	X	UQ - W	X	UQ - W
MD15	Farmer	UQ - S	X	UQ - S	X	X
MD16	Other	?	X	Q - S	?	Q - W
MD17	Other	?	X	UQ - W	X	X
MD18	Other	UQ - S	X	UQ - S	X	?

Key

UQ - W: *Unquantified, weak impact*
UQ - S: *Unquantified, strong impact*
X: *No impact*
Q - W: *Quantified, weak impact*
Q - S: *Quantified, strong impact*
?: *Impact is unclear*

Annex 5. Data sources

(i) Data sources for the study

Code	BM&F	DCE	MCX	Bursa M.	JSE/SAFEX
PD1	?	?	?	?	Testimony
PD2	Spot-futures correlation	Spot-futures correlation	Spot-futures correlation	?	Spot-futures correlation
PD3	Testimony	Testimony	Liquid indigenous contract	World reference price	Wide divergence with CBOT
PD4	Secondary literature	Case study	?	Testimony	Testimony
PD5	?	?	?	Biofuel impact on market	X
PD6	Direct observation	SMS data	Exchange data	X	SMS data + testimony
PD7	?	Case study	Survey results	Testimony	X
PD8	?	Exchange data / case study	Survey results	X	Testimony
PD9	?	Exchange data / case study	Survey results	X	?
PD10	Secondary literature	Exchange data / case study	Survey results	X	Planting and price data
PD11	Secondary literature	Exchange data / case study	Survey results	X	Testimony
PD12	?	?	Survey results	X	X
PD13	X	X	?	X	X
PD14	X	X	Survey results	X	X
PR1	Secondary literature	Case study of DCE pilot	Survey results	Testimony	Testimony
PR2	Secondary literature	Case study / secondary lit.	Secondary literature	Testimony	Testimony
PR3	Secondary literature	Testimony	?	Testimony	Testimony
PR4	?	X	?	Testimony	Testimony
PR5	?	?	X	Testimony	Consumer/Producer Prices
PR6	Exchange initiatives/data	X	?	Testimony	Testimony
PR7	Secondary literature	Testimony	?	Testimony	Testimony
PR8	Correlations BM&F/NYBOT	Correlations DCE/CBOT	Liquidity data	Testimony	Correlations SAFEX/CBOT
IV1	Volume and OI data	Volume and OI data	Volume and OI data	Volume and OI data	Volume and OI data
IV2	X	X	?	?	X
IV3	?	?	?	?	?
IV4	?	?	Survey / secondary lit.	?	Exchange investigation
IV5	Market composition / sec lit	?	?	?	Testimony
IV6	X	X	X	X	X
IV7	?	?	?	?	Testimony
IV8	Exchange rules	Exchange rules	Exchange rules	Exchange rules	Exchange rules
IV9	Exchange rules	Exchange rules	Exchange rules	Exchange rules	Exchange rules
IV10	Exchange rules	Exchange rules	Exchange rules	Exchange rules	Exchange rules
IV11	?	Testimony	X	X	Testimony
IV12	?	?	?	?	X
IV13	?	X	Secondary literature	?	Exchange investigation
IV14	?	X	Survey / secondary lit.	X	Exchange investigation
PT1	X	X	Survey / direct observation	X	?
PT2	Testimony	Regional price differentials	X	X	Location differentials
PT3	?	X	?	X	Testimony
PT4	?	X	Direct observation	X	Testimony
PT5	?	X	X	?	?
PT6	Delivery data	Delivery data	Delivery data	Delivery data / testimony	Delivery data
PT7	Exchange rules	Exchange rules	Exchange rules	Exchange rules	Exchange rules
PT8	X	X	?	X	X
PT9	X	X	?	X	X
PT10	Exchange initiatives	X	Secondary literature	X	Bank data and testimony
PT11	Exchange initiatives	X	Survey results	X	X
PT12	?	?	?	X	X
PT13	?	Exchange rules	Survey results	X	X
PT14	?	?	Survey results	X	X
PT15	?	?	Survey results (mentha)	X	Testimony
PT16	?	X	Survey results (mentha)	X	X
PT17	?	Exchange rules on GMO	Survey results (cardamom)	X	X
PT18	X	X	X	X	X
FF1	Secondary literature	Case study of 2007 pilot	Secondary literature	X	Testimony
FF2	?	X	Secondary literature	X	Testimony
FF3	?	X	?	X	Testimony
FF4	?	X	?	X	Testimony
FF5	Exchange initiative/sec. lit.	Case study of 2007 pilot	Secondary literature	X	Testimony
FF6	?	X	?	?	?
FF7	?	X	?	X	Testimony
FF8	Exchange initiative/sec. lit.	X	Bank MOUs with MCX	X	Testimony
FF9	Exchange initiative/sec. lit.	X	Secondary literature	X	Bank data and testimony
MD1	Exchange initiatives	Exchange data	Exchange initiatives / sec lit	X	Testimony
MD2	Exchange initiatives	Exchange data / sec lit	Exchange initiatives / sec lit	X	Testimony
MD3	?	Testimony	Exchange initiatives / sec lit	Testimony	Testimony
MD4	Exchange initiatives	?	Survey results	Exchange initiatives	Testimony
MD5	X	X	X	X	Malawi initiative
MD6	Exchange initiatives	X	Survey results (cardamom)	Testimony	X
MD7	Exchange initiatives	X	X	X	Data / testimony
MD8	X	?	Ex. initiatives / Direct obs.	X	X
MD9	?	X	Ex. initiatives / Direct obs.	X	X
MD10	?	Exchange initiatives	Exchange initiatives	X	X
MD11	?	?	Exchange initiatives	X	Direct observation
MD12	?	X	Exchange initiatives	X	X
MD13	X	X	Survey results	X	Testimony
MD14	?	X	Exchange initiatives / sec lit	X	Testimony
MD15	Exchange initiatives	X	Exchange initiatives / sec lit	X	X
MD16	?	X	Secondary literature	?	Exchange data
MD17	?	X	Secondary literature	X	X
MD18	Exchange initiatives	X	Survey results (mentha)	X	?

(ii) Potential indicators and data sources: an “ideal type” impact assessment

Code	'Ideal type' Indicator / Data Source
PD1	Econometric analysis
PD2	Spot-futures price correlation
PD3	Correlation with international contracts for same commodity
PD4	Survey / testimony
PD5	Econometric analysis
PD6	Survey / testimony
PD7	Survey / testimony
PD8	Survey / testimony
PD9	Survey / testimony
PD10	Crop area & production volume data correlation with pricing / survey / testimony
PD11	Survey / testimony
PD12	Survey / testimony
PD13	Econometric analysis
PD14	Econometric analysis
PR1	Survey / testimony
PR2	Survey / testimony
PR3	Farmer investment levels (e.g. equipment purchase) / survey / testimony
PR4	Benchmarking
PR5	Correlation between producer and consumer prices / Value chain analysis
PR6	Survey / testimony
PR7	Survey / testimony
PR8	Correlation with international contracts for same commodity
IV1	Volume and Open Interest Data
IV2	Price levels correlated to changes in positions held by speculative participants
IV3	Volatility levels correlated to changes in positions held by speculative participants
IV4	Broker data on farmer defaults / survey / testimony
IV5	Econometric analysis / testimony
IV6	Econometric analysis / testimony
IV7	Econometric analysis / testimony
IV8	Consequences for the defaulters' counterparty / Exchange rules and regulations
IV9	Exchange rules and regulations
IV10	Exchange rules and regulations
IV11	Correlation with international contracts for same commodity / survey / testimony
IV12	Price levels correlated to changes in positions held by speculative participants
IV13	Survey / testimony
IV14	Broker data on retail investor defaults / survey / testimony
PT1	Survey / testimony
PT2	Regional spot price differentials
PT3	Survey / testimony
PT4	Survey / testimony
PT5	Spot-futures price correlation
PT6	Exchange delivery data
PT7	Exchange rules and regulations
PT8	Survey / testimony
PT9	Survey / testimony
PT10	Bank data / survey / testimony
PT11	Survey / testimony
PT12	Comparison between production and sales volume, and warehouse capacity / survey /
PT13	Survey / testimony
PT14	Survey / testimony
PT15	Production data separated by quality grade / exchange rules and procedures / survey /
PT16	Production data separated by quality grade / survey / testimony
PT17	Survey / testimony
PT18	Import volumes / survey / testimony
FF1	Bank data / survey / testimony
FF2	Bank data / survey / testimony
FF3	Survey / testimony
FF4	Farmer investment levels (e.g. equipment purchase) / survey / testimony
FF5	Survey / testimony
FF6	Survey / testimony
FF7	Agriculture productivity and growth data
FF8	Survey / testimony
FF9	Bank data / survey / testimony
MD1	Exchange and intermediary education seminar & course attendance data / survey / test
MD2	Education seminar & course content / survey / testimony
MD3	Survey / testimony
MD4	Survey / testimony
MD5	International trade flows / exchange regionally originated transaction and delivery vol
MD6	Export volumes, and volumes by destination
MD7	Survey / testimony
MD8	Data on rural usage of internet and other technologies / survey / testimony
MD9	Survey / testimony
MD10	Broker data on location of clients and terminals
MD11	Data on ICT investment and infrastructure
MD12	Service provider data / survey / testimony
MD13	Exchange and service provider data / survey / testimony
MD14	Service provider data / survey / testimony
MD15	Exchange product and service portfolio
MD16	Employment data
MD17	Tax revenues originating from exchange transactions, deliveries or from employees
MD18	Survey / testimony

Annex 6. How hedging works: simple strategies using futures and options contracts

(i) Hedging using futures contracts

A futures contract is effectively a standardized forward contract, which represents an obligation to make or take delivery of a fixed quantity and quality of a commodity at a specific location. Unlike forwards, however, futures contracts do not often result in physical delivery. Instead, they can be offset by an equal and opposite contract before the delivery date.

Hedging using futures contracts is the practice of reducing exposure to price risk by shifting that risk to another market participant with an opposite risk profile, or to an investor willing to accept the risk in the hope of profiting from correct anticipation of market price movements.

It should be noted, however, that although the hedger is protected from losses caused by unfavourable price movements, the opportunity to make windfall gains from favourable price movements is also foregone.

Making a hedge requires setting up a position in the futures market that is equal but opposite to a position in the cash market. A loss in one market should be offset by a gain in the other market:

- A "long hedge" involves buying futures contracts to protect against increasing prices in the spot market – thus, a cardamom exporter looking to purchase cardamom in three months' time would buy cardamom futures contracts. If the price goes up in the spot market, the manufacturer would have to pay more for the cardamom. However, that increase in costs would be offset by a windfall gain in the futures market (and vice versa). Therefore, the long hedge is an ideal tool for a purchaser who is looking to *lock in the cost of raw materials*. This, in turn, is useful to ensure that the purchaser is not left with a shortfall in financing when it comes to purchasing the raw materials, and also for the purposes of forecasting, planning and budgeting.

- A "short hedge" involves selling futures contracts to protect against falling prices in the spot market – thus, a cardamom producer looking to sell cardamom in three months' time would sell cardamom futures contracts. If the price goes down in the spot market, the producer would receive less for the cardamom. However, that reduction in income would be offset by a windfall gain in the futures market (and vice versa). Therefore, the short hedge is an ideal tool for a producer who is looking to *lock in a price for a crop at time of harvest, or alternatively a means to lock in the value of stored inventory until sale at a time of more attractive prices.* This is useful to guarantee the producer a minimum return on production, and also to provide a higher degree of certainty about the level of expenditure and investment that could be incurred while still remaining profitable.

Hedging is effective because spot and futures prices generally move in tandem and converge as the contract nears expiry. Even though the differential between the spot and futures prices – known as the "basis" – may widen or narrow, the risk of an adverse change in this relationship ("basis risk") is usually significantly lower than holding an unhedged position in the spot market. However, it is due to the presence of basis risk that it is very rare to attain what is called a perfect hedge, where futures and spot markets offset each other exactly.

(ii) Hedging using options contracts

An options contract is one that gives the options buyer the right, but not the obligation, to buy or sell a futures contract at a specified price (the "strike price") at or before some later date (the "expiry date"). To obtain such a contract, the buyer needs to pay an "options premium" upfront to the seller of the options contract – the buyer's maximum loss is limited to this premium. The seller of an option receives this premium, but the potential loss is theoretically unlimited. (Where options are exchange-traded, the options premium is determined through trading on the open market.)

For a commodity producer, the purchase of a put option effectively sets a minimum price – the strike price – which the producer receives. If the price dips below that level in the period prior to the expiry of the options contract, the producer is able to exercise his/her option to sell at the guaranteed minimum price level. He/she thereby receives a price that is higher than the prevailing market rate.

For a commodity purchaser, the purchase of a call option effectively sets a maximum price – the strike price – which the purchaser must pay for the commodities he/she needs. If the price rises above that level in the period prior to the expiry of the options contract, the purchaser is able to exercise his/her option to buy at the guaranteed maximum price level. He/she thereby pays a price that is lower than the prevailing market rate.

Therefore, hedging using options contracts may be likened to a form of insurance, where the purchaser of the option pays a premium to protect against a possible loss. There are four main reasons why options are often more suitable than futures as hedging instruments for farmers:

- Options buyers can protect against unfavourable price movements while still benefiting from favourable ones;
- The maximum cash outlay is fixed at time of purchase, providing certainty on the cost and cashflow implications of taking the position in the market;
- At their most straightforward, options are easier for cash-poor or resource-constrained entities – such as small-scale farmers – to understand and use;
- At a more advanced level of sophistication, options positions can be structured to provide risk management strategies that are highly customized to an entity's requirements (collars, straddles and strangles are just some of the possibilities).

However, the use of options may also have some drawbacks For example, options premiums may be most expensive at the time when they are most needed. In this respect, there may be scope for Governments to subsidize market-determined options premiums for small-scale farmers, or for financial institutions to provide financing – subsidized or otherwise – to support farmers in the purchase of options premiums. Finally, as they are highly flexible instruments, there are a range of possibilities for Governments, financial and microfinance institutions, and other intermediaries to develop tools customized specifically for small-scale farmers. It should also be pointed out that a functional market for exchange-traded options depends on a liquid futures market. It also depends on the presence in the market of options sellers (often known as "options writers"). These are usually financial institutions that have the level of sophistication required to competently manage the risk exposure that arises from the sale of options.

Annex 7. UNCTAD profile, papers and publications

Organizational profile

Established in 1964 as a permanent intergovernmental body, the United Nations Conference on Trade and Development (UNCTAD) is the principal organ of the United Nations General Assembly in the field of trade and development. It is the focal point within the United Nations for the integrated treatment of development and interrelated issues in the areas of trade, finance, science and technology, investment and sustainable development.

UNCTAD's main goals are to maximize the trade, investment and development opportunities of developing countries, to help them face the challenges that arise from globalization, and to integrate them into the world economy on an equitable basis. UNCTAD pursues its goals through research and policy analysis, intergovernmental deliberations, technical cooperation, and interaction with civil society and the private sector.

UNCTAD's membership currently stands at 192 member States. Many intergovernmental and non-governmental organizations have observer status and participate in its work. The secretariat of UNCTAD is located in Geneva, Switzerland, and its 400 staff members form part of the United Nations Secretariat.

More information can be found at: http://www.unctad.org

UNCTAD's contribution on commodity exchanges

UNCTAD is the leading international organization supporting the establishment and development of commodity exchanges and associated institutions (such as collateral managers and regulatory agencies) in developing countries and countries with economies in transition. Over the past 15 years, the UNCTAD secretariat has built up a solid record of providing support across two main dimensions:

- **Direct technical assistance:** Both for creating new exchanges, and for improving the performance of existing exchanges (including providing assistance to design new contracts), with involvement in initiatives in the Dominican Republic, Ghana, Kazakhstan, India, Indonesia, Malaysia, Nigeria, the Russian Federation, Sri Lanka, Turkey and Ukraine, as well as advising on and supporting the creation of the proposed Pan-African Commodities and Derivatives Exchange – a regional exchange for Africa;

- **Research, policy advice and awareness-raising**: UNCTAD has also boosted awareness about, and understanding of, the potential role of commodity exchanges through publications, presentations and the organization of conferences, including a major networking event – the Emerging Markets Forum – which was introduced in 1999 as an addition to the Swiss Futures and Options Association's annual Bürgenstock conference (one of the world's major future industry meetings).

As the only international organization that has a comprehensive mandate on commodities and a proven track record of over 40 years of innovative and often groundbreaking work, UNCTAD is ideally placed to overcome the trust gap that still often exists between the public and private sectors in developing countries, and which hinders investments in trade-related institutions.

Therefore, the organization has been able to work productively both with governments and with the private sector, to create on the one hand an environment that is conducive to commodity-exchange success, and on the other, an acceptance that a functional commodity exchange needs sound regulation. An organization such as UNCTAD brings a measure of impartiality to discussions on the use of modern risk-management and financing tools in the commodity sector, and thereby helps potential users of these tools to feel more comfortable about using them. Its core role is that of an "honest broker", informing those active in the commodity sector of the new possibilities open to them, assisting in the considered evaluation of the benefits of new tools and the implications of their use.

Details about the work programme of the Commodities Branch, in the area of commodity exchanges and beyond, can be found at: http://www.unctad.org/commodities

Related papers and publications

Commodity Exchanges and their impact on the trade of developing countries. UNCTAD, 1983. (TD/B/C.1/248)

Contribution to the improvement of the functioning of commodity markets, analysis of ways of improving the efficiency and use of existing mechanisms for the management of risks arising from commodity price fluctuations. UNCTAD, 1993. (TD/B/CN.1/10)

A survey of commodity risk management instruments. UNCTAD, 1993. (UNCTAD/COM/15)

Technical and regulatory conditions influencing participation in, and usage of, commodity exchanges by both buyers and sellers of commodities. UNCTAD, 1993. (UNCTAD/COM/16)

Risk distribution after liberalization of commodity marketing and problems of access to risk management markets for developing-country entities – illustrated by the case of coffee in Africa. UNCTAD, 1994. (TD/B/CN.1/GE.1/2)

Counterpart and sovereign risk obstacles to improved access to risk management markets: issues involved, problems and possible solutions. UNCTAD, 1994. (TD/B/CN.1/GE.1/3)

Feasibility study on a worldwide pepper futures contract. UNCTAD, 1995. (UNCTAD/COM.64)

Guidelines for facilitating access to risk management markets through the stimulation of local and regional exchanges: the case of cotton in the Near East/Commonwealth of Independent States/Pakistan. Dr. Sebahatin Gazanfer, 1995. (UNCTAD/COM/65)

Minerals and fuel price risks in Southern Africa and possibilities for risk management. UNCTAD, 1995. (UNCTAD/COM/69)

New types of non-trade-related participation in commodity futures markets. UNCTAD, 1996. (UNCTAD/COM/83)

Company control and management structures: the basic requirements for a sound use of market-based risk management instruments. UNCTAD, 1996. (UNCTAD/ITCD/COM/Misc.1)

Managing price risks in India's liberalized agriculture: can futures markets help? World Bank/UNCTAD, 1996. (World Bank report no. 15453-IN)

Price-risk management in the fuels sector: a manual. UNCTAD, 1996. (UNCTAD/COM/Misc.100)

Price-risk management in the metals sector: a manual. UNCTAD, 1996. (UNCTAD/COM/Misc.101)

Emerging commodity exchanges: from potential to success. UNCTAD, 1997. (UNCTAD/ITCD/COM/4)

Government policies affecting the use of commodity price-risk management and access to commodity finance in developing countries. UNCTAD, 1997. (UNCTAD/ITCD/COM/7)

An integrated approach to the management of production and marketing risks in the primary sector of developing countries. UNCTAD, 1997. (UNCTAD/ITCD/COM/8)

The feasibility of a tropical plywood futures contract. UNCTAD, 1998. (UNCTAD/ITCD/COM/12)

A survey of commodity risk management instruments. UNCTAD, 1998. (UNCTAD/ COM/15/Rev.2)

Examination of the effectiveness and usefulness for commodity-dependent countries of new tools in commodity markets: risk management and collateralized finance. UNCTAD, 1998. (TD/B/COM.1/EM.5/2)

New strategies for a changing commodity economy: the use of modern financial instruments. Selected papers prepared for the "Partners for Development" summit organized by UNCTAD and the City of Lyon. 9–12 November 1998.

The global trading village: mutual benefits for the international online trading community and developing countries. Twenty-first Bürgenstock meeting. UNCTAD, 2000.

Casanova, J. The role played by risk management and clearing systems in the economy of future exchanges and ECNs. Twenty-first Bürgenstock meeting. 2000.

Imo, C. Online brokerage: status and trends. Twenty-first Bürgenstock meeting. 2000.

Overview of the world's commodity exchanges, 2001. Twenty-second Bürgenstock meeting. UNCTAD, 2001.

Farmers and farmers' associations in developing countries and their use of modern financial instruments. UNCTAD, 2002. (UNCTAD/ITCD/COM/35)

Commodity exchanges around the world. Twenty-third Bürgenstock meeting. UNCTAD, 2002.

Roche, J. Mobile trading comes of age. Twenty-third Bürgenstock meeting. 2002.

A primer on new techniques used by the sophisticated financial fraudster: with special reference to commodity market instruments. UNCTAD, 2003. (UNCTAD/DITC/COM/39)

Overview of the world's commodity exchanges, 2004. UNCTAD, 2005. (UNCTAD/DITC/COM/2005/8)

Progress in the development of African commodity exchanges. UNCTAD, 2005. (UNCTAD/DITC/COM/2005/9)

The world's commodity exchanges: past, present, future. Joint publication by UNCTAD and the Swiss Futures and Options Association for the twenty-seventh international Swiss Futures and Options Association Bürgenstock conference, September 2006.