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India Taking Agriculture to the Market

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CURRENCY EQUIVALENTS

Currency unit: Indian rupee (Rs) (annual average)

2000: US\$ 1 = Rs 47.0	2002: US\$ 1 = Rs 48.40	2004: US\$ 1 = Rs 44.93
2001: US\$ 1 = Rs 47.69	2003: US\$ 1 = Rs 45.95	2005: US\$ 1 = Rs 44.27
2006: US \$1 = Rs 45.13	2007: US\$1 = Rs 40.13	

FISCAL YEAR (FY)

April 1–March 31

Acronyms and Abbreviation

AEZ	Agriculture Export Zone	kg	Kilogram
AGDP	Agricultural gross domestic product	km	Kilometers
APEDA	Agricultural and Processed Food Products Export Development Authority	MoA	Ministry of Agriculture (India)
APM	Agricultural Produce Marketing (Act)	MoFPI	Ministry of Food Processing Industries (India)
ATMA	Agricultural Technology Management Agency	MoRD	Ministry of Rural Development
CET	Central excise tax	MRL	Maximum residue limit/level
CST	Central sales tax	NGO	Nongovernmental organization
EC	European Commission	NHB	National Horticulture Board
EDB	Ethylene dibromide	no.	Number
EU	European Union	NRC	National Research Centre (India)
EurepGAP	Euro-Retailer Produce Working Group for Good Agricultural Practices	NSSO	National Sample Survey Organization (India)
FDI	Foreign direct investment	OECD	Organisation for Economic Co-operation and Development
FOB	Free on board	OIE	World Organization for Animal Health
FPO	Fruit Products Order	PFA	Prevention of Food Adulteration (Act)
GAP	Good agricultural practices	R&D	Research and development
GCA	Gross cropped area	Rs	Rupees
GDP	Gross domestic product	SAARC	South Asian Association for Regional Cooperation
GHP	Good hygiene practices	SME	Small and medium enterprise
GMP	Good management practices	SPS	Sanitary and phytosanitary metric ton
GOI	Government of India	t	metric ton
ha	Hectares	UAE	United Arab Emirates
HACCP	Hazard analysis and critical control point	UK	United Kingdom
HH	Household	USA	United States of America
HWT	Hot water treatment	USAID	United States Agency for International Development
ISO	International Organization for Standardization	VAT	Value-added tax
ITC	India Tobacco Company Ltd.	VHT	Vapor heat treatment
		WTO	World Trade Organization

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INDIA

Taking Agriculture to the Market

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Executive Summary

Overview

Policy makers in India recognize the importance of well-functioning markets to agricultural growth, food security, and broad-based rural development. Markets facilitate the commercialization and diversification of farming, and they are essential for efficiently bringing food and agricultural products to domestic and international consumers. Well functioning domestic markets can reduce the cost of food and assure stability of supply, which as the recent global food crisis has highlighted, are key to assuring the food security of poor and non-poor households. They also open opportunities for greater value-addition and employment throughout the economy. In this regard, the Prime Minister of India, Dr. Manmohan Singh, noted during the Agriculture Summit 2005 in New Delhi that “an important commitment of the government is to integrate the domestic market to all goods and services. The time has come for us to consider the entire country as a common or single market for agricultural products. We have to systematically remove all controls and restrictions....”

The rapid growth of the Indian economy is bringing new forces for change in agricultural marketing and processing systems. Changes in consumer demand are fueled by rising incomes, increasing urbanization, a growing middle class demanding more diversified and higher-quality food, more working women demanding access to prepared or processed foods and more convenient shopping under one roof, and increased exposure to products through wider media penetration (domestic and international television, cable, and internet). These forces in turn drive changes in the structure of marketing and encourage agricultural diversification.

Critical weaknesses have been exposed in the agricultural marketing system as a result of these rapidly evolving domestic and international developments. For most commodities, the agricultural marketing system—defined broadly to include physical assembly, handling, storage, transport, processing, wholesaling, retailing, and export of agricultural commodities and associated infrastructure and support services—remains fragmented and uncoordinated, subject to multiple layers of intermediaries, with markets that have inadequate infrastructure and facilities, and supply chains subject to high wastage and losses. In addition, the tighter international sanitary and phytosanitary (SPS) standards promulgated by governments and the private sector constitute an additional hurdle for India’s agricultural exports to overcome.

Experiences in many developed countries (in the USA and OECD, for example) and developing countries (such as Brazil, China, Indonesia, Malaysia, and Thailand) illustrate a natural evolution in how agricultural marketing systems are organized and managed. This evolution is driven by changing socioeconomic conditions resulting from urban growth, rising consumer incomes, concerns about quality and food safety, increased agro-processing, and improved infrastructure and services. While the traditional marketing structure—in which fresh agricultural produce moves from farms to rural assembly/primary wholesale markets, secondary wholesale markets, retail markets, and finally to consumers—may persist, new forms of coordinated supply chains may emerge, owing to the economic and competitive need to reduce logistical costs, meet consumers’ rising demand for more value-added products, and at the same time address consumers’ concerns about convenience, quality, and food safety. As noted, such forces for change are becoming evident in India.

The development of efficient and competitive marketing systems in India that can effectively respond to these domestic and global changes will require action on a number of fronts in the short to medium term. Given the important roles of the public and private sector in developing the agricultural marketing system, at this juncture the government needs to reorient its strategy to focus on:

- Continuing reforms in the policy and regulatory environment to eliminate the remaining obstacles to more effective market operations and the development of more efficient supply chains.
- Rationalizing the roles and activities of the large number of government agencies involved in agricultural marketing development to foster greater coordination, build synergies, eliminate duplication of effort, and increase the focus on facilitation and regulation rather than direct intervention.
- Reviewing and rationalizing public expenditures in the sector. Public expenditures should focus increasingly on financing public goods and services (such as markets, market information and extension, food safety, complementary rural infrastructure, and capacity building) that facilitate increased private sector participation. The numerous grant schemes designed to foster private sector investment should be reviewed and rationalized to eliminate duplication and maximize impact.

Policy and Regulatory Environment: Remaining Steps

Complete the deregulation of the agricultural marketing system. Since the late 1990s, the Government of India (GOI) has implemented a vast array of policy reforms that have hastened the growth and development of the agricultural marketing system. The next steps in moving forward are to permanently remove storage and movement restrictions on all commodities and enforce them only during emergencies, eliminate the small-scale industry reservation on the remaining agro-industrial activities, and allow phased entry of foreign direct investment (FDI) in food retailing (for example, through joint ventures with local companies) (table 1). Parliamentary approval of the Forward Contracts (Regulation) Amendment Bill 2006, which will remove the ban on trading of commodity options, will be critical milestones.

Nationwide adoption of the model Agricultural Produce Marketing (APM) Act is an equally crucial milestone in the reform process. Broad-based adoption of the model Act is essential for building an integrated national market, which to date has been adopted by only 15 states and union territories. But institutional reforms within the Mandi complex are also necessary to improve the management and quality of services provided by the regulated market network. Such reforms could include subcontracting market management to the private sector or privatizing markets. The Mandi Board could concentrate on planning and on regulating the wholesale marketing network, thus eliminating the conflict of interest that currently arises when it acts as both operator and regulator. The removal of storage and movement controls will also enable India's commodity futures markets to operate more effectively. These markets could play an important role in enabling farmers to hedge their price risks in the context of a more liberalized market.

Rationalize the tax structure governing wholesaling, retailing and agro-processing. Changes in the tax structure will improve the incentives for private sector investments and participation. The adoption of VAT by state governments helped considerably in reducing the impact of cascading state taxes across the agricultural supply chain, but the central excise tax on a large number of processed agricultural and food products remains high. This tax increases the cost to consumers and reduces the competitiveness of Indian products overseas.

Complete the unfinished agenda for rationalizing the roles of government agencies. As mentioned, a multiplicity of government agencies are involved in the agricultural marketing system. Functions and schemes overlap significantly. At least 39 central government agencies promote agricultural marketing development, either broadly or with respect to specific commodities. Most of these agencies offer investment grants to the private sector, but weak coordination of these efforts prevents greater synergies in development impact and in some instances leads to duplication. For example, three government ministries offer grants to invest in cold storage facilities; each grant scheme has different terms and conditions. Clearly these schemes should be rationalized. Greater

coordination should be fostered among the agencies that implement them to promote greater consistency, minimize duplication, more effectively track the level of support, and document the impact of these investments..

Rationalizing Public Investments in Agricultural Marketing: Towards a New Paradigm

Improve market infrastructure and services. The limited accessibility and inadequate facilities of existing markets are major constraints to efficient operation. In the medium term, it is expected that a large share of agricultural produce will continue to flow along traditional marketing channels. The continuing pressure on these traditional channels highlights the need to fill the significant gap in market infrastructure. Efforts over the longer term, however, have to be framed within a holistic agricultural market development strategy. In formulating a development plan to expand market infrastructure, two major issues are of concern. First, in assessing infrastructure needs, a comprehensive assessment of current and future marketing needs (that is, growth in production and demand, expected volumes of marketed throughput, and product quality standards), nationally and at the state level, is required. This assessment will necessarily involve careful consideration of factors driving the development of alternative marketing arrangements to meet diverse and rapidly changing local needs, such as direct purchase, contract farming, and vertical integration trends. Market development, therefore, may call for a range of options, from setting up village or district-level markets, rural hubs, to establishing general or specialized wholesale markets or terminal markets, to facilitating the development of more direct marketing arrangements. Second, careful consideration is required as to whether the government or private sector should take the lead in implementing the various market development activities.

Improving the operations and facilities of regulated markets requires a closer review of how the regulated market system is managed, and particularly of how it uses the significant revenues generated from the marketing cess and other fees. It will be critical to ensure that more of these resources are used to improve market facilities (for example, to provide price information systems, adequate shops, parking, drainage, improved roads, security within the market, public toilets, canteens, and hostels for farmers). Greater transparency regarding the actual revenues generated by the mandi system and the allocation of expenditures is critical. The annual audit of accounts and their public disclosure should become mandatory for all Mandi Boards.

Strengthen grades and standards and food safety. While grades governing the quality of agricultural produce function best if adopted voluntarily, as they are set primarily to facilitate trade and are not a regulatory instrument, standards for food safety should be mandatory. The public sector has a critical role to play in ensuring food safety, not only in terms of policy making and regulation, but also in providing information and training (for example, information on international standards or risk assessment training), key infrastructure for prevention and control (such as laboratories for disease monitoring and surveillance or food testing), and research (for example, to develop hazard control strategies).

Improve access to credit. Poor access to credit is cited by farmers, traders, processors, and exporters as a major constraint to their production and marketing activities. Policy actions that could improve access to credit encompass a number of areas, including: legal and regulatory reforms and restructuring of rural banks, and broader adoption of innovative products, such as group lending, kisan credit cards, and financial and operational leasing. Policy reforms are needed to improve the overall regulatory and legal framework for rural finance, in particular for rural banks and rural credit cooperatives. Priority areas for action include: (1) enhancing the regulatory oversight and supervision based on internationally accepted prudential norms; (2) reducing government control and ownership (for regional rural banks this would require an amendment of the existing law, and for rural cooperatives it would require state governments to adopt the model Cooperatives Law); (3) strengthening corporate governance and improving management and staff skills, particularly in credit decisions and risk assessment and management; and (4) strengthening the legal framework to make it

easier for regional rural banks and credit cooperatives to recover small loans and to facilitate the use of land as collateral.

Strengthen rural road connectivity. Public investment in rural roads, by increasing rural connectivity, can have a significant impact on farmers' access to markets, the development of supply chains, and overall marketing efficiency, in addition to other beneficial impacts on rural households. In implementing the Bharat Nirman, it will be important for the Ministry of Rural Development (MoRD) to take the lead in implementing essential policy and institutional changes as well as in financing, technology transfer, human resource development, and monitoring of rural road development in different states. Panchayat Raj bodies at the district, block, and village levels can play a pivotal role in the construction and management of rural roads. Community participation offers significant potential for mobilizing the support of local communities in generating resources, acquiring land, and tailoring rural road programs to local needs.

Strengthening Farmers' Linkages to the Supply Chain

Contract farming and supermarket procurement arrangements are two supply chain arrangements that are gaining ground amid active debate in India. While there is growing appreciation, especially among entrepreneurs engaged in agricultural trade and agro-processing, of the potential benefits of more coordinated supply chains, an important concern is whether small-scale farmers can equally benefit from these arrangements. International experience provides useful lessons for fostering greater inclusion of small-scale farmers. Notably, many of the lessons emerging from this experience, such as successful approaches for strengthening farmers' bargaining power or improving their technical capacity to meet consumers' product and quality requirements, are equally relevant for farmers who market produce through traditional channels.

Recent experience in India indicates that contract farming and supermarket procurement approaches will have to involve small-scale farmers in the medium term, because the farm structure obliges them to do so. Experience in several countries in East Asia and Latin America shows that land will not be the most important determinant of participation; individual capital/labor ratios and access to public infrastructure will be more important. The small-scale farmers who are "rich" in financial and human capital assets will be able to participate in the demanding new supply chains, which highlights the importance of improving farmers' range of assets to meet the new requirements of more coordinated supply arrangements.

Approaches to promote equitable participation by large- and small-scale farmers include: (1) facilitating entry and competition among buyers (for example, improving the rural infrastructure or establishing collection centers to reduce the transaction costs involved in sourcing from small-scale farmers); (2) organizing farmers into formal or informal groups to meet the volume requirements and strengthen farmers' bargaining power; (3) enhancing farmers' capacity to adopt improved production and postharvest techniques to meet the required higher quality standards; (4) assisting farmers to obtain the capital to make on-farm improvements and other required investments (for example, in irrigation, greenhouse, grading, or cooling facilities) and acquire essential national and international certifications; (5) training farmers and buyers about their rights and obligations under contract farming arrangement and in the design of contracts; and (6) developing institutions that assist farmers to settle contract disputes (such as commodity or market associations). In some countries, public-private partnerships have been instrumental to the success of new supply chain arrangements (for example, in providing extension and technical assistance to improve the quality and safety of produce and accreditation of farmers).

The Ministry of Agriculture's AGMARKNET program, which collects selling prices at regulated markets and disseminates them through the Internet, is improving access to real-time price information by market users. In the future, this program could be expanded to include information from nonregulated markets. Innovative ways of connecting to these databases using advances in

communications technology (dial-up services, mobile phones, or rural kiosks) could be explored. Strengthening the public and private extension system can play an important role in helping farmer access to production and market information. A number of private firms in India offer extension services to farmers, although these generally are linked to input supply or output purchasing/contract farming arrangements. The public extension system, on the other hand, is falling behind. It must be reoriented away from traditional supply-driven, production-focused approaches and towards more market-oriented approaches. Delivery of public extension services could be improved by introducing decentralized strategic planning, with the active participation of farmers and other stakeholders.

Strengthening Capacity to Meet Sanitary and Phytosanitary (SPS) Standards

There is a need for the government to move towards a more cost-effective and strategic approach to SPS standards. Such an approach would involve placing somewhat less emphasis on mandatory controls, inspections, and testing and considerably more emphasis on promoting agro-food system stakeholder awareness about SPS management; developing and promoting adoption of good practices (such as good agricultural practices, good manufacturing practices, and hazard analysis and critical control point systems) throughout the supply chain; and facilitating effective individual and collective action by private firms, farmers, service providers, and others. It is often assumed that the management of food safety and agricultural health is predominantly the responsibility of the public sector. Indeed, many critical regulatory, research, and management functions are normally carried out by governments, and in a variety of circumstances importing countries require that certain functions, such as export certification, be performed by a designated “competent authority” in the public sector. However, the private sector can also play an important role in setting standards and in actual compliance with food safety and agricultural health requirements. Capacity building in the private sector can complement (or even substitute for) public sector capacity, such as the investment in accredited laboratory testing facilities.

Conclusion

India’s rural development strategy faces the challenge of meeting rapidly changing needs in rural areas, nationwide, and globally. Concurrent rapid growth in the agricultural and rural nonfarm sectors is an integral and important part of overall economic development, because these sectors jointly, directly, and indirectly help generate opportunities for greater employment and income growth. Removing policy and regulatory barriers so that those who choose to remain in agriculture can enhance their productivity and competitiveness and achieve the highest returns from their endeavors is critical for maximizing the agricultural sector’s contribution to overall economic growth. It is particularly important because the majority of India’s workforce remains dependent on agriculture. At the same time, growth in the rural nonfarm sector (industry and services) will not only offer alternative employment opportunities but will create a strong foundation for consumer demand in rural areas. An increase in rural-based demand can, in turn, stimulate growth in the agricultural and other sectors of the economy. Achieving such broad-based growth, however, will require vigilant adjustment to rapidly changing market opportunities and challenges, internally and globally.

A dynamic agribusiness sector and agricultural markets that integrate rural areas into the state and national economy will be important drivers for agricultural and rural growth, food security, and rural poverty reduction in India. As noted in the 10th Five Year Plan, fostering an efficient and competitive agricultural marketing system is indispensable for the overall development of the country’s economy. International experience shows that modern and efficient agricultural marketing systems and the consequent improvements in competitiveness are crucial catalytic forces for directly and indirectly promoting growth and poverty reduction. Modern marketing systems reduce the cost of food, reduce supply uncertainties, and improve the diets of the poor and non-poor in urban and rural areas. In opening greater opportunities for farmers and other entrepreneurs, they help generate

employment and consequently raise and diversify income potential in rural and urban areas. Finally, they enhance farmers' incentives to increase productivity and link more closely into local, national, and international markets. India has made great strides in the last five years in improving the environment for an efficient and competitive agricultural marketing system to grow and develop. The challenge now is to sustain this momentum over the medium to longer term, so that the agricultural sector and society as a whole can truly capture the multiple benefits of well-functioning and efficient agricultural marketing systems.

Table 1: Fostering efficient and competitive agricultural marketing systems: Policy options

Main constraints	Strategic priorities	Policy options		Possible responses by private sector (farmers, cooperatives, entrepreneurs)
		Government of India	State governments	
I. Creating the enabling environment				
Weak coordination and overlapping functions among large number of government agencies. Overlapping government investment schemes.	Readjusting strategy for agricultural marketing system development.	<ul style="list-style-type: none"> • GOI in collaboration with state governments, private sector, and other stakeholders to review progress in implementing agricultural marketing strategy and explore options to: <ol style="list-style-type: none"> 1. Rationalize roles and activities of large number of government agencies. Explore option for formal institutional mechanism to foster greater coordination. 2. Rationalize government expenditures on the large number of investment grant schemes. Consider options for targeting support and phasing out in the medium term. 3. Prioritize types of specific complementary investments in public goods and services to support market development (see part II below). 	<ul style="list-style-type: none"> • Explore option for formal institutional mechanism to foster greater coordination across state departments involved in agricultural marketing development. 	
Overregulation of marketing system.	Reforming policy and regulatory environment to foster efficient marketing chain.	<ul style="list-style-type: none"> • Remove remaining domestic trade controls (storage and movement restrictions) and institute only in emergencies, eliminate small-scale industry reservation. • GOI Parliamentary approval of the Forward Contracts (Regulation) Amendment Bill 2006. • Rationalize taxation structure in the agro-processing and retailing sector. • Permit phased FDI through joint ventures with local firms. 	<ul style="list-style-type: none"> • Adoption of model APM Act. • Improve mandi management: increased transparency of revenue generation and market operation through regular audits. • Reorient revenues towards market development; explore public-private partnerships, including such options as contracting market management to the private sector or privatizing markets. • Separate regulatory and operational functions of Mandi Board to remove conflict of interest. 	

Table 1 (cont'd.)

Main constraints	Strategic priorities	Policy options		Possible responses by private sector (farmers, cooperatives, entrepreneurs)
		Government of India	State governments	
II. Strengthening market infrastructure and services				
Inadequate marketing infrastructure, facilities, and services.	Improving access to markets and services.	<ul style="list-style-type: none"> • Prioritize market infrastructure development support, explore options for public-private partnerships. • Support investments in rural roads and state-level policy and institutional changes to ensure longer-term operation and maintenance. 		<ul style="list-style-type: none"> • Provide complementary assistance for private sector development of markets (access to land, application procedures).
Conflicting government regulations governing food processing. Weak domestic food safety capacity.	Reforming regulatory framework for food processing. Strengthening food safety.	<ul style="list-style-type: none"> • Support awareness campaign and capacity building throughout private sector on good agricultural, hygiene, and manufacturing practices (for example, raise public awareness of food safety risks through various media, promote good agricultural practices on pesticide use through extension agents, and include such information in the curricula of public agricultural/technical institutes and universities). • Strengthen disease surveillance and control systems. • Accredite private laboratories and conduct reference/consistency testing. • Undertake coordinated market surveillance programs to gauge the incidence of various food safety hazards in the domestic agro-food system. • Improve water supply and sanitation. 		<ul style="list-style-type: none"> • Develop in-house management practices to minimize food safety risks. • Develop industry-wide codes of good practice, industry monitoring, and oversight.
Limited access to capital by farmers, traders, processors.	Improving access to rural credit.	<ul style="list-style-type: none"> • Amend existing laws to reduce government control and ownership of regional rural banks; strengthen regulatory oversight over, and support restructuring of, rural banks. 	<ul style="list-style-type: none"> • Adopt model Cooperative Act. 	<ul style="list-style-type: none"> • Under contract farming arrangements, supply inputs, help farmers obtain loans and crop insurance.
		<ul style="list-style-type: none"> • Support innovative approaches (scaling up of microfinance models, group lending, kisan credit card, financial/operational leasing). 		
	Developing effective linkages by farmers to supply chains	<ul style="list-style-type: none"> • Increase private entry and competition through improved infrastructure (roads, electricity), assist in setting up collection centers/assembly markets. • Facilitate organization of producer organizations. • Train farmers and buyers in contract negotiation/contract design. 		<ul style="list-style-type: none"> • Organize producer organizations, collection centers. • Supply inputs; help farmers obtain loans and crop insurance. • Educate farmers about their rights and obligations under contract farming.
	Enhancing farmers' capacity to meet market standards.	<ul style="list-style-type: none"> • Support strengthening of market information systems. • Strengthen agricultural research on postharvest management. 	<ul style="list-style-type: none"> • Improve extension service delivery, foster greater market orientation—for example, through the Agricultural Technology Management Agency (ATMA) approach. • Strengthen agricultural research on postharvest management. 	<ul style="list-style-type: none"> • Provide technical advice to farmers (possibly in partnership with government extension system).

Table 1 (cont'd.)

Main constraints	Strategic priorities	Policy options		Possible responses by private sector (farmers, cooperatives, entrepreneurs)
		Government of India	State governments	
IV. Strengthening capacity to meet SPS needs				
Weak capacity to meet tightening international SPS standards.	Influencing “rules of the game.”	<ul style="list-style-type: none"> • Undertake continuous bilateral and multilateral dialogue and periodic negotiations to address emerging constraints or opportunities related to SPS issues. 		
	Strengthening capacity for compliance.	<ul style="list-style-type: none"> • Support awareness campaign and capacity building of private sector on good agricultural, hygiene, and manufacturing practices. • Strengthen SPS and animal health monitoring and surveillance systems. • Accredite private laboratories and conduct reference/consistency testing. • Support research on food safety and agricultural health concerns (for example, field trials to determine alternative pest management approaches or to establish suitable minimum residue levels for crops with market potential; research to improve the quality of planting material). • Support technical, administrative, and institutional change and innovation within the private sector to improve food safety (for example, through public-private partnerships for product innovation and establishing product traceability systems). • Facilitate private sector collective action (creation of active industry/exporter associations) and self-regulation. 		<ul style="list-style-type: none"> • Implement in-house good management practices to minimize food safety, environment and other risks (for example, HACCP principles); develop systems for traceability. • Industry association awareness building and self-regulation.

I. Introduction

A. Overview

Improvements in farmers' productivity and competitiveness and greater diversification of agricultural production are major pillars of the Government of India's (GOI's) poverty reduction strategy, because they offer the means to raise incomes across millions of households that depend on agriculture. The welfare of such households is a major concern, given that more than three-quarters of India's poor are in rural areas, and most of the rural poor depend on agriculture for employment and livelihoods. According to the Census (2001), about 228 million people in rural India, equivalent to 56 percent of the total labor force, are farmers and agricultural laborers. The National Sample Survey Organization (NSSO) estimates that in 2005 direct income from farming accounted for more than 50 percent of farm household incomes. This share is likely to be higher if income from agricultural wages is included. As agricultural growth appears to be slowing, policy makers are concerned about agriculture's prospects for reducing rural poverty. Indeed, the average annual rate of growth of agricultural gross domestic product (AGDP) declined from 3.7 percent during 1985/86–1994/95 to 1.9 percent during 1995/96–2004/05 (table 1.1).

The implications of weakening agricultural performance—especially for the large number of poor, agriculture-dependent households, and especially in the traditional green revolution states and poorest states—have compelled the government to revitalize agriculture. The government's goal, as expressed in the National Agricultural Policy 2000 and 11th Five Year Plan (2007–2012), is to avert the slow down and raise the agricultural growth rate from about 3 percent to 4 percent per year (Ministry of Agriculture 2000; Planning Commission 2006). To achieve this goal, the GOI puts emphasis on increasing agricultural productivity and promoting agricultural diversification. The impetus for diversification also increased in light of India's comfortable foodgrain situation, awareness of the growing and unsustainable fiscal burden of foodgrain and other subsidies, and concerns over the environmental degradation associated with intensive rice-wheat systems (World Bank 2005f).¹

Policy makers recognize the importance of well-functioning markets to agricultural growth and broad-based rural development. Functioning markets are necessary to support the commercialization and diversification of farming and to efficiently and competitively bring agricultural products to domestic and international consumers. Well functioning domestic markets can reduce the cost of food and assure stability of supply, which as the recent global food crisis has highlighted, are key to assuring the food security of poor and non-poor households. They are also essential to fostering more rapid growth in the nonfarm sector (that is, in manufacturing and services) by expanding opportunities for greater value-addition and employment in the economy overall. Greater appreciation of markets' important role in overall economic development has

Table 1.1: Agricultural growth rate in major states, 1985/86–2004/05, constant 1993/94 rupees

Region/state	Average annual AGDP growth rate, %		Rural poverty (headcount %)
	1985/86–1994/95	1995/96–2004/05	2004/05
Northern Region			
Punjab	3.9	2.3	5.9
Haryana	4.6	2.3	9.2
Uttar Pradesh		2.5	25.3
Uttaranchal ^a		1.3	31.7
Eastern Region			
Bihar		3.1	32.9
Jharkand ^a		4.9	40.2
Orissa	0.2	0.8	39.8
West Bengal	5.6	2.9	24.2
Western Region			
Gujarat	6.2	0.6	13.9
Maharashtra	6.4	0.2	22.2
Madhya Pradesh		0.4	29.8
Chattisgarh		-0.4	31.2
Rajasthan	5.2	0.7	14.3
Southern Region			
Andhra Pradesh	4.7	3.3	7.5
Tamil Nadu	6.6	-0.9	16.9
Karnataka	4.7	0.2	12.0
Kerala	5.3	-2.4	9.6
INDIA	3.7	1.9	21.8

Source: AGDP derived from World Bank database and author's calculation. Poverty rate-Planning Commission.

¹ These developments are discussed in detail in World Bank (2005f).

refocused government attention on improving the environment in which efficient agricultural marketing and agro-processing systems can grow and develop.

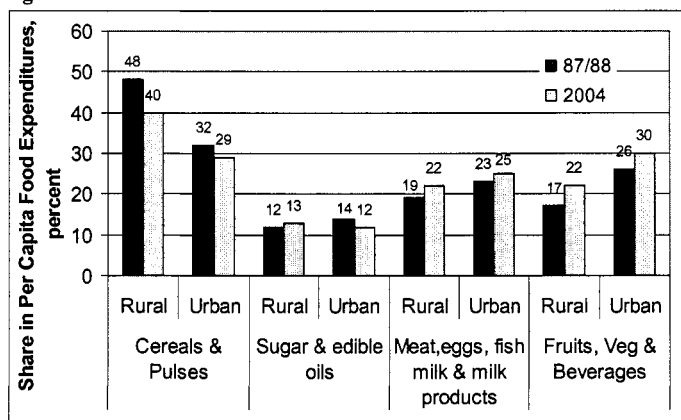
Rapid growth in India's economy has raised incomes and is opening a large domestic consumer base. Sustained economic growth since the 1990s contributed to increasing incomes and urbanization. GDP per capita rose by over 80 percent in real terms, from about 9,079 rupees (Rs) in 1990/91 to Rs 16,586 in 2006/07 (1993/94 rupees). The middle class, about 30% of India's 1.2 billion population, is the fastest-growing income group. Rural poverty rates (headcount) declined

from 39 percent in 1987/88 to 28 percent in 2004/05 (Planning Commission). Income growth in rural areas, with about 75 percent of India's population, has opened a large potential market for goods and services.

Rapid economic growth is also changing the composition of consumer demand. Domestic consumers are diversifying their diets, moving away from cereals and towards higher-value products such as fruits and vegetables, dairy, meat, and fish (figure 1.1). This trend is consistent with expectations, as the expenditure elasticity for these high-value agricultural products is estimated to be three to four times that of cereals (Dev & Rao 2004). Greater female participation in the workforce and higher disposable incomes are driving growth in demand for prepared and semi-prepared foods, which in turn drives the growth of processed food industries (Pingali and Khwaja 2004). Growing consumer preference for shopping convenience under one roof, increased exposure to the media (television, cable, and the Internet), and increased ownership of durable goods such as refrigerators and cars are fostering the growth of modern retailing. Modern retail outlets such as supermarkets and hypermarkets, in turn, are demanding greater efficiency and quality standards in the supply chain (Mukherjee and Patel 2001).

Increased globalization of markets is opening new export markets for Indian agricultural products, both fresh and processed. Within India, the progressive elimination of government export restrictions enabled local entrepreneurs to tap export markets increasingly. Rapid technological advances domestically and internationally in real-time communication (cellular phones, Internet) and transportation (by air and sea) further facilitate these international linkages. Indian agricultural exports grew at an average annual rate of 7.8 percent from 1990/91 to 2005/06 in real terms. India diversified out of its traditional exports of tea, spices, and coffee to export a wider array of horticultural, marine, and livestock products. Between the triennium ending (TE) 1990/91 and TE 2005/06, the value of fresh and processed fruits and vegetables exported by India rose from 84 million US dollar (US\$) to US\$ 550 million in real terms (1993/94 dollars), while exports of marine products rose from US\$ 516 million to US\$ 1.7 billion during the same period (figure 1.2). Globalization also contributes to "diet globalization" within India, where diets no longer conform to traditional local norms but are influenced by international tastes (Pingali and Khwaja 2004).

Figure 1.1: Food consumption in India is shifting from cereals to higher value foods.

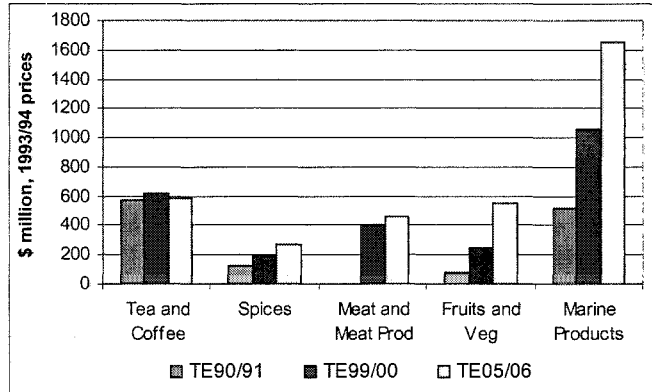


Source: NSSO 1996, 2006b.

B. Challenges in the Agricultural Marketing and Processing Systems

These rapidly evolving domestic and international developments are exposing critical weaknesses in India's agricultural marketing system. For most commodities, the system remains fragmented and uncoordinated, subject to multiple layers of intermediaries, with markets that have inadequate infrastructure and facilities, and a supply chain subject to high losses and wastage. It is common in India to have up to 6 or 7 intermediaries between the farmer and consumer in the marketing of fruits and vegetables (McKinsey 1997). This long supply chain contributes to significant wastage—as much as 40 percent of total fruit and vegetable production, equal to the consumption of the United Kingdom (UK), is wasted (McKinsey 1997). A recent estimate puts postharvest losses in the food chain at about Rs 500 billion per year or about 11 percent of agriculture GDP (Mukherjee and Patel 2005).

Figure 1.2: Agricultural exports are diversifying.



Source: Department of Commerce.

Note: TE – triennium ending.

The tightening of international sanitary and phytosanitary (SPS) standards imposes new hurdles on Indian agricultural exports. Governments, as per the SPS Agreement of the WTO, are free to set their own food safety standards and technical regulations, as long as they are based on scientific principles and are both transparent and nondiscriminatory. In addition to these public SPS standards, the private sector in many countries imposes more stringent SPS standards; one example, adopted by European retailers, is the standards of the Euro-Retailer Produce Working Group for Good Agricultural Practices (EurepGAP), which blend food safety and quality management standards. As a result, a large number of Indian agricultural export shipments in recent years have been rejected in importing countries for failure to meet prescribed standards (for example, for levels of contaminants, product labels, and the use of additives).

Objectives of This Study

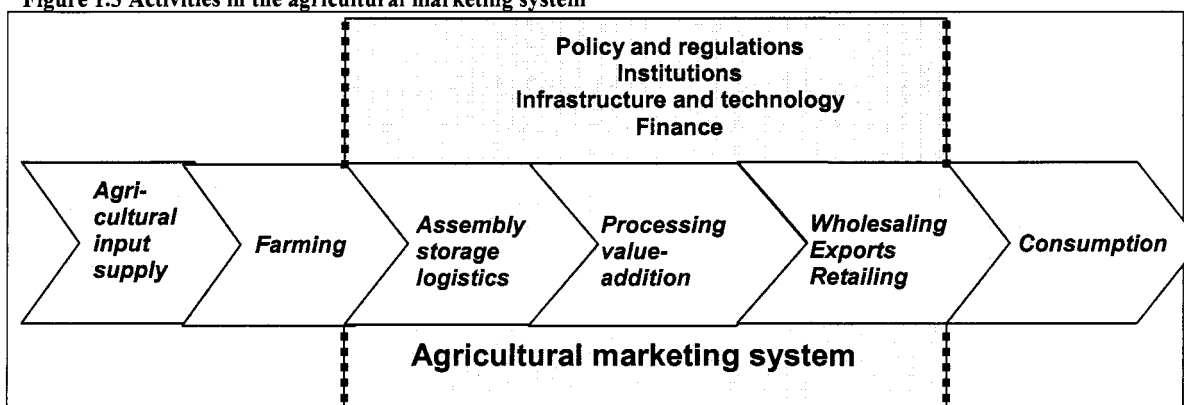
To help the agricultural sector capitalize on emerging market opportunities and address the challenges described earlier, this study aims to: (1) examine the structure, operation, and performance of India's agricultural marketing and processing sectors, with particular emphasis on high-value crops; (2) review the scope and impact of government policies and programs to promote the growth and development of efficient and competitive systems domestically; (3) identify the major bottlenecks and constraints (policy, technical, and institutional) to achieving this goal, and (4) explore options for improving the performance of the agricultural marketing and processing sectors, drawing on national and international experience.

For this study, "agricultural marketing" is defined in the broadest terms—that is, the performance of all activities involved in the flow of products and services from the point of initial agricultural production until they are in the hands of consumers (figure 1.3). Agricultural marketing includes the physical assembly, handling, storage, transport, processing, wholesaling, retailing, and export of agricultural commodities as well as accompanying support services, such as market information, establishment of grades and standards, commodity trade financing, and price risk management. How well the agricultural marketing systems works will depend on the policy and regulatory environment, the functioning of market support institutions, and the availability and accessibility of infrastructure, marketing and processing technologies, and finance.

This study primarily focuses on the marketing of higher-value crops, in support of the government’s emphasis on agricultural diversification. Because the marketing system for higher-value agricultural products is relatively “new” in the Indian agricultural perspective, little is known about the system’s status and performance, especially compared with the marketing of traditional commodities such as rice, wheat, oilseeds, cotton, sugar, and livestock, which local and international researchers have studied extensively.² To overcome the lack of detailed, field-level data on market operations and performance for higher-value crops, this study conducted an agricultural marketing survey in February–May 2005 in four states (Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh), focusing on five crops (maize, potatoes, tomatoes, mangoes and turmeric). The states were selected to illustrate different levels of market development and regions in the country. The five crops were selected in consultation with state agriculture officials to illustrate different marketing challenges. The India Agricultural Marketing Survey collected data through interviews with 1,579 farmers, 1,597 traders, 316 enterprises, market officials in 78 markets, and village leaders in 155 villages. Annex A provides details on the survey design. This report presents the survey findings and also draws from a companion World Bank report, “India’s Emergent Horticultural Exports: Addressing SPS and Other Challenges” (World Bank 2007).

The remainder of this report is organized as follows. Chapter 2 briefly recapitulates the main characteristics of the policy environment for agricultural marketing and agro-processing in India, focusing largely on the reforms of the 1990s and more recent efforts to further the development of the marketing system. The special characteristics of farmers who produce high-value crops and the challenges they face are the focus of chapter 3. Chapter 4 begins by reviewing data on the accessibility, infrastructure, and services of wholesale markets as well as aspects of wholesale trading, such as traders’ sources of information, their sources of credit, and marketing costs and margins. Trends in food retailing and the use of domestic grades and standards are also reviewed. Chapter 5 examines trends in value-addition and exports of high-value agricultural products. Based on the findings in these chapters, chapter 6 synthesizes and reviews policy options for fostering more efficient and competitive agricultural marketing systems in India.

Figure 1.3 Activities in the agricultural marketing system



Source: Authors.

² See, for example, Sharma 1997; Jha and Srinivasan 1999; World Bank 1999a, 1999b, 2000, 2005f; Umali-Deininger and Deininger 2001; Ministry of Consumer Affairs, Food and Public Distribution 2002; Sharma and Gulati 2003; Banerji and Meenakshi 2004; Acharya 2004.

II. Policy Environment for Agricultural Marketing and Processing in the 1990s

Historically, agricultural marketing in India was subject to a large number of regulations. These regulations, most of which derive from the Essential Commodities Act 1955, include controls on private storage, transport, processing, exports, imports, credit access, and market infrastructure development. They also include the small-scale reservation of selected enterprises. These regulations were put into place primarily to ensure a reasonable income for farmers and access to food commodities by consumers at affordable prices.

The government and other stakeholders in the agricultural sector have increasingly recognized that pervasive regulation of domestic marketing is no longer ideal. Such regulation has increased transaction costs, risks, and uncertainty, thus unintentionally harming farmers and the agricultural sector. The resulting large marketing margins have placed downward pressure on farm prices, increased the costs for consumers, and undermined the competitiveness of exports. Marketing restrictions and policies discouraged private investments in marketing infrastructure development, agro-processing, and agro-industry that could expand demand for primary agricultural products as well as generate additional employment in rural areas.

To address these concerns, the GOI over the last five years implemented wide-ranging policy reforms to promote greater efficiency and competitiveness in agricultural marketing. These measures focused on: (1) increasing deregulation, (2) reducing direct and indirect taxation of agricultural marketing and processing, (3) strengthening government capacity to tackle food safety issues, and (4) launching several investment incentive schemes. The government followed a careful pace of reform to avert adverse effects on farmer welfare.

Since the late 1990s, the GOI removed several marketing restrictions. The government lifted storage and transport controls, removed several agricultural commodities from small-scale industry reservation, eliminated controls on cold storage and dairy processing, and formulated the model Agricultural Produce Marketing (APM) Act, which removes restrictions on direct sales by farmers and permits entities outside the government to establish and operate wholesale markets. A new Food Safety and Standards Act, which rationalize the multiple and sometimes conflicting regulations governing food processing and the Warehousing (Development and Regulation) Act, which will facilitate access to trade credit, have recently been approved by parliament. These policy and regulatory reforms are crucial to improving the investment climate in the agricultural marketing system.

The GOI and state governments also took a number of steps to rationalize the high rates of taxation of primary and processed agricultural commodities. All states have adopted the value-added tax (VAT) regime, which rationalizes the high and cascading state sales taxes. Over the last five years, the GOI reduced or eliminated the central excise tax (CET) on several processed agricultural products. Even so, a large share of agricultural and food products remains subject to high CET.

The priority given to agricultural marketing is illustrated by the growing number of government agencies involved in its development. This study identified at least 38 central government agencies involved in market development, and the multiplicity of agencies is resulting in overlapping mandates, functions, and schemes. The growing emphasis on promoting efficient agricultural marketing and agro-processing systems is very much warranted, but it highlights the need for a more coordinated strategy for the sector's development. These issues are elaborated below.

A. Liberalizing Agricultural Marketing

The scope of marketing reforms adopted by the GOI widened and the pace of reform hastened during the last decade. The most critical actions were: (1) in 1998, repeal of the Cold Storage Order 1964, which eliminated the licensing requirement and government control over cold storage fees; (2) in 2002, lifting the licensing requirements, stocking limits, and movement restrictions for wheat, paddy/rice, coarse grains, edible oilseeds, and edible oils, and removing restrictions on access to credit under the Selective Credit Control Policy; (3) also in 2002, amending the Milk and Milk Products Order 1992 to remove restrictions on investments by the private sector in dairy processing and to focus on food safety issues; (4) in 2003, eliminating the ban on futures trading of 54 commodities including wheat, rice, oilseeds, and pulses;³ and (5) since 1997, removing several agricultural products from small-scale reservation (table 2.1).⁴ In 2003, the GOI formulated the model act to reform the Agricultural Produce Marketing (Development and Regulation) Act 1951. The model act aims to foster a single market in the country by removing the restriction on selling agricultural commodities wholesale only in state-regulated markets and permitting the private sector to develop and operate wholesale markets. In 2006, parliament approved the Food and Safety Standards Act, which rationalizes the complex and overlapping web of regulations governing food processing and the Warehousing (Development and Regulation) Act, which will facilitate access to trade credit, The GOI also repealed the Cess Act, thus eliminating the 0.5 percent cess on agricultural and plantation exports.

Table 2.1: Major GOI agricultural marketing policy reforms, 1998/99–2005/06

Year	Policy reform
1998/99	<ul style="list-style-type: none"> • Cold Storage Order 1964 repealed
2001/02	<ul style="list-style-type: none"> • Restrictions on domestic and foreign investments (up to 100 percent) in bulk handling and storage removed • Inter-Ministerial Task Force and Committee of State Ministers on Agricultural Marketing Reforms established
2002/03	<ul style="list-style-type: none"> • Licensing requirements, stocking limits, and movement restrictions on wheat, paddy/rice, coarse grains, edible oilseeds, edible oils, and selective credit controls lifted • Milk and Milk Products Control Order (MMPO) amended to remove restrictions on new milk processing capacity, while continuing to regulate health and safety conditions • Leather and leather and paper products removed from small-scale reservation list
2003/04	<ul style="list-style-type: none"> • Ban on futures trading of 54 commodities, including rice, wheat, oilseeds, and pulses, removed • Levy on sugar reduced from 15 percent to 10 percent • Model act for State Agriculture Produce Marketing (Development and Regulation) formulated • Processed food items exempted from licensing under Industries (Development and Regulations) Act 1951, except those reserved for small-scale industries (SSIs) and alcoholic beverages • Food processing included in list of priorities for bank lending • Automatic approval for foreign direct investment up to 100 percent for most processed foods, except alcohol and beer and those reserved for SSIs
2004/05	<ul style="list-style-type: none"> • Group of Ministers established to formulate modern integrated food law
2005/06	<ul style="list-style-type: none"> • National Horticulture Mission initiated
2006/07	<ul style="list-style-type: none"> • Food Safety and Standards Act approved • Warehousing (Development and Regulation) Act approved. • Repeal of Cess Act • Forward Contracts (Regulation) Amendment Bill submitted to parliament

Source: Ministry of Finance 2002, 2003a, 2004a, 2004b, 2005a, 2006; Ministry of Food Processing Industries 2002, 2004, 2005a; Department of Food and Public Distribution 2005.

A key legislation awaits parliamentary approval. The Forward Contracts (Regulation) Amendment Bill 2006, which removes the ban on trading commodity options has been submitted to parliament.

³ Due to concerns about rising food prices in 2007 and 2008, GOI re-imposed of the ban on future trading of wheat, rice, potatoes, soybean oil and chickpeas.

⁴ Processed products (or processing activities) removed from small-scale reservation included: ice cream; vinegar; rice and dal (milling); biscuits; sweetened cashew nut products; tapioca, sago, and flour; poultry feed; semifinished vegetable- and chrome-tanned hides and skins; harness leather; leather shoes; leather washers and laces; and sandalwood, pine, eucalyptus, lemon grass, and palm rosa oils.

State-regulated Wholesale Markets

Almost all states in India have an Agricultural Produce Marketing (Development and Regulation) (APM) Act, which gives state governments the sole authority to establish and manage wholesale markets.⁵ The APM Act, adopted by most states in the 1960s and 1970s, establishes a network of state-controlled “regulated markets” or *mandis* and Marketing Committees to operate each. The Marketing Committee is responsible for enforcing the provisions of the Act and is empowered to establish markets; control and regulate admission to the market; charge fees (market, license, and rental fees); and issue, renew, suspend, or cancel licenses. Market committees usually retain a certain percentage of revenues collected, with the balance transmitted to the Agricultural Produce Marketing Board (table 2.2). The Board is the apex body for all marketing committees and exercises a monopoly on wholesale market development throughout the state. Commission agents may facilitate auctioning of produce in the market, with the commission rate set by the state government. All “notified” agricultural commodities grown in areas surrounding a wholesale market are required by law to be sold only through that market. The number of notified commodities varies by state and market location. In 2006, there were over 7,500 regulated markets in the whole country.⁶

Table 2.2: Implementation of the Agricultural Produce Marketing Act in selected states

	Maharashtra	Tamil Nadu	Uttar Pradesh	Orissa
APM Act	Maharashtra Agricultural Produce Marketing (Regulation) Act 1963	Tamil Nadu Agricultural Marketing (Regulations) Act 1987	Uttar Pradesh Agricultural Marketing (Regulations) Act 1964	Orissa Agricultural Produce Marketing Act 1956, amended in 1996
Apex agency	Maharashtra State Agricultural Marketing Board	Tamil Nadu Agricultural Marketing Board	Uttar Pradesh State Agricultural Produce Marketing Board	Orissa State Agricultural Marketing Board
No. regulated markets				
Principal yards	290 ^a	272	244	45 ^b
Subyards	593	15	347	380
No. agricultural commodities notified	286	40	106	114
No. Market Committees	285	20		61
Auctions by	Commission agents	Commission agents	Commission agents	Market Committee official
Market fee	0.75–1%	1%	2%	1%
Mandi revenue distribution		85% kept by Market Committee, 15% to Mandi Board (7.5% for market development fund, 7.5% for Board overhead)	20% kept by Market Committee, 80% to Mandi Board (30% for Board overhead, 50% market development)	95% kept by Market Committee, 5% by Mandi Board

Source: Maharashtra State Agricultural Marketing Board, Tamil Nadu Agricultural Marketing Board, Orissa State Agricultural Marketing Board, Uttar Pradesh State Agricultural Produce Marketing Board.

a There are also about 2,700 unregulated village markets in Maharashtra.

b There are in addition 397 unregulated wholesale and 1,150 unregulated primary markets in Orissa.

Implementation of the APM Act varies considerably by state. Maharashtra and Uttar Pradesh more strictly enforce the channeling of produce through the regulated markets, and the development and operation of new markets are confined to the Mandi Board and the Market Committees. In line with stricter enforcement, these states also have a large number of “notified” commodities: 593 in Maharashtra and 347 in Uttar Pradesh. By contrast, in Tamil Nadu, except for 15 commodities, there is no restriction on where and to whom farmers can sell. Some wholesale markets are developed and managed by local governments, municipal corporations, and the private sector (individuals and trader associations). In Orissa, farmer sales are restricted to regulated markets, but these regulations are only weakly enforced. Commission agents auction the goods in regulated markets in Maharashtra, Tamil Nadu, and Uttar Pradesh, while the Market Committee official does the same in Orissa. The respective Mandi Boards set similar market fees of about 1–2 percent of the gross value

⁵ Kerala, Jammu and Kashmir, Manipur, Andaman and Nicobar Islands, Dadra and Nagar Haveli, and Lakshadweep do not have the regulation.

⁶ In 2003, there were 7,383 wholesale markets in the country, of which 7,360 were regulated markets. In addition, there were 27,294 rural periodic markets (Ministry of Agriculture, as cited in www.indiastat.com).

of sales, which are paid by the buyer. Notably, the field survey found significant fee evasion in Maharashtra through under-reporting of quantities sold or sales outside official market hours.

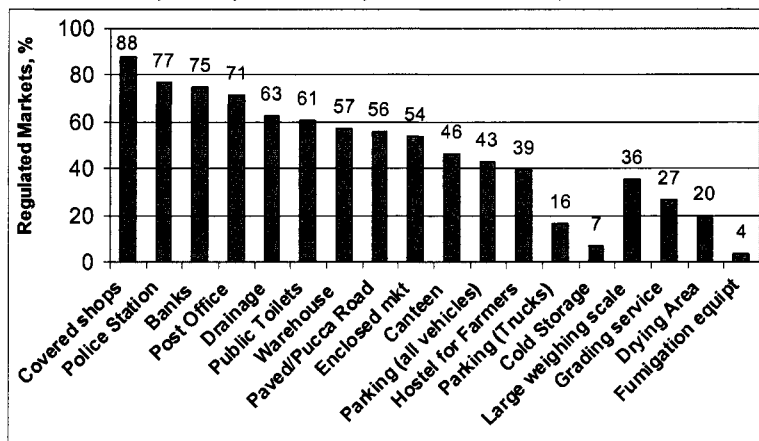
Today, the APM Act adversely affects farmers and the agricultural sector. It restricts farmers' choices. They are required to sell their produce at regulated markets and cannot take advantage of other channels that offer better returns. In some cases, by banning direct sales (to processors and other bulk buyers, for example) the Act leads to higher transaction costs. Although it is the buyer who pays the market and commission agent fee charged at the regulated markets, these costs eventually get passed on to farmers in the form of lower purchase prices. The Act constrains market development and modernization by restricting private sector involvement in the operation and construction of wholesale markets. While the regulated market system collects significant revenues from market and other fees, the infrastructure and facilities in most markets are inadequate. The survey of 78 wholesale markets in Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh found that a large proportion of markets had limited paved roads, storage, drainage, and parking facilities. Nor did they have such basic amenities as public toilets and large weighing scales (figure 2.1). In some states, traditional retail markets have evolved into wholesale markets, many of which have very poor facilities—no water, covered areas, drainage, or appropriate waste disposal.

In 2001, the Ministry of Agriculture (MoA) established an inter-ministerial task force to recommend measures for increasing the efficiency and competitiveness of the marketing system, with the goal of fostering a “single market” in the country. The task force recommended a number of reform measures, including amendment of the state APM Acts. This effort culminated in the formulation of a model act in 2003, which proposes to remove the restriction on direct marketing by farmers, open the development of market infrastructure to other agencies, and establish a framework for contract farming (box 2.1).

By 2008, 15 states had amended their APM Acts: Andhra Pradesh, Arunachal Pradesh, Chandigarh, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Madhya Pradesh, Karnataka, Maharashtra, Nagaland, Orissa, Rajasthan, and Sikkim. Bihar completely repealed the Act. Annex table 2.1 summarizes the status of APM reform in other

states. Several states are amending their Act. In the interim, some states, including Uttar Pradesh and Karnataka, allow firm-specific waivers for direct procurement. Reform has been slowed by opposition from vested interests. For example, prior to the adoption of proposed APM Act reforms in Rajasthan, traders protested by closing regulated markets at the start of the harvest for several days.

Figure 2.1: Facilities available in regulated markets handling high-value products in Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh, 2005



Source: India Agricultural Marketing Survey 2005; author's calculations.

Note: High-value products include maize, tomatoes, potatoes, mangoes, and turmeric.

Box 2.1: Salient features of the model Agricultural Produce Marketing (Development and Regulation) Act 2003

- Legal persons, growers, and local authorities permitted to establish new markets in any area.
- No compulsion on growers to sell their produce through existing regulated markets.
- Establishment of direct purchase centers and of consumer/farmer markets for direct sale.
- Promotion of public–private partnerships in the management and development of agricultural markets.
- Separate constitution for special markets for commodities like onions, fruits, vegetables, and flowers.
- A separate chapter to regulate and promote contract farming arrangements in the country.
- Market Committee to promote alternative marketing system, contract farming, direct marketing, and farmer/consumer markets.
- State Marketing Boards to promote standardization, grading, quality certification, market-led extension and training of farmers, and market functionaries in marketing-related areas.
- Constitution of State Marketing Standards Bureau for promotion of grading, standardization, and quality certification of agricultural produce.

Source: Ministry of Finance 2004a.

Integrated Food Law

Earlier, the food and food processing sectors were governed by a complex web of laws, enforced by eight ministries.⁷ In some cases, several of these laws and associated regulations prescribed contradictory or differing standards, which increased transaction costs and discouraged private investment. For example, the Fruit Products Order (FPO) allowed artificial sweeteners in fruit products, and the Prevention of Food Adulteration (PFA) Act banned them. Mandatory declaration labels required by the PFA differed from those of the Packaged Commodity Regulation Rules (1977) under the Standard Weights and Measures Act. The emulsifier and stabilizers permitted for use in jams and chutneys under the PFA differed from those allowed under the FPO.

In 1998, the GOI began to rationalize the legal and regulatory framework for food and food processing. The Prime Minister’s Council on Trade and Industry established a Task Force on Food and Agro-Industries Management Policy to examine the issues and recommend measures to promote the growth of the food and agro-industries. The task force completed its report in November 1998. Subsequently a Group of Ministers was created and charged with formulating a new integrated food law.

Parliament approved the Food Safety and Standards Act in 2006. The new Act consolidates the laws relating to food. It establishes the Food Safety and Standards Authority of India, which will lay down science-based standards for food items; regulate the manufacture, storage, distribution, sale, and importation of food items; and ensure the availability of safe and wholesome food for human consumption (Ministry of Food Processing Industries 2005b. Other key provisions of the Act: (1) repeal of a number of previous Acts and Orders;⁸ (2) define standards for food additives,

⁷ The most critical were the Prevention of Food Adulteration Act 1954, implemented by the Ministry of Health and Family Welfare); Milk and Milk Products Order 1992 and Agricultural Produce Grading and Marking Act 1937, implemented by the Ministry of Agriculture; the Essential Commodities Act 1955, Standards of Weights and Measures Act 1976, Consumer Protection Act 1986, and Bureau of Indian Standards Act 1986, implemented by the Ministry of Food, Consumer Affairs, and Public Distribution; the Fruit Products Order 1955, implemented by the Ministry of Food Processing Industries; import and export regulations, implemented by the Ministry of Commerce; Trade in Endangered Species Act, implemented by the Ministry of Forest and Environment; Atomic Energy Act 1962/Control of Irradiation of Food Rule 1991, implemented by the Ministry of Science and Technology; and Infant Milk Substitutes, Feed Bottles, and Infant Foods (Regulation of Production, Supply, and Distribution) Act 1992, implemented by the Ministry of Human Resource Development) (Patnaik 2005).

⁸ The laws and orders repealed are the Prevention of Food Adulteration Act 1954 (37 of 1954), Fruit Products Order 1955, Meat Food Products Order 1973, Vegetable Oil Products (Control) Order 1947, the Edible Oils Packaging (Regulation

contaminants, genetically modified and organic foods, packaging, labeling, and food imports; (3) make provisions for accrediting laboratories, research institutions, and food safety auditors; (4) mandate licensing and registration of food business and set penalties for offenses; and (5) establish a Food Safety Adjudication Tribunal. This Act is a critical milestone in rationalizing the legal and regulatory framework for the food processing sector and in improving the investment climate in the food processing industry.

Remaining Regulatory Reform Agenda

The reforms listed earlier are crucial to improving the investment climate in the agricultural marketing system, but a number of areas for domestic reform remain. While the GOI has temporarily lifted several key regulations such as storage and transport controls, the threat of their reimposition discourages both local and foreign investment (table 2.3). Indeed, a storage ceiling for wheat of 100,000 tons⁹ per establishment was reintroduced in 2006. Such unpredictable changes in policy are cited as discouraging private investment in modern bulk foodgrain storage infrastructure in the country. A large number of states still have to adopt the model APM Act. Some processed agricultural products remain subject to small-scale reservation: rapeseed, mustard, and groundnut oil;¹⁰ pickles; bread; pastry; boiled sweets; cashew shell oil and natural essential oils; and wooden crates for packaging.

Table 2.3: Major domestic policy and trade regulations at the central and state levels, 1996 and 2008

Regulation		Rice	Wheat	Sugar	Oilseeds, edible oils	Cotton	Livestock /products	Fruits and vegetables	Spices	Other cash crops (e.g., maize)
Central government										
Movement control	2008 1996	Lifted	Lifted Lifted	Lifted	Lifted	Lifted				
Storage control	2008 1996	Lifted		Lifted	Lifted	Lifted				
Processing control	2008 1996			Reduced (Levy)		(Ginning fees)	(Milk)			
Small-scale reservation	2008 1996		(Bread, pastry)		(Ground- nut, mustard)		(Ice cream)	(Pickles, chutney)		
Selective credit control	2008 1996									
Government procurement	2008 1996									
Consumer price subsidy	2008 1996	Targeted	Targeted	Reduced						
Export/import	2008 1996									
Futures banned	2008 1996				(soya oil)					
State government										
Wholesale marketing control	2008 1996	#	#	#	#	#		#	#	#

Source: World Bank 2005f; author's assessment.

Note: Shaded cells = commodity controls exist; lifted = commodity regulation temporarily not enforced; # = wholesale marketing controls removed in some states.

Order) 1998, Solvent Extracted Oil, De-oiled Meal, and Edible Flour (Control) Order 1967, Milk and Milk Products Order 1992, and other Orders under the Essential Commodities Act 1955 (10 pf 1955) relating to food.

⁹ Note that all references to "tons" in this report are in *metric* tons.

¹⁰ Exceptions are rapeseed, mustard, and groundnut oil produced through solvent extraction, and oils processed by grower cooperatives and state agro-cooperatives.

B. Taxation of the Agricultural Marketing System

High domestic taxation raises the cost of agricultural marketing and processing. Agricultural incomes are not directly taxed in India. Instead, the central and state governments impose various taxes on agricultural produce. At the regulated market level, in addition to handling and distribution charges, commission agent fees (1–8 percent), and the regulated market cess (0.5–2 percent), buyers also pay sales or purchase taxes ranging from 2 to 8 percent. States may also levy additional “special taxes.” For example, Punjab and Uttar Pradesh levy additional state development taxes of 0.5–3 percent.¹¹

Processed agricultural products are subject to high and multiple taxes. State sales taxes on processed agricultural products range from 8 to 23 percent. While primary agricultural commodities are mostly exempted, processed food commodities are subject to an additional central sales tax (CST) of 4 percent. As of January 2008, all states and Union Territories, have adopted the value-added tax (VAT). The VAT generally follow four categories: staple food products like rice, wheat, whole wheat flour, and salt have 0 percent VAT; other products for daily consumption are taxed at 4 percent; most processed food products are taxed at 12–13 percent; and “demerit” goods such as alcohol, tobacco, and carbonated soft drinks are taxed at a higher rate (Patnaik 2005).

Processed agricultural products are also subject to a central excise tax (CET). This tax is levied on all manufactured goods in India but is collected only from the “branded” or organized sector. The CET on agricultural products range from 8 to 18 percent, but most attract a CET of 8 percent. Most other countries do not levy an excise duty on agricultural and processed food products. In Thailand, for example, excise duty is levied only on carbonated drinks and fruit juices (Prime Minister’s Council on Trade and Industry 1998).

To promote the development of the food processing sector, the GOI reduced or exempted a number of processed food products from the CET over the last five years. The CET was removed from processed fruits and vegetables, milk, ice cream, and meat, fish, and poultry preparations (table 2.4). The government cut the CET for packaged foods, instant mixes, and aerated drinks to 8 percent. Other agricultural products, however, remain subject to the CET.

Table 2.4: Tax reforms in the agricultural and food processing sector

Year	Direct and indirect taxes
2001/02	Central excise tax <ul style="list-style-type: none"> • Processed fruits and vegetables reduced from 16% to 0% • Specified cold chain equipment exempted Import duties <ul style="list-style-type: none"> • Agricultural machinery and implements reduced from 25% to 15%
2002/03	
2003/04	Central excise tax <ul style="list-style-type: none"> • Aerated drinks reduced from 32% to 24% • Biscuits and boiled sweets reduced from 16% to 8%
2004/05	Introduction of VAT Central excise tax <ul style="list-style-type: none"> • Dairy machinery, tractors, hand tools (spades, shovels, sickles) reduced from 16% to 0% • Meat, poultry, fish preparations reduced from 16% to 8% • Food grade hexane reduced from 32% to 16% Tax waiver <ul style="list-style-type: none"> • New agro-industries engaged in processing, preserving, and packaging fruits and vegetables: deduction of 100% profits for 5 years, and 25% for next 5 years
2005/06	Central excise tax <ul style="list-style-type: none"> • Aerated drinks reduced from 24% to 16% • Condensed milk, ice cream, meat, poultry, and fish preparations, pectins, pasta, and yeast exempted • Ready-to-eat packaged foods, instant mixes (<i>dosa, idli</i>) reduced from 16% to 8% • Vegetable tanning extracts (quebracho and chestnut) exempted Import duties <ul style="list-style-type: none"> • Packaging machines for food processing reduce from 15% to 5%

Source: Ministry of Finance 2002, 2003a, 2004a, 2004b 2005a, 2006; Ministry of Food Processing Industries 2002, 2004, 2005a.

¹¹ In Punjab, this comprises a 2 percent rural development tax and a 1 percent infrastructure tax. Uttar Pradesh levies a 0.5 percent rural development tax.

C. Investment Climate

Recent assessments of the investment climate studies (*World Bank 2004b, 2005b*) identify a number of regulatory, governance, and infrastructural constraints to more rapid growth of private enterprises (table 2.5). The two most critical problems are the high entry and exit barriers in industry, which are exacerbated by insufficient labor market flexibility and an unreliable and expensive power supply (World Bank 2004b). For example, starting a business requires 11 procedures taking about 71 days (for comparison, this is about 4.5 times the number of days required in China). Registering property, enforcing contracts, and export and import trading also require a large number of procedures and days. Poor access to infrastructure remains an important limitation, especially with respect to power: the India Investment Climate (World Bank 2004b) finds that on average manufacturers face nearly 17 significant power outages per month in India, versus 5 in China. Approximately 9 percent of the total value of firm output is lost due to power outages.

Table 2.5: Selected investment climate indicators for India and China

Activity	India	China	Activity	India	China
Starting a business			Dealing with licenses		
Procedures (no.)	11	13	Procedures (no.)	20	30
Time (d)	71	48	Time (d)	270	363
Cost (% of income per capita)	61.7	13.6	Export and import trading		
Hiring and firing workers^a			Documents for export (no.)	10	6
Difficulty of hiring index	56	11	Signatures for export (no.)	22	7
Rigidity of hours index	40	40	Time for export (d)	36	20
Difficulty of firing index	90	40	Documents for import (no.)	15	11
Rigidity of employment index	62	30	Signatures for import (no.)	27	8
Firing costs (weeks of wages)	79	90	Time for import (d)	43	24
Registering property			Closing a business		
Procedures (no.)	6	3	Time (yr)	10	2.4
Time (d)	67	32	Cost (% of estate)	9	22
Cost (% of property value)	7.9	3.1	Infrastructure		
Enforcing a contract			Days to get a fixed-line phone connection	29.8	9.3
Procedures (no.)	40	25	Days to connect to electricity grid	47.8	25
Time (d)	425	241	Percentage running generators	60.9	21.2
Cost (% of debt)	43.1	25.5			

Source: World Bank 2005b.

^a Indices are scored between 0 to 100, representing the highest level of regulation. The rigidity of employment index is the average of the difficulty of hiring, rigidity of hours and difficulty of firing indices. Cost of firing measures the cost of advance notice requirements, severance payments, and penalties in weekly salaries.

To address infrastructural constraints in rural areas, the GOI initiated the Bharat Nirman Program in 2005. The program, to which the government is committing Rs 1,740 billion over 2005–09, aims to improve access to infrastructure throughout rural India by investing in irrigation, drinking water, sanitation, roads, electrification, and telecommunications. More specifically, Bharat Nirman seeks to: (1) construct about 146,000 kilometers of rural roads, which will provide road connections to 38,484 villages with more than 1,000 people and to all 20,867 habitations in hilly and tribal areas with more than 500 people; (2) provide telephone connections to 66,822 villages that previously lacked connections or had dysfunctional telephone systems; and (3) provide electricity to 125,000 villages through grid-based supplies or, in remote and inaccessible areas, through alternative technologies. These efforts, if successful, will contribute significantly to attracting private investment in rural areas.

D. Ministries and Agencies Involved with Agricultural Marketing and Processing

Fostering the development of the agricultural marketing and agro-processing sector falls under the purview of a large number of government ministries and agencies, resulting in overlapping mandates. This study identified at least 39 government agencies involved in agricultural marketing (table 2.6). The main ministries are the Ministries of Agriculture; Food Processing Industries; Consumer Affairs, Food, and Public Distribution; Health and Family Welfare, Small Scale Industries; Commerce and Industry; and Finance. Their respective departments are responsible for

policy formulation and regulation. They implement various programs to encourage private investment in domestic trading, postharvest management, exports, and quality management. They support initiatives to build capacity, improve food safety, and improve market information. Perhaps inevitably, this multiplicity of ministries and departments results in overlapping mandates.

Various ministries implement investment incentive schemes to attract private investment in agricultural marketing and agro-processing. These schemes usually involve an investment grant to private entrepreneurs for a range of projects, including: (1) contract farming; (2) setting up food processing, cold storage, packing, transport, irradiation, food fortification, and abattoir facilities; (3) investing in quality management, for example, to conform with certain standards or codes of practice, such as those embodied in Hazard Analysis and Critical Control Point (HACCP) programs, the CODEX Alimentarius, and the International Organization for Standardization (ISO) 9000/14000; (4) promoting exports (for example, through participation in exhibitions and international department store displays); and (5) establishing food parks and agro-export zones (table 2.7; see also more detailed list in Annex table 2.3). Grant amounts range from 10 to 50 percent of total project costs, although most grants are in the 25–30 percent range. The largest grants have ranged from Rs 100,000 to Rs 50 million. From 2000/01 to 2004/05, it is estimated that the GOI funded roughly Rs 7.7 billion on these programs.

The MoA, in promoting a holistic strategy for agricultural development, places high priority on developing the agricultural marketing system. As noted, the MoA spearheaded formulation of the model APM Act and leads efforts to foster state adoption of the amendments. The MoA places considerable emphasis on horticulture development to increase the productivity and profitability of agriculture, promote optimal use of natural resources (land, water, and the environment), generate greater employment in rural areas, and improve the nutritional security of the people (Ministry of Finance 2003b, 2005/06b). To achieve these goals, the MoA set up the National Horticulture Mission in 2005, which seeks to promote the holistic development of the sector and double horticultural production by 2011. The National Horticulture Board (NHB), under the MoA, supports a number of programs designed to foster growth of the marketing and agro-processing system for horticultural products. These programs mainly consist of back-ended capital subsidy investment schemes supporting the construction, expansion, and modernization of cold storage and warehouses for horticultural produce; the promotion of commercial horticulture through improved production and postharvest management; and the development of supply chains (table 2.).

Between 1999/2000 and January 2005, NHB provided financial support amounting to Rs 3.1 billion to establish 1,242 cold storage facilities in the country, covering 23 states (Patnaik 2005). This investment expanded India's cold storage capacity by 4.9 million tons. Uttar Pradesh was the largest beneficiary of this support in terms of additional capacity created (2.2 million tons), the number of facilities constructed (464), and total subsidies granted (Rs 1.4 billion). Maharashtra was the second-largest beneficiary in terms of additional storage capacity (216,000 tons) and Bihar was third (225,000 tons) (Annex figure 2.2). Notably, the major impetus for the private sector to enter the cold storage business was the repeal of the Cold Storage Order 1964 in 1998.

The MoA launched the Scheme on Market Infrastructure, Grading, and Standardization in 2004 to attract large-scale investment in market infrastructure and value chain projects. The scheme is implemented in states that amend the APM Act to allow direct marketing, contract farming, and competitive markets in the private and cooperative sectors. State governments allocate land for the markets. The physical targets under the scheme are 561 markets (Rs 20 million each), 6,984 rural markets (Rs 4 million each), and 50 grading centers (Rs 2 million each) (Planning Commission 2005). These investments will significantly improve access to markets at the state level.

Table 2.6: Government agencies involved in promoting agricultural marketing and agro-industry development

Agency	Policy formulation	Regulation	Domestic trading	Postharvest management	Agro-processing	Agro-exports	Grades, standards, SPS	Training/capacity building	Market information	Direct marketing activities
Ministry of Agriculture										
Dept. of Agriculture and Cooperation	X									
Directorate of Marketing and Inspection		X	X				X	X	X	
Directorate of Plant Protection, Quarantine and Storage						X	X			
Dept. of Animal Husbandry and Dairying	X	X	X				X			
Boards and Autonomous Bodies										
National Horticulture Board			X	X	X		X	X	X	
National Dairy Development Board			X		X		X	X	X	X
Coconut Development Board			X		X			X		
National Oilseeds and Vegetable Oils Development Board			X	X	X			X		
National Insecticides Board	X					X	X			
Nat'l Institute of Agricultural Marketing			X	X	X			X		
Nat'l Institute of Post Harvest Technology				X	X			X		
Nat'l Cooperative Devt. Corporation			X	X						
Nat'l Agricultural Cooperative Marketing Federation of India										X
Small Farmers Agribusiness Consortium			X	X	X					
Ministry of Food Processing Industries										
Dept. of Food Processing Industries	X	X			X		X	X		
Dept. of Agro and Rural Industries	X									
Ministry of Consumer Affairs, Food, and Public Distribution										
Dept. of Consumer Affairs	X	X								
Bureau of Indian Standards	X	X					X			
Dept. of Food and Public Distribution	X									
Directorate of Sugar		X			X					
Directorate of Vanaspati, Vegetable Oils and Fats			X		X					
Central Warehousing Corporation										X
Food Corporation of India			X							X
Ministry of Small Scale Industries	X	X		X		X				
Ministry of Commerce and Industry										
Dept. of Commerce	X					X				
Dept. of Industrial Policy and Promotion	X	X			X					
Directorate General of Foreign Trade									X	
Autonomous and Statutory Bodies										
Indian Institute of Packaging			X		X		X			
Agricultural and Processed Food Products Exports Development Authority	X		X			X	X	X	X	
Marine Products Export Development Authority			X		X	X	X	X	X	
Export Inspection Council					X	X				
Coffee Board			X	X		X	X	X	X	X
Rubber Board			X	X	X	X	X	X	X	
Spices Board			X	X	X	X	X	X	X	
Tea Board			X	X	X	X	X	X	X	
Tobacco Board			X	X		X		X	X	X
Ministry of Health and Family Welfare	X	X			X		X	X		
Ministry of Finance										
National Bank for Agriculture and Rural Development			X	X	X	X				

Source: Ministry of Food Processing Industries 2005a; Ministry of Commerce 2005, Patnaik 2005.

The Ministry of Food Processing Industries (MoFPI) was established in 1998 to formulate and implement policies and plans for the sector with the goal of catalyzing investments in food processing. In line with this goal, the MoFPI supports programs to: (1) develop infrastructure, (2) upgrade technology and establish modern food processing industries, (3) foster backward and forward linkages in the value chain, (4) strengthen quality management, and (5) develop human resources and institutions. The first four programs provide investment grants to the private sector. Funding for these activities under the 10th Plan totaled Rs 6.5 billion (Ministry of Food Processing Industries 2005). Between 2002/03 and December 2004, MoFPI investment subsidies for infrastructure development were estimated to total Rs 473.4 million; subsidies for the modernization of the food processing industry and the promotion of backward and forward linkages amounted to Rs 798 million, while quality management subsidies amounted to Rs 166 million (Patnaik 2005).

In 2004/05, the GOI introduced more incentives in the food processing sector. All new agro-industries involved in processing, preserving, and packaging fruits and vegetables are eligible for a tax deduction of 100 percent of profits for five years, and 25 percent for the five years thereafter.

The Agricultural and Processed Food Products Export Development Authority (APEDA), established in 1998, promotes agricultural exports. As an autonomous agency under the Ministry of Commerce, APEDA aims to maximize foreign exchange earnings through increased agricultural exports, provide better income to the farmers through higher unit value realization, and create employment opportunities in rural areas by encouraging value-added exports of farm produce. APEDA supports the private sector by identifying new markets, providing support systems to exporters and manufacturers, and introducing new products to the international market. APEDA also has a number of schemes to promote the development of modern agricultural marketing and agro-processing arrangements to facilitate exports as well as export promotion. With the state governments, APEDA is cofinancing the establishment of 60 Agro-Export Zones (AEZs). APEDA also provides investment subsidies to the private sector for infrastructure development, quality management, and research and development.

The plethora of schemes increases the attractiveness of investing in agricultural marketing and agro-processing for private entrepreneurs, but now there is some duplication. For example, at least three ministries promote cold storage investments through grant schemes offering different terms:

- The NHB (MoA): 25 percent investment grant, up to Rs 5 million; 33.3 percent for the Northeast, up to Rs 6 million.
- MoFPI: 25 percent grant for plant, machinery, technical civil works in general areas; 33.33 percent in difficult areas, up to Rs 750,000.
- APEDA: 25 percent grant, up to Rs 1 million.

There is an urgent need for greater coordination among government agencies to ensure greater consistency across development programs, minimize duplication, more effectively track the level of support and impact of complementary programs, and eliminate the possibility of double-dipping.

Table 2.7: Major agricultural marketing and agro-industry investment grant schemes for the private sector, 2005

Agency	Scheme	Purpose of scheme						Scheme expenditures
		Marketing	Storage	Processing	Grades, standards, SPS	Agricultural exports	Number supported	
Ministry of Agriculture <i>Directorate of Marketing and Inspection</i>	1. Grameen Bhandran Yojana		X					
	2. AGMARK grading and standardization				X			
Small Farmers Agribusiness Consortium	1. Agri-Clinic, Agribusiness Center	X					2,200 trained, 383 ventures (as of 2005)	
	2. Venture capital assistance	X	X	X			21 firms	Rs 40.2 million (2005/06)
National Horticulture Board	1. Cold storage construction, expansion, and modernization		X				1,242 cold storage facilities (FY 99/00-04/05)	Rs 3.1 billion (FY 00/01-04/05)
	2. Horticulture supply chain development	X						Rs 1.8 billion (FY 00/01-04/05)
Ministry of Food Processing Industries	1. Infrastructure development							
	Food parks	X	X	X			47 (as of FY 04/05)	
	Packaging center	X						
	Modernized abattoirs			X			12 (FY 03/04-04/05)	
	Integrated cold chain facilities		X					
	Irradiation facilities			X				
	Value-added centers			X				
	2. Modernization of food processing industries							
	Upgrading, establishing, modernizing			X				
	3. Backward and forward integration and promotional activities							
	Backward linkages (contract farming)	X					37,985 farmers under contract farming	Rs 798.2 million (FY 02/03-Dec. 04)
	Forward linkages (market surveys, test marketing, brand promotion, and related activities)	X						
	Food fortification			X				
4. Quality assurance, Codex standards, research and development (R&D)								
Total Quality Management (ISO 9000/14000, HACCP, and similar standards)					X			
Capacity building for quality assurance					X			
Bar coding								
Food processing R&D	X			X				
Quality control laboratory					X		5	

Table 2.7 (continued)

Agency	Scheme	Purpose of scheme						Number supported	Scheme expenditures
		Marketing	Storage	Processing	Grades, standards, SPS	Agricultural exports			
Ministry of Commerce	1. Special Economic Zones (SEZs): Export promotion, industrial parks (including Agribusiness Zones)	X	X	X		X	35 SEZs		
	2. Market development assistance: Participation in trade fairs, exhibitions, and similar activities					X			
	3. Market access initiative: Showrooms, warehouses, publicity, export market surveys, exhibitions, and so forth					X			
	4. Export promotion of horticulture products from NE region	X				X			
	5. Vishesh Krishi Upaj Yohana (fruits, vegetables, minor forest produce)					X			
Ministry of Commerce: APEDA	1. Agri-Export Zones (AEZs)					X	60 AEZs	Rs 17.2 billion (est.)	
	2. Market development								
	Packaging development and design	X							
	Surveys and feasibility studies					X			
	Brand publicity					X			
	3. Infrastructure development								
	Specialized transport units	X							
	Mechanization of harvesting	X							
	Sheds for intermediate storage, grading, cleaning		X			X			
	Mechanized handling for grading, sorting, washing, waxing, ripening, packaging								
	Precooling facilities		X						
	Preshipment treatment			X					
	Integrated postharvest handling systems			X					
	Pollution control			X					
	4. Quality development								
	Cold storage facilities		X						
	Quality management (HACCP, ISO, Total Quality Management)			X		X			
	Quality assurance laboratories			X		X			
	Quality management training			X		X			
Local and international study tours						X			
5. Research and development (R&D)									
R&D for export enhancement					X				
6. Horticulture transport assistance		X							

Source: Ministry of Food Processing Industries 2005a; Ministry of Commerce 2005; Patnaik 2005.

III. Linking Farmers to the Market

About 228 million people in rural India, equivalent to 56 percent of the total labor force, are farmers and agricultural laborers. Their output in 2007/08 contributed about 18 percent of national GDP. Because farmers and agricultural laborers constitute a large proportion of the rural poor,¹⁴ the government's poverty reduction strategy gives major priority to increasing agricultural productivity and fostering agricultural diversification as a means of raising farm incomes and employment in rural areas. Consequently, as elaborated in chapter 1, the government is promoting greater production of higher-value crops, livestock, and other products. These products are not staples, so their demand is more sensitive to price and income changes. Farmers must become highly attuned to the changing needs and preferences of consumers, local or international, as signaled through the market.

How well connected are farmers to the market? The first chapter of this report described the India Agricultural Marketing Survey, undertaken to obtain a better understanding of the marketing practices and challenges confronting farmers. Nearly 1,600 farmers in Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh were surveyed about their experiences in marketing higher-value crops, particularly tomatoes, potatoes, mangoes, maize, and turmeric. This chapter draws extensively on the survey results.

The majority of farmers surveyed report selling their high-value produce through wholesale markets, both regulated and unregulated. Farmers' most frequently cited concerns regarding the wholesale markets they patronize include inadequate market facilities, high marketing fees, long distances to the market, and the dishonesty of traders. Farmers' efforts to market their produce are further hampered by limited access to market information. Often farmers have to rely on other farmers for information on prices, postharvest activities, and quality management. The limited reliance on agricultural officers for production and marketing information points to weaknesses in the agricultural extension and market information systems. Other than cleaning and grading for size, farmers undertake few postharvest activities, partly because they have limited access to technical advice about such activities and receive little monetary reward for undertaking them.

Contract farming as an integrated marketing arrangement is gaining ground for a number of commodities in India. In many cases, contract farming has brought benefits in the form of greater access to improved inputs and technical advice, higher productivity and farm incomes, and increased demand for labor in rural areas. In other cases, contract farming has brought implementation problems associated with inadequate contract design, farmers' poor understanding of the terms of their contracts (such as pricing rules or quality standards), farmers' limited bargaining power, and the lack of a legal framework governing contractual arrangements. Farmers' participation in producer associations remains limited, although the survey results indicate that farmers participating in associations receive prices that are 5 percent higher on average. These issues are explored in greater detail in the sections that follow.

A. Characteristics of Farmers Growing High-Value Crops

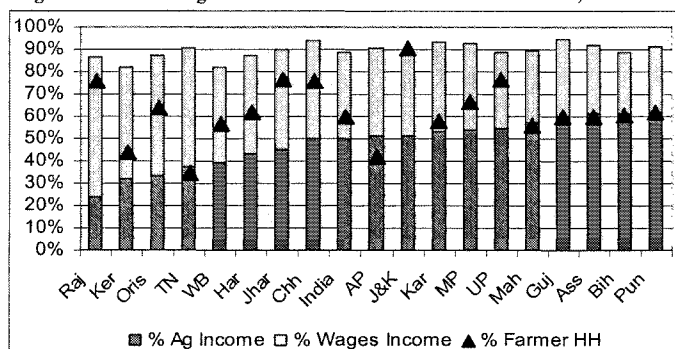
Farmer households¹⁵ constitute the majority of rural households in India. According to the latest NSSO estimates, farmer households accounted for 60 percent of rural households in 2002–03. With the exception of Tamil Nadu, Andhra Pradesh, and Kerala, they accounted for 50–70 percent of

¹⁴ Farmer households comprise about 124.6 million farmers and 103.1 million agricultural laborers in rural areas. An additional 2.9 million farmers and 4.3 million agricultural laborers are found in urban areas.

¹⁵ According to the NSS, a "farmer household" has at least one farmer engaged in agricultural activities, including the cultivation of crops, cultivation of trees (rubber, coconut, or coffee, for example), animal husbandry, fisheries and aquaculture, beekeeping, vermiculture, or sericulture.

rural households in most states (figure 3.1). Among farmer households, there continues to be limited diversification of sources of income. In 11 of the 18 states surveyed by the NSSO, direct income from farming accounts for over 50 percent of household income. This share is likely to be higher if incomes from agricultural wages are included. In view of the significant dependence of a large majority of rural households on agriculture, getting agriculture moving will require an emphasis not only on raising farmers' productivity and diversifying their production, but also on linking farmers more effectively to markets to meet growing and rapidly diversifying consumer demand.

Figure 3.1: Percent share of farmer households in rural households and share of agricultural and wage income in total farmer household income, 2002–03.



Source: NSSO 2005b.

Note: Raj = Rajasthan; Ker = Kerala; Oris = Orissa; TN = Tamil Nadu; WB = West Bengal; Har = Haryana; Jhar = Jharkand; Chh = Chhattisgarh; AP = Andhra Pradesh; J&K = Jammu and Kashmir; Kar = Karnataka; MP = Madhya Pradesh; UP = Uttar Pradesh; Mah = Maharashtra; Guj = Gujarat; Ass = Assam; Bih = Bihar; Pun = Punjab.

Diversification to higher-value crops poses new challenges for farmers. The greater perishability of many higher-value crops demands more sophisticated systems for postharvest management and marketing. The higher price and income elasticities of demand for these crops require farmers to be adept at responding to changing market trends. To understand these challenges, it is helpful to begin at the first point of sale and gain a clear picture of the farmers who grow higher-value crops.

Are farmers growing higher-value crops similar to other farmers in India? Studies of crop choice and market participation have shown that farmers who grow nontraditional crops and who market their crops have different productive assets and access to credit and farmer networks than farmers who do not (Foster and Rosenzweig 1995; Conley and Udry 2001; Key, Sadoulet, and de Janvry 2000; Bandiera and Rasul 2004). The India Agricultural Marketing Survey finds that most producers of the five focus crops are small-scale farmers, owning about 1–3 hectares on average. This finding dispels the common impression that only large-scale farmers are able to diversify into high-value agricultural production. Even so, on average the farmers in the survey owned twice as much land as the average farmer in the state (table 3.1).¹⁶

Overall, the experience in India appears to be consistent with that of other countries, where farmers growing higher-value crops tend to be more “asset rich” than the average farmer. The survey found that farmers growing higher-value crops have relatively larger farms, higher rates of literacy, and greater amounts of other assets, such as livestock or a house made of brick or cement (table 3.1). This information is not sufficient, however, to determine whether wealth attributes encourage farmers to grow high-value crops or if these attributes are an outcome of producing and marketing such crops.

Use of irrigation is fairly common in the production of higher-value crops. In Uttar Pradesh, over 90 percent of the area under potatoes, tomatoes, turmeric, and maize is irrigated; 84 percent of mango area is irrigated (Annex figure 3.1). In states where access to irrigation is more limited, significantly less irrigated area is planted to the focus crops. Turmeric is predominantly irrigated in Tamil Nadu. Irrigation is widely used for tomatoes in Maharashtra, Orissa, and Tamil Nadu,

¹⁶ In 1995/96, about 62 percent of landholdings in India were less than one hectare; 93 percent are less than two.

probably because of the crop's greater sensitivity to water availability. The use of irrigation in mango production is limited. In focus group interviews, farmers in Tamil Nadu noted the increasing shift from producing paddy to mangoes, a less water-intensive crop, to cope with growing water scarcity in the state.

Overall, farmers' access to formal credit arrangements is very limited. Only 12 percent of farmers in the marketing survey had access to formal credit through banks and other credit institutions (Annex table 3.2). Farmers had slightly better access to formal credit in Orissa (18 percent) and Maharashtra (24 percent) than in Uttar Pradesh (4 percent) and Tamil Nadu (9 percent). In focus group interviews, farmers frequently cited difficulties with meeting the documentation and other requirements of banks as a major disincentive for applying for bank loans. Farmers depend more on informal sources of credit; about 30 percent of the farmers interviewed obtained loans from moneylenders, friends, and relatives. As more organized marketing systems develop, farmers will increasingly require credit to invest in the new and modern technologies essential for meeting the higher standards imposed by more sophisticated marketing systems, such as assurances of food quality, safety, and traceability. Improving farmers' access to capital from the formal sector at a lower cost will be crucial.

Farmers most frequently identify poor access to irrigation and credit as constraints to increased production. The marketing survey asked village leaders, including farmers, to identify the main constraints to agricultural production in their villages. Limited access to irrigation is the most frequently cited problem. In Maharashtra, all but 1 of 41 villages surveyed list it as a major problem (Annex table 3.3). Poor access to credit is the second most cited problem. Insufficient access to extension and inputs are also identified as constraints. About one-fourth of the villages surveyed in Tamil Nadu and Orissa note poor roads as a constraint, while one-third of the villages surveyed in Maharashtra report problems with labor shortages.

B. Farmers' Access to Markets

Agricultural produce is generally marketed in India through four broad channels: (1) directly to consumers, (2) through wholesalers to retailers or exporters, (3) through cooperatives or public agencies, and (4) through processors to retailers or consumers (Acharya 2004). These channels may involve multiple intermediaries between farmers and the ultimate consumers (table 3.2).

The India Agricultural Marketing Survey finds that most farmers sell their produce through wholesale markets (table 3.3). Sales to traders at the farmgate are an equally important channel for farmers in Orissa and Tamil Nadu, especially for maize, mangoes, and turmeric. Preharvest contracts with traders are most common for mangoes. Direct sales to processors are not significant, accounting

Table 3.1: Selected characteristics of households growing high-value crops in four states

Characteristic	59 th NSS (agricultural households)	Marketing Survey (farmer households)
Land owned (ha)		
Tamil Nadu	0.8	1.7**
Maharashtra	1.8	3.7***
Uttar Pradesh	0.8	1.0
Orissa	0.8	1.4***
Literate household head (%) ^a		
Tamil Nadu	71	84**
Maharashtra	74	94***
Uttar Pradesh	60	60
Orissa	64	79***
SC/ST household head (%)		
Tamil Nadu	27	10***
Maharashtra	31	5***
Uttar Pradesh	28	31
Orissa	44	55
Female household head (%)		
Tamil Nadu	15	4***
Maharashtra	9	1***
Uttar Pradesh	7	4***
Orissa	10	1***
Katcha house ownership (%) ^b		
Tamil Nadu	24	3***
Maharashtra	4	0***
Uttar Pradesh	19	38**
Orissa	47	36**
Value of livestock/poultry (Rs 000s)		
Tamil Nadu	6	16**
Maharashtra	9	36*
Uttar Pradesh	7	12**
Orissa	4	10***

Source: Fafchamps, Vargas-Hill, and Minten 2006.

Note: * denotes significantly different from the NSS state average at 10%, ** at 5%, and *** at 1%. Some entries could not be tested due to zero variation in observations in data. SC/ST – scheduled castes/scheduled tribes.

a A person who can both read and write a simple message with understanding in at least one language.

b A katcha house has neither brick nor cement walls or a metal roof.

for less than 5 percent of sales in most cases. Direct sales to processors may be low partly because of the APM Act and partly because supply chains are not well developed.

Table 3.2: Major marketing channels for cereals and agricultural produce

Cereals	Fruits and vegetables
Farmer—consumer	Farmer—consumer
Farmer—village trader—consumer	Farmer—processor—consumer/exporter
Farmer—wholesaler—retailer—consumer	Farmer—primary wholesaler—processor—consumer
Farmer—village trader—wholesaler—consumer/export	Farmer—primary wholesaler—secondary wholesaler—retailer/consumer
Farmer—wholesaler—miller—processor—wholesaler—retailer—consumer	Farmer—preharvest contractor—primary wholesaler—secondary wholesaler—consumer
Farmer—government agency (FCI)—fair price shop—consumer	

Source: Adapted from Acharya 2004.

Table 3.3: Sales destination of farmers' produce

Crop/state	Market destination (% of crop sales)					Crop/state	Market destination (% of crop sales)				
	Wholesale market	Village market	Directly to processor	Trader at farmgate	Co-op and others		Wholesale market	Village market	Directly to processor	Trader at farmgate	Co-op and others
Maize						Mangoes					
TN	43	1	0	44	13	TN	53	1	5	34	7
OR	46	16	1	37	0	OR	48	19	0	28	5
MH	88	3	0	1	8	MH	72	10	5	3	10
UP	60	23	0	0.1	16	UP	55	24	0	6	15
All States	63	12	0.2	15	10	All States	56	13	2	20	8
Tomatoes						Turmeric					
TN	85	7	0	7	1	TN	50	0	0	14	36
OR	56	13	0.3	26	5	OR	45	1	0	54	0
MH	79	16	0	4	1	MH	98	2	0	0	0
UP	67	13	0	4	16	UP	26	3	4	28	39
All States	67	13	0.1	14	6	All States	53	1	1	29	16
Potatoes						Rice					
TN	100	0	0	0	0	TN	19	2	2	57	20
OR	58	18	0	20	4	OR	9	29	5	56	5
MH	69	14	4	0	13	MH	96	4	0	0	0
UP	60	7	1	9	23	UP	59	31	0	5	5
All States	63	11	1	11	14	All States	34	21	2	36	7

Source: Fafchamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; and UP = Uttar Pradesh.

Although most products are sold through wholesale markets, the proportion actually sold in regulated wholesale markets differs markedly by state. The APM Act requires farmers to sell produce through regulated wholesale markets, but the marketing survey finds that enforcement of the APM Act varies significantly by state. Only in Maharashtra are 85–100 percent of commodities sold through regulated markets. In Uttar Pradesh, except for tomatoes, less than 42 percent of sales occur through regulated markets (table 3.3). Despite the large “presence” of regulated markets in Orissa, less than 20 percent of crop sales are channeled through these markets.

Farmers were asked which aspects of the wholesale market should be improved. Their responses varied by state (table 3.4). In Maharashtra and Uttar Pradesh, where functioning regulated markets are more widespread, a reduction in market fees is cited by about half of the farmers. Improved market facilities and more honest traders are also frequently cited. By contrast, in Tamil Nadu and Orissa, where regulated markets are not as dominant, a reduction in market fees is cited by less than 15 percent of farmers. There is greater demand for improved market infrastructure, as farmers more frequently mention the need for closer markets, improved transportation, and cold storage facilities. Farmers in Uttar Pradesh and Maharashtra highlight the need to reduce theft in markets. Market officials reported that most thefts occur after the market is closed. Although 89 percent of markets in Uttar Pradesh post guards in markets after hours, only 40 percent of markets in Tamil Nadu and Orissa and 45 percent in Maharashtra have after-hours security.

Table 3.4: Wholesale market improvements requested by farmers

Farmers requesting (%)	State and type of wholesale market									
	Maharashtra		Uttar Pradesh		Orissa		Tamil Nadu		All	
	Grain	F&V	Grain	F&V	Grain	F&V	Grain	F&V	Grain	F&V
Closer market	17	19	27	35	60	55	70	70	30	34
Reduced fees	41	41	50	47	13	13	13	15	39	37
Improved transportation	20	48	49	16	48	47	46	30	35	33
Improved facilities	64	66	32	36	8	7	27	27	45	47
Cold storage	17	15	20	17	64	61	7	7	20	18
More honest traders	37	35	58	55	11	13	27	25	41	39
Less theft	11	10	37	31	0	0	3	5	18	16
Permission to sell and/or sell more often	9	10	10	23	3	8	6	19	17	15

Source: *Fafchamps, Vargas-Hill, and Minten 2006.*

Note: Satisfaction with wholesale market includes farmers who were indifferent, satisfied, and very satisfied. F&V = fruits and vegetables.

These findings resemble results of a recent survey in Karnataka. The Karnataka State Agricultural Prices Commission surveyed 3,408 farmers in the state and found that only 29 percent sold their produce in the regulated wholesale markets. Farmers' main reasons for failing to sell in the regulated markets included: distance to the market (31.2 percent), good price at the local market (18.4 percent), small quantity of produce sold (12.7 percent), no knowledge of the market (8 percent), cheating in weighing and harassment by hamals/coolies (3.1 percent); and the long wait for weighing (1.4 percent) (National Commission on Farmers 2006).

C. Farmers' Access to Market and Other Information

Market information is an essential input to farmers' production and marketing decisions. It helps farmers decide what to produce and when, where and how to market their produce. It also guides their longer-term investments (Kohls and Uhl 1990). Market prices are one of the most important types of market information. The marketing survey finds that farmers primarily rely on other farmers for production and marketing information (table 3.5). Agricultural traders in immediate markets are the second most common source of both production and marketing information, ranging from information on how to use fertilizer and pesticide to information on prices as well as grading and other postharvest practices. Agricultural extension officers and the mass media play a limited role. These results suggest major weaknesses in the agricultural extension and market information systems.

3.1 These findings are consistent with farmers' ranking of constraints to increased production of high-value crops. They cite lack of knowledge as a major constraint to increasing production (Annex table 3.1). Notably, among the four states, the contribution of agricultural extension officers is highest in Orissa for production-related information. Contract buyers, though to a very limited extent, are a source of information for a small percentage of farmers on sorting and grading and crop prices.

D. Postharvest Activities Performed by Farmers to Enhance Quality

Postharvest activities such as cleaning, sorting, grading, milling, and packaging can potentially enhance the sale price of agricultural produce. Farmers growing high-value crops recognize that better quality can translate into a significant price premium. Farmers were asked the prices of high versus average quality produce, and the price premium was estimated as the difference between the two prices. The quality features considered included size, shape, color, smell, taste, and moisture content. Based on farmers' estimates, the average quality premium between high and average quality produce is 69 percent for mangoes, 59 percent for tomatoes, 53 percent for potatoes, 47 percent for turmeric, and 34 percent for maize.

Table 3.5: Farmers' sources of information

Type of information/state	Source of information (% farmers)							
	Other farmers	Agricultural traders	Personal observation	Agricultural officers	Contract buyers	Input suppliers	Mass media	Other
Crop prices								
Tamil Nadu	34	45	0	6	0	1	13	1
Orissa	46	47	1	4	1	1	1	1
Maharashtra	78	6	1	11	0	1	2	1
Uttar Pradesh	67	25	0	3	2	0	1	0
Total	66	21	0	7	1	0	3	1
Sorting/grading of crops								
Tamil Nadu	30	4	50	8	2	4	2	0
Orissa	54	17	9	18	0	0	15	0
Maharashtra	79	1	4	11	0	0	0	4
Uttar Pradesh	76	13	0	2	8	0	2	0
Total	69	7	10	8	3	1	1	2
Postharvest practices								
Tamil Nadu	31	1	52	7	0	3	6	0
Orissa	56	9	8	20	0	2	1	3
Maharashtra	77	0	3	11	0	2	0	5
Uttar Pradesh	77	13	0	2	7	0	2	0
Total	69	5	9	8	2	2	2	3
Irrigation use								
Tamil Nadu	26	1	53	14	0	4	2	0
Orissa	50	6	10	29	0	1	3	1
Maharashtra	81	0	4	10	0	0	0	4
Uttar Pradesh	86	6	0	3	0	1	2	2
Total	73	3	10	10	0	1	1	3
Fertilizer and pesticide use								
Tamil Nadu	14	6	27	21	1	27	3	1
Orissa	35	12	8	34	0	7	2	3
Maharashtra	74	1	2	11	0	10	2	1
Uttar Pradesh	60	13	0	8	0	14	3	1
Total	58	6	5	13	0	13	2	1

Source: Fafchamps, Vargas-Hill, and Minten 2006.

Despite these perceived price premiums, not all farmers perform postharvest activities to improve quality. The marketing survey found large variation across commodities and states. Orissa has the fewest farmers undertaking postharvest operations (25 percent) (Annex table 3.4). About 80% of farmers in Uttar Pradesh and 70% in Tamil Nadu and Maharashtra report undertaking some postharvest activities. Only one-third or fewer farmers in Tamil Nadu and Orissa grade their mangoes, compared to over 90 percent in Uttar Pradesh and Maharashtra. Only 37 percent of tomato farmers in Orissa report grading their harvest compared to 99 percent in Uttar Pradesh. About 70 percent of maize farmers and 90 percent of turmeric farmers dry their produce, but only a small percentage performs any milling and grinding (5 percent of turmeric farmers and 45 percent of maize farmers). The large discrepancy between farmers' perceived price premiums for quality and actual actions may be attributed to a number of factors, including the small volume of produce (which limits grading possibilities); price uncertainty (not knowing whether market prices will cover the cost of additional postharvest activities); and the transaction cost of searching for buyers who will reward quality.

Few buyers of agricultural produce signal quality requirements to farmers. Very few farmers participating in the marketing survey (6 percent) have actually received requests from buyers to change product specifications within the last five years (table 3.6). A large share of buyers who made such a request did not offer a price premium. With respect to food safety, only 3 percent of farmers have been asked to change the type of chemical or input they use. Among those farmers, the predominant change was related to pesticide use: a reduction in use (57 percent), changes in the timing of pesticide application (62 percent), and changes in the type of pesticide used (26 percent).

Table 3.6: Do traders reward farmers for quality-enhancing measures?
(% farmers)

	Maize	Potatoes	Tomatoes	Mangoes	Turmeric	All
Farmers reporting that:						
Buyers request and pay price premium	3.1%	0.8%	1.3%	4.1%	0.0%	2.4%
Buyers request but do not pay price premium	3.8%	9.6%	16.1%	6.3%	3.8%	6.7%
Buyers make no requests	93.2%	89.6%	82.6%	89.5%	96.2%	91.0%
Buyers pay more as a share of those making requests	45%	8%	7%	40%	0%	26%
Farmers receiving buyers' requests for:						
Changes in product quality specifications	2.4%	8.8%	10.0%	7.0%	1.2%	5.7%
Not using certain chemicals/inputs	5.2%	2.3%	8.6%	2.6%	1.1%	2.6%
Changes in postharvest practices	4.4%	3.6%	8.3%	3.7%	2.1%	3.9%
Farmers' response to buyers' requests:						
Changed to comply with requests	2.4%	0.3%	0.7%	0.2%	0.8%	0.8%
Did not change despite requests	4.4%	10.1%	16.7%	10.3%	3.1%	8.3%
Had no requests from buyers	93.2%	89.6%	82.6%	89.5%	96.2%	91.0%
Those complying as a share of those with requests	35%	3%	4%	2%	21%	8%

Source: India Agricultural Marketing Survey 2005; authors' calculations.

Even when buyers change their quality specifications, farmers do not always alter their practices. Very few farmers (only 8 percent) report that they actually complied with buyers' changed quality specifications. This low response rate is explained partly by the fact that only 26 percent of buyers who made such requests actually rewarded farmers through higher prices. Farmers report that 40 percent of mango and 45 percent of maize buyers did pay more when they complied with specifications.

What factors drive farmers to undertake postharvest activities to improve quality? A regression analysis of survey data found that farmers selling at wholesale markets and village markets (compared to those selling at the farmgate) are significantly more likely to alter their postharvest practices to improve quality (Annex table 3.5). A price premium for quality provides another incentive for farmers to change their practices. A household head with secondary education also increases the propensity to undertake postharvest practices, perhaps implying that the complexity of these practices requires a higher level of skill and literacy. Those who receive information on postharvest practices from other farmers and agricultural officers are more likely to adopt them, which may indicate farmers' higher level of trust for these sources of information.

E. Contract Farming: Status and Challenges

Contract farming is being promoted by the GOI to strengthen farmers' linkages to the market. The model APM Act suggests legal provisions for introducing contract farming at the state level. Contract farming is an agreement between farmers and marketing/processing firms for the production and supply of agricultural products under a forward agreement. This arrangement rests on a farmer's commitment to supply a specific quantity of an agricultural commodity that meets certain quality standards at a specific time set by the buyer; it also rests on a buyer's commitment to purchase the commodity, usually at a previously agreed upon price. In most cases, the buyer also supplies or arranges for the farmer to receive inputs, production advice, and credit (Kohls and Uhl 1990; Eaton and Shepherd 2001; Singh 2005).

In India, contract farming has been adopted to grow and market a wide variety of commodities. These commodities include grains (rice, wheat, maize, barley); fruits (mangoes, apples); vegetables (tomatoes, potatoes, gherkins, chilies, mint, spinach); oilseeds; cotton; livestock products (broilers, milk); seeds; trees (eucalyptus, poplar); and other crops (tea, sugarcane, chicory, oil palm) (Spices 2003; Vaswani et al. 2003; Birthal, Joshi, and Gulati 2005; Deshpande 2005; Singh

2005). The contracts are often verbal, and a growing number are made with producer groups. Some examples are presented in table 3.7.

Table 3.7: Examples of successful contract farming initiatives

Commodity	State	Agency	Farmers contracted	Services provided by buyer
Cotton	Tamil Nadu	Appachi Cotton Company	Farmer association	Seed, other inputs, crop insurance, credit
	Maharashtra	Cotton Corporation of India	Farmer association	Extension
Safflower (oilseed)	Maharashtra	Marico Industries	Cooperative	Credit, extension
Tea	Tamil Nadu	Tea Board	Women' self-help group	Extension, transport
Fruits, vegetables	North India	Mother Dairy/National Dairy Development Board	Grower associations	Inputs, extension
Gherkins	Karnataka	Global Green	Grower associations	Seed, other inputs, extension
	Andhra Pradesh	BHC Agro (India)	Individual farmers	Seed, other inputs, credit, transport
Maize, oilseeds	Punjab, Tamil Nadu	Mahindra Shubhlabh	Individual farmers	Seed, other inputs, farm equipment, extension, credit, crop insurance
Basmati rice, fruits, vegetables	Madhya Pradesh, Maharashtra, Karnataka, Haryana	Rallis Kisan Kendras-ICICI	Individual farmers	Inputs, extension, credit, accident insurance
Wheat	Madhya Pradesh	HLL-Ralis-ICICI	Individual farmers	Inputs, extension, credit
Basmati rice	Punjab, Uttar Pradesh	Pepsi Co.	Individual farmers	Seed, other inputs, extension
Barley	Karnataka	Ugar Sugar Works Ltd.	Individual farmers	Seed, extension
Tomatoes	Punjab	Nijjer	Individual farmers	Seed, extension
Potatoes	Maharashtra	Fechi Co.	Individual farmers	Seed, extension, soil testing
Milk	Punjab	Nestlé India Ltd.	Individual farmers, agents	Inputs, extension, transport
Broilers	Multi-state	Venkateshwara Hatcheries	Individual farmers	Inputs, extension, transport

Source: Spice 2003; Dev and Rao 2004; Birthal, Joshi, and Gulati 2005; Deshpande 2005; Singh 2005; India Agricultural Marketing Survey 2005.

Earlier, contract farming arrangements were mainly two-party agreements between farmers and the buyer. More recently, trilateral and multilateral arrangements have developed.¹⁷ In most cases these arrangements address farmers' constraints in accessing inputs, credit, and production advice. Overcoming these constraints is especially critical when buyers introduce new technologies, such as improved crop varieties and livestock breeds, to farmers. To help farmers deal with the production risks, some buyers also help them obtain crop insurance.

Recent studies of contract farming in India have documented successful and unsuccessful experiences. The successful initiatives indicate that farmers engaged in contract farming benefited from substantial increases in yields and farm incomes; that contract farming contributed to increased employment, resulting from greater demand for family and hired labor; and that contract farming helped reduce farmers' risks because of the assured price and market (Bhalla and Singh 1996; Rangi and Sidhu 2003; Haque 1999; Dev and Rao 2004; Birthal, Joshi, and Gulati 2005; Deshpande 2005; Singh 2005). For example, Birthal et al. compared the performance of contract and noncontract farmers producing vegetables (with the National Dairy Development Board), milk (Nestlé India), and broilers (Venkateshwara Hatcheries). They found that contract farmers' net profits surpassed those of noncontract farmers by 78 percent (for vegetables), 100 percent (for milk), and 13 percent (for broilers). The higher returns mainly derived from higher yields and lower production and marketing costs. Costs were reduced in terms of farmer's time, transport of inputs and outputs, and access to information and new technology.

The extent to which contract farming shows bias towards larger-scale farmers differs considerably across different contexts. Some studies pointed to a bias by some firms in Punjab

¹⁷ An example of a trilateral arrangement is: farmer/producer group + buyer + bank. Two examples of multilateral contract farming arrangements are: (1) farmer/producer group + buyer + input supplier + bank and (2) farmer/producer group + facilitator + buyer + input supplier + bank.

towards medium- and large-scale farmers (Bhalla and Singh 1996; Singh 2000a and Satish 2003). Other studies found the opposite (Haque 1999; Dev and Rao 2004; BIRTHAL et al. 2005). BIRTHAL et al. found that contract farmers were about equally distributed among small-, medium-, and large-scale farmers for poultry and vegetables in Andhra Pradesh, Punjab, Haryana, and Delhi, while small-scale contract farmers accounted for the majority (56 percent) engaged in dairy production in Punjab. Dev and Rao (2004) found small-scale and marginal farmers dominating gherkin contract farming in Andhra Pradesh and Karnataka. Other studies documented that farmers pulled out of contract growing arrangements because of problems with lower prices, unjustified quality discounts or product rejections, delayed payments, and inadequate extension support (Bhalla and Singh 1996; Singh 2005). Breach of contract by farmers and buyers has also occurred (Bhalla and Singh 1996; Singh 2000).

Contract farming implementation problems can be traced to a number of factors. These factors include inadequacies in contract design (for example, in pricing rules, delivery and payment rules, quality specifications and associated price implications, technical support requirements for farmers to adopt new technologies); a poor understanding between farmers and buyers of their expected roles; limited bargaining power of smaller-scale farmers; and the lack of a legal framework to govern contracting arrangements. Problems with inadequate contract design and program implementation contributed to the poor performance of contract farming organized by the Punjab Agro Industries Corporation (PAIC) in 2002. PAIC committed to provide farmers seed and technical assistance and to purchase all of the produce at a previously agreed price (Singh 2005). Bad weather during the harvest led to disease in farmers' crops (for example, peas became infected by fungus). Poor quality fungicides and inadequate technical support added to the problem. Large-scale rejections of farmers' produce ensued because it did not meet PAIC quality standards. Farmers were instead advised to sell in the open market, which led to a crash in local prices (Singh 2003; Rangi and Sidhu 2003). As a result of these production and marketing problems, about 60 percent of the farmers subsequently dropped out of the program (Dhaliwal, Kaur, and Singh 2003).

The India Agricultural Marketing Survey finds limited participation by farmers in contract farming. Of the farmers surveyed, only 5.5 percent (87) are contract farmers. Most of them are in Tamil Nadu (62 percent), followed by Maharashtra (17 percent), Orissa (14 percent), and Uttar Pradesh (6 percent). Contract farming arrangements are more prevalent for mangoes (85 percent). The most common assistance provided by the buyer, especially for mangoes and turmeric, is labor for harvesting (49 percent of contracts), followed by production advice (14 percent). Very few contractual arrangements provide inputs (4 percent). For mango farmers, the most frequently cited reason for entering into a contract farming arrangement is the difficulty in finding workers to harvest the fruit. Contract buyers are mainly traders (57 percent), processors (19 percent), and exporters (14 percent).

F. Other Marketing Arrangements

Other marketing arrangements designed to foster greater vertical coordination in the marketing chain have also been tried in India. The expanded access to the Internet, declining costs of computer technology, and affordable alternative sources of electricity (such as solar energy) have made it easy to set up rural kiosks operated by private companies and nongovernmental organizations (NGOs). Kiosks offer a range of services related to production and marketing, including, for example, farm and animal husbandry management and marketing advice, or input supply and price information. In some private initiatives, kiosks also serve as purchasing centers for farmers' products. The procurement operations require private companies to obtain a special waiver from the APM Act from the respective state governments. A well-known example of this initiative is the *e-choupal* (e-kiosk) operated by the ITC Limited Ltd. Each kiosk sells inputs and provides free

production and marketing information while serving as a procurement station for farmers' output (box 3.1).

Despite a general perception that credit-marketing interlinked sales are widespread, the study finds only a limited number of cases. The presence of interlinked sales between farmers and traders at the regulated markets is widely regarded as one reason that farmers do not sell directly to buyers. The survey, however, finds that only 9 percent (106 farmers) report selling their produce in advance. About 56 percent of these 106 farmers are in Tamil Nadu, 25 percent in Uttar Pradesh, 10 percent in Maharashtra, and 8 percent in Orissa. Only for maize and tomatoes do farmers receive an advance in kind, in the form of farm inputs (fertilizer, seed, and pesticide). The fact that farmers growing the focus crops are relatively better off than the average farmer in the state may partly explain the limited use of interlinked credit arrangements.

Box 3.1: Direct marketing through the e-choupal

Between 2000 and 2007, the agribusiness division of ITC Limited set up 6,400 Internet kiosks called e-Choupals in nine Indian states, reaching about 38,000 villages and 4 million farmers. ITC establishes an Internet facility in a village and appoints and trains an operator (*sanchalak*) from among the farmers in the village. The *sanchalak* operates the computer to enable farmers to get free information on local and global market prices, weather, and farming practices. The e-Choupal also allows farmers to buy a range of consumer goods and agricultural inputs and services (sourced from other companies).

The e-Choupal serves as a purchase center for ITC for 13 agricultural commodities including, with the *sanchalak* acting as the commission agent in purchasing the produce and organizing its delivery to ITC. In 2006/07 ITC purchased about 2 million tons of wheat, soybeans, coffee, shrimp, and pulses valued at \$400 million through the e-Choupal network. This direct purchasing cuts marketing costs for both farmers and ITC. It improves price transparency and allows better grading of produce. It also allows farmers to realize a bigger share of the final price.

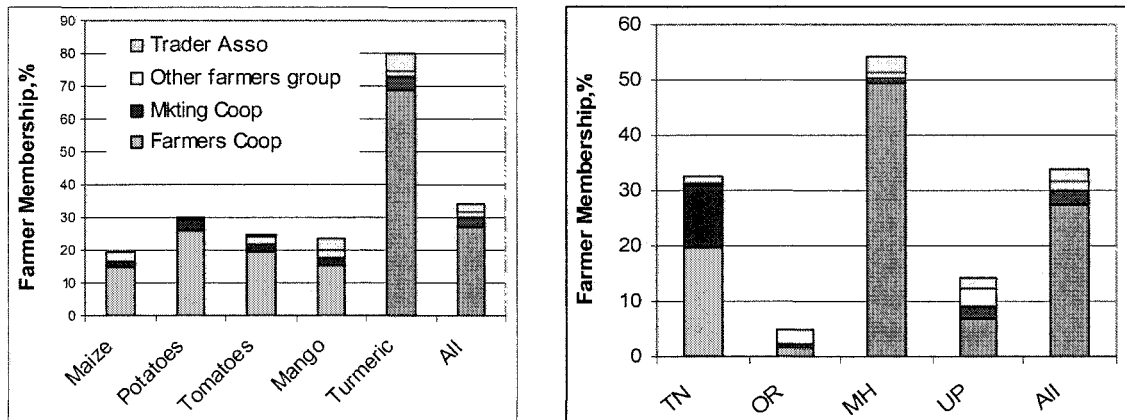
Source: Shivakumar, personal communication, 2007.

G. Farmers' Participation in Producer Groups

Producer groups, whether in the form of an association, cooperative, society, or other formal or informal organization, can benefit farmers in a number of ways. With the large number of small-scale and marginal farmers in India and often small marketable surpluses, producer groups through collective efforts can provide a mechanism to lower transaction costs in marketing and purchasing inputs, facilitate access to technical services and credit, and provide a unified voice to influence policy. Nationally, farmer participation in producer organizations is limited; the NSS survey of farm households in 2002/03 found that only 2.2 percent had at least one member of the household participating in a registered farmer organization.

The India Agricultural Marketing Survey also finds limited participation of farmers in producer groups. Only about one-third of the farmers report being members of any type of producer group or association (figure 3.2). Participation is highest in Maharashtra (52 percent) and Tamil Nadu (30 percent) and much more limited in Orissa (4.8 percent) and Uttar Pradesh (10 percent). Membership is most widespread among turmeric farmers (73 percent). The survey found that farmers' participation in an association benefits them by increasing the prices they receive in collectively selling produce by an average of 4.9 percent.

Figure 3.2: Farmers' membership in producer groups by crop and state



Source: India Agricultural Marketing Survey; author's calculations.

IV. Trading in Agricultural Commodities

Farm produce generally flows to local wholesale markets, which is a pivotal stage in the marketing system in India. It is where agricultural products are purchased by other wholesalers for sale in other wholesale markets in other states, by retailers for sale at local markets, by processors for greater value-addition; and by exporters for shipment to other countries in fresh or processed forms. At independence, when the country was plagued by food shortages and famines, “the immediate concern for government was to save farmers and consumers from malpractices of traders and facilitate the growth and development of an orderly marketing arrangement” (National Commission on Farmers 2006:396). The central and state governments’ desire to develop and organize the marketing of agricultural produce through regulated markets led to passage of the APM Act and the launch of a massive program to develop a national wholesale marketing network. This chapter reviews the operation of these markets and the performance of the wholesale trade. It draws mainly on the findings of the India Agricultural Marketing Survey in Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh.

The marketing survey finds that the limited accessibility and poor facilities of wholesale markets impede them from operating more efficiently. In 2006, India had more than 7,500 regulated wholesale markets, but their infrastructure and facilities remain inadequate despite the significant revenues they generate. They are a major source of the significant losses and wastage in the marketing system. Within these markets, physical and informal barriers prevent entry into the trading business. Notably, marketing margins in the wholesale market decline with increased trader density. Analysis of wholesale marketing in Tamil Nadu finds that the likelihood of farmers selling at a wholesale market increases significantly with improvements in market facilities. Although wealthier farmers capture a larger share of the benefits from the facilities in congested markets, investments in market facilities would be advantageous to the poor, because sales by poorer farmers would increase proportionally more than those by wealthy farmers.

Traders cite governance issues and poor access to credit and rural infrastructure as some of the most critical constraints to the growth of their business. Poor road conditions and roadblocks (with the associated side payments) increase transport costs and cause delays. Traders rely mainly on personal funds to meet working capital needs. Among those who borrow, most depend on informal sources, such as moneylenders and friends or relatives. Many cite problems with meeting the numerous bank documentation requirements as a major factor discouraging them from obtaining a bank loan.

Organized food retailing, particularly by supermarkets and hypermarkets, is expanding rapidly in India, even with the ban on foreign direct investment (FDI). Rising incomes, increased urbanization, a growing middle class, greater numbers of working women, and increased exposure to products through wider media penetration have fueled the growth of food retailing. Retailers in the organized sector identified several key constraints to their operations, including a number of restrictive regulations, inadequate infrastructure, and multiple taxation. These issues are discussed in the following sections.

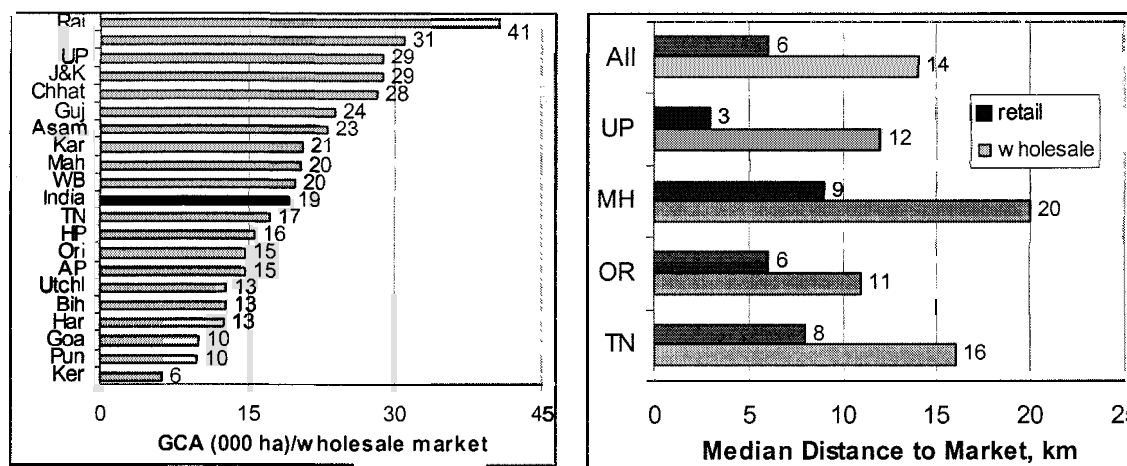
A. Access to Wholesale Markets

Market Density and Distance

Market density and distance to the nearest market have an important influence on market accessibility, the associated cost of transportation, and the returns to marketing. In 2006, India had about 7,566 regulated wholesale markets and 21,780 rural primary/periodic retail markets—village *haats*, shanties, and the like (Ministry of Finance 2007). Market density differs significantly by state.

Kerala, Punjab, and Goa have the highest density of wholesale markets, with each market serving on average about 10,000 hectares of gross cropped area (GCA). Haryana, Bihar, Uttarakhand, Andhra Pradesh, and Orissa follow, with wholesale markets serving between 13,000 and 15,000 hectares of GCA. Madhya Pradesh and Rajasthan have the lowest market density (figure 4.1).

Figure 4.1: Wholesale market density in India (2003) and distance to wholesale markets in focus states (2005)



Source: Ministry of Agriculture; India Agricultural Marketing Survey 2005; authors' calculations

State averages, however, can mask variations in market accessibility at the local level. The India Agricultural Marketing Survey asked farmers about the distance to the nearest wholesale and retail markets for grains and fruits. Distance to market is an important consideration, especially for perishable high-value commodities, because of the potential losses during transport. The survey found that the median distance to a wholesale market is about 11 kilometers in Orissa and 12 kilometers in Uttar Pradesh (figure 4.1). Wholesale markets in Tamil Nadu and Maharashtra are more distant, with median distances of 16 and 20 kilometers, respectively. In addition to distance, farmers also list “bad roads” as an important constraint to marketing, as noted in the previous chapter.

Infrastructure and Services Available in Wholesale Markets

Wholesale markets may be specialized or dual-purpose. Seventy-eight wholesale markets were visited for the survey. Dual-purpose markets—which function as wholesale and retail markets—are more prevalent in Tamil Nadu and Orissa. In Maharashtra and Uttar Pradesh, most markets are exclusively wholesale markets (table 4.1). Most wholesale markets are in urban areas.

The concentration of regulated wholesale markets varies considerably by state. Regulated wholesale markets dominated in Maharashtra (95 percent) and Uttar Pradesh (94 percent). In Orissa, regulated markets dominated the sample

Table 4.1: Type, location, and size of markets

Market characteristic	Tamil Nadu	Orissa	Maharashtra	Uttar Pradesh	All
Type of market (%)					
Wholesale only	35	0	58	88	57
Wholesale and retail	65	100	42	12	73
Located in urban area (%)	95	70	30	71	65
Type of market management (%)					
Regulated	10	90	95	94	72
Unregulated, managed by:					
State government	0	0	5	0	1
Local municipality	45	10	0	0	14
Managed privately	10	0	0	6	4
Management not reported	25	0	0	0	6
Average market area (acres)	14	5	86	33	35
Average no. stalls	282	34	242	175	175
Average shop area (sq ft)	704	428	1608	1348	1001
No. markets surveyed	20	20	20	18	78

Source: India Agricultural Marketing Survey 2005; authors' calculations

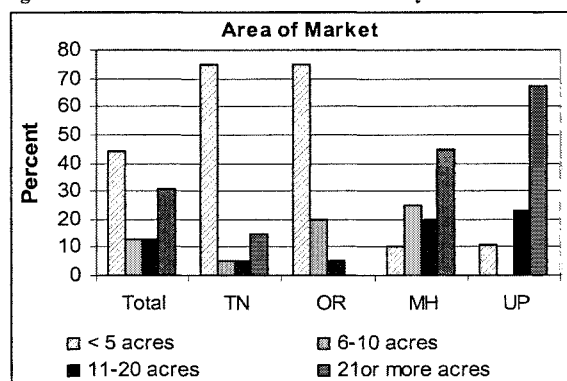
(90 percent), but the APM Act is only weakly enforced. Only 10 percent of the wholesale markets in Tamil Nadu are regulated. Most wholesale markets are managed by local municipalities and not overseen by the Tamil Nadu Marketing Board.

At the state level, market density appears to be inversely related to market size. The density of markets in Tamil Nadu and Orissa is higher, but these markets are also smaller: three-fourths occupy less than 5 acres (2 hectares) (figure 4.2). By contrast, market density is lower in Uttar Pradesh and Maharashtra, but the markets themselves tend to be larger: 67 percent of wholesale markets in Uttar Pradesh and 65 percent in Maharashtra occupy 21 acres (8.5 hectares) or more.

Market infrastructure and facilities in the surveyed wholesale markets are limited and rudimentary. Good market facilities and infrastructure are critical to reducing transaction costs, improving price transmission, and preserving the quality of produce (Kohl and Uhl 1990; Acharya 2004). There currently is no national or state database on the availability of infrastructure and facilities in India's wholesale markets. The marketing survey found limited infrastructure in many markets (figure 4.3). Infrastructure was slightly better in Maharashtra and Uttar Pradesh than in the other two states. Most markets had covered shops, but less than 50 percent of markets in Maharashtra and Orissa had paved roads within the market yard. With the exception of Maharashtra, only 44 percent of wholesale markets in Uttar Pradesh and 10 percent in Orissa and Tamil Nadu had parking for vehicles in the market. About 70–80 percent of markets in Maharashtra, Tamil Nadu, and Uttar Pradesh had drainage systems, but only one-third had them in Orissa. Access to warehouses is limited, except in Maharashtra (85 percent). Less than 40 percent of markets had a drying area and less than 20 percent had cold storage facilities.

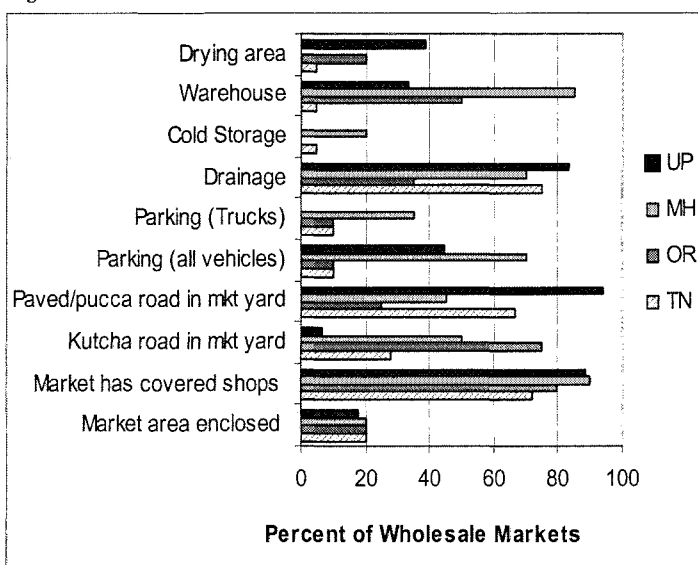
Nationally, warehouse capacity is low and confined to a few states. In 2004, six states accounted for 72 percent of warehouse capacity in India: Punjab, Andhra Pradesh, Uttar Pradesh, Haryana, Maharashtra and Tamil Nadu. Punjab had the largest capacity at 19 million tons (Annex figure 4.2). Warehouses in India are used generally for foodgrains, particularly rice and wheat. Three of every four warehouses are operated by government agencies—Food Corporation of India (FCI), Central Warehouse Corporation, and State Warehouse Corporations (SWCs). They are concentrated in the major foodgrain-producing states, such as Punjab, Andhra Pradesh, Uttar Pradesh, and Haryana. Warehouses

Figure 4.2: Distribution of wholesale markets by area



Source: India Agricultural Marketing Survey 2005; IMRB 2006.

Figure 4.3: Limited infrastructure in wholesale markets



Source: India Agricultural Marketing Survey 2005; authors' calculations.

for other commodities remain limited. Mukherjee and Patel (2005), as part of a survey of the retail sector in India, found that warehouses and godowns (and the mandis that operate them) are often located inside cities, where truck transport is restricted during certain hours. Transport is delayed by city traffic congestion, and the timing of market transactions is restricted.

Cold storage facilities are even more limited nationally. These facilities are concentrated in a few states. About 80 percent are in six states—Uttar Pradesh, Uttaranchal, West Bengal, Bihar, Gujarat, and Madhya Pradesh—and 95 percent of the capacity in these facilities is used to store potatoes (Annex figure 4.3). Uttar Pradesh and Uttarakhand¹⁸ jointly in 2004 had the largest capacity, at 8.3 million tons. To some extent, cold storage capacity in the two states was enhanced by the NHB's cold storage investment grant scheme, which helped to add nearly half a million tons in capacity altogether in Uttar Pradesh and Uttarakhand between 1999/2000 and early 2005. Other states operate more multipurpose cold storage facilities. Himachal Pradesh and Maharashtra have a more significant share of cold storage capacity dedicated to fruits and vegetables. Kerala has the highest share (89 percent) used to store milk, meat, and other livestock products, followed by Maharashtra and Tamil Nadu.

Most wholesale markets offer a very limited range of services. They generally have a bank, post office, and police station, and nearby bus and railway stations (figure 4.4), but overall, only 29 percent of the markets surveyed have a large weighing machine for traders to use. Other important amenities for market users, such as public toilets, a canteen, and a hostel for farmers are frequently lacking. They are more readily available in Maharashtra and Uttar Pradesh, but still in only about 70 percent of the markets. Less than 40 percent of the markets had public toilets or canteens in Orissa and Tamil Nadu. With the exception of Maharashtra, less than 40 percent offered value-enhancing services, such as drying, grading, and fumigation.

Stalls or shops in wholesale markets operate with limited equipment. About 90 percent of the stalls had electricity in Maharashtra and Tamil Nadu, but only 63 percent in Orissa and 42 percent in Uttar Pradesh. Surprisingly, not all stalls had mechanical scales: 96 percent had them in Orissa, 90 percent in Uttar Pradesh and Maharashtra, and 74 percent in Tamil Nadu (figure 4.5). Less than 10 percent of the shops had packing or fumigation equipment. Except for Maharashtra (76 percent), less than one-third of shop owners in other states owned transport vehicles.

Inadequate market infrastructure can have a significant impact on farmers. A recent study (Shilpi and Umali-Deininger 2007) examined the impact of accessibility of wholesale markets and availability of market infrastructure within markets in Tamil Nadu. The study found that the likelihood of farmers selling at the market increased significantly with an improvement in market facilities and a decrease in travel time to the market. Wealthy farmers are able to capture a disproportionate share of the benefits of market facilities in congested markets, but as noted earlier, investments to improve market facilities would benefit the poor, because sales by poorer farmers would increase proportionally more than sales by wealthy farmers.

Regulated wholesale markets generate substantial revenues from market and other related fees, but only a limited amount appears to be reinvested in the marketing network. Among the markets in the survey that were willing or able to report earnings, the average revenue per year is Rs 9.1 million (Annex table 4.1).¹⁹ Market earnings depend on the size of the market, type of commodities traded, and volume of sales, and they vary significantly by state and across markets within the state. Uttar Pradesh markets have the highest average annual earnings, at Rs 21.9 million,

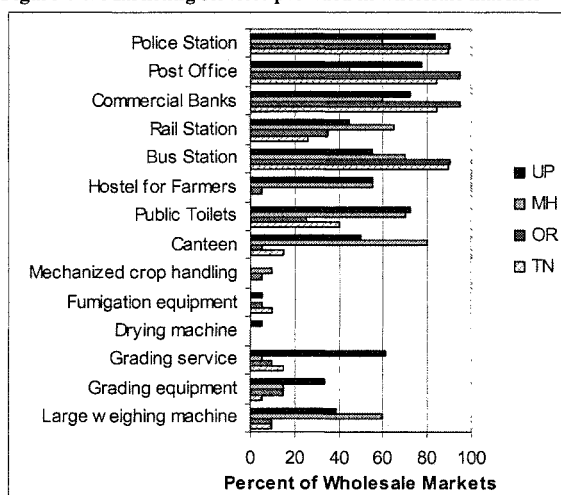
¹⁸ Uttar Pradesh and Uttaranchal formerly were a single state.

¹⁹ Only 70 percent of the wholesale markets surveyed were willing to supply revenue information, suggesting limited transparency in operations. Orissa and Uttar Pradesh had the highest response rate. Reluctance to provide revenue information was greater in the unregulated markets. Only 2 of the 20 unregulated markets in the survey provided information.

but annual earnings within the state ranged from Rs 3.3 million to Rs 68.5 million. The amount kept by the respective market committees differed by state, from 30 percent in Uttar Pradesh to 77 percent in Orissa. Of the total market revenues, however, only a small share is spent on operations and maintenance, equipment, facilities, and infrastructure. On average, Market Committees in Orissa, Uttar Pradesh, and Maharashtra spend from 19 to 44 percent of total expenditures on operations and maintenance, 1 to 8 percent on equipment, and 6 to 19 percent on facilities. Notably, these are the areas that farmers would like improved (chapter 3) (for example, almost half of the farmers in the survey cite the need to improve market facilities).

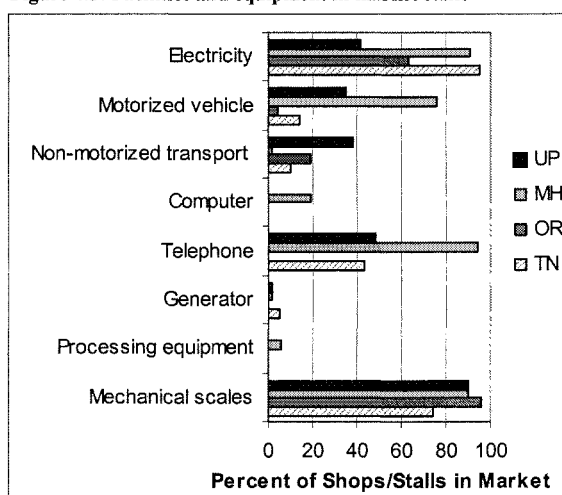
The auction system is not practiced in all markets. To promote greater transparency in the

Figure 4.4: Marketing services provided in wholesale markets



Source: India Agricultural Marketing Survey 2005; authors' calculations.

Figure 4.5: Facilities and equipment in market stalls



Source: India Agricultural Marketing Survey 2005; authors' calculations.

sales process and ensure a fair price to farmers, state governments mandated the adoption of open auctions in the regulated markets. The marketing survey finds that the majority of markets in Maharashtra (90 percent) and Uttar Pradesh (83 percent) follow the auction system in their wholesale markets, but only 45 percent have implemented it in Tamil Nadu. In Orissa, only 1 of the 20 markets visited uses the auction system (Annex table 4.2). As expected, auctions are more common in regulated markets: 61 percent of regulated markets report using the auction system compared to 40 percent of unregulated markets. In most cases, commission agents or employees of the market authority conduct the auctions.

Open outcry is the most common method of auctioning. Electronic bidding was not available in any of the markets. Information given prior to the auction can provide important inputs to sellers' and buyers' decisions on the sale price. The survey finds that limited information is given about the quality of produce sold, such as the grade/size, percentage of broken grains, and moisture content (Annex table 4.3). This finding is consistent with other reports that quality measures are not yet widely adopted in the marketing system. Only two-thirds of commission agents/traders report providing the quantity of the lot for sale, less than half report the variety, and only about one-third report the grade.

Informal Barriers to Trader Entry in Wholesale Markets

The management of shops in wholesale markets varies by state. Among the wholesale markets surveyed, 70–100 percent of the markets in Tamil Nadu, Orissa, and Uttar Pradesh rented out shops or stalls to traders, while in Maharashtra shops were sold and rented out in about half of the markets (table 4.2). If sold, the shops were auctioned, with the price influenced by the type of product sold. The type of product sold becomes a factor because many markets designate certain

locations for trading particular crops only. If a trader seeks to rent a shop in a market, 93 percent of the traders report the need to apply to the market authority. But personal connections and family relationships also play an important role.

Market officials contacted for the survey list several requirements for obtaining a shop or stall in the wholesale market. A number of legal requirements, such as applying for a trading license, proof of identity and residence, sales tax registration, and security deposit, tend to be more strictly enforced in Uttar Pradesh and Maharashtra, perhaps because of the higher prevalence of regulated markets in these states. Other factors taken into account for gaining a place in the market include experience

Table 4.2: Traders' access to shops/stalls in wholesale markets

	TN	OR	MH	UP	All states
Methods for allocating shops/stall (% of markets):					
Sold and rented	29	0	53	13	23
Rented only	71	100	47	88	77
If sold or leased, shop obtained by (% of markets):					
Auction	75	--	10	50	31
Price depends on product	75	--	30	50	44
If renting, shop obtained by (% of traders):					
Applying to market authority	18	41	74	93	62
Auction	25	4	1	2	8
Personal connection	49	48	11	5	24
From parent/relative	6	6	12	0	5
Other	2	0	2	0	1
Total	100	100	100	100	100
Requirements for getting a shop/stall in the market (% of markets):					
Experience as trader	20	25	40	22	27
Years of education	10	5	15	0	8
Security deposit	25	40	40	72	44
Sales tax registration	5	10	45	50	27
License	20	45	90	78	58
Proof of identity	20	35	75	78	51
Proof of residence	20	35	75	78	51
Creditworthiness/solvency	10	10	25	22	17
Guarantees	10	0	55	78	35
Any affidavit	5	20	10	67	24

Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; and UP = Uttar Pradesh.

as a trader, creditworthiness, and presentation of guarantees.

The focus group interviews and field visits suggest that some of these conditions serve as informal barriers to entry. In regulated markets in Maharashtra and Tamil Nadu, potential traders must present references from other traders currently operating in the market (five references in the case of one market in Maharashtra) to obtain a license to trade or set up a shop there. This requirement is consistent with the finding that personal connections and family relationships are important for being able to rent a shop. In addition, many wholesale markets have reached their full capacity, and the physical infrastructure itself limits entry. The slow pace of market development thus imposes a critical barrier to entry.

Limited Involvement of Market Committees in Market Disputes

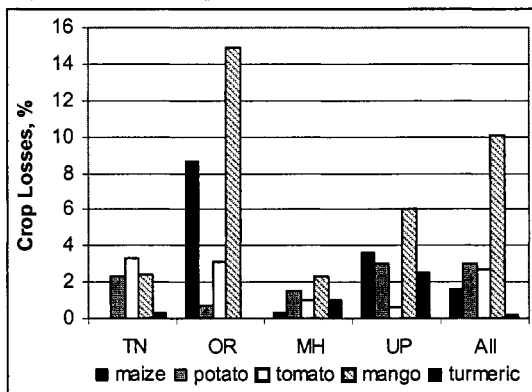
4.1 The presence of different types of market-related associations and systems for dispute resolution provides some information on the level of development of market institutions. One of the expected advantages of regulated markets is their dispute resolution mechanisms (Acharya 2004). The marketing survey finds that trade associations are present in 80–89 percent of markets in Maharashtra and Uttar Pradesh, but in only half of the surveyed markets in Tamil Nadu and Orissa. Market workers' associations are found in all markets, with the highest percentage (56 percent) in Uttar Pradesh.

Market disputes are generally handled informally. Market officials indicate that on average about two-thirds of disputes are resolved by buyers and sellers themselves (Annex table 4.4). Market committees take on a bigger role in dispute resolution only in Maharashtra. Traders' associations have very limited involvement in dispute resolution. Market officials were asked about the main causes of market disputes. In all four states surveyed, about half of the market officials identify price as main cause (Annex figure 4.4). Problems with product quality are cited by 60–80 percent of market officials in Orissa and Uttar Pradesh. Payment delays are a larger problem in Maharashtra (50 percent).

Crop Losses in the Wholesale Markets

The perishability of high-value agricultural products adds to the complexity of handling and marketing them. Based on information on traders' last transaction at the wholesale market, it is estimated that about 3 percent of the value of the two vegetable crops in the survey—tomatoes and potatoes—is lost from spoilage at the trader's level. Spoilage losses in mangoes are higher, at an average of 10 percent of the value of sales (figure 4.6). The average spoilage losses for the hardier products surveyed—maize and turmeric—are the lowest, at 1.6 and 0.2 percent, respectively. Actual crop losses are likely to be higher, as traders tend to account only for losses from physical wastage and do not factor in price discounts on commodities as quality deteriorates in the market. The main factors contributing to these losses, according to traders, are damage during storage, buyers picking only the good produce and disposal of the rest, congestion in the markets, and insufficient infrastructure in the markets.

Figure 4.6: Estimated produce losses in wholesale markets



Source: Fafchamps, Vargas-Hill, and Minten 2006.

Waste management in the markets is often lacking. Staff working in the wholesale market was asked how spoiled produce was handled. More than half (54 percent) responded that market employees or contracted firms handled garbage disposal and waste management. About 29 percent reported that it was just left to rot, while 13 percent reported that it was left for animals to eat. Only limited pest control is exercised in the market. Effective pest control is another measure to reduce losses, especially for storable agricultural products. As pests such as rats and insects can easily move around the market area, an integrated approach is generally needed for effective pest management. Market officials were asked about the pest control measures they employed. Fifty-nine percent indicated that no particular control measure for rats and insects are implemented in their market, 32 percent indicated that it was up to individual shop owners to take care of their rat problems (27 percent said the same for insects). Only 8 percent reported that the market management, market association, or a subcontracted firm took care of rat problems (10 percent for insect problems).

The survey found that the availability of infrastructure and market facilities is an important determinant of crop losses. Regression analysis was used to analyze the main factors contributing to crop losses in wholesale markets. Losses are higher the longer the produce is held at the market. The availability of parking for vehicles can reduce crop losses by about 9 percent (Annex table 4.5). Notably, only 27 percent of the wholesale markets studied were rated by traders as having adequate parking. Market facilities such as a warehouse and fumigation equipment can reduce losses by about 6 percent and 13 percent, respectively.

B. Trading in Wholesale Markets

Traders in wholesale markets perform a variety of roles. They function as commission agents, wholesalers, retailers, or a combination of these roles. Commission agents conduct auctions; organize the grading, sorting, weighing, bagging, storing, and transport of produce for the buyer; collect marketing fees; and in some instances provide credit to farmers. They perform a facilitating role. They are supposed to act on behalf of the farmer to obtain the best price and do not take ownership of the produce. Wholesalers and retailers, on the other hand, take ownership of the

produce. The survey found that on average, traders are male and in their 40s. The lack of female traders is notable. The majority of traders have formal education; the level varies across states.

The delineation of functions between being a commission agent and wholesaler/retailer has blurred. About 65 percent of traders in Maharashtra function as both wholesalers and commission agents, and about 20–30 percent of traders in the other states perform these dual roles (Annex table 4.6). While it could not be verified that they were acting in both capacities in handling the same transaction, the duality of roles can put farmers at some disadvantage in the transaction. A significant proportion (20–40 percent) of traders has close relatives who are commission agents or wholesalers. This connection can also work to the disadvantage of farmers. In one of the focus group discussions undertaken as part of the survey, farmers complained that commission agents lower the sale price when selling to their relatives.

Traders pay attention to the variety and quality of produce they procure. Based on information about their last purchase transaction, over 80 percent of traders in all states reported paying attention to the variety and quality of the produce. Traders put a price premium on good quality produce. Like the farmers, the traders were asked about the difference in price between high-quality and average produce. The price premium is estimated by the difference between the two. The quality features considered included size, shape, color, smell, taste, and moisture content. Based on traders' responses, the quality premiums between average and high-quality produce amounted to 54 percent for mangoes, 48 percent for tomatoes, 29 percent for potatoes, 37 percent for turmeric, and 28 percent for maize. As noted in the previous chapter, it appears, however, that the quality premiums are not fully passed on to farmers.

Traders' Main Source of Working Capital

Traders mainly use their own personal funds as a source of working capital (table 4.3). Among those who borrow, a large proportion depend on informal sources, such as moneylenders and friends or relatives. In Tamil Nadu, the proportion of traders relying on moneylenders (31 percent) is three times those relying on banks (11 percent). A greater proportion of traders in Maharashtra have formal links to the banking sector, about 87 percent have bank accounts, and about 32 percent have an overdraft facility or had obtained a bank loan in the past year. During the focus group interviews, traders in Tamil Nadu noted that the numerous documentation requirements were a major factor discouraging them from obtaining a bank loan. They reported preferring to use the bank's overdraft facility, although the amount of funds may be more limited.

Table 4.3: Traders' credit sources

	Source of credit (%)				
	TN	OR	MH	UP	All
Bank	11.3	14.9	30.0	9.0	16.4
Credit institution	1.0	1.8	0.2	0.5	0.9
Moneylender	30.5	11.1	2.0	14.3	14.3
Friend or relative	13.2	4.8	3.7	8.8	7.6
Other source	1.4	1.1	1.0	1.4	1.2
Trader is member of saving association/chit fund	5.6	8.5	8.5	1.5	6.1
Trader has bank account	31	39	87	46	51
In addition to bank account, trader has overdraft facility	24.0	9.0	32.4	10.8	21.8

Source: India Agricultural Marketing Survey 2005; authors' calculations.
 Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; and UP = Uttar Pradesh.

The majority of sales and purchases involve payment on delivery. Based on sales or purchases over the past year, traders report that 60–65 percent of these transactions occurred on a cash basis (Annex figure 4.5). In one-third of the cases, they obtained trade credit from the buyer. Advance payment is very limited.

Traders' Main Sources of Information

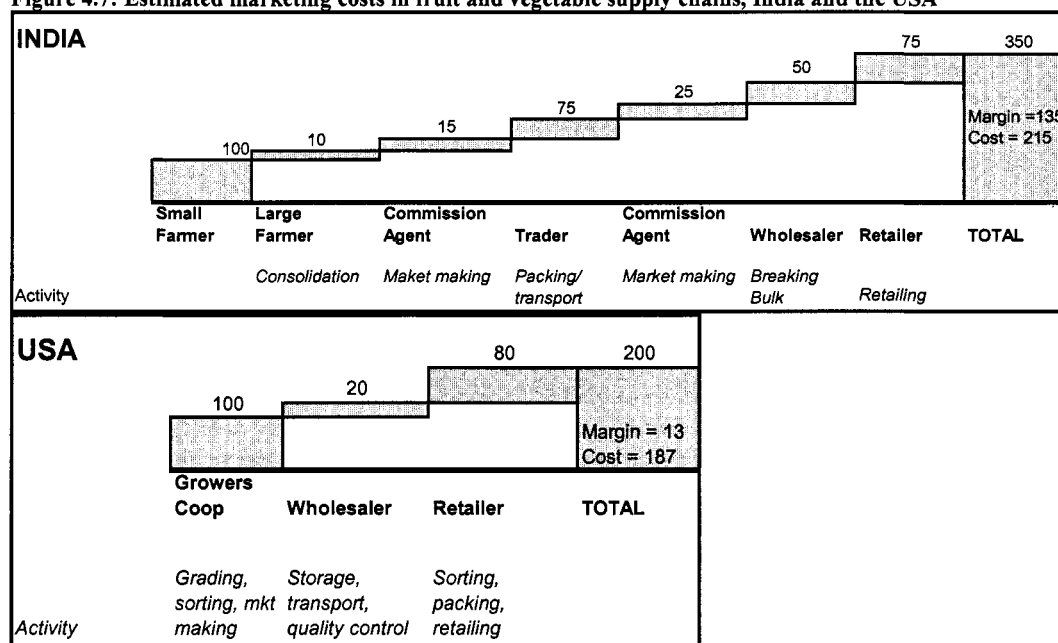
Traders mainly rely on regular suppliers and buyers for price information. Price information is critical for an efficient marketing system as it enables market participants to capitalize on arbitrage opportunities—that is, to move produce to markets where prices are higher. Traders in the survey

obtained price and market information from several sources. A large percentage of traders reported collecting information themselves; few traders employed other people to collect information (Annex figure 4.6). The other most frequent sources of information are other traders (33 percent) and regular suppliers or buyers (18 percent). It is only in Maharashtra that traders have developed a reliance on the mass media, such as newspaper and electronic screens or boards displaying prices.

Marketing Costs and Margins

The large number of intermediaries in the supply chain can raise the costs of the final product for consumers. In the case of fruits and vegetables, the supply chain is not integrated, and in some cases 6–8 intermediaries exist between the farmer and the consumer (Confederation of India Industries and McKinsey and Company 2004). Figure 4.7 illustrates the impact of a large number of intermediaries on the marketing costs for fruits and vegetables in India. Costs are about 1.7 times those in the USA.

Figure 4.7: Estimated marketing costs in fruit and vegetable supply chains, India and the USA



Source: McKinsey and Company 1997.
 Note: Cost buildup for fruits and vegetables.

The gross margins for more perishable commodities tend to be higher. To assess the profitability of trading activities, gross margins are estimated for the last sales transaction of the trader and for the past year. The gross margin is defined as the difference between the total sales and purchase value of a commodity. The study could not conduct more disaggregated analyses of operational expenses because traders were hesitant to provide detailed cost information. Median values are reported to address the effect of large outliers. The survey finds that on an annual basis, the median gross margins as a percentage of total sales averaged 4 percent for maize, 7.8 percent for turmeric, 8.8 percent for potatoes, 10.3 percent for tomatoes, and 12.2 percent for mangoes (table 4.4). The higher percentage return for mangoes and tomatoes may reflect the higher risk premia due to their greater delicacy and perishability.

4.2 Analysis of the survey data indicates that a 10 percent increase in the density of traders in the wholesale market reduces the gross marketing margin (GMM) by 0.6 percent (Annex table 4.7). The impact of trader density on reducing marketing margins has important implications for the conditions imposed for entry into the trading business in the wholesale markets. As discussed earlier, being able

to buy or rent a stall or shop in a market is conditioned not only on legal requirements but on the physical limitations imposed by the market's size and by informal factors such as personal or family connections.

Table 4.4: Marketing margins from trading

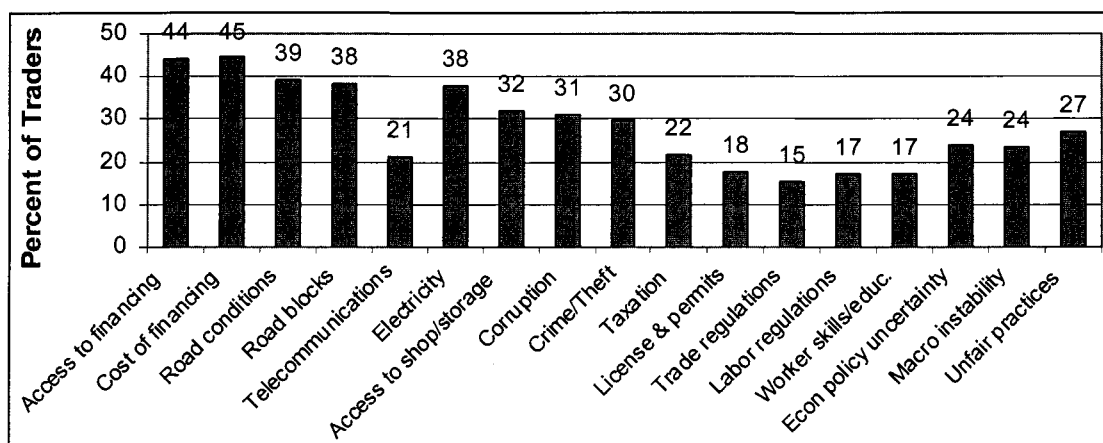
	Product					
	Maize	Potatoes	Tomatoes	Mangoes	Turmeric	All
Last transaction, median value:						
Quantity traded (kg)	800	1,500	475	800	800	1,000
Sales value (Rs)	5,670	8,190	3,276	7,476	23,982	5,964
Gross margin (Rs)	840	714	882	1,092	462	840
Gross margin/annual sales value (%)	14.8	8.7	26.9	14.6	1.9	14.1
Days elapsed between arrival and sale	1	1	1	1	2	1
Annual sales/purchases, median value:						
Average purchase price (Rs/kg) – mean	5.1	5.9	8.6	8.9	21.8	
Value of annual purchases (Rs 000s)	289	692	354	600	460	514
Value of annual sales (Rs 000s)	310	792	434	757	480	586
Annual gross margin (Rs 000s)	13	69	45	92	37	50
Gross margin/annual sales value (%)	4.1	8.8	10.3	12.2	7.8	8.5
No. observations	292	365	366	316	134	1,473

Source: India Agricultural Marketing Survey 2005; author's calculations.

C. Investment Climate in Wholesale Trading

Traders in the survey identified access to credit and infrastructure and governance issues as the most critical constraints to the growth of their business. Access to credit and cost of financing are the most frequently cited constraints (figure 4.8). In addition to the collateral requirement, the significant documentation required and the large number of government offices that traders must contact to procure that documentation, pose major hurdles to obtaining a bank loan. Poor road conditions and roadblocks (with the associated side payments) are the second most cited constraints. They delay transport and increase transport costs. Unavailability of electricity, lack of storage, corruption, and theft in markets are the third group of frequently cited constraints.

Figure 4.8: Constraints in the investment climate for agricultural trading in Orissa, Uttar Pradesh, Maharashtra, and Tamil Nadu



Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: Figures represent constraints rated by trader as moderate, major, and very severe.

The severity of constraints varies by state. In Orissa, access to shops, access to finance, and the cost of finance are the most important constraints identified by more than half of the traders (Annex figure 4.7). The second most important set of constraints is related to governance (corruption and theft) and problems with rural infrastructure (roads, telecommunications, electricity); they are

noted by about one-fourth of traders. In Uttar Pradesh, infrastructural problems (road conditions, electricity) and governance (roadblocks, corruption) rank highest. They are listed as major problems by about 60 percent of traders. These are followed by difficulties in accessing finance (47 percent) and the cost of finance (47 percent). In Maharashtra, problems with electricity were the most important, mentioned by about 60 percent of traders. This constraint is followed by the high cost of finance and poor access to shops/storage, noted by half of the traders. In relative terms, Tamil Nadu appears to have a better investment climate compared to the other states surveyed; the severity of the constraints from the traders' perspective is lower. About one-third of traders surveyed in Tamil Nadu report that poor infrastructure (road conditions, roadblocks) and poor access to finance is the most important constraints.

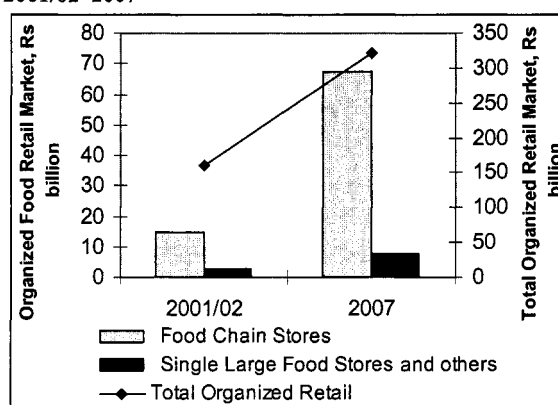
D. Food Retailing

With an estimated 15 million retail outlets in the country, the retail sector contributes about 10 percent of GDP and employs 6–7 percent of the labor force in India (Bajpai and Dasgupta 2004). Food retailing comprises a large segment of the retail sector, accounting for about 63 percent of total retail sales. The food retail sector consists of two segments, the unorganized/traditional and organized sectors. The unorganized retail sector comprises traditional low-cost formats, such as the local *kirana* shops, owner-operated general stores, convenience stores, hand cart vendors, and pavement vendors. They are generally family businesses utilizing household labor. The organized sector consists of licensed food retailers operating in a number of formats, from the traditional government cooperative and private retail outlets and chains to the newer supermarkets, large and mini-supermarkets, grocery and convenience stores, discount stores, and specialty chains (Singh 2004; Chengappa et al. 2005b; Mukherjee and Patel 2005). In 2001/02, the organized sector's food retail sales were estimated at Rs 18 billion. Rapid growth of the food retail sector has been projected over the next couple of years. One projection shows a quadrupling of total food retail sales to about Rs 75 billion by 2007 (figure 4.9).

Several factors drive the rapid growth in the domestic food retail sector. Rising incomes, increased urbanization, a growing middle class demanding more diverse and higher-quality food products, more working women seeking the convenience of shopping for necessities under one roof, and increased exposure to products through wider media penetration (television, cable, Internet) are fueling growth (Singh 2004; Chengappa 2005; Mukherjee and Patel 2005). Indian families' increased ownership of durable goods such as cars and refrigerators also facilitates the shift from daily purchases in neighborhood *kirana* stores to weekly/fortnightly shopping in supermarkets (Mukherjee and Patel 2005). Finally, the increased entry of both domestic and multinational food manufacturers, fostered by economic liberalization beginning in the 1990s, has significantly increased the number of manufactured and processed food products in the market. These trends also encourage smaller retail outlets to expand to accommodate more brands (Mukherjee and Patel 2005).

The organized food retail sector grew rapidly despite the ban on foreign direct investment. As per the latest estimate (2001), modern retail channels account for only 2 percent of Indian food sales compared to 13 percent in China, 30 percent in Indonesia, and 50 percent in Thailand (table

Figure 4.9: Sales in the organized food retail sector, India, 2001/02–2007



Source: *The Economic Times* 2003.

4.5). Despite the recent rapid expansion of locally owned hypermarkets, supermarkets, super centers, warehouse clubs, and discount stores, there are no national chains. Most retail companies tend to operate more regionally. Notably, the modern food retail stores expanded more rapidly in the southern states and cities (Chennai, Bangalore, and Hyderabad). Their early start is attributed to lower real estate prices, a large base of high-income and brand-conscious consumers, conducive to laws and regulations, and good infrastructure. In South India, 20 percent of households in cities such as Chennai and Bangalore purchase 40 percent of their groceries through these outlets (Singh 2004). In recent years, these modern retail formats have expanded to northern India cities such as Mumbai, Delhi, Kolkata, Pune, Lucknow, Jaipur, and Ahmedabad (Mukherjee and Patel 2005) (table 4.6).

4.3 Some kirana stores are upgrading themselves to become “super” kiranas or stand-alone supermarkets. This trend is apparent in Bangalore and Chennai, where organized food retailing is gaining ground. The super kiranas offer a wider range of products than the typical grocery store. Corporate manufacturers such as Hindustan Lever Ltd., ITC, Godrej, Bharti., Reliance, and DCM Sriram Consolidated are also setting up hypermarkets, supermarkets, and retail outlets in rural areas, recognizing their huge untapped potential. Gas-station stores are another growing retail outlet. Petroleum companies like Hindustan Petroleum Corporation Ltd., Indian Oil, and Bharat Petroleum have introduced branded outlets like Speedmart (around 60–65 in number), ConveniO’s (around 150), and In&Out Stores (around 100), which sell food items (Singh 2004).

A recent survey of retailers found that organized players value the importance of setting up efficient supply chains, but many lack the financial resources to do so (Mukherjee and Patel 2005). These retailers mainly operate on a hub-and-spoke model²⁰ to cut down on transportation. To achieve economies of scale and avoid multiple taxation and extra commissions from procuring from the regulated markets, some large retail players buy fresh produce directly from farmers. For example, Food World has contract farming arrangements with large-scale farmers and farmer cooperatives and associations in Karnataka.²¹ For vegetables, it has established fruit and vegetable collection centers where farmers who are registered vendors can bring their produce. Food World sets strict quality standards and farmers are paid at wholesale market rates (Chengappa et al. 2005b).

The more rapid growth of the retail sector, especially the organized sector, is constrained by a number of policy, regulatory, and institutional factors. The main constraints cited by organized retailers include: (1) the APM Act, which hinders the development of supply chains; (2) restrictions on shop opening times and days of operation (shops can open only six days a week); (3) difficulties in acquiring land owing to restrictive zoning regulations, land ceiling and rent control laws, high stamp duties, and the high cost of real estate; (4) multiple taxation and the complexity of taxes,

Table 4.5: Supermarkets’ share in food retail, selected countries

Country	Percentage share of supermarkets in food retail
USA, UK, or France	70–80
First wave:	
Argentina	60
Brazil	75
Taiwan	55
Czech Republic	55
Costa Rica	About 50
Chile	About 50
South Korea	50
Philippines	About 50
Thailand	About 50
South Africa	55
Second wave:	
Mexico	40
Columbia	47
Guatemala	36
Indonesia	30
Bulgaria	25
Third wave:	
China	13
India	2
Kenya	20

Source: Farina 2002; Gutman 2002; Thailand Development Research Institute 2002; Reardon and Berdegue 2002; Rangkuti 2003; Weatherspoon and Reardon 2003; De Hernandez 2004; Dries, Reardon, and Swinnen 2004; Hu et al. 2004; Neven and Reardon 2004; Orellana and Vasquez 2004; Lee and Reardon 2005; Manalili 2005; Reardon and Timmer 2005a; Reardon, Berdegue, and Timmer 2005.

²⁰ Firms establish one hub, at a pivotal location near their stores, from which they assemble products from different suppliers. These hubs then supply the needs of each store (Mukherjee and Patel 2005).

²¹ Food World follows seasonal contracts with guaranteed purchase at predetermined prices (Chengappa et al. 2005b).

which hinder interstate trade and development of interstate supply chains;²² (5) inadequate infrastructure—including poor approach roads and parking and public transport facilities (which hinder customers' access), the poor quality of electricity (which hampers efficient operations), and inadequate sewage and sanitation services; (6) multiple licenses and permits to start retail operations;²³ and (7) the lack of capital to develop supply chains. Unorganized retailers have some advantages over organized retailers in that they often do not pay taxes, and their establishment costs are low. For example, the operating cost of small-scale retailers is estimated at 3–4 percent of sales, compared to supermarkets at 13–15 percent of sales (Mukherjee and Patel 2005).

Table 4.6: Examples of organized, privately owned retail chains in India

Outlet type	Company name	Ownership	No. outlets	Locations	Purchasing agent
Hypermarket	Giant	Dairy Farm International (Hong Kong)	9	Mumbai, Hyderabad, Vizag	Mainly distributors; directly from a few local manufacturers and importers
Hypermarket	Choupal Sagar	Local ITC	1	Sehore, Madhya Pradesh	Not available
Hypermarket	Metro Cash & Carry ^a	Foreign (Metro AG, Germany)	2	Bangalore	Mainly local manufacturers and importers
Hypermarket/supermarket	Big Bazaar/Food Bazaar	Local (Pantaloons Group)	17	Mumbai, Bangalore, Gurgaon, Hyderabad, Kolkata	Mainly distributors; directly from a few local manufacturers and importers
Hypermarket/supermarket	Great Wholesale Club	Local (Spencers Group)			Mainly distributors, directly from local manufacturers
Supermarket	FoodWorld	Dairy Farm International (Hong Kong)	93	Major cities in South India; Pune in Maharashtra	Mainly distributors; directly from a few local manufacturers, importers, farmers
Supermarket	Nilgiri's	Local (Nilgiri's Franchisee Pvt. Ltd.)	30	Major cities in Tamil Nadu, Andhra Pradesh, and Pondicherry; Pune in Maharashtra	Mainly distributors; directly from a few importers, farmers
Supermarket	Trinethra	Local (Trinethra Group)	68	Major cities in Andhra Pradesh	Mainly distributors; directly from a few local manufacturers, importers
Supermarket	Vitan	Local (Vitan DSI Ltd.)	13	Chennai/Bangalore	Mainly distributors; directly from a few local manufacturers
Supermarket	Adani Raoji	Local (family owned)	6	Ahmedabad	Mainly distributors; directly from a few local manufacturers
Supermarket	Fabmall	Local (Fabmail India Pvt. Ltd.)	10	Bangalore	Mainly distributors; directly from a few local manufacturers
Discount grocery chain	Margin Free	Local cooperative (Consumer Protection and Guidance Society)	350	Major cities in Kerala, Tamil Nadu, Karnataka	Local manufacturers and distributors
Discount grocery chain	Subiksha	Local (Viswapriya groups)	143	Major cities in Tamil Nadu and Pondicherry	Local manufacturers and distributors
Discount grocery chain	Sabka Bazaar	Local (Home Stores Pvt. Ltd.)	25	Delhi and adjoining areas	Mainly distributors; directly from a few local manufacturers

Source: Singh 2004; Mukherjee and Patel 2005.

^a Metro Cash & Carry has government permission for wholesale operations only.

An issue that is the subject of considerable debate is whether FDI in retailing, including food retailing, should be allowed. The majority of the organized retailers surveyed by Mukherjee and Patel (2005) favored the opening of FDI through joint ventures, because such ventures could ease

²² These include excise duty; octroi duty in most cities; professional tax (which results in double taxation of retailers who also pay the trade tax and business tax); refuse, water, and garbage tax; resale tax; trade, license, establishment, and business tax (Mukherjee and Patel 2005).

²³ According to a CII-KSA (2003) study, on average 15 licenses from 11 government agencies (central, state, and local) are required to open a retail store, which takes up to six months and costs between Rs 5,000 and Rs 500,000, depending on the kind and size of store.

their capital constraints in developing supply chains. The organized players recognize that an efficient supply chain is critical to successful operation. They can also benefit from the technical know-how and best management practices of multinational retailers. Other proponents point to the benefits to consumers through lower prices, to the extent that organized retailers can take advantage of economies of scale and lower transactions costs with the development of supply chains. Supply chain development can contribute to expanding markets for farmers' produce, especially higher-value products, reduce the high losses (estimated by McKinsey at Rs 500 billion per year), and generate additional employment along the supply chain. Industry experts in food processing believe that the growth of the food processing sector hinges on the growth of the retailing sector. The entry of FDI will expand the organized retail sector and therefore encourage growth of the food processing industry, which is also critical for reducing losses in the marketing system (Mukherjee and Patel 2005). Proponents note that the threat to unorganized retailers will not be as severe, because the majority of Indian consumers will still prefer to buy their fresh produce (such as fruits and vegetables) from local vendors on a daily basis rather than storing it for a week, while reaping other benefits such as greater personal attention, purchases on credit, and home delivery.

4.4 Opponents to FDI in retailing contend that the rapid growth of the organized sector will bring a large potential displacement of retailers in the unorganized sector. Guruswamy et al. (2005) note that retailing is the "primary form of disguised unemployment and underemployment in India." Therefore, expansion of the organized sector will result in significant net loss of jobs. Trade associations oppose FDI because the development of supply chains by organized retailers will make many trading activities redundant as the marketing chain gets simplified. Manufacturers (local and domestic) of fast-moving consumer goods oppose FDI because it may reduce their leverage in the market. Indian manufacturers have built massive distribution networks that give them a stronger position in the market than retailers. With the growth of organized retailing and vertical integration of distribution, retailers will begin to play a larger role in designing and branding new (possibly in-house) products to meet consumers' preferences. Manufacturers will therefore have to gear their production to the specific demands of retailers. Others note that procurement practices by organized retailers are biased towards large-scale farmers and therefore will bypass the vast majority of small-scale farmers in India (Mukherjee and Patel 2005). The rapidly growing Indian economy and changing structure of consumer demand are major forces driving the development of modern organized retailing, however, and the ban on FDI in retailing has not been sufficient to stem the tide of local entrepreneurs entering the sector.

4.5 International experience offer useful lessons for minimizing the adverse impact of growth and expansion in organized retailing. As supermarkets became a dominant force in retailing in many developed and developing countries, their emergence profoundly altered the organization of the food retail trade. In countries where they have acquired a sizeable share of the retail market, supermarkets have fostered extensive changes in the structure of production and wholesale marketing of produce. Procurement by individual stores has been superseded by centralized procurement strategies, a network of distribution centers, and "preferred supplier systems" (Berdegué et al. 2003; Reardon and Timmer 2005a, 2005b). Perhaps more significant for producers, as supermarkets developed and the standardization and reputation of their brands became important, they shifted from relying on traditional wholesale markets and brokers in spot markets to relying on long-term relationships with wholesalers and producers specialized in a specific product category and dedicated to the supermarket as their main client (Reardon and Timmer 2005a). Supermarkets have also tended to develop long-term relationships with specialized and dedicated food processors. These long-term contracts with suppliers are termed "vertical restrictions," and in many ways they imitate outcomes from a vertical merger even if they do not constitute full vertical integration. The contracts serve as incentives for suppliers to dedicate themselves to their supermarket clients by undertaking client-specific investments in learning and equipment.

A major concern in India is the potential impact of supermarkets on farmers, especially small-scale farmers. Supermarkets demand a wide variety and large volumes of products, and the high transaction costs of dealing with numerous suppliers frequently encourage supermarkets to source supplies from larger players wherever possible (Reardon and Berdegúe 2002; Reardon and Timmer 2005b). When a given product cannot be obtained from medium- or large-scale farmers alone (because there are no large-scale farmers, for example) or supplies are inadequate (there are not enough large-scale farmers to supply the product, for example), supermarkets contract small-scale farmers. For this reason, globally there is a mixed picture with regard to small-scale farmers' involvement in supermarket supply chains. In some countries in South America (Argentina, Brazil, Chile) and parts of Eastern Europe (Russia, Slovakia, the Czech Republic), supermarkets do not contract with smaller-scale farmers, whereas supermarkets in other parts of Eastern Europe (Croatia, Poland), East Asia (China, Indonesia, Thailand), Central America (Ecuador, Guatemala, Nicaragua), and Africa (Kenya) contract with smaller-scale producers (Berdegúe et al. 2003; Boselie, Henson, and Weatherspoon 2003; Dries, Reardon, and Swinnen 2004; Reardon and Timmer 2005b).

Supermarkets adopt a variety of methods in procuring products from small-scale farmers. Some have direct contracts with small-scale farmers, as in China, Croatia, Kenya, Thailand, and Zimbabwe (Boselie, Henson, and Weatherspoon 2003; Dries, Reardon, and Swinnen 2004; Hu et al. 2004). Some act as wholesalers or enter into contracts with wholesalers, who subsequently purchase from or contract with small-scale farmers or producer organizations. This strategy is found in the Philippines, South Africa, Thailand, Indonesia, China, and Mexico (Boselie, Henson, and Weatherspoon 2003; Hu et al. 2004; Chowdhury, Gulati, and Gumbria-Said 2005; Chengappa et al. 2005b; Natawidjaya 2005). Other supermarkets ask large- and small-scale farmers to deliver produce to collection centers, where it is graded, washed, packaged, labeled, and priced, as in Thailand, Vietnam, Costa Rica, Guatemala, Nicaragua, Kenya, and Zimbabwe (Boselie, Henson, and Weatherspoon 2003; Berdegúe et al. 2003; Chen, Shepherd, and da Silva 2005). In the Philippines, the US Agency for International Development (USAID) supports a pilot project in which purchases are organized through large-scale farmers, who subcontract small-scale farmers (Chen, Shepherd, and da Silva 2005). Many supermarkets tend to use a combination of these approaches. Producer organizations reduce the cost of transacting with small-scale farmers, but studies also show that they are not sufficient to ensure contracting. Investments in physical capital, management practices, and institutions that ensure collective compliance with supermarket standards are needed for farmers to maintain contracts with supermarkets in Chile (Berdegúe 2001) and in Central America (Jano et al. 2004).

Notably, studies in various countries suggest that land size or land tenure often is not the most important determinant of farmers' participation in modern supply chains. Assets other than land appear to play a much bigger role, particularly education; access to irrigation, transport, and roads; and other physical assets, such as wells, cold chains, greenhouses, good-quality irrigation water (because of contaminants), vehicles, and packing sheds. A very good farmer organization—another major asset—can help small-scale farmers sell directly to supermarkets (Reardon and Timmer 2005b; Reardon and Berdegúe 2006). In some cases, supermarkets may provide critical inputs (seed, fertilizer, credit, technical assistance). For many small-scale farmers, these contracts are the only source of such inputs, as seen in Central and Eastern Europe, Central America, Thailand, and China).

E. Domestic Grades and Standards

Grades and standards are crucial both to pricing and operational efficiency in the agricultural marketing system. Grading is the sorting of agricultural produces into uniform categories according to quality standards. By enabling the sale of products by sample or description, it reduces the buyers' and sellers' search and transaction costs and fosters more efficient price discovery processes. Grading can help reduce spoilage by separating products of poorer quality from those of high

quality. High-quality products can command price premiums over lower-quality products if they are differentiated by grades (Kohl and Uhl 1990).

4.44 Standards and technical regulations stipulate what can or cannot be exchanged and define the procedures that must be followed for exchange to take place. By facilitating the flow of information, standards reduce uncertainty and convey consumers' expectations and their quality and food safety requirements to producers. Without market standards, the rule of "*caveat emptor*" ("let the buyer beware") prevails, along with confusion and unfairness. Standards can serve as an indirect mechanism for transferring technology to and within developing countries. They are crucial in allowing firms in developing countries to integrate into global agro-food supply chains by ensuring the compatibility and traceability of products and/or raw materials from geographically dispersed places. Harmonized standards between countries and/or industries can reduce transaction costs by reducing duplicative conformity assessment functions, including inspection, testing, and certification.

The Directorate of Marketing and Inspection under the Department of Agriculture and Cooperation is responsible for enforcing and implementing the Agricultural Produce (Grading and Marking) Act. Its mandate includes promoting standardization and grading of agricultural products. Grades and standards have been prescribed for 164 commodities at the producer level and for export. As of January 2005, the list of commodities with AGMARK standards included 25 fruits and vegetables. The AGMARK grades are primarily voluntary grades covering such characteristics as size, variety, weight, color, and moisture level. For certain items they also cover the acceptable levels of organic and inorganic foreign matter (pulses) and chemical properties (such as specific gravity for essential oils). Different grades and standards are laid out under AGMARK for domestically consumed products versus exports. In the case of mangoes, for example, the AGMARK grade specifies that for export "mangoes shall comply with the residue levels of heavy metals, pesticides, and other food safety parameters as laid down by the Codex Alimentarius Commission."

The Directorate provides third-party certification under the AGMARK quality certification scheme. The AGMARK seal is supposed to ensure quality and safety. Any consumer, trader, or manufacturer can test products at one of the 23 regional AGMARK laboratories for designated commodities. Typically, testing is only carried out for commodities prone to adulteration, such as oils, ghee, whole and ground spices, honey, and whole and milled food grains. AGMARK certification is compulsory for blended edible vegetable oils and fat spreads.

AGMARK standards, however, are not effectively enforced in the domestic market. A recent survey in the Delhi region measured the presence of heavy metals in a range of vegetables sold in wholesale markets (Marshall et al. 2003). High levels of heavy metals were found in many of the samples: among several hundred samples of palak (spinach beet) tested, 72 percent had lead concentrations exceeding the Indian permissible limit of 2.5 milligrams per kilogram (mg/kg), while 100 percent of the samples exceeded the more stringent CODEX limit of 0.3 mg/kg. Approximately half of the lead concentration in palak was found in plant tissue, implying that diligent washing would not eliminate the risk to consumers. While 100 percent of the samples had concentrations of cadmium within the limits specified by India's Prevention of Food Adulteration (PFA) Act (1.5 mg/kg), 70 percent of the samples exceeded the more stringent European Union (EU) standard (0.2 mg/kg). For zinc, 21 percent of samples exceeded both Indian and international standards. The current weak enforcement of food safety standards poses serious public health concerns.

V. Value-Addition and Export of High-Value Agricultural Products

Agro-industry is an important segment of the manufacturing sector in India. It includes firms involved in processing raw materials from the crop, livestock, forestry, and fisheries subsectors and intermediate products from other industries, such as hides and skins for manufacturing leather products and edible oils for manufacturing hydrogenated oils. In 2000/01, agro-industrial enterprises accounted for 82 percent of total units and 73 percent of employment in the manufacturing sector in India. They account for approximately 35 percent of total manufacturing GDP or 5.5 percent of total GDP (Chadha and Gulati 2007). Within agro-based industries, the food processing sector accounts for about 40 percent of employment, number of units, and value-added.

Given India's growing domestic and export market opportunities, its diverse agro-climatic conditions, and its large, wide-ranging raw material base, the GOI sees considerable untapped potential for growth in the food processing sector. India processes only about 2 percent of its primary agricultural production into value-added products. The government views the development of the food processing sector as critical to increasing net returns to farmers, transforming more perishable products into more storable and appealing food products, reducing the significant postharvest losses in the marketing system, and opening new avenues for exports. A number of constraints must be overcome to attain more rapid growth in the food processing sector. Among the most critical constraints reported by agro-processors and exporters are the high cost of credit, problems in accessing credit, problems in electricity supply, and governance issues.

India's agricultural exports climbed steadily during the 1990s and early 2000s, with nontraditional exports (fruits and vegetables, spices, meat, and marine products) mainly driving growth. Between 1990/91 and 2005/06, agricultural exports grew at an annual average rate of 7.8 percent in real terms, reaching about US\$ 6.4 billion in 2005/06. Despite its potential advantage of low-cost production, India's weak capacity to meet stringent SPS requirements in importing countries is hampering more rapid expansion of agricultural exports. The main challenges to sustaining and expanding exports include: (1) absolute barriers or binding constraints for accessing particular markets; (2) temporary losses due to rejected (and sometimes destroyed) consignments of fresh or processed products; (3) higher consignment-specific or recurrent transaction costs; and (4) patterns of "defensive commercialization," whereby firms fail to pursue opportunities for remunerative trade with certain countries or types of buyers because of concerns about their inability to ensure compliance with regulatory or private standards in those markets.

A. Recent Performance of the Agro-Food Processing Sector

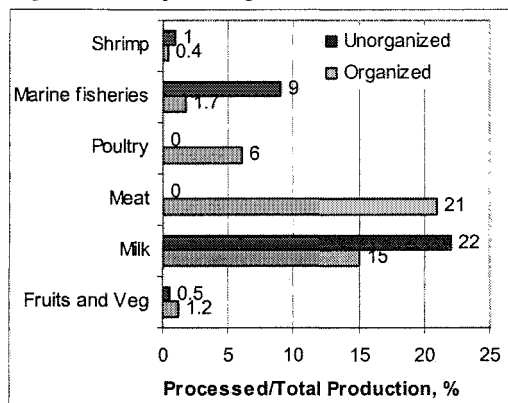
Food Processing

India is one of the top 10 producers of many agricultural commodities but processes only a fraction of its production. India is the largest producer of milk in the world (91 million tons), the second-largest producer of fruits and vegetables (150 million tons), the third-largest producer of foodgrains (210 million tons), and the seventh-largest producer of fish (Ministry of Food Processing Industries 2005c). However, most of this production is still consumed in fresh form. Recent estimates show processing levels of only 2 percent for fruit and vegetables, 6 percent for poultry, 21 percent for meat, and 10 percent for marine products. The dairy sector has the highest level, at 37 percent (Govindan 2005a) (figure 5.1). These levels are low compared to overall averages of 30 percent in Thailand, 70 percent in Brazil, 78 percent in the Philippines, and 80 percent in Malaysia (Mukherjee and Patel 2005).

The GOI views the food processing sector as a vital contributor to agricultural growth and the development of rural areas. The sector directly employed 13 million people in 2004/05, and it is

estimated to promote 2.4 times that number in indirect employment (Ministry of Food Processing Industries 2005c). Agricultural production has increased over time, but seasonal production surpluses often create localized market price crashes and increase postharvest losses. For example, postharvest losses in the food chain are estimated to amount to about Rs 500 billion per year nationally (Mukherjee and Patel 2005). Expanded food processing is expected to increase net returns to farmers, transform more perishable products into more storable and appealing ones, reduce the significant postharvest losses in the marketing system, and open new avenues for exports (Dev 2004; Ministry of Food Processing Industries 2005c).

Figure 5.1: Food processing levels in India



Source: Rabobank analysis, as cited in Govindan 2005a.

Although the majority of Indians still prefer to consume fresh produce and freshly cooked food, a number of factors are driving the recent expansion of the food processing sector. As in the retailing sector, rising income levels, increased urbanization, a growing middle class demanding more diversified and higher-quality food products, an increasing number of working women, and exposure to a wide variety of processed products through the media and overseas travel are driving growth of the food processing sector (Dev 2004; Pingali and Khwaja 2004; Govindan 2005a; IBEF 2006). All of these trends help to increase demand for processed, ready-to-cook, and ready-to-eat products.

In 2004/05, the food processing sector contributed about 14 percent of manufacturing GDP, producing about Rs 2.8 trillion worth of products. The unorganized sector accounts for more than 70 percent of the industry's output in volume and 50 percent in value terms. Prior to 1991, the government largely reserved the food processing sector for small-scale units. This policy restricted the entry of large-scale domestic firms and FDI in the sector. Since 1991 the government increasingly removed regulatory restrictions, and over the last five years it introduced a number of investment incentives (chapter 2). This policy shift increased the participation of domestic and foreign multinational firms in the sector (Govindan 2005a). Between 1991 and 2006, foreign direct investment in the food processing sector totaled US\$ 1.2 billion (Ministry of Finance 2007). The MoFPI estimates that the food processing industry grew by 7.1 percent per year over the last decade, albeit from a low base. It projects an average annual growth rate of about 7.3 percent over the next five years (Ministry of Food Processing Industries 2005a).

The fruit and vegetable processing sector in India is currently a Rs 36 billion (about US\$ 800 million) industry (Govindan 2005a). Production is split between the organized and unorganized sector, with the organized sector accounting for about 48 percent of the industry's output. Product composition differs significantly across sectors, partly due to the fact that processing of some items such as pickles/chutneys is reserved for the small-scale sector.²⁴ Pickles, mainly produced in the unorganized sector, are the single most important item, accounting for 30 percent of the total processed output. Juices, pulp/concentrates, and potato chips make up about 70 percent of the value of production in the organized sector. The industry currently has an installed capacity of around 2.3 million tons (IBEF 2006). This capacity doubled over the last 10 years, although utilization is around

²⁴ Firms that do not meet the requirements for small-scale industry status can still process reserved items such as pickles and chutneys if they export at least 50 percent of production.

46 percent. Currently, about 45 percent of the production of processed fruits and vegetables is exported. The remainder primarily caters to the defense and institutional sectors.

B. Marketing Operations of Agro-Processors and Exporters

The processors and exporters interviewed for the survey were generally well educated, owned considerable assets, and had sales ranging from Rs 76,000 to Rs 2 million. A total of 327 mango, turmeric, maize, potato, and tomato processors and exporters were interviewed (Annex table 5.1). They produced a wide variety of products, ranging from mango juice and pulp to potato chips, turmeric powder, and maize starch.²⁵ Median annual sales for those in the national list were Rs 2 million, compared to Rs 76,000 for those in the state list (table 5.1). Enterprise owners in the national list are well educated (75 percent had at least an undergraduate

degree) and employed more workers. The enterprises generally own the land, building, and basic equipment (scales, processing equipment, telephone) used. Notably, most firms do not own vehicles for transport.

With the exception of those involved in processing or exporting potatoes, a large share of agro-processors and exporters interviewed (around 40 percent) report directly purchasing raw materials from farmers. In view of the APM Act, this was a surprising result. For some crops such as mangoes, 90 percent of exporters report sourcing products directly from farmers (table 5.1). Most of these mango exporters also report that farmers deliver the product to their place of business. While fairly large numbers of processors report buying directly from farmers, only a small fraction (8 percent) do so on a contractual basis.

Table 5.1: Characteristics of processors and exporters

Enterprise characteristic	National list	Local list
No. enterprises	97	230
Socioeconomic background		
Age (yr)	43	41
Proportion that are male (%)	96	90
Education, % of owners who have:		
Primary education or less	0	18
Undergraduate education or more	75	31
Scale and structure of business		
Proportion that are sole owners (%)	61	90
Median annual purchases (Rs 000s)	1,800	64
Median annual sales of unprocessed products (Rs 000s)	2,000	76
Median annual sales of processed products (Rs 000s)	1,800	35
Equipment owned (% of enterprises that own)		
Land or buildings	63	82
Mechanical scales	74	87
Processing equipment	64	48
Telephone	87	36
Computer	69	11
Motorized vehicles	45	29
Refrigerated trucks	2	0
No. employees (median, full-time equivalent)	6	2
Working capital (median, Rs 000s)	500	30
Proportion of enterprises that (%):		
Buy from farmers	33	40
Provide advances to farmers	8	5
Buy on contract from farmers	5	3

Source: Fafchamps, Vargas-Hill and Minten 2006.

Table 5.2: Source of capital by type of enterprise

Source of capital	Domestic processor	Exporter
Bank account	40%	96%
Of which, account has overdraft	30%	31%
Of which, average maximum amount of overdraft (Rs)	1,041,429	2,653,846
Overseas bank account	0%	0%
Annual financial statement	28%	81%
Borrowed from source in last 12 months:		
Bank/financial institution	22%	36%
Domestic partner/owner	2%	2%
Foreign partner/owner	0%	0%
Advance from foreign buyer	0%	4%
Other credit institution	1%	0%
Moneylender	3%	2%
Friend or relative	8%	4%
Other	1%	2%

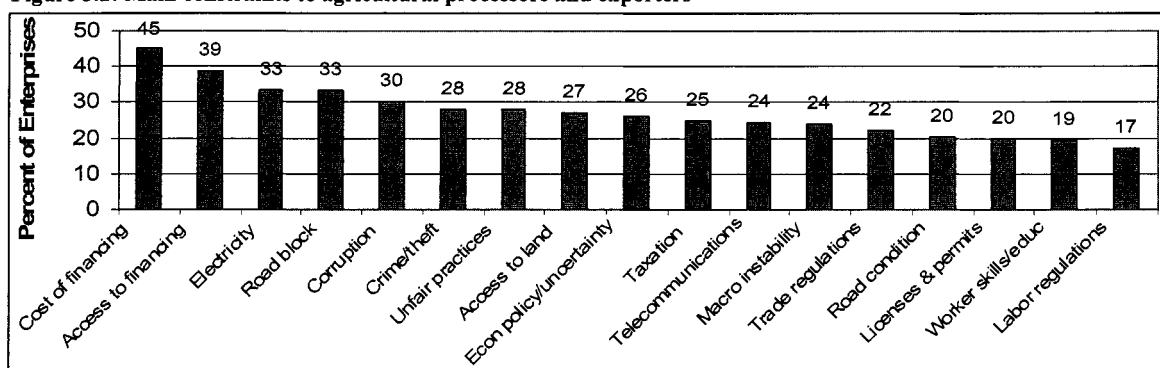
Source: India Agricultural Marketing Survey; authors' calculations.

²⁵ The survey, however, encountered a high nonresponse rate among the sample drawn from the national list. Additional firms were drawn from a state list. Nonresponse bias thus likely affects the results. See Annex A for details.

The survey and focus group discussions highlighted processors' and exporters' limited dependence on banks, especially for working capital. About 40 percent of the domestic processors have bank accounts, and of those with accounts, 75 percent have an overdraft facility, mainly for meeting working capital needs (table 5.2). Only 22 percent indicated they had borrowed from a bank during the previous years. Almost all exporters have bank accounts, although only about one-third have an overdraft facility. A slightly larger share, 36 percent, had borrowed from banks during the last year. Surprisingly, some processors and exporters still borrow from moneylenders, friends, and relatives.

Agro-processors and exporters in the survey cited the high cost of credit, poor access to credit, poor electricity supply, and governance issues as the most critical constraints to expanding their business. High interest rates and collateral and documentation requirements are the most frequently cited constraints (figure 5.2). The second set of constraints includes poor electricity supply (availability and quality), which disrupts processing activities. Roadblocks and associated payments, corruption, crime, theft, and unfair practices form the third group of problems, which increase operating costs. Difficulties in obtaining land, uncertainty over economic policy, and high rates of taxation are cited as constraints by more than one-quarter of the respondents.

Figure 5.2: Main constraints to agricultural processors and exporters



Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: Figures represent constraints rated by entrepreneurs as moderate, major, and severe.

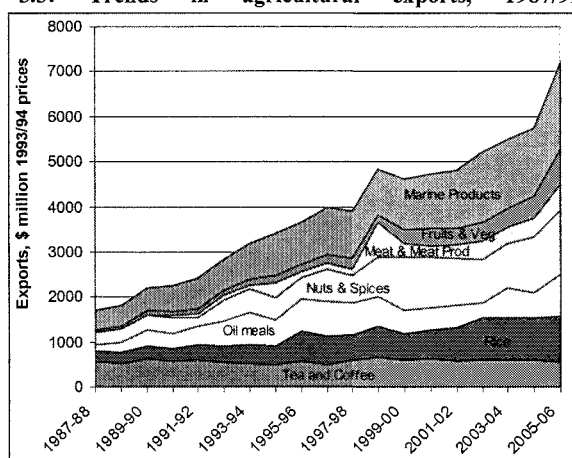
The ranking of constraints and their severity vary significantly by state. The cost of finance (59 percent) and difficulties in accessing finance (48 percent) and land (34 percent) are the three most critical constraints cited by entrepreneurs in Orissa (Annex table 5.1). In Uttar Pradesh and Maharashtra, poor electricity supply and roadblocks are the two most cited problems (over 50 percent of entrepreneurs). These are followed by corruption (45 percent) and crime/theft (39 percent) in Uttar Pradesh and by macro-instability (46 percent) and high rate of taxation (45 percent) in Maharashtra. By contrast, entrepreneurs in Tamil Nadu appear to face the most favorable investment climate for processors and exporters. With the exception of unfair practices (cited by 38 percent of entrepreneurs), less than 15 percent of entrepreneurs cited other factors as constraints.

C. Recent Agricultural Export Performance

The increased globalization and liberalization of international markets, facilitated by both bilateral trade agreements and the WTO, are opening new export markets for Indian agricultural products, both fresh and processed. Rapid technological advances in real time communication (cellular phones, Internet) and transport (by air and sea), within India and internationally, and the progressive removal of government export restrictions have further strengthened these international

linkages. Indian agricultural exports²⁶ not only grew rapidly, but they have also diversified from traditional exports of tea, spices, and coffee to exports of horticultural, fisheries, and livestock products. In the last 15 years, the highest export growth rates per year in real terms were recorded by meat and meat products (13.8 percent), fruit and vegetable exports (12.9 percent), and cashews and spices (11.2 percent), although starting from a low base. Marine exports grew at 6.9 percent per year. By 2005/06, marine exports amounted to US\$ 1.9 billion (current prices), cashew and spice exports totaled US\$ 1.4 billion, and fruit and vegetable exports reached US\$ 770 million (figure 5.3).

Figure 5.3: Trends in agricultural exports, 1987/99–



2005/06. Source: Department of Commerce.

By the early 2000s, the main destination of Indian agricultural exports was high-income countries, particularly but not exclusively those within the Organisation for Economic Co-operation and Development (OECD). High-income countries account for about 58 percent of total agricultural export value (table 5.3). Major markets for processed fruits and processed vegetables are the EU and USA. Exports of fresh fruits and fresh and dried vegetables are concentrated in countries within the South Asian Association for Regional Cooperation (SAARC).

Table 5.3: Major destinations of Indian agricultural exports, 2004

	SAARC	Middle East and North Africa	Other high income	Other middle income	Other low income	Export value (US\$ millions)
Rice	33%	8%	43%	10%	7%	554
Fish	0%	0%	91%	9%	0%	1,413
Fresh fruits	36%	8%	55%	2%	0%	65
Fresh and dried vegetables	50%	9%	10%	31%	0%	176
Processed fruits and vegetables	1%	4%	85%	10%	0%	284
Meat	0%	22%	1%	76%	1%	271
Tea	3%	3%	60%	30%	3%	301
Other	15%	6%	52%	24%	3%	3,891
Total exports (agriculture and allied products)	898	383	4,014	1,506	154	6,955
Share of total exports	13%	6%	58%	22%	2%	100%

Source: Estimated from UN Comtrade data.

Despite being one of the major horticulture producers in the world, India is a small player in the global horticulture export trade. India's share of global exports is only 0.3 percent for fresh and processed fruits, 1 percent for fresh and processed vegetables, 0.2 percent for fresh cut flowers, and 2.6 percent for dried flowers and fresh and dried plants. Among fruits and vegetables, the fastest-growing segments are processed vegetables and processed fruits, which grew at an average rate of 10 percent and 11 percent per annum, respectively, in real terms. Major exports of processed fruits and vegetables include mango pulp, which accounted for almost 50 percent of the value of processed fruit exports in 2004. Other processed fruit exports include pickles and chutneys from various fruit,

²⁶ These include tea, coffee, rice, spices, cashews and cashew products, oil meals, fruits, vegetables, and marine products.

including mangoes. Seventy-five percent of India's export earnings from fruit and vegetable exports are from 10 countries.²⁷

As Indian agricultural exports increase and diversify in destination and composition, a major challenge is meeting the SPS standards in export markets. As per the SPS Agreement of the WTO, each country is allowed to set its own standards and technical regulations as long as these are based on scientific principles and are both transparent and nondiscriminatory. Members of WTO are encouraged although not required to adopt the internationally recognized standards, guidelines, and proposals of the Codex Alimentarius (for food safety), the International Plant Protection Convention (for plant health), and the World Organization for Animal Health (OIE) (for animal health). SPS measures are traditionally established and enforced by government authorities. This pattern still prevails with regards to plant and animal health measures, but with regards to food safety, often more stringent private sector standards are being introduced. Private standards or supplier protocols have grown in prominence over the past decade or so as a means of further ensuring compliance with official regulations, filling perceived gaps in such regulations, and/or facilitating the differentiation of company or industry products from those of competitors. Increasingly, private standards tend to blend food safety and quality management concerns (for example, ISO 22000) or to have protocols that combine food safety, environmental, and social (child labor, labor conditions, animal welfare) parameters. As an example, of the latter, major European retailers have adopted the Euro-Retailer Produce Working Group for Good Agricultural Practices (EurepGAP) fruit and vegetable protocol (Willems, Roth, and van Roekel 2005).

D. SPS Standards and Indian Horticultural Exports²⁸

Challenges posed by SPS standards have manifested themselves in different ways for Indian horticulture. They include:

- *Absolute barriers or binding constraints for accessing particular markets.* The most prominent case involves fresh mangoes and the plant health concerns of authorities in the USA and Australia (and until recently Japan).
- *Temporary losses due to rejected (and sometimes destroyed) consignments of fresh or processed product.* The most high-profile incident occurred in 2003, when 28 containers of grapes consigned to the Netherlands were rejected owing to violative pesticide residues. Less visible yet more common instances include the rejection of numerous small consignments of processed horticultural products by the USA because of improper labelling, poor packaging, illegal additives, and other problems. Other markets have experienced a few other episodes in which fresh produce was rejected.
- *Higher consignment-specific or recurrent transaction costs* due to duplicative testing, high levels of entry-point inspection, or the further treatment of goods upon arrival in the overseas market. These costs have affected the profitability of India's cut-flower exports to Japan and the Netherlands and added to the costs of exporters of other products.
- *Patterns of "defensive commercialization,"* whereby firms fail to pursue opportunities for remunerative trade with certain countries or types of buyers because of concerns about their inability to ensure compliance with regulatory or private standards in those markets. This pattern is common in Indian horticulture, although additional factors have also weighed on these commercial strategies.

²⁷ These include Bangladesh, USA, United Arab Emirates (UAE), Great Britain, Germany, Saudi Arabia, Sri Lanka, the Netherlands, and France.

²⁸ See World Bank (2007).

Table 5.4 summarizes various ways that SPS measures and challenges have affected Indian horticultural exports and presents some emerging SPS challenges.

The defensive commercialization impact is perhaps least noticed but most pronounced in Indian horticulture. The other issues are being dealt with in response to specific events or through bilateral negotiations. There are large differentials in the unit values of Indian exports to different markets and distribution channels (table 5.5). For many products, a majority of sales are directed at lower-value markets. This trend partially reflects comparative advantage—for example, India’s location permits access to South Asian and Persian Gulf markets at relatively low freight costs, and the resident and immigrant populations in these markets prefer fruit and vegetable varieties commonly grown in India. For some of these markets, transactions are readily managed by Indian suppliers, and commercial behavior strongly resembles the patterns found in the Indian domestic market.

Table 5.4: Major impacts and emerging challenges of SPS measures for Indian horticultural exports

Binding constraint	Temporary losses	High compliance costs	Defensive commercialization	Emerging challenges
Agreement on SPS requirements for export of fresh mangoes to USA and Australia	Grape consignment rejections in Europe	Pesticide monitoring program for grapes	Processed fruit and vegetable sales by small and medium enterprises	Heavy metals in fresh and processed vegetables
	Border rejections of many small consignments of processed fruits and vegetables	Fumigation of cut flowers in Japan	Grape export strategies	Pesticides in pomegranates
	Onion consignment rejection in Europe	Stalled upgrading of mango pulp operations	Onion export strategies	Requirements for traceability in processed fruits and vegetables
	Periodic price discounts by private buyers	EurepGAP and smallholder vegetable growers	Avoidance of certain cut-flower markets	Environmental and social requirements in cut flowers

Source: World Bank 2007.

Table 5.5: Unit value variations between markets applying higher and lower SPS standards
(average FOB unit values on Indian exports, 2002–03, in US\$/t)

Product	Higher standard market	Lower standard market
Grapes	1,035 (UK)	697 (UAE)
Mangoes	894 (UK)	545 (UAE)
Pomegranates	1,185 (UK)	433 (UAE)
Onions	148 (Malaysia)	116 (Sri Lanka)
Mushrooms	786 (USA)	516 (Russia)
Dehydrated onions	892 (Germany)	488 (Romania)
Preserved onions	1,256 (Germany)	856 (Sri Lanka)
Mango pulp	845 (UK)	591 (Saudi Arabia)
Preserved gherkins	402 (USA)	314 (Russia)
Mixed frozen vegetables	681 (UK)	494 (UAE)

Source: World Bank 2007.

Yet at least some of these commercial patterns reflect either an inability or a lack of confidence among processors and exporters to comply with the quality, food safety, and/or plant health requirements of the higher-value markets. These patterns may also reflect an implicit calculation on their part that they would not be commercially compensated for the investments and recurrent costs necessary to attain higher quality and/or comply with food safety or plant health standards. Nothing is wrong with serving less-demanding customers, especially if they provide consistent business and margins are adequate to sustain the supply chain. In some of these markets, India may face relatively less competition and thus command a large or even dominant market share. Being a cheap, reliable supplier may not be a sustainable commercial strategy in the long term,

however. Dynamic horticultural markets may see new entrants. Lax food safety and plant health standards may not prevail in the future in the targeted middle- and low-income markets.

Addressing Pesticide Residue Problems in Grape Exports

Problems related to pesticide residues and heavy metals in fresh and processed exports are a major challenge for Indian horticulture exports. Grape exports furnish one prominent example. Grapes are a highly seasonal crop, and India has the advantage of being able to capitalize on a critical window in the European market between March and April, when grape production ends in South Africa and Chile, and before grapes from Egypt and Turkey enter the market. India is one of the few countries that can produce good-quality fresh grapes at this time of the year. In 2003/04 India exported about 27,000 tons of grapes with an export value of about US\$ 25 million.²⁹ Grape exports to Europe accounted for about US\$ 15 million, indicating that any loss in market share in Europe will be very costly for India. Moreover, although grape exports account for only a small share (about 0.5 percent) of total agricultural exports, it was an important milestone for India to penetrate the EU market.

In May 2003, Indian grape exporters catering to the European market received a pivotal wake-up call concerning the costs of failing to meet food safety standards. In the midst of a commercial dispute with an Indian grape exporter, a Dutch importer had samples of Indian grapes tested by a private laboratory. The tested samples contained residues of the insecticide methomyl in excess of the EU maximum residue limit (0.05 microgram per kilogram). Dutch authorities alerted about the finding tested samples from the 28 containers of Indian grapes in Rotterdam port and found that about 75 percent of them exceeded the maximum residue limits (MRLs) for methomyl and/or acephate. This triggered the EU Rapid Alert system, resulting in significant short-term economic losses and affecting India's reputation as an exporter. The price of Indian grapes dropped sharply. The Indian grape shippers incurred losses, either in Dutch sales or by diverting the shipments to other markets. This incident came as a shock to the industry and to the Indian government.

5.19 In the months following the end of the 2002/03 grape export season, India's Agricultural and Processed Food Products Export Development Authority (APEDA) took the lead in addressing the pesticide problem. It consulted widely within the industry and with external experts and devised an integrated scheme of grape supply chain oversight to restore the industry's reputation and minimize future noncompliance with EU standards. Implemented in 2003/04, the scheme included:

- Registration with the Department of Agriculture of all farms growing grapes destined for Europe. Some 6,200 growers registered for the 2003/04 season.
- Formation of a cadre of horticultural field inspectors who would visit each registered grape grower at least three times during the crop cycle. Some 244 inspectors were initially appointed and trained (there are now 291).
- Inspection and registration of all grape export packinghouses by APEDA. Approximately 100 packinghouses were inspected, of which 20 failed to meet certain basic requirements.
- Mandatory testing prior to harvest for pesticide residues in samples from each registered field of export grapes. Authorization for exporting grapes was given only to fields that passed the test. Grapes from fields with failed results would need to be sold in other markets or retested.
- Checking of every consignment by AGMARK to ensure conformity with EU quality specifications for grapes. AGMARK would issue certificates.
- Issuance of a phytosanitary certificate by the Plant Protection, Quarantine, and Storage Department for every consignment of grapes for export.

²⁹ In 2004, India produced about 1.2 million tons of grapes. Grape production increased by 70 percent over the last decade. Maharashtra produces about 75 percent of national grape output.

- In 2005, another procedure was added, whereby the National Research Centre (NRC) for Grapes took a 5 percent sample from grape consignments exiting the packinghouse to retest for pesticide residues.

5.20 Ultimately the grape crisis gave rise to a stringent system of checks and controls to ensure that fruit shipped to Europe met prevailing standards. This system required considerable resources. Laboratory testing capacity had to be enhanced quickly, so considerable supplementary resources were provided to public laboratories, and partial subsidies were given to upgrade private sector laboratories. A 25 percent government subsidy was also given to private and cooperative packinghouses to upgrade their systems. Budgetary support facilitated the training and placement of the grape field inspectors and the expanded work of AGMARK. Ongoing support to NRC–Grapes was enhanced, both for overseeing the pesticide monitoring program and for conducting an expanded program of research on pest management. Recognizing this considerable burden, APEDA committed to subsidizing 50 percent of the costs of the mandatory pesticide residue testing.

The experience in responding to the grape crisis generated several benefits. The new control system reduced the failure rate among samples of grapes intended for export to the EU from about 12 percent in 2003/04 to 6 percent in 2006 (*World Bank 2007*).³⁰ To date, no consignment of Indian grapes has been officially rejected or put on the EU Rapid Alert System. Local laboratory testing contributed to some foreign exchange savings. Instead of exporters paying EU laboratories the equivalent of Rs 25,000 per sample for testing the grapes, the tests could be performed locally for Rs 7,000 per sample. Finally, the crisis also raised greater awareness among domestic consumers about food safety issues more generally and pesticide residues in food specifically, leading to increased vigilance by local consumer groups and NGOs.

The grape crisis provided strong impetus for exporters and the industry at large to promote better agricultural practices and improved oversight and control over the entire supply chain. Several companies are working with their outgrowers to become certified under EurepGAP as groups or so-called Produce Marketing Organizations. An estimated 30 percent of currently registered export grape growers (3,500–4,000) are either EurepGAP certified or will be so shortly. Increased attention is being given to pest scouting and reducing the overall level of chemical spraying. Questions have been raised about the accuracy of preharvest intervals recommended on pesticide labels, and recommendations are being revised. Both private companies and cooperatives are closing export channels to growers who do not consistently follow good agricultural practices. Record-keeping is being improved, as are overall systems of traceability.³¹ The GOI is also developing a national program for good agricultural practices (IndiaGAP).

The grape crisis directed greater attention to the cost of compliance. The cost of pesticide residue testing (to government and the private sector) for grapes is estimated to be about 7.9 percent of the FOB value of India's grape trade to Europe (table 5.6). This cost is quite high compared to costs internationally, where the recurrent compliance cost is about 1–3 percent of export revenues. In the Indian spice industry, the estimated cost for testing dry chilies for pesticide residues and aflatoxin is 2.8 percent of FOB value. In the Bangladeshi and Nicaraguan shrimp industries, the total recurrent costs of compliance with export food safety requirements are 1.1 percent and 1.3 percent of export revenues. Some of the compliance costs for grapes, such as laboratory testing and operational costs of packinghouses, could decline if other commodities (such as other fruit and vegetable exports) are subject to similar standards and compliance testing. But at the same time, the high costs also point to the need for greater collective action (such as the formation of a grape exporters association) within

³⁰ There is still room for improvement, as the failure rate in South Africa is less than 4 percent of samples.

³¹ One firm is developing a sophisticated database combining information on farmers' pesticide spraying, weather, and residue tests to provide more exact recommendations to growers.

the grape industry. Collective action could foster the adoption of sustainable “codes of good practice” throughout the supply chain as a means of reducing some high-cost activities, such as repeated field inspections and multiple mandatory tests.

Table 5.6: Estimated annual cost of meeting SPS standards in the EU in 2005
(US\$)

Cost type	Public sector	Private sector	Total
Laboratory equipment—amortized over 10 years and assuming only 50% of costs could be attributed to residue testing for grapes	50,000	75,000	125,000
Packinghouse upgrades—amortized over 10 years	62,500	187,500	250,000
NRC pesticide monitoring management, excluding capital investments	115,000		115,000
Packinghouse approval		5,000	5,000
Farmer registration (6,500 x US\$ 10)	32,500	32,500	65,000
Field inspector farm visits (3 x 6,500 x US\$ 10)	97,500	97,500	195,000
Pesticide residue testing (4,200 samples x Rs 7,000)	341,860	341,861	683,721
AGMARK certification (1,000 containers at US\$ 25 each)		25,000	25,000
Total	699,360	764,361	1,463,721

Source: World Bank 2007.

Note: Assuming exports of 15,000 t, the cost of SPS compliance is US\$ 98/t. Assuming the average FOB price is US\$ 1/kg, the cost of SPS compliance is 10%. The cost of residue testing alone, not including any capital expenditures, is US\$ 45/t or 4.5% of FOB value.

Emerging Plant Health Challenges

Plant health issues pose another barrier to the entry of agricultural exports into some markets. An example is mango exports to the USA, Japan, and Australia. Some 564 pests are considered to be associated with mango production in India (Australian Government 2004). Many of these pests are not present in potential mango-importing countries, and some could survive long-distance transport and storage, thus posing a potential threat to fruit and other agricultural production in the importing countries. Some of these pests are difficult or impossible to detect through visual inspection or cannot be contained simply by cleaning the fruit’s surface. More elaborate phytosanitary measures are needed to manage the potential risks posed by these pests.

As a result, Indian fresh mangoes have been barred from the Japanese and Australian markets for extended periods. Protracted negotiations between these trading partners and India have been taking place to resolve the phytosanitary constraints. For these countries, the primary concern was the risks posed by various fruit fly species. India has been conducting a long-standing dialogue with the USA (lasting more than a decade) to agree on suitable phytosanitary measures for the entry of India mangoes into the US market. In March 2006, a Framework Equivalency Plan was outlined, which would enable Indian fresh mangoes to be exported to the US market. The central part of this agreement is that the Indian mangoes would be irradiated, at a low dose, at specially approved facilities. The system of compliance would also involve procedures for produce inspection (including preclearance), irradiation facility certification and auditing, and other measures.

India has also been having a long-standing dialogue with Japan on measures to resolve its plant health concerns.³² The proposed solution is to use vapor heat treatment (VHT) to manage the risk posed by fruit flies. APEDA imported the equipment for this technology and a testing and demonstration chamber was created at Vashi. In June 2006, Japan formally lifted the ban on Indian mangoes, and the first trial shipments to Japan took place in July 2006. Several exporters have expressed interest in tapping this market and are willing to invest in their own VHT facilities. The

³² The Japanese have negotiated market access arrangements for fresh fruits with many countries, based on agreed methods of phytosanitary treatment. For example, agreements were reached for using VHT on Australian, Philippine, and Thai mangoes, on Israeli papayas, and Taiwanese litchis. Methyl bromide treatment is the agreed treatment for cherries from Canada, Colombia, New Zealand, and the USA. See Gupta and Khetarpal (2005) for elaboration on Japanese plant health requirements.

Japanese mango market is well supplied from Southeast Asia and elsewhere, but there could well be commercial opportunities for Indian exports. These should be examined further before investments in specialized treatment facilities are made.

With Australia, more elaborate measures have been defined and agreed upon to reinstate Indian mango exports to the country. Prior to 1996, Indian mangoes were regularly exported to Australia and treated with ethylene dibromide (EDB). This trade was suspended following the global phase-out of EDB because of concerns about worker health and safety. Recently, Australian authorities carried out a detailed pest risk assessment to determine the required remedies, which include: vapor heat or hot water treatment prior to export; establishment of pest-free production areas; inspection and remedial action for other identified pests; and government support for operational systems to maintain and verify the phytosanitary status (for example, registration of orchards and packinghouses and government inspection prior to export).

To follow up, the GOI has designated several locations as free of the mango pulp weevil and mango nut weevil. The terms of reference and institutional responsibilities for establishing and maintaining such pest-free areas have been outlined. One pilot scheme reportedly has begun in Maharashtra. Pursuing this approach will be an enormous challenge, given the extensive coordination required between federal and state agricultural agencies and research institutions, and the current weak internal quarantine control mechanisms to prevent the movement of mangoes from one production site or state to another.³³

To further capitalize on export opportunities, costs and returns in meeting SPS requirements must be carefully assessed and balanced. All things considered, it is not obvious that the likely costs and administrative attention needed to fulfill all the requirements for accessing the Australian market would match the benefits of participating in that market. Costs and benefits must be more thoroughly assessed before making major investments or public resource commitments. Achieving compliance at a potentially high cost would not make sense if the actual commercial potential of this trade is limited. However, instituting several of the required supply chain oversight and product inspection measures would likely have spillovers for enhancing India's fresh mango trade in other countries. A detailed assessment could better inform government policies and resource allocations (box 5.1). Part of that assessment should include a closer examination of the actual market potential for Indian mangoes in those countries that would especially value the improved Indian phytosanitary controls.

Food Safety for Processed Products

India's trade in a range of processed fruit and vegetable products appears to have a stronger basis for international market access and competitiveness, relative to its trade in fresh horticultural produce. With processed products, Indian suppliers do not encounter the plant health issues inhibiting the fresh produce trade. Indian exports also have somewhat less difficulty in managing risks related to pesticide residues and other contaminants, greater flexibility with regard to domestic and international logistics, and greater potential for product differentiation and company branding. The industry already draws upon large numbers of farmers for raw materials and employs significant numbers of people relative to the capital invested.

Mango pulp exports illustrate the opportunities and challenges in processed food exports. India is among the world's leading suppliers of mango concentrate and puree. India's export trade in mango pulp features clusters of firms in parts of Tamil Nadu, Maharashtra, and Andhra Pradesh. In 2003/04 India exported close to 90,000 tons of pulp, with an export value of around US\$ 55 million. India produces puree from a number of mango varieties, including Alfonso, Kesar, and Totapuri. Worldwide, Alfonso puree is recognized as a superior product and holds a significant premium over

³³ India's Plant Protection, Quarantine, and Storage Department issued guidelines for establishing pest-free areas for fruit flies and mango nut (seed) and pulp weevils in May 2005.

similar products from major exporting countries. However, the bulk of India's exports are directed to very price-conscious juice and preparation manufacturers in the Middle East and Southeast Asia, with comparatively small quantities going to industrial consumers in higher-priced European, North American, or North Asian markets.

Box 5.1: Framework for an ex ante assessment of costs and benefits of sanitary and phytosanitary compliance

Cost-benefit analysis can and should be used to determine the advisability of new or potential investments in standards compliance. Expected costs will need to be compared with expected benefits. This is easier to do at the enterprise level (in financial terms) than at the broader sectoral or even national level, given that certain costs and (especially) benefits are likely to spill over onto other stakeholders, including participants in domestic market supply chains. Nevertheless, such likely impacts can be noted and at least partly estimated. Such forward-looking cost-benefit analysis related to the adoption of new standards is important to undertake. Although an inexact science, this exercise can normally shed ample light on the magnitude of likely costs and benefits and thus effectively contribute to policy making and public investment decisions.

In the context of trade, compliance costs are defined as the additional costs necessarily incurred by the government and/or private enterprises in meeting the requirements to comply with a given standard in a given external market. This definition has two key elements. First, it covers the costs that are *additional* to those incurred by the government and/or the private sector in the absence of the standard. Second, it refers to those costs that are *necessarily* incurred in complying with the standard. A distinction needs to be made according to the level of recurrence of compliance costs. Nonrecurring costs are the one-off or time-limited investments made to achieve compliance. Recurring costs are borne over time (for example, the costs of maintaining regular surveillance and laboratory testing programs). For an ex ante analysis, nonrecurring costs need to be amortized appropriately. In estimating the costs of compliance, it is necessary to consider costs incurred by both the public and private sectors.

Examples of typical costs that may be incurred include:

- Investment in packinghouses or upgrading packinghouses.
- Investment in testing infrastructure (laboratories).
- Cost of pesticide residue surveillance programs.
- Third-party certification costs.
- Costs of training farmers, processors, and exporters in good agricultural practices, good hygiene practices, and good management practices (GAP, GHP, and GMP).
- Costs of measures required for phytosanitary treatments (such as fumigation, establishing pest-free areas, setting up hot water treatment facilities).
- Costs of field trials to confirm/modify preharvest intervals for pesticide use.
- Cost of upgrading procurement systems.
- Cost of hygiene controls in food processing, such as upgrading factories to meet hazard analysis and critical control point (HACCP) standards.

In addition to the costs of compliance, the associated benefits must also be identified and quantified. Benefits could include maintaining market share, enhancing market access, or reducing costs through unimpeded access. As with compliance costs, the benefits associated with compliance can be recurring or nonrecurring. Potential tangible benefits relate most directly to the impact that better food safety control systems have on production costs, including reduced wastage and/or reworking, enhanced productivity, and so forth. Further tangible benefits may include broader access to markets and/or particular market segments. Although the focus here is on export-oriented supply chains, spillover benefits can also occur in the domestic market through reduced wastage and enhanced safety of products. These benefits act to offset recurring compliance costs such that the longer-term impacts might result in lower supply costs. These benefits can be augmented if the government and firms innovate in the face of new standards and thus minimize compliance costs.

Source: World Bank 2005a.

Mango pulp importers complain, however, that India suffers vis-à-vis its Latin American competitors because it cannot establish prices early in the season or maintain them at stable levels

throughout the season. Current reliance on spot purchases, compounded by mistrust and antagonism between growers and processors, and between processors and merchant exporters, makes it very difficult to set and sustain stable prices. This failure places Indian exporters at a disadvantage. Government and industry should work to develop new models of cooperation among growers, processors, and exporters to comply with prevailing commercial requirements. Poor crop intelligence is another factor cited as a major impediment to stable and predictable product pricing, which indicates that the system for generating and monitoring crop estimates also needs to be improved.

VI. Fostering an Efficient and Competitive Agricultural Marketing System: Policy Options

Experiences in many developed and developing countries (for example, in the USA, OECD countries, China, Brazil, Indonesia, Thailand, and Malaysia) illustrate a natural evolution in the organization and management of agricultural marketing systems. This evolution is driven by changing socioeconomic conditions resulting from urban growth, rising consumer incomes, and concerns about quality and food safety, increased agro-processing, and improved infrastructure and services. While the traditional marketing structure—in which agricultural produce moves from farms to rural assembly/primary wholesale markets, to secondary wholesale markets, and on to retail markets—may persist, new marketing arrangements may arise, driven by the competitive need to reduce logistical costs, the need to meet rising consumer demand for more value-added products, and concerns about convenience, quality, and food safety. For example, some general wholesale markets may come to specialize in trading only a limited range of products, or they may even deal exclusively in samples of graded produce that are auctioned electronically to achieve greater efficiency. Other markets may expand to become terminal markets (serving major cities in the USA and Japan, for example) or market complexes (such as the Thalad Market in Bangkok or the Unidades Alimentarias in Spain), which include facilities for grading, processing, and packaging.

Some processors, exporters, and supermarket chains, seeking to reduce costs, maintain greater coordination throughout the value chain, and ensure traceability of produce, may bypass the wholesale market system altogether and create direct links with producers. These links may take the form of contract growing arrangements (as in China, Brazil, and Eastern Europe), corporate farming, or vertical integration (FAO 1999; Hu et al. 2004; Reardon et al. 2005; World Bank 2005e). In the UK, about 75 percent of all traded fruits and vegetables bypass wholesale markets, although some of the transactions are actually arranged by wholesalers based in wholesale markets. Produce is often delivered directly from farmers or field-based collection centers or pack houses to supermarkets, which have developed their own merchandising/distribution complexes (FAO 1999).

Similar forces for change are emerging in India. These forces are unleashed by sustained and rapid economic growth, which changes the structure of domestic demand, and by opportunities created when export markets are opened for a diverse range of agricultural products. Now, however, the agricultural sector in general and the agricultural marketing system in particular face the immense challenge of catching up to meet the changing needs of farmers, traders, and the broadening range of consumers that agriculture must cater to—not only Indian households, but also processors, institutional buyers, specialty and general retailers, supermarkets, restaurants, hotels, food chains, and exporters. As illustrated in the previous chapters, the agricultural marketing system in India remains uncoordinated and fragmented, characterized by an inadequate and poorly equipped network of markets in most states, with limited market support services. More efficient operations are further impeded by a number of regulations, including the APM Act and the small-scale industry reservation.

India's private sector has stepped forward, despite these impediments, to pioneer new marketing arrangements in some states to reduce transaction costs and improve food safety and hygiene. These new approaches include modern electronic wholesale market trading (SAFAL in Bangalore, electronic spot exchanges in Mumbai) or close collaboration with farmers to set up farm input supply/output collection centers in various states (e.g. ITC's e-choupal, Bharti rural hubs, Tata Kisan Sansar), supermarket retailing, and contract farming for various crops across the country. The successes among these private initiatives illustrate the gains in marketing efficiency that could be achieved and offer lessons for ensuring that benefits are shared broadly among farmers, traders, and consumers.

In the short to medium term, fostering the development of efficient and competitive marketing systems that can effectively respond to the dynamic changes occurring domestically and internationally would require action on a number of fronts. Recognizing the important roles of the public and private sector in the development of the agricultural marketing system, a reorientation of the government's current strategy is needed, focusing on:

- i. Continuing reform of the policy and regulatory environment to eliminate the remaining obstacles to more effective market operations and the development of more efficient supply chains.
- ii. Rationalizing the roles and activities of the large number of government agencies involved in agricultural market development to foster greater coordination, build synergies, eliminate duplication of effort, and increase their focus on facilitation and regulation rather than direct intervention.
- iii. Reviewing and rationalizing public expenditures in the sector. Public expenditures would focus more closely on financing public goods and services—such as markets, market information and extension, food safety, rural infrastructure, and local capacity building—that facilitate private sector participation. The very large number of grant schemes to foster private sector investment would be reviewed and rationalized to eliminate duplication and maximize impact. Over the medium term, as the investment climate and inflow of private investments improve, support would become more targeted, and “sunset” provisions would be formulated for some of the investment grant schemes.

In reorienting the government's agricultural marketing strategy, it would be important to consider the broad diversity of agro-ecological, socioeconomic, institutional, and infrastructural conditions across the states, along with the wide-ranging and changing needs of farmers, traders, processors, and consumers today. Thus the development strategy would need to be tailored to specific states or regions.

Given the competing needs in the economy, it will be essential to focus public expenditures on areas or marketing activities that, because of their economic characteristics, the private sector is less likely to finance or provide adequately. Table 6.1 classifies the major types of marketing activities according to their economic characteristics and, based on these classifications, suggests the roles the public and private sector should play. Marketing activities generally exhibit private good characteristics. Under competitive market conditions, the private sector can supply agricultural products and marketing services at socially optimal levels (see Annex B for a discussion of the economic classification of different types of goods and services).

Many activities, however, come with positive or negative externalities, or spillover effects, necessitating public involvement or intervention. Examples of positive externalities are the information spillovers associated with market information and extension and the large social benefits from access to roads, water, and electricity, which justify government involvement to ensure that they are provided at adequate levels. Some activities have negative externalities (for example, the pollution associated with input use, agricultural processing, and transport), and government intervention (for example, regulation or the imposition of a pollution tax) is needed to internalize the negative externalities. Market support services are a mix of toll and public goods, while market infrastructures are generally private goods with significant externalities. These services often will need to be provided through a combined public and private effort. Owing to their public good nature or externalities associated with some goods and services, market support services may be undersupplied by the private sector and require public financing. However, their execution can be subcontracted to the private sector (for example, market management). Lessons from other countries illustrate priority areas for the public sector in fostering the development of agribusiness and agricultural marketing systems (box 6.1).

Table 6.1: Economic characteristics and performance mechanisms for agricultural marketing activities

Activity	Nature of the good/service			Main financing mechanisms		Main operational mechanisms	
	Main type of economic good	Economies of scale ^a	Externalities ^b	Public	Private ^c	Public	Private ^c
Marketing operations:							
Product assembly	Private	H		No	Yes	No	Yes
Product grading	Toll	M	I	No	Yes	No	Yes
Packing/packaging	Private	M	P	No	Yes	No	Yes
Processing	Private	H	P	No	Yes	No	Yes
Cold storage	Private	M	P	No	Yes	No	Yes
Storage	Private	H		No	Yes	No	Yes
Freight transport	Private	H	P	No	Yes	No	Yes
Wholesaling/retailing	Private	M		No	Yes	No	Yes
Advertising and promotion	Private	M	I	No	Yes	No	Yes
Market research	Toll good	M	I	No	Yes	No	Yes
Contract farming	Private	M	P	No	Yes	No	Yes
Market support services:							
Market information (individualized service)	Toll good	L	I	No	Yes	No	Yes
Market information (mass media)	Public	H		Yes	Yes, preferred	No	Yes, preferred
Quality certification	Toll good	M	I	Yes	Yes, preferred	Yes	Yes, preferred
Food safety surveillance and enforcement	Toll good	M	Ph, I	Yes	Yes	Yes	Yes
Industry promotion	Toll good	M	I	Yes	Yes, preferred	Yes	Yes, preferred
Market infrastructure:²							
Wholesale/retail markets	Private	M	P	Yes	Yes	No	Yes
Roads	Private	M	S,N	Yes	Yes	Yes	Yes
Electricity	Private	H	P	Yes	Yes	Yes	Yes, preferred
Port facilities	Private	H	P	Yes	Yes	Yes	Yes, preferred
Piped water supply	Private	H	Ph,G	Yes	Yes	Yes	Yes, preferred
Railways	Private	H	N	Yes	Yes	Yes	Yes, preferred

Source: Author's assessment.

a H = high; M = medium; L = low.

b P = pollution; I = information spillover; Ph = public health; S = public safety; G = groundwater depletion; N = network externalities.

c Includes farmer organizations, cooperatives, and NGOs.

Some activities exhibit economies of scale, such as storage, processing, and port and rail facilities. They require “lumpy” investments, and in the absence of well-functioning financial markets, can serve as a barrier to entry. Modern processing, storage, transport, and trading facilities may face higher operating costs initially due to low capacity utilization. These large unit costs in the initial years, together with uncertainty about the future, may inhibit private firms from investing in these activities.

A. Creating the Enabling Policy Environment

Since the late 1990s, the government took many bold steps in deregulating agricultural marketing, reducing taxation of the system, and directing substantial public resources to foster the development of efficient and competitive agricultural marketing systems in the country. These interventions contributed to improving market performance and attracting greater private investment. At this juncture it is opportune to review and adjust the government's strategy for agricultural marketing development to address the emerging “second-generation” challenges.

There is a need to rationalize the roles and activities of the large number of government agencies involved in agricultural marketing development to foster greater coordination, build synergies, and eliminate duplication of effort. As noted in chapter 2, at least 39 GOI agencies are involved in promoting agricultural marketing development. Several GOI Departments and agencies offer grants to attract private investment in agricultural marketing, processing, and exports, many targeted at high-value horticulture. These programs encourage greater inflow of private capital, but

weak overall coordination has engendered a multiplicity of overlapping schemes subject to different terms and conditions. There is an urgent need to review and monitor progress in implementing these schemes, assess their impact, and, where appropriate, rationalize them to minimize duplication. In some cases, it may be time to consider adopting sunset provisions. These actions will be critical to maximize the returns and impact from government development expenditures in the system. At the same time, public expenditures need to focus increasingly on financing public goods and services that facilitate private sector participation. Examples include markets, market information and extension, food safety, rural infrastructure, and local capacity-building.

Box 6.1: Role of government in agricultural marketing and agribusiness development

Setting and ensuring enforcement of transparent and consistent “rules of the game”

- Establish and enforce rules that define and allocate property rights (that is, property and bankruptcy laws, intellectual property rights, zoning regulations).
- Establish and enforce rules that define permissible and nonpermissible forms of cooperation and competition (that is, licensing laws, laws of contract and liability, company and cooperative laws; antitrust laws).
- Establish and ensure compliance with biosafety, food safety, worker safety, and sanitation regulations.
- Negotiate favorable terms for access to international markets, and ensure fair practices on the part of international trading partners.

Addressing market failures

- Ensure that the country is protected from the harmful introduction/spread of plant pests and animal diseases.
- Ensure the availability of (production, price, industry) information and statistics to facilitate market activity and to monitor market progress.
- Invest in or facilitate risk management instruments for agribusiness system participants (futures contracts, options, negotiable warehouse receipts, crop insurance).
- Compensate for unbalanced power relationships within the agribusiness system by monitoring potential abuses of market power, providing training and information, and/or supporting organizational development among weak participants.
- Compensate losers in structural reform processes through safety nets and other transitional, targeted programs.

Build physical and knowledge capital

- Facilitate development of agricultural marketing facilities (that is, marketplaces, wholesale markets).
- Invest in infrastructure, especially infrastructure related to transport and energy.
- Invest in knowledge-building to accelerate the agribusiness learning process and better enable the emergent private sector to participate/compete (that is, research and development, academic/technical training, agricultural extension).

Source: World Bank 2003c.

Continued progress in deregulating the agricultural marketing system will be crucial. During the Agriculture Summit 2005 in New Delhi, the Prime Minister of India, Dr. Manmohan Singh, emphasized that “an important commitment of the Government is to integrate the domestic market to all goods and services. The time has come for us to consider the entire country as common or single market for agricultural products. We have to systematically remove all controls and restrictions...” To achieve this goal, it will be necessary to take the next step and permanently remove storage and movement restrictions on all commodities, limit their enforcement to emergencies only, eliminate the small-scale industry reservation on the remaining agro-industrial activities, and allow phased entry of FDI in food retailing (for example, through joint ventures with local companies).

Nationwide adoption of the model APM Act will be critical for building an integrated national market, but institutional reforms within the regulated market complex will be necessary to accompany these regulatory reforms to improve the management and quality of services provided by the regulated market network. Reforms could include subcontracting market management to the private sector or privatizing markets, while the Directorate of Marketing or the Mandi Board concentrates on planning and regulation throughout the wholesale marketing network. An exclusive focus on planning and regulation will remove the conflict of interest occurring when the Board functions as both market regulator and operator. The removal of internal trade restrictions is essential if India's commodity futures exchanges are to operate effectively and enable farmers to hedge their price risks in the context of more liberalized markets. Storage, movement, and credit controls are not compatible with the operations of this risk management instrument.

Approval of the Forward Contracts Bill in allowing the trading of options will be critical for expanding the set of risk management instruments available to the private sector. Rationalization of the tax structure governing wholesaling, retailing, and agro-processing will improve incentives for private sector investment and participation. The adoption of VAT by state governments has helped considerably in reducing the impact of cascading state taxes across the agricultural supply chain. But the central excise tax on processed food items remains high for a large number of processed agricultural and food products. It increases the cost to consumers and reduces the competitiveness of India's products overseas.

Promoting agribusiness, agro-industry, and overall growth in the rural nonfarm sector requires an increased focus on improving the rural investment climate. In addition to agricultural market deregulation, measures that will improve the investment climate include:

- *Implementing labor market reform* by removing legislation that blocks layoffs in medium and large firms, easing constraints to hiring contract labor, and allowing more flexible working days in retailing.
- *Facilitating access to credit for small and medium enterprises (SMEs)* by introducing new technologies for SMEs, facilitating the establishment of credit information bureaus for small borrowers, and promoting collateral substitutes.
- *Investing in key infrastructure.* Efficient transport services are critical to India's manufacturing competitiveness; investments are needed to improve roads and port infrastructure and promote more efficient functioning of railways (World Bank 2004b).

B. Expanding Market Infrastructure and Services

Improving Market Infrastructure

There is a great need to improve the marketing infrastructure network and the facilities in markets, but this expansion will need to be framed within a holistic infrastructure development strategy. The expectation that a large share of agricultural produce will continue to flow along traditional marketing channels in the medium to longer term highlights the need to fill the significant gap in market infrastructure. In formulating a market infrastructure development plan, two issues of concern must be addressed. First, an assessment of infrastructure needs will require a comprehensive assessment of current and future marketing needs, nationally and at the state level, taking into account projections of production and demand growth, expected volumes of marketed throughput, and product quality standards. The assessment will necessarily involve careful consideration of factors driving the development of alternative marketing arrangements to meet diverse and rapidly changing local needs (that is, direct purchase, contract farming, and vertical integration trends). Market development, therefore, may call for a range of options, from setting up village markets or

establishing district-level agri-marts, rural hubs, general or specialized wholesale markets, or terminal markets, to facilitating the development of more direct marketing arrangements. Second, careful consideration is required in determining who can take the lead in implementing various activities—the government or the private sector.

Efforts to strengthen the marketing network and improve the management of existing markets are contingent on reform of the APM Act. The GOI therefore should encourage states to amend their APM Acts in line with the recently formulated model act. Two critical areas for action are to (1) enable other (non-public sector) agencies to develop and operate agricultural markets and (2) enable farmers to market their produce outside state-regulated markets. The second action will give farmers the freedom to choose the best option for marketing their output to obtain the best price. Enabling other entrants to develop and operate markets will complement government efforts to improve farmers' access to key market infrastructure and services. In view of the government's programs to promote increased agricultural productivity and output of various commodities, permitting private investments in wholesale markets will help ensure that the necessary facilities are available when these initiatives come to fruition. Having the correct infrastructure in place will enhance competition; reduce marketing losses from spoilage and spillage, transportation, and other marketing costs; and improve hygiene in the marketplace, thus strengthening the competitiveness of Indian agricultural products. As the India Agricultural Marketing Survey found, limits to the number of shops available in a market obstruct further entry by private traders, which could enhance competition.

The private sector is interested in investing in wholesale markets where permitted by the APM Act. In Tamil Nadu, for example, a turmeric traders' association with 156 members, recognizing the impediments to trade of not having a wholesale market (for example, the lack of transparency in pricing and the increased logistical costs of assembling an appropriate volume of produce) are taking it upon themselves to build and manage a wholesale market. The Spices Board is providing assistance amounting to Rs 1 million. To finance the remainder of the development costs, the traders have formed groups of five to obtain group loans from banks.

Improving the operations and facilities of existing regulated markets will require a closer review of how the regulated market system is managed, especially of how market revenues are used. The regulated Market Committees and the state Mandi Boards collect a significant amount of revenue from the marketing cess and other fees (license, shop rental, market entry fees). It will be critical to ensure that more of these resources are invested back into the markets to improve market facilities, including very basic facilities that are often lacking, such as price information systems; adequate shops, parking, drainage, and improved roads; security; public toilets; canteens; and hostels for farmers. Greater transparency is needed regarding the actual revenues generated by the mandi system and the allocation of expenditures. Annual audits of accounts and their public disclosure should become mandatory.

The GOI is proposing a new national program for developing terminal markets to help fill the marketing infrastructure gap. A terminal market will have a hub-and-spoke format to link with collection centers in major production areas, and it will provide electronic auctioning of goods, cold storage and warehouse facilities, grading and packaging facilities, transport (including cool chains), and banking services. The government's program is designed as a public-private joint venture, with a minimum of 51 percent private equity. The GOI will provide the balance through venture capital funds from the Small Farmers Agri-Business Consortium (SFAC). The private sector partner is expected to build the infrastructure and provide the services, establish the collection centers, organize farmer associations, and manage the market. The state government will facilitate land acquisition, provide basic support infrastructure (electricity, water, communications, etc), and provide regulatory clearances.

International experience shows the importance of formulating a market infrastructure plan based on pluralistic marketing arrangements to meet diverse local needs, rather than committing exclusively to one business model. In deciding the direction for market infrastructure development, it is important to begin with a holistic, long-term plan for developing market infrastructure at the state level. Such a plan would encompass a variety of possible approaches, which will provide the overarching framework for individual projects. This strategy will help to ensure that new initiatives build on and catalyze synergies with existing systems. Each new initiative will require a clear definition of goals, careful assessments of market requirements (for example, the current and future volume of throughput) and physical infrastructure needs, and, most important, an assessment of the initiative's economic viability. Thus the ex ante prescription of a 1 percent ceiling on marketing fees for the terminal market already may circumscribe the economic viability of some potential investments.

In some states, the terminal market model may suit local needs, but in states with differing circumstances, other approaches may generate greater benefits. For example, business growth in Assam has been spurred by primary wholesale markets (Graham Dixie, World Bank personal communication). In Uttar Pradesh, the development of complementary rural assembly markets (*haat painths*) benefited farmers and contributed to development of the rural economy. The Uttar Pradesh Diversified Agricultural Support Project supported the upgrading of 114 haat painths and cattle markets.³⁴ These markets serve as points for direct consumer sales as well as assembly points for bulk purchases for transport to more distant wholesale markets or buyers. The construction/market upgrading investments resulted in a 15–20 percent increase in the number of buyers and sellers and a 39 percent increase in daily traded volumes. Because of improvements in basic facilities like toilets and drinking water, the participation of women traders in the market increased by 18 percent (IIM 2003; World Bank 2004a). Table 6.2 provides a useful checklist to guide decision-making in developing new markets.

Strengthening Standards for Food Safety

While grades governing the quality of agricultural produce function best if they are voluntary and they are set primarily to facilitate trade and are not a regulatory instrument, standards for food safety, on the other hand, should be mandatory. The adoption of food safety standards addresses concerns over the potential acute health risks posed by pesticide residues, heavy metals, other forms of environmental contamination, and especially microbiological contamination from such pathogens as *E. coli* and *Salmonella*. The public sector has a critical role to play in ensuring food safety, not only in terms of policy making but also in the provision of information and key infrastructure, prevention, control, and research. Table 6.3 lists some of the main activities involved in promoting food safety, how this effort may evolve as the economy develops, and key areas of public intervention.

Improving Access to Credit

Inadequate access to credit and its high cost are cited by farmers, traders, processors, and exporters as an important constraint to expanding or improving production and marketing. Most farmers do not have access to formal institutional finance and rely on informal sources of credit. Traders and entrepreneurs note the cumbersome procedures for and cost of obtaining loans from banks for working capital and investment needs, which push them to depend on moneylenders, friends, and relatives.

³⁴ These markets had an estimated annual turnover of 1,000 tons in trade commodities. After the markets were built and upgraded, management was transferred to the village panchayat.

Table 6.2: Developing rural/wholesale markets: Key planning processes

<p style="text-align: center;">STAGE 1 IDENTIFYING THE NEED FOR RURAL MARKETS</p> <p>1.1 Establish a clear set of goals for the market 1.2 Identify market channels in rural areas 1.3 Define responsibility for decision-making for the market (government, private sector, community) 1.4 Review planning considerations 1.5 Identify market improvement options (new or existing markets)</p> <p style="text-align: center;">STAGE 2 ASSESSING MARKET TRADING REQUIREMENTS</p> <p>2.1 Decide on design information needed 2.2 Assess supply and demand 2.3 Estimate the market's throughput</p> <p style="text-align: center;">STAGE 3 WORKING WITH FARMERS AND TRADERS</p> <p>3.1 Consult with the users 3.2 Provide support to the market committee 3.3 Assess user needs</p> <p style="text-align: center;">STAGE 4 IDENTIFYING THE SPACE REQUIRED</p> <p>4.1 Estimate sales space requirements 4.3 Identify trading spaces 4.4 Decide on the market's facilities 4.5 Determine the area needed for the site.</p>	<p style="text-align: center;">STAGE 5 CHOOSING THE RIGHT SITE</p> <p>5.1 Review suitability of site locations 5.2 Review site features 5.3 Determine if an environmental assessment is needed 5.4 Prepare an impact statement 5.5 Review site options and availability</p> <p style="text-align: center;">STAGE 6 PREPARING THE SITE PLAN</p> <p>6.1 Gather design data 6.2 Organize land uses 6.3 Plan vehicular access and circulation 6.4 Plan for supplementary uses 6.5 Finalize the site plan</p> <p style="text-align: center;">STAGE 7 DECIDING ON THE BUILDINGS AND EQUIPMENT NEEDED</p> <p>7.1 Design buildings 7.2 Design infrastructure 7.3 Identify environmental impact mitigation measures 7.4 Decide on market equipment</p>	<p style="text-align: center;">STAGE 8 CHECKING THE MARKET'S VIABILITY</p> <p>8.1 Estimate development costs 8.2 Estimate recurrent costs 8.3 Estimate benefits 8.4 Test financial viability 8.5 Assess the proposals 8.6 Amend the market design to ensure viability</p> <p style="text-align: center;">STAGE 9 CONSTRUCTING THE MARKET</p> <p>9.1 Obtain consents and agree on the financing 9.2 Prepare tender documents and tender the works 9.3 Complete construction and equipment contracts, supervise construction, and monitor implementation 9.4 Confirm practical completion and evaluate the work</p> <p style="text-align: center;">STAGE 10 OPERATING AND MAINTAINING THE MARKET</p> <p>10.1 Commission the market 10.2 Agree on space allocation and leases 10.3 Agree on the market fee schedule 10.4 Agree on the market regulations</p>
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Source: Tracey-White 2003.

Rural banking in India typically is associated with directed lending, interest rate caps on small loans, and debt waivers announced by governments from time to time as relief measures for indebted farmers. All of these policies have led to credit rationing and are likely to have a counterproductive impact on credit flows to rural areas. Akin to the case of private agro-processing enterprises surveyed in this study, rural banks are also subject to the “inspection and vigilance raj” (from the Central Vigilance Commission, CAG, and other agencies), which has meant that the appetite for risk taking and the desire to innovate are considerably reduced. Instead the emphasis is on collateralized lending, standard products that may or may not fit agricultural needs, and “procedure”-based approaches to banking, which are cumbersome and heavily document-based. All of these limitations point to the need for rural banks to transition to easier and more efficient operating procedures.

Policy actions that could improve access to rural credit encompass a number of areas, including: parliamentary approval of the legal framework for the use of negotiable warehouse receipts, legal and regulatory reforms and restructuring of rural banks,³⁵ and promotion of innovative products, such as group lending, kisan credit card, and financial and operational leasing.³⁶

³⁵ See World Bank (2004c) for a more detailed discussion.

³⁶ In a *financial lease*, lease payments amortize the price of the asset. At the end of the lease period, the lessee can purchase the asset for a token price. The lessee is responsible for maintenance and risk of obsolescence of

Table 6.3: Public activities to improve food safety

Type of public activity	How activities evolve as a country develops			Key areas for public sector support
	Low income	Middle income	High income	
Policy decision-making capacity	<ul style="list-style-type: none"> Stakeholder involvement in policy making Disease or hazard surveillance Participation in Codex, OIE, International Plant Protection Convention 			<ul style="list-style-type: none"> Legal and regulatory framework Infrastructure to support disease surveillance or monitoring capability Risk assessment training Participation in international organizations
	Qualitative risk assessment to inform risk management		Quantitative risk assessment and cost-benefit analysis	
	Adapt standards from Codex or major importer for niche markets		Set standards according to local risk conditions and preferences	
Provision of information	Targeted interventions for reducing childhood illness and malnutrition	Consumer and industry education for better food handling and preparation	Labeling and certification to inform consumers about production processes, product safety, and potential hazards	<ul style="list-style-type: none"> Market information about import standards Voluntary certification system Training programs for producers and consumers
Measures for prevention and control	Hygiene, training at key points in food chain	<ul style="list-style-type: none"> Control of external or single source hazards Phased imposition of standards Monitoring of key hazards in food supply 	<ul style="list-style-type: none"> Mandated standards Widespread application of HACCP Monitoring of food supply 	<ul style="list-style-type: none"> Control programs for single-source hazards Phased imposition of regulation for formal food sector Provide generic HACCP models for small-scale processors and food vendors
Infrastructure and research	<ul style="list-style-type: none"> Water supply Sanitation Marketing facilities Applied research to reduce key hazard 		Basic and applied research on many hazards	<ul style="list-style-type: none"> Sanitation and water supply Marketing infrastructure Research to develop hazard control

Source: Unnevehr and Hirschom 2002.

Priority areas for improving the performance of rural banks and credit cooperatives include: (1) enhancing the regulatory oversight and supervision based on internationally accepted prudential norms; (2) reducing government control and ownership (for regional rural banks, this effort requires amending the current law; for rural cooperatives, it requires state governments to adopt the model Cooperatives Law); (3) strengthening corporate governance and improving management and staff skills, particularly in credit decisions and risk assessment and management; and (4) strengthening the legal framework to make it easier for regional rural banks and credit cooperatives to recover small loans and to facilitate the use of land as collateral (World Bank 2003b, 2004c).

The government's program to legalize the use of negotiable warehouse receipts can significantly improve access to working capital across the supply chain. Warehouse receipts are used widely in many countries, including Brazil, Japan, Poland, the USA, and Vietnam, as secure collateral to obtain financing for commodities (World Bank 2005g). As a negotiable instrument, a receipt can be traded, sold, swapped, or used as collateral by farmers and entrepreneurs for obtaining loans from formal institutions³⁷ (World Bank 2003c). In moving forward, the development of an efficient warehousing system and indemnity fund or bonding will be critical. Reliable and efficient warehousing will be essential from the lender's perspective, because improper storage or inaccuracies in the warehoused quantity/quality will reduce the security cover. An efficient licensing

the asset, and the leasing contract usually cannot be canceled. An *operating lease* does not include the option to purchase the asset. Maintenance costs and risk of obsolescence are borne by the lesser, and leases can be canceled. The lessor recoups the investment through multiple leases and final sale of the asset. Because of the option to purchase the asset, a financial lease is a close substitute for a loan.

³⁷ Annex C describes how negotiable warehouse receipts operate.

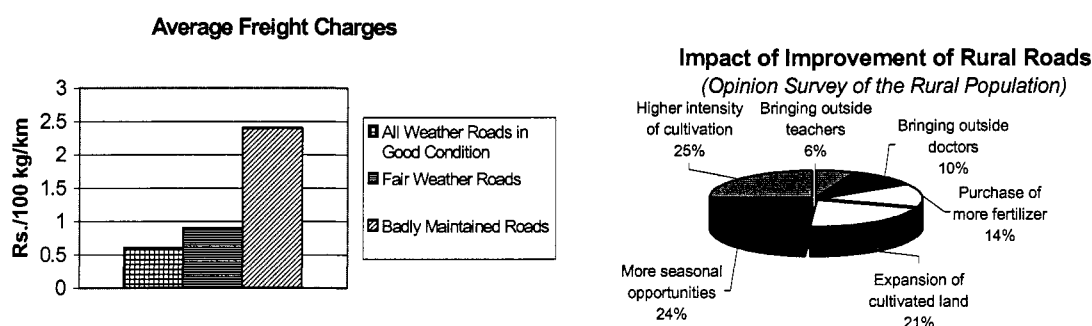
procedure that guarantees minimum standards will need to be put in place and could be managed by the government or subcontracted to the private sector. An indemnity fund or bonding will also be required in case a warehouse is not able to deliver a commodity. Most often, the indemnity fund is financed from a fee levied on customers (World Bank 2005g).

Promoting innovative approaches can be instrumental to expanding access to credit. Contract farming in which the buyer provides inputs and technical advice can ease farmers' working capital needs. Facilitating the scal-up and sustainability of low-cost microfinance models, such as a model that links a self-help group with a bank, could make finance more accessible, especially for small-scale farmers. Promoting new risk mitigation instruments (for example, weather-based insurance) and greater savings mobilization, perhaps through banks' use of "agents or banking correspondents" such as post offices and NGOs (recently enabled by a Reserve Bank of India circular on banking correspondents), could increasing savings mobilization and help reduce farmers' vulnerability to risk, while reducing transaction costs for banks.

Enhancing Rural Road Connectivity

Public investments in rural roads, by increasing rural connectivity, can have a significant impact on farmers' access to markets, the development of supply chains, and overall marketing efficiency, in addition to other beneficial impacts on rural households. A recent study of rural road investments in Bangladesh found that they reduced poverty by 5–7 percent through lower transportation and input costs, higher wages, and higher agricultural production and output prices (Khandker et al. 2006).³⁸ Specifically, transport expenses declined by 36–68 percent, agricultural wages rose by 27 percent, fertilizer costs fell by 5 percent, and output prices rose by 4 percent. Rural road improvements in Andhra Pradesh also illustrate cost savings and other benefits to the community (figure 6.1). The GOI recognizes the need to strengthen rural connectivity. Under the Bharat Nirman program, the Ministry of Rural Development aims to build by 2009 about 146,187 kilometers of rural roads to link 66,802 unconnected habitations of over 1,000 people³⁹ and ensure full market connectivity by upgrading 194,132 kilometers of existing associated routes.

Figure 6.1: Impact of rural road improvement on the rural economy in Andhra Pradesh, 1997



Source: Rural Transport Surveys 1997; Andhra Pradesh Economic Restructuring Project.

Ensuring the sustainability of these investments requires drawing lessons from past experiences. Most government programs in the past suffered from the lack of a carefully designed policy and institutional framework to ensure sustainability. Maintenance is often neglected. Road assets

³⁸ They also contributed to increased girls' and boys' schooling.

³⁹ This includes 500 in hilly and tribal areas.

deteriorate prematurely, and a huge backlog of maintenance accumulates. The quality of construction and maintenance is generally poor, resulting in overall low service life of the roads. In implementing the Bharat Nirman it will be important for MoRD to take the lead in implementing essential policy and institutional changes as well as in financing, technology transfer, human resources development, and monitoring of rural road development in different states. Panchayat Raj bodies at the district, block, and village levels can play a pivotal role in the construction and management of rural roads. Community participation offers significant potential for mobilizing the support of local communities in resource generation, land acquisition, and tailoring the rural road programs to local needs (World Bank 2003c).

C. Strengthening Farmer Linkages to the Market

Uncoordinated and highly fragmented agricultural supply chains are hampering the ability of farmers and enterprises to capitalize on more remunerative market opportunities. Agricultural products often have to go through several layers of intermediaries before reaching the consumer, contributing to higher costs and losses across the marketing chain. Fostering well-coordinated supply chains can provide many advantages, such as the reduction in costs and losses in transportation and storage; access to technologies, capital, and technical and market information; tracking and tracing of sources of produce; and better control of product safety and quality. In some cases well-coordinated supply chains can also provide opportunities for risk-sharing across chain partners. Partners can optimize results when they collaborate to fine-tune their activities to minimize transaction costs along the supply chain from “farm to fork” (van Roekel, Willems, and Boselie 2002). Given that agricultural products are bulky, perishable, with varying quality, and produced in dispersed areas, more coordinated supply chain management can be critical to reducing costs and losses and expanding markets. A number of policy impediments, particularly the APM Act and various trade controls (transport, storage), have impeded the development of more efficient supply chains in India. Thus progress in reforming these regulations is critical to capturing the benefits of more efficient supply chains.

While the major share of agricultural production is expected to flow through traditional marketing channels in the medium term, two supply chain arrangements that have been actively debated in India are contract farming and supermarket procurement arrangements. There is growing appreciation, especially among entrepreneurs engaged in agricultural trade and processing, of the potential benefits of more coordinated supply chain arrangements, but an important concern is whether small-scale farmers can equally benefit from these arrangements. The following section draws lessons from international experience in implementing these arrangements and explores options for fostering greater inclusion of small-scale farmers. Notably, many of the lessons derived, such as the approaches to strengthen farmers’ bargaining power or improve their technical capacity to meet consumers’ product and quality requirements, are also relevant to farmers who market produce through traditional channels.

Linking Small-scale Farmers through Contract Farming

Contract farming, while expanding in many states, still presents a number of implementation challenges. As described in chapter 3, these include limited farmer bargaining power, poor enforcement of contract terms and conditions, small-scale farmers’ lack of technical expertise, high incidence of quality discounts and product rejections, and exposure of farmers with contracts to risk. Table 6.4 summarizes some approaches to overcome these problems.⁴⁰

A number of mechanisms can help improve farmers’ bargaining power. Farmers by virtue of their relatively small operations and large numbers often have little bargaining power relative to

⁴⁰ This section draws extensively from Swinnen (2004) and Eaton and Shephard (2001).

contracting firms. Their bargaining position can be enhanced by fostering collective organizations (producer groups, associations, cooperatives, and the like); educating farmers about contracting operations; training farmers in contract negotiation; and enabling more rapid entry by greater numbers of contracting firms to expand competition. Experience in markets where contract farming has been in existence for a number of years shows that where farmers have been able to organize collectively to deal with contracts, they have managed the contracts well (Japan and the USA, for example) (Wilson 1986; Asano-Tamanoi 1988; Singh 2005). Farmers' leverage can be improved by programs that encourage the establishment of producer organizations and by strengthening existing organizations through training in leadership and management. It is particularly crucial to educate the members and leaders of such organizations about contract negotiation. In India there is broad experience in organizing producer organizations, including many successful experiences. It is important to draw lessons from them.

Table 6.4: Public and private options for strengthening farmers' linkages to the market

Issue	Public sector		Private sector
	Public investments	Policy environment	
Limited farmer bargaining power	<ul style="list-style-type: none"> • Improve rural infrastructure (roads, markets, electricity) to foster competition • Provide support for organizing producer organizations or new institutional arrangements (such as collection centers) • Train farmers in contract negotiation • Train firms in contract design and management 	<ul style="list-style-type: none"> • Liberalize trade to attract investments in contract farming • Develop guidelines to encourage companies to invest 	<ul style="list-style-type: none"> • Educate farmers about their rights and obligations as contractees
Lack of technical expertise	<ul style="list-style-type: none"> • Train extension staff for market-oriented agriculture 		<ul style="list-style-type: none"> • Provide extension support to farmers • Supply key inputs
High incidence of quality discounts and product rejections	<ul style="list-style-type: none"> • Support training for farmers in appropriate cultivation and quality-enhancement practices • Train firms in contract design and management • Educate farmers about their rights and obligations as contractees 	<ul style="list-style-type: none"> • Establish institutions for dispute resolution • Enforce explanation of grading decisions to farmers • Enforce explanation of rejections to farmers 	<ul style="list-style-type: none"> • Educate farmers about their rights and obligations as contractees • Provide extension support to farmers • Supply inputs to farmers • Monitor quality before harvest
Poor enforcement of contract terms and conditions	<ul style="list-style-type: none"> • Invest in statistical data needed for yield forecasting • Educate farmers about their rights and obligations as contractees • Train firms in contract design and management • Establish knowledge base of contracts 	<ul style="list-style-type: none"> • Establish institutions for dispute resolution • Develop institutions that allow for independent verification of contract specifications • Strengthen producer organizations 	<ul style="list-style-type: none"> • Develop trust • Develop contracts that are self-enforcing • Develop interlinked credit and output arrangements • Conduct regular monitoring visits to farms • Conduct yield forecasting (by firms)
Exposure of farmers with contracts to risk	<ul style="list-style-type: none"> • Foster the development of commodity futures exchanges • Train firms in how to use market instruments to hedge their risk 	<ul style="list-style-type: none"> • Enable an insurance market 	<ul style="list-style-type: none"> • Design contracts that share risk equally among parties and provide some insurance

Source: Swinnen 2004; Eaton and Shephard 2001.

Competition prevents contracting firms from exercising monopoly power over farmers with respect to contract terms. While imitation is a powerful motivator of competition, governments can encourage competition by removing constraints to firm entry, such as by improving rural infrastructure, which helps to reduce the transaction costs involved in undertaking contracting, and allowing contracting firms to increase the number of farmers they contract with (Minten 2006). Developing collection centers in some countries has also been a cost-effective way for firms to contract with a large number of small-scale farmers at once (as in Bulgaria, Poland, Romania, and Latin America). Investing in other aspects of the rural infrastructure, such as electricity, has also been cited as important (Baker and da Silva 2006).

Contract enforcement is crucial to make contract farming sustainable. Ultimately, the best way of solving contract enforcement problems is to build trust. This may take time. Innovative contract specifications and self-enforcing contracts could mitigate the problem (Bogetof and Olsen 2002; World Bank 2005h). Creating the right conditions for successful self-enforcing contracts requires extensive knowledge of the sector and local conditions (box 6.2). There can be a public sector role for capacity building in contract design and development of a knowledge base that draws public lessons from the individual experiences of firms in contract design. Monitoring and evaluation are essential to enforce contracts. For the contractor, the combination of yield forecasting and regular farm visits allows the firm to check for shirking or side-selling of produce, as well as to monitor climatic conditions and the incidence of pests and disease that might reduce the quantity or quality of the final product. Dependable statistical information on current and past production is needed for appropriate yield forecasting (Minten 2006).

Other interventions that can help ensure better enforcement of contracts. Strengthening producer organizations may help enforce contracts on the farmers' side. Other options include: (1) educating farmers about their rights and obligations as parties to a contract; (2) investing in institutions that assist farmers with dispute settlements (it is generally impossible or too costly to settle disputes in court, so alternative institutions, such as commodity or market associations, can play an important role in settling disputes); and (3) developing institutions that allow for independent verification of contract specifications. Interventions that strengthen public sector quality testing and certification schemes can help in this regard, as can interventions that set up systems for accreditation and certification, promote better farm and postharvest practices, and encourage better record keeping and traceability systems.

Capacity building for farmers and buyers helps improve contract success. Contract farming is often a new venture for both the contracting firm and the contracted farmer. For farmers it often involves taking on new production and farm management practices. On the firm side it often involves monitoring contracts in an environment of imperfect information and a high degree of risk. There is a need to build capacity on both sides to ensure that contracts are well implemented, monitored, and managed.

Fostering the use of risk management mechanisms can help farmers cope with risks associated with contract farming. Agricultural production is always risky: farmers face both yield and price risk, which can lead to substantial income and welfare volatility. When farmers enter contracts in which they agree to deliver a specified quantity and quality of produce at a given date, they increase their exposure to the risk of defaulting on the contract if their yield is worse than expected for some reason. They further increase their exposure to risk if they agree to undertake specific investments to fulfill the contract. Contracts can help farmers deal with these risks if they offer provisions for yield and/or price insurance to farmers as applicable. For example, contracting firms can offer farmers a fixed price and insure the price risk they take on by using commodity options, which are more easily available to them than to farmers. For this kind of risk management strategy to work, the Forward Contracts (Regulation) Amendment Bill must be approved. The Bill provides for the use of commodity options, public support to develop commodity exchanges, and training for contracting firms in using options to hedge their risk.

Linking Small-scale Farmers to Organized Supply Chains

Recent experience in India suggests that in the medium term, supermarkets and their agents must largely source produce from small farmers, because the farm structure obliges them to do so. This experience is shared by several countries in East Asia and Latin America where small-scale farmers predominate. Given existing farm structures, Reardon and Timmer (2005b) note that land will therefore not be the most important determinant of participation. The individual capital/labor ratios and access to public infrastructure will be more important drivers of participation. It will be the

“asset-rich” small farmers, in financial and human capital terms, who will be able to participate in the new, demanding supply chains.

These experiences highlight the importance of upgrading farmers’ range of assets to meet the new requirements of supermarkets or other coordinated supply arrangements. Such assistance could take the form of: (1) organizing farmers into formal or informal groups to meet volume requirements; (2) building capacity in production and postharvest techniques to meet the higher quality standards required; (3) helping farmers obtain the capital to make on-farm improvements and other required investments (irrigation, grading, and cooling facilities); and (4) assisting farmers in obtaining required national and international certifications (Boselie, Henson, and Weatherspoon 2003; Reardon and Timmer 2005b). Some supermarkets or their agents in China (Xincheng, SanLu), Kenya (Homegrown), Croatia (Konzum), and Central America (Hortifruti) assist farmers to overcome these asset constraints by supplying inputs, providing technical training to farmers, or helping farmers to obtain bank loans (box 6.3). In some countries, public–private partnerships were instrumental to the success of supply chain arrangements. Some examples include joint extension delivery by supermarket field staff and government extension officers (Hortico in Zimbabwe and Homegrown in Kenya), technical assistance to improve quality and safety of produce and accreditation of farmers (Dutch assistance to farmers for Tops in Thailand), and technical assistance to assess the supply potential of small producers (USAID-supported partnerships between universities and Alice in Kenya). Finally, the public sector will have an important role to play in the development of rural infrastructure and services such as rural roads, electricity, agricultural extension, and rural credit institutions.

Box 6.2: Private contract enforcement and self-enforcing contracts

Enforcing contracts through courts is sometimes not viable owing to a combination of litigation costs, ineffective contract law, poor third-party verifiability, and the potential loss of the only suitable trading partner for that commodity. This is especially true in transition economies. In this situation, contracts may be enforced without legal institutions by including flexible conditions to anticipate market changes and by including sufficiently large private sanctions. Private sanctions include both the losses that result from termination or nonrenewal of the business relationship and from reputation losses, including increased costs of doing business in the future.

To understand how this approach can be effective, it is important to understand that typically, when there are no changes in factors that affect the contract conditions, there will be no contract breach—otherwise rational partners would not have agreed to the contract in the first place. If important changes occur in the market environment, however, it may become attractive for some partner to breach the contract. Consider the case when a farm and a processing company agree up front on a price to be paid by delivery of a commodity. The contract price is set at the expected market price, but the actual market price may deviate from the contract price. If the market price is higher than the contracted price, the contract provides unanticipated benefits to the processing company but it provides unanticipated losses to the farmers, who could sell the product at a higher price on the market. The farmers will compare the costs of staying with the contract (that is, the losses it incurs by obligating them to sell at a lower contract price than the market price) with the costs they would incur by breaching the contract. As long as the costs of contract breach are larger, the farm will continue to supply. If market prices increase sufficiently, it may become beneficial for the farm to breach the contract and sell its product to another company that pays the market price. Inversely, if the market price falls below the contracted price, the farm gets unexpected benefits from the contract, and the processing company has to pay more than it would pay to buy the commodity in the market. Now the processing company considers whether it will honor the contract.

Hence, as long as the market price varies within a certain range around the contracted price, the contract will be honored by both parties. This range is called the “self-enforcing range” of the contract. More generally, the self-enforcing range measures the extent to which market conditions can change without precipitating a hold-up by either party. As long as the relationship remains within the self-enforcing range, in which the benefits of a hold-up are less than the costs for each transacting party, contract breach will not occur.

Source: World Bank 2005h.

Box 6.3: Supermarkets: Sourcing produce from small-scale farmers

Fruits and vegetables in India: Food World operates 93 supermarkets in major cities in India. Each city follows a hub-and-spoke policy with centralized purchases. It buys one step away from farmers, usually from mills for rice, cereals, and gram and from wholesale markets for other commodities. It also has direct contracts with farmers, farmer associations, and farmer cooperatives, usually annual seasonal contracts with guaranteed purchase at a previously agreed price. Food World negotiates with seed and fertilizer companies on behalf of farmers for loans and ensures that correct varieties are supplied. Farmers deliver their fruits and vegetables to collection centers. Payments, however, are made about 11–45 days after sale.

Vegetables in China: Xincheng is a vegetable wholesale firm dedicated to supplying 500 supermarkets in China. It sources half of its vegetables from 4,200 small-scale farmers in the rural area near Shanghai with which it has contracts. Xincheng supplies the farmers with seed, fertilizer, and pesticides on credit at the beginning of the production season. It also provides technical assistance to train farmers in producing vegetables that meet the quality and safety standards that Xincheng requires. The contract specifies that all produce has to be grown according to these standards and sold to Xincheng at harvest. Input costs are deducted from the output price paid. The firm applies high quality standards (in terms of appearance and freshness of the produce) and monitors the produce to ensure that it meets the food safety requirements of the Shanghai municipal government.

SanLu, a similar supplier of vegetables to supermarkets, sources vegetables from small-scale farmers through verbal agreements with village group leaders. SanLu provides farmers with seed, technical assistance, and information about market needs for various vegetables and producer prices. It guarantees to purchase the produce if it meets its quality standards. Produce is delivered by farmers to collection centers which are located in the main production centers. SanLu packs and washes the vegetables for the Beijing supermarkets and export markets.

Strawberries in Croatia: In Croatia, the supermarket chain Konzum established a preferred supplier program to procure strawberries. The program's main feature is to encourage suppliers to use irrigation and greenhouses to reduce the seasonality of strawberry production and increase quality. Both irrigation and greenhouse production required significant capital investments by farmers, who lacked either capital to make such investments or the collateral to secure bank loans. To enable farmers to obtain bank loans, Konzum intervened with local banks, stating that its contracts with farmers could serve as a "collateral substitute."

Leafy greens in Costa Rica and Nicaragua: Hortifruti, the wholesale buyer of fresh fruits and vegetables for the largest supermarket in Costa Rica (CSU), has established a network of farmer suppliers. Seventy percent of these suppliers are small-scale farmers who predominantly produce leafy greens. These farmers have an implicit contract (rather than an explicit written contract) with Hortifruti, which gives them stable access to an attractive and growing market where they can sell at prices slightly above the wholesale market. Each supplier must clean, crate, or pack the product in final usable trays and deliver it to one of Hortifruti's distribution centers. Extension workers visit suppliers to check crop calendars and production practices. In addition to receiving technical assistance some farmers receive input credit. Produce is rejected if it does not meet the color, shape, and ripeness characteristics that consumers seek. Hortifruti tests the produce for pesticide residues and *E. coli* infection to better inform extension staff on how to direct their technical assistance to farmers. The costs of the tests are borne by the farmer, but farmers do not receive penalties for produce that does not pass the test, nor is substandard produce discarded (there are no quality standards that supermarkets must adhere to). Hortifruti believes that either of these punishments would damage their ability to build sustainable relationships with farmers schooled in producing high-quality produce. The advantage to Hortifruti of contracting farmers is that they have a group of farmers they can work with to increase quality standards. Alvarado et al. (2003) also note (translation in Berdegué 2003): "The strategies of monitoring and control of growers and harmonization of growers' planting periods resulted in company growth of 15–20 percent per year between 1997 and 2001, and cost savings of 40 percent, as a result of reduction in product losses and waste due to quality increase."

Source: Berdegué et al. 2003; Hu et al. 2004; Dries, Reardon, and Swinnen 2004; Chengappa et al. 2005a; Chen, Shepherd, and da Silva 2005.

Small-scale farmers therefore need support in upgrading their skills to meet the requirements of coordinated supply chains. Such support involves investment in farmers' human and physical capital, assisting in the development of producer organizations to facilitate market connections for small-scale farmers, and strengthening the managerial capacity of these organizations to ensure these links are maintained. The impact of supermarkets on farmers, however, is only part of the picture. Some studies have shown that supermarkets also reduce the costs of the food basket for lower- and middle-income consumers (for example, in Chile).

Improving Market Information and Market Intelligence

Market information is extremely critical in enabling farmers to stay attuned to the demands and changing preferences of consumers. Market information is essential to guiding farming, marketing, and investment decisions. It encompasses more than timely and accurate prices; it also encompasses buyer contacts, distribution channels, buyer and producer trends, import regulations where appropriate, competitor profiles, grade and standards specifications, variety specifications, seed sources, production guidance, postharvest handling advice, and storage and transportation recommendations. As highlighted by farmers, lack of access to production and marketing information is a major constraint.

The MoA's AGMARKNET program to collect sales prices at the regulated markets and make these prices accessible through the Internet can contribute significantly to improving access to real-time price information. In the future, these could be expanded to nonregulated markets as well. Innovative ways of connecting to these databases using advances in communication technologies should be explored and enabled (for example, dial-up services, mobile phones, or rural kiosks).

Strengthening the extension system (public and private) can play an important role in helping farmers obtain critical market information. A number of private firms in India offer extension services to farmers, but generally they have been linked with input supply or output purchasing/contract farming arrangements. Some examples include the AMUL's Dairy Cooperative federation, Mahindra's Krishi Vihar, ITC's e-choupal, and Food World supermarket's contracting arrangements. Yet the public extension system is falling behind. It must shift away from its traditional, supply-driven and production-focused approach and towards a more market-oriented approach. Improved delivery of public extension services could be promoted by introducing decentralized strategic planning in which farmers and other stakeholders participate actively. One approach that has displayed some success in transitioning to a more market-oriented approach in India is the Agricultural Technology Management Agency (ATMA). ATMA is essentially a management concept, in which existing extension and other support service staff are used more effectively in the district by fostering coordination among line departments and fostering partnerships with producer groups, women's groups, NGOs, and the private sector (box 6.4).

In formulating extension strategies, there can be a large payoff for incorporating training on market intelligence for farmers or farmer groups. Market intelligence involves building capacity to undertake market research—that is, to seek out and analyze relevant market information—to guide decision making. Box 6.5 presents an example of how training by extension officers on market intelligence helped a women's group in Bangladesh successfully refine their enterprise development plans to better respond to market needs. Similar experiences have been documented for ATMA groups in Bihar (Singh, Swanson, and Singh 2005).

Box 6.4: Agricultural Technology Management Agency (ATMA) scheme

The ATMA approach is one mechanism being piloted by India's Ministry of Agriculture to promote decentralized, farmer-driven extension. The ATMA approach involves the creation of new management mechanisms, including an ATMA society and ATMA governing board at the district level, farmer advisory committees and block technology teams at the block level, and producer/self-help groups at the village level. ATMAs are quasi-governmental registered societies. They have more flexibility than government line departments, because they can receive funds from both government and nongovernmental sources, enter into contracts, maintain revolving accounts, charge for services, and recover costs from farmers or other service recipients. The ATMAs are controlled by governing boards of stakeholders and receive guidance from Farmer Advisory Committees established at the block level. The block technology teams are responsible for implementing and integrating the extension activities across each block, thus ensuring coordination among the different line departments. They work closely with the farmer interest/self-help groups.

Bottom-up planning and prioritization of extension needs are institutionalized under this new approach through the preparation of strategic research and extension plans (SREPs) approved by the governing board. Block action plans are prepared by block technology teams within the framework of the SREP and approved by Farmer Advisory Committees. The block plans are aggregated to produce the district's annual work plan. The program also promotes increased partnerships between the ATMAs and the private sector and NGOs. ATMAs support private extension initiatives by contracting NGOs to take on extension responsibilities in selected blocks/areas, using farmer-to-farmer extension services through individuals or through farmer organizations, and by developing partnerships with input providers for demonstrations and farmer training.

Source: Seth and Sidhu 2003; World Bank 2005f.

D. Strengthening Capacity to Manage SPS Standards

Strengthening SPS management capacity in India can contribute to growth and poverty reduction by increasing the competitiveness of Indian exports, improving domestic food safety, and promoting the adoption of safer and more sustainable agricultural practices.⁴¹ But the approach of government so far in SPS management concerning agro-food exports has mainly been *defensive*—reacting to events in a “fire-fighting” mode to limit damage from apparent noncompliance with trading partners' requirements. In response to various crises on the SPS front, the strategy of the public sector has combined (1) aggressive enforcement of existing or modified regulations, (2) heightened requirements for mandatory testing of raw materials and finished products, and (3) considerable investment in new “hardware,” either through investment in public sector laboratories or subsidies for private investment in laboratories, factory upgrades, and the like.

This approach has generally proven “successful,” at least in terms of relatively quickly restoring India's access to the affected market. Yet such crisis management measures have generally been quite expensive, both financially for the government and in terms of lost income or livelihood for the many farmers, SMEs, and factory workers adversely affected by regulatory crackdowns. In some cases (grape exports, for example), the cost of compliance has been quite high. The considerable attention given to product testing has enabled the GOI and various sectors to gain a more detailed look at the symptoms of noncompliance (that is, in the form of test results showing violative levels of microbiological parameters or pesticide residues).

Developing countries such as India and individual suppliers commonly perceive little room for maneuvering in the face of emerging standards. In other words, they believe that they must “comply or perish.” In reality, countries and suppliers face a wide range of choices, even when they seek to comply with a particular standard. Developing countries and individual suppliers can pursue one or a combination of the following strategies in the context of evolving standards:

⁴¹ See World Bank (2007) for a more detailed discussion.

Box 6.5: Market intelligence and women producers in Bangladesh

A group of women producers wanted to diversify into new, profitable products, especially those suited to the landless among them. At a preliminary meeting to discuss resources, a short list of four products was developed: (1) bamboo baskets, (2) potato crisps/chips, (3) rice cakes, and (4) embroidered blouses. The women believed that embroidered blouses offered the best opportunity. After learning about market intelligence, four of the women, with assistance from agricultural extension officers, decided to research the local town market and report back to the group.

Two marketing specialists and two extension officers accompanied the women to the market, gave them some training in market research, and provided a checklist of questions. The specialists led the first two market interviews, and then the women farmers led the process. The women were worried about going into the market, but they were supported by one another and helped by the local extension officers and government marketing specialists.

Through their research, the women discovered that there was a small and slow market for bamboo baskets, the potato crisp market was dominated by large-scale processors, and the market for embroidered blouses was seasonal and difficult. However, there was an excellent opportunity to supply rice cakes. These were supplied from a town two hours away, and the women already had the skills and resources to produce high-quality rice cakes. Retailers were enthusiastic about being able to source rice cakes locally. At the next farmers' meeting, the women presented their findings. The group agreed to produce samples of rice cakes and take them to the retailers during the following week.

Source: Dixie 2006, personal communication.

- *Compliance:* adopting measures to meet international standards or the requirements of one's trade partners. This strategy might involve some combination of legal/regulatory change, the application of certain technical or other risk management approaches, the implementation of testing, certification, and/or other conformity assessment measures, and other actions.
- *Voice:* seeking to influence the "rules of the game" and/or how they are implemented via participation in international standard-setting fora, communications with the WTO, negotiations with bilateral or regional trading partners, and/or business planning with downstream clients.
- *Redirection:* altering commercial strategies to encompass sales to different countries or market segments, changes in the mix or form of products, and other maneuvers, taking into account the costs and benefits of complying with different standards.

The timing and mode of strategic response may also vary. Actions may be taken on a proactive or reactive basis. A proactive response involves anticipating future requirements and taking measures ahead of time in a manner that minimizes costs or maximizes benefits. A reactive response involves a player waiting until the requirements are put in place and only then adopting responsive actions, perhaps hoping to limit action or at least to learn from the mistakes of the "first movers." The strategy can be either defensive or offensive; a defensive strategy involves measures designed to minimize the changes required, whereas an offensive strategy involves trying to exploit an opportunity created by standards, such as a price premium for organic products. The locus of strategic response may also vary. Some responses may be taken by individual firms, farms, or government agencies. Other responses involve collective action, perhaps through producer or industry organizations or interministerial task forces. There is scope also for strategic responses that involve public-private collaboration or collaboration between developing country stakeholders in multiple countries (table 6.5).

Table 6.5: Actors in strategic response to standards

Institution/approach	Individual	Collective
Public	Specific Ministry or agency	Interministerial taskforces Gov't. to Gov't. memoranda of understanding Multicountry SPS counter-notification
Public-private	Subsidies/Cofinancing Joint ventures	Joint public-private sector task-forces
Private	Firm/farm investments Company "codes of practice"	Industry association "code of practice" Grower association program Coordinated supply chain partnerships

Source: World Bank 2007.

While there are certainly diverse views, the mainstream official and private perspective in Indian horticulture is that many, if not most, of the emerging SPS and other international standards are not scientifically based and therefore represent an unfair "barrier to trade." This situation is considered to result either from deliberate efforts to protect farmers or processors from competition or to be fueled by unreasonable consumer fears in high-income countries and improved technologies for detecting hazards. Whatever the driving forces, the presumed primary solution is seen to lie in effective negotiations with India's (official and private) trading partners and, failing that, in addressing the various measures in international fora for setting standards or resolving disputes.

In the future, it would be important for the GOI to move towards a more cost-effective and strategic approach. Considerably more emphasis is needed to promote awareness about SPS management among agro-food system stakeholders. Taking a more proactive stance requires moving towards a more cost-effective, strategic approach. Such an approach would place somewhat less emphasis on mandatory controls, inspections, and testing. It would place considerably more emphasis on promoting agro-food system stakeholder awareness about SPS management and facilitating effective individual and collective action by private firms, farmers, and service providers. It is often assumed that the management of food safety and agricultural health is predominantly the responsibility of the public sector. Indeed, many crucial regulatory, research, and management functions are normally carried out by governments, and in a variety of circumstances importing countries require that certain functions be performed by a designated "competent authority" in the public sector (table 6.6). However, the private sector can also play a critical role in setting standards and in the actual compliance with food safety and agricultural health requirements. Capacity building in the private sector can complement (or even substitute for) public sector capacity, as with the investment in accredited laboratory testing facilities.

By narrowing the gap between domestic and international standards, India could create a better platform for expanding exports. Extension service providers have a large role in promoting agricultural good practices to ensure that farmers follow recommended dosages and appropriate pre-harvest intervals in using agricultural chemicals and in assisting with soil and water testing. There is also a need for promoting good hygiene and manufacturing practices and quality management to minimize food safety, environmental, and other risks.

India and its private sector are in a position to anticipate standards and take early action to gain competitive advantage through compliance and differentiation. Unlike many other developing countries, India has enormous scientific and technical capacities. It can effectively undertake research and field trials to stay ahead of the game. For example, Indian stakeholders anticipate problems in complying with existing EU pesticide residue tolerances for pomegranates. Indian complaints about "unfair" approaches used to test for residues in pomegranates are getting limited attention, given that this crop is of minimal commercial importance to India's trading partners. India needs to manage this challenge—through its own actions—by performing its own field trials to establish proper regulatory tolerances and by promoting better pest management practices among its

pomegranate growers. Similarly, future challenges are expected in relation to compliance with heavy metal tolerance levels in vegetables. Proactive steps can be taken to reduce the incidence of such heavy metals, thus lowering the risks of future trade disruptions and the risks to Indian consumers.

There is growing evidence to indicate that for well-prepared countries and suppliers, rising standards represent an opportunity for modernization of export supply and regulatory systems and adoption of safer and more sustainable practices (World Bank 2005d). Countries that have taken a proactive stance, including staying abreast of technical and commercial requirements and anticipating future changes, have been able to reposition themselves in more remunerative market segments.

Table 6.6: Public and private sector roles in enhancing trade-related SPS and quality management capacity

Public sector role	Private sector role
<p>Diplomacy: (Responsibility of central government)</p> <ul style="list-style-type: none"> • Undertake continuous dialogue and periodic negotiations to address emerging constraints or opportunities. • Emphasize commitments, confidence building, and opportunities for mutual recognition and joint problem-solving (rather than conflicts per se). <p>Building awareness and promoting good practices: (Responsibilities lie with central and state governments)</p> <ul style="list-style-type: none"> • Raise stakeholder awareness about and promote good agricultural, hygiene, and manufacturing practices and quality management. • Incorporate these areas into curricula of public agricultural/technical institutes and universities as well as consumer awareness campaigns. • Accredite private laboratories and conduct reference/consistency testing. • Facilitate technical, administrative, and institutional change and innovation within the private sector (for example, through public-private partnerships for product innovation or product traceability systems). <p>Risk assessment and management:</p> <ul style="list-style-type: none"> • Adopt suitable food safety and agricultural health legislation modeled on international good practices and consistent with India's WTO and other treaty obligations. (Responsibility of central government) • Manage national or state systems of pest and animal disease surveillance. (Responsibilities lie with central and state governments) • Undertake coordinated market surveillance programs to gauge the incidence of various food safety hazards in the domestic agro-food system. (Responsibilities lie with central and state governments) • Find solutions to phytosanitary constraints that limit domestic (for imports) and foreign (for exports) market access. This effort might entail pest risk assessment, product inspection, or agreed development of pest- or disease-free areas. (Primary responsibilities lie with the central government, but state governments have an important role in implementation) • Support research to address food safety and agricultural health concerns (for example, field trials to determine alternative pest management approaches or to establish suitable MRLs for crops with market potential; improve the quality of planting material). (Responsibilities lie with central and state governments; role for national and state-level agricultural research organizations) 	<p>"Good" management practices:</p> <ul style="list-style-type: none"> • Implement appropriate management practices to minimize food safety, environmental, and other risks. Examples include "good" agricultural, hygiene, and manufacturing practices and HACCP principles. • Where commercially valuable, gain formal certification for such adopted systems. • Develop incentives, advisory services, and oversight systems to induce similar adoption of the above "good practices" by supply chain partners. <p>Traceability:</p> <ul style="list-style-type: none"> • Develop systems and procedures to enable the traceability of raw materials and intermediate and final products in order (for example) to identify sources of hazards or manage product recalls or other emergencies. <p>Develop training, advisory, and conformity assessment services:</p> <ul style="list-style-type: none"> • On a commercial basis, provide support services to agriculture, industry, and government related to quality and food safety management. Invest in the needed human capital, physical infrastructure, and management systems to competitively supply such services. <p>Collective action and self-regulation:</p> <ul style="list-style-type: none"> • Work through industry, farmer, and other organizations to share the costs of awareness-raising and systems improvement, alert government to emerging issues, advocate for effective government services, and provide a measure of self-regulation through the adoption and oversight of industry "codes of practice."

Source: World Bank 2007.

E. Conclusion

The Government of India's rural development strategy faces the challenge of meeting rapidly changing needs in rural areas, the country, and the global environment. A recent added challenge is global rise in food prices. Economic development and increasing industrialization normally lead to a changed and smaller role for the agricultural sector. This structural evolution has begun in India. A concurrent rapid pace of growth in the agricultural and rural nonfarm sectors is thus important and integral to India's overall development, because these sectors jointly, directly, and indirectly help generate opportunities for greater employment and income growth. To maximize agriculture's contribution to the overall economic growth, it is critical to remove policy and regulatory barriers, so that those who choose to remain in agriculture can enhance their productivity and competitiveness and achieve the highest returns from their endeavors. Removing these barriers is particularly important because the majority of India's workforce remains dependent on the agricultural sector for its livelihood. At the same time, growth in the rural nonfarm sector (industry and services) not only offers greater alternative employment opportunities but can create a strong foundation for consumer demand in rural areas. An increase in rural-based demand in turn can stimulate growth in the agricultural and other sectors of the economy. Achieving such broad-based growth, however, will require vigilant adjustments to rapidly changing market opportunities and challenges, internally and globally.

Integrating rural areas into the state and national economy through a dynamic agribusiness sector and agricultural markets will be important drivers for agricultural and rural growth, ensuring the country's food security, and rural poverty reduction in India. As noted in the 10th Five Year Plan, fostering efficient and competitive agricultural marketing is indispensable for the overall development of the country's economy (Planning Commission 2003). International experience shows that modern and efficient agricultural marketing systems and the consequent improvements in competitiveness can be a crucial catalytic force for directly and indirectly promoting growth and poverty reduction. Modern marketing systems can help to reduce food costs, resolve supply uncertainties, and improve the diets of the poor and non-poor in urban and rural areas. In opening greater opportunities for farmers and other entrepreneurs, they contribute to generating employment and consequently raising and diversifying income potential in rural and urban areas. Finally, they enhance incentives for farmers to increase productivity and link into local, national, and international markets (World Bank 2003c). India has made great strides in the last five years in improving the environment for the growth and development of an efficient and competitive agricultural marketing system. The challenge now is to sustain this momentum over the medium to longer term, so the agricultural sector and society as a whole truly capture the multiple benefits of well-functioning and efficient markets.

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Annex A: India Agricultural Marketing Survey

A survey of the agricultural marketing chain was undertaken in four states in India as part of the study described in this report. The four states—Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh—were selected to cover the broad spectrum of development in agricultural marketing chains for higher-value agricultural produce. Maharashtra in the west and Tamil Nadu in the south rank high among Indian states in terms of per capita income. They are more advanced in diversifying into high-value crops and in developing marketing and processing facilities to penetrate export markets. The more populous northern and eastern states of Uttar Pradesh and Orissa, on the other hand, rank low in per capita income. Although some agricultural diversification has taken place in these states, they have yet to develop the marketing and processing sectors that could catapult them into outside markets. The respective state governments raised their own specific concerns about the need for improving agricultural marketing within their states and were happy to provide support to the study.

Crop Selection

To compare agricultural marketing across the four states, it was necessary to select crops that were produced in all four states and could ensure adequate statistical coverage and comparison across individual farmers and traders. Given the study's focus on the operational efficiency of agricultural marketing systems for high-value crops, five crops were selected to illustrate different marketing challenges. Ideally cereals, vegetables, fruits, spices, highly perishable crops, and storable commodities would be represented among the five crops. To fit these criteria, maize, potatoes, tomatoes, mangoes, and turmeric were chosen. Maize is an annual grain crop used increasingly for producing starch as well as livestock and poultry feed. Potatoes and tomatoes are common vegetable crops, but tomatoes are more perishable and suffer greater handling losses than potatoes. Mangoes are tree crops grown and consumed widely in India and partly exported. Quality control, handling, and sanitary issues are most serious for tomatoes and mangoes. Turmeric is a ginger-like spice essential to Indian cuisine. One-fifth of India's output is exported.

Sampling Design

Detailed surveys of traders, agricultural marketing enterprises, and farmers involved in trading, processing, exporting or producing one of the five study crops were conducted in Maharashtra, Orissa, Tamil Nadu, and Uttar Pradesh. In each state, 20 wholesale markets and 40 villages were selected to construct a sample of 400 traders and 400 farmers. Community surveys were conducted at the market and village level. A sample of 600 processors and exporters of the five crops (in principle, 150 in each state) was also drawn. In line with the study's objectives, the survey focused on wholesale markets, wholesale traders or brokers, and farmers who sold the five crops to traders for resale.

The sampling strategy was designed around the market. First, a market was sampled for a given crop. The enumerators listed the traders found in the sampled market (those who could regularly be found in the market, regardless of whether they owned a permanent structure for trading), recording which crop they traded and whether they traded as a wholesaler, commission agent or retailer for that crop. Those traders found to be trading as wholesalers or commission agents for the crop for which the market was selected comprised the sampling frame from which traders were sampled and interviewed. During the listing process, traders of the crop for which the market had been selected were asked to list five villages from which they sourced most of their crop, or which were known to produce a lot of the crop in question. Based on their responses, a list of villages that supplied the selected market was drawn up and became the sampling frame from which the team supervisor sampled two villages. Two villages were visited to develop a list of households that produced the crop for sale, that bought one of the five crops for resale, or that processed one of the five crops. This became the sampling frame from which farmers, village traders, and village

processors were selected. For each market, 20 traders were interviewed (both in the market and in the village), 2 villages were selected, and 20 farmers surveyed across the 2 villages. Ideally 10 of the 20 traders were to be found in the villages listed. In reality few traders resided in the villages; they were more likely to reside in urban areas and travel to the villages to buy and sell. When the required number of small-scale traders was not found in the village, village retail markets were visited to find small-scale traders in a given crop. Retail traders as well as wholesale traders and commission agents were found in the village markets.

A two-pronged approach was taken to sample processors and exporters. Small-scale, informal processors were listed as part of the village listing exercise, and they were all interviewed, given that few processors were expected to be found. In addition, a list of medium- and large-scale enterprises was drawn up for each state, using a combination of national and state-level lists of agricultural enterprises.

Markets were selected for a given crop with a probability in proportion to the quantity of that crop traded in their district. Each state comprises about 30 districts, and each district contains on average six or seven markets. This selection process required data on the quantities of maize, potatoes, tomatoes, mangoes, and turmeric traded in each district. In only one of the states selected—Uttar Pradesh—were records of annual quantities traded available. In the absence of similar data for the other states, estimated market surplus data were used as the basis for sampling the markets. Markets were selected randomly for each crop with a probability proportional to the districts' share of the state's total market surplus in a given crop. Markets in districts with a negative market surplus for a given crop were given a zero probability of being selected for that crop.

The final breakdown of the sample by crop, state, and market participant is presented in tables A1.1 and A1.2. The locations of markets and villages sampled for each crop are shown in figures A1.1 to A1.4.

Table A1.1: Number of respondents by crop

Respondent	Maize	Potatoes	Tomatoes	Mangoes	Turmeric	Total
Market	43	52	58	58	29	78
Trader	314	527	532	425	146	1,597
Village	63	62	89	71	27	155
Farmer	369	430	456	417	165	1,579
Enterprise	34	23	23	132	103	316

Table A1.2: Number of respondents by state

Respondent	Maharashtra	Orissa	Famil Nadu	Uttar Pradesh	Total
Markets	20	20	20	18	78
Trader	411	400	386	400	1,597
Village	41	40	35	39	155
Farmer	401	400	378	400	1,579
Enterprise	70	167	35	44	316

Figure A1.1:

Location of sampled markets in Orissa



Figure A1.2:

Location of sampled markets in Maharashtra



Figure A1.3:

Location of Sampled markets in UP



Figure A1.4:

Tamil Nadu: Location of Surveyed Markets



Annex B: Economic Considerations in Agricultural Marketing

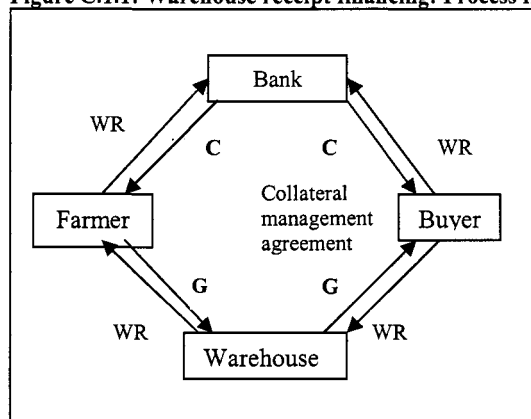
Agricultural producers, traders, and processors encounter a number of market failures, which require public sector intervention to resolve. These market failures include:

- **Excludability of users:** If anyone can freely obtain and use new knowledge, such as market information or extension advice, there is little incentive for the private sector to provide it.
- **Rivalry of consumption:** If one's use of a product or service does not reduce its availability to others (for example, the use of extension advice), the private sector will be reluctant to provide it.
- **Externalities:** Frequently described as the spillovers or side effects of an economic activity, externalities can be positive (integrated pest management) or negative (water and air pollution).
- **Economics of scale:** Processing costs may increase as the volume of output decreases. Economies of scale can make it more difficult for small firms to compete or undertake investments to comply with regulations or standards, such as food safety standards. For large firms, economies of scale can generate market power.
- **Asymmetric information:** Participants in a marketing transaction may not have the same knowledge of the market situation. Farmers may lack the information that traders possess about consumers' quality preferences.

These market failures can be overcome through regulation and investments in public goods—that is, goods that are nonexcludable (potential users cannot be excluded from use by owners) and nonrival (consumption of the good does not reduce its supply to others). Purely public goods and purely private goods occupy opposite ends of the economic spectrum. Toll goods are those with high excludability and low rivalry. Common pool goods are those with low excludability but high rivalry. Many marketing-related goods and services lie in the intermediate area, which means that there is considerable potential for the public and private sectors to share responsibility for funding and delivering them. Those with significant externalities may also justify public intervention of some kind, such as subsidizing the activities that result in positive externalities or taxing or regulating those that result in negative externalities.

Annex C: Using Negotiable Warehouse Receipts

Figure C.1.1: Warehouse receipt financing: Process flow



Source: World Bank (2005d)

Note: WR= Warehouse Receipt; C = Cash; G = Goods

The process of using negotiable warehouse receipts may be divided into seven steps (annex figure C1.1) (World Bank 2005d):

- **Step 1:** The farmer, company, or trader deposits the commodity in a warehouse operated by a designated warehouse keeper. The stored commodity is certified for quality and graded by a government-approved valuer(s). The certificate issued accompanies the commodity to be deposited, which is then inspected by an agency authorized to certify the quantity deposited. The warehouse issues a warehousing receipt that specifies the quantity (as certified by the warehouse) and the quality (as certified by the accompanying quality certificate) of the commodity.
- **Step 2:** The farmer, company, or trader can request financing from a bank, which then takes possession of the warehouse receipt pending its decision on financing. The bank does this to ensure that the commodity stored is not subsequently tampered with.
- **Step 3:** The bank deputs an approved controller/assayer to draw samples from the stored commodity and bring it to a certified laboratory for testing.
- **Step 4:** The financing amount is fixed at a percentage lower than the market value of the commodity stored, after keeping an adequate margin based on the price volatility of the commodity. In the event that the quality tests do not confirm the quality stated on the warehouse receipt, financing is rejected.
- **Step 5:** The bank appoints a collateral manager who monitors the commodity stored, conducts periodic stock audits, and provides an indemnity cover and fidelity insurance for the transaction. The bank monitors the market value of the stored commodity based on the daily price from the most liquid spot market. If the market value is lower than the stipulated bank cover, a margin call is issued. The company/trader acquires an insurance cover for the commodity stored and the warehouse keeper purchases an insurance cover for the warehouse against theft, fire, and natural calamity.
- **Step 6:** The farmer, company, and trader can respond to the margin call within the stipulated time period by either depositing additional quantities of the commodity or prepaying part of the outstanding amount. If the company/trader does not respond to the margin call, the bank exercises the right to sell the commodity at the end of the stipulated period and recover the outstanding amount.
- **Step 7:** At the end of the financing period, the company/trader repays the outstanding amount (principal plus interest) and the bank hands over the warehouse receipt, thereby releasing the commodity and completing the transaction.

Annex D: India's Emergent Horticulture Exports: Addressing SPS and Other Challenges

Executive Summary⁴⁰

How Have Sanitary and Phytosanitary Issues Affected India's Horticultural Trade?

In recent years, both the private and public sectors in India have developed aspirations for expanding India's participation in international horticultural trade. Despite being one of the world's largest producers of horticultural crops, India trades very little of its massive production internationally. India's share in global horticultural trade was a mere 0.5 percent in 2004 (US\$ 575 million, compared with a global trade of US\$ 108 billion).⁴¹ Given the increased attention to food safety and/or plant health concerns in many segments of international horticultural trade, questions have been raised as to whether sanitary and phytosanitary (SPS) measures have been or could be a "barrier" to India's present and future horticultural trade, and what the appropriate responses from Indian stakeholders should be.

SPS standards are but part of a wider set of competitiveness challenges facing Indian horticultural producers, processors, and exporters. Most subsectors face on-going challenges related to varietal development, postharvest loss, local and/or international logistics, and market organization. In many subsectors, the very fragmented system of production and trade is not especially suited for international trade, especially in cases where there are growing demands for the traceability and/or certification of products or raw materials. There is a widespread perception among stakeholders that India's huge domestic production of various fruits should inevitably translate into large-scale exports (for example, of mangoes, bananas, or even citrus). This perception is inconsistent with the experience of most leading developing country exporters, which fostered large, export-oriented supply chains backed up by smaller domestic markets. The challenges that India faces have arisen at least in part because of the huge rift between standards in India's domestic market, on the one hand, and international standards, on the other.

The challenges posed by standards have manifested themselves in different ways for Indian horticulture, including:

- *Absolute barriers or binding constraints for accessing particular markets.* The most prominent case involves fresh mangoes and the plant health concerns of US and Australian authorities.
- *Temporary losses from rejected (and sometimes destroyed) consignments of fresh or processed product.* The most high-profile incident occurred when some 28 containers of grapes consigned to Holland in 2003 were rejected due to violative pesticide residues. Less visibly, yet more commonly, numerous small consignments of processed horticultural products entering the USA have been rejected for improper labelling, poor packaging, inclusion of illegal additives, and other reasons. In other markets, there have been a few other rejections of fresh produce.
- *Higher consignment-specific or recurrent transaction costs* due to duplicative testing, high levels of entry-point inspection, or the further treatment of goods upon arrival in overseas

⁴⁰ This annex summarizes the findings reported in World Bank (2007).

⁴¹ In this study, "horticultural products" are defined as including fresh and processed fruits and vegetables, cut flowers, and ornamental plants. Nuts or dried/processed legumes and pulses are not included, although the Agricultural and Processed Food Products Export Development Authority (APEDA) generally includes them in its data on horticultural exports.

markets. The profitability of India's cut-flower trade into Japan and the Netherlands has been affected, and exporters of other products have also had to bear added costs.

- *Patterns of "defensive commercialization,"* whereby firms fail to pursue opportunities for remunerative trade with certain countries or types of buyers because of concerns about their inability to ensure compliance with regulatory or private standards in those markets. This pattern is common in Indian horticulture, although additional factors have also weighed on these commercial strategies.

The Official Response to Trade-related SPS Management

There is a common assumption that developing countries such as India (and individual suppliers therein) have no room for maneuvering in the face of emerging standards. That is, they face situations of "comply or perish." In reality, countries and suppliers face a wide range of choices, even when they seek to comply with a particular standard, although the increased emphasis in recent years on proscriptive process/procedural requirements (rather than product or outcome standards) does somewhat curtail this room for maneuvering.

Developing countries (and individual suppliers) can pursue one or a combination of the following types of strategies in the context of evolving standards:

- *Compliance:* adopting measures to meet international standards or the requirements of one's trade partners. This strategy might involve some combination of legal/regulatory change, the application of certain technical or other risk management approaches, the implementation of testing, certification, and/or other conformity assessment measures, and other actions.
- *Voice:* seeking to influence the "rules of the game" and/or how they are implemented via participation in international standard-setting fora, communications with the World Trade Organization (WTO), negotiations with bilateral or regional trading partners, and/or business planning with downstream clients.
- *Redirection:* altering commercial strategies to encompass sales to different countries or market segments, changes in the mix or form of products, and other maneuvers, taking into account the costs and benefits of complying with different standards.

The timing and mode of strategic response may also vary. Actions may be taken on a proactive or reactive basis. A proactive response involves anticipating future requirements and taking measures ahead of time in a manner that minimizes costs or maximizes benefits. A reactive response involves a player waiting until the requirements are put in place and only then adopting responsive actions, perhaps hoping to limit action or at least to learn from the mistakes of the "first movers." The strategy can be either defensive or offensive; a defensive strategy involves measures designed to minimize the changes required, whereas an offensive strategy involves trying to exploit an opportunity created by standards, such as a price premium for organic products. The locus of strategic response may also vary. Some responses may be taken by individual firms, farms, or government agencies. Other responses involve collective action, perhaps through producer or industry organizations or interministerial task forces. There is scope also for strategic responses that involve public-private collaboration or collaboration between developing country stakeholders in multiple countries.

While there are certainly diverse views, the mainstream official and private perspective in Indian horticulture is that many, if not most, of the emerging SPS and other international standards are not scientifically based and therefore represent an unfair "barrier to trade." This situation is considered to result either from deliberate efforts to protect farmers or processors from competition or to be fueled by unreasonable consumer fears in high-income countries and improved technologies for detecting hazards. Whatever the driving forces, the presumed primary solution is seen to lie in effective negotiations with India's (official and private) trading partners and, failing that, in addressing the various measures in international fora for setting standards or resolving disputes.

With such a perspective, arguably insufficient attention has been devoted to monitoring the requirements of official and private standards, interpreting their implications for Indian horticulture, and using current and anticipated requirements as catalysts to upgrade existing operations and strengthen supply chain management. This response is not altogether surprising, given the limited imprint of export horticulture on Indian agriculture thus far. Yet the absence of a proactive or preventive approach to managing SPS standards for trade has left Indian horticulture either to adopt “defensive” strategies of commercialization—that is, to avoid markets that apply more stringent standards—or to adopt reactive, “fire-fighting” methods when trading partners’ concerns about India’s noncompliance with standards lead to actual or threatened trade interruptions.

These approaches contrast sharply with those taken in leading (and competing) developing countries in the horticultural export trade, such as Brazil, Chile, Mexico, Thailand, Kenya, and South Africa. The mainstream Indian approach seems to call for negotiation first and belated (and begrudging) compliance second. In contrast, many other countries are investing in compliance as a means to both improve their competitive position and enhance the effectiveness of their negotiations on particular technical and commercial matters. With regard to trade performance patterns and the prevailing international reputation for horticultural industries, this latter approach seems to have been relatively more effective.

When faced with crises related to noncompliance with SPS measures, as in the case of grapes, the public sector has focused on end-of-the line solutions. This strategy has included a combination of: (1) aggressive enforcement of existing or modified regulations, (2) heightened requirements for mandatory testing of raw materials and finished products, and (3) considerable investments in new “hardware,” either through investment in public sector laboratories or subsidies for private investment in laboratories, factory upgrades, and other improvements.

This approach has generally proven “successful,” in the sense that access to the affected market was restored relatively quickly. Yet such crisis management measures have generally been quite expensive, both financially for the government and in terms of lost incomes or livelihoods for the many farmers, small and medium enterprises (SMEs), and factory workers adversely affected by regulatory crackdowns. In some cases (for example, grapes), the sustainability of the adopted measures is uncertain, given the higher overhead cost of compliance. The considerable attention given to product testing has enabled the Indian government and various sectors to gain a more detailed look at the symptoms of noncompliance (including results of tests indicating violative levels of microbiological parameters or pesticide residues), although insufficient attention and resources have been directed to address the underlying causes of these problems. Recent moves to improve agricultural practices through initiatives such as the IndiaGAP program suggest a shift in the right direction, however.

Taking a More Proactive Stance Towards SPS Management

Standards present an opportunity for modernizing export supply and regulatory systems and adopting safer and more sustainable practices. Countries that have taken a proactive stance, including staying abreast of technical and commercial requirements and anticipating changes, have been able to reposition themselves in more remunerative market segments. Consignments from such countries are subjected to comparatively less inspection by trading partners. “Good” reputations, gained through demonstrated compliance, yield lower transaction costs for farmers and exporters.

Considerably more emphasis is needed to promote awareness about SPS management among agro-food system stakeholders. Taking a more proactive stance requires a move towards a more cost-effective and strategic approach. Such an approach would place somewhat less emphasis on mandatory controls, inspections, and testing. It would place considerably more emphasis on promoting agro-food system stakeholder awareness about SPS management and facilitating effective individual and collective action by private firms, farmers, and service providers. By narrowing the gap between domestic and international standards, India could create a better platform for expanding exports.

Extension service providers have a large role in promoting agricultural good practices to ensure that farmers follow recommended dosages and appropriate preharvest intervals in using agro-chemicals and in assisting with soil and water testing. There is also a need for promoting good hygiene and manufacturing practices and quality management to minimize food safety, environmental, and other risks.

India and its private sector are in a position to anticipate standards and take early action to gain competitive advantage through compliance and differentiation. Unlike many other developing countries, India has enormous scientific and technical capacities. It can effectively undertake research and field trials to stay ahead of the game. For example, Indian stakeholders anticipate problems in complying with existing European Union (EU) pesticide residue tolerances for pomegranates. Indian complaints about “unfair” approaches used to test for residues in pomegranates are getting limited attention, given that this crop is of minimal commercial importance to India’s trading partners. India needs to manage this challenge—through its own actions—by performing its own field trials to establish proper regulatory tolerances and by promoting better pest management practices among its pomegranate growers. Similarly, future challenges are expected in relation to compliance with heavy metal tolerance levels in vegetables. Proactive steps can be taken to reduce the incidence of such heavy metals, thus lowering the risks of future trade disruptions and the risks to Indian consumers.

By anticipating shifting standards in existing markets, India is likely to identify opportunities for expanding into more remunerative segments in these markets. India does not currently face very stringent standards for horticultural commodities in regional markets or in the Middle East. The bulk of Indian produce entering these markets is targeted at the migrant worker community. This low-priced, bulk market should remain an attractive outlet for Indian exporters, who benefit from inexpensive and frequent freight links and similarities in diet and culture with the targeted importers and consumers. Yet there should also be potential to more firmly tap into the expanding high-end market segment in the Middle East, especially supermarkets. The required standards do not match those applicable at the higher end in Europe, although buyers for these supply chains will increasingly want evidence of “good agricultural practices” and produce traceability.

There is a need to institute stronger monitoring and evaluation components to gauge the effectiveness of various investment and incentive schemes and/or instruments made available by the central and state governments to promote horticultural exports and facilitate the upgrading of postharvest practices, infrastructure, and quality assurance systems. For instance, there are plans for more than 48 Agricultural Export Zones (AEZs) for horticultural crops. Carefully evaluating the performance of some of these schemes will have large payoffs in terms of future strategic decision making and resource allocation. There is also a need to rationalize various subsidy schemes and make some of them easier for the private sector to access.

There is a need to carefully assess the costs and benefits of standards compliance and evaluate the trade-offs. Investments in phytosanitary and food safety risk assessment and mitigation should be guided by the market potential of the export commodity. For example, all things considered, it is not obvious that the likely costs and administrative attention required for Indian mangoes to gain access to the Australian market would match the benefits of participating in that market, given its probable size. Achieving compliance at a potentially high cost would not make sense if the actual commercial potential of this trade is limited.

The experience to date has been that the government has taken disproportionate responsibility for managing SPS-related “crises.” It is often assumed that the management of food safety and agricultural health is predominantly the responsibility of the public sector. Indeed, many crucial regulatory, research, and management functions are normally carried out by governments. In a variety of circumstances, importing countries require certain functions to be performed by a designated “competent authority” in the public sector. The private sector also has fundamentally important roles to

play, however, in the process of setting standards and in the actual compliance with food safety and agricultural health requirements. Experience elsewhere demonstrates that capacity building in the private sector can complement (or even substitute for) public sector capacity, including in research and development and conformity assessment (inspection, certification, and testing). This report contains both general and very specific recommendations pertaining to the redefinition of public and private sector roles and responsibilities in managing SPS-related challenges in Indian horticulture.

There is a much greater need for collective action by the private sector. International experience highlights the importance of collective action within the private sector to promote awareness of SPS matters, to find technical and institutional solutions to emerging challenges, to implement programs to promote “good” agricultural or manufacturing practices, and otherwise provide a degree of self-regulation, which then reduces the need for government agencies to play enforcement roles. Indian horticulture presents many instances in which limited cooperation among private sector actors has either created a vacuum that the government has had to fill or has forced individual firms to tackle problems on their own. For example, the absence of an organized forum among Indian grape exporters has prevented any self-regulation, with APEDA filling the void with a mandated system of multistage government oversight.

For crops with limited potential for short-term export development, it would be important to carefully weigh the benefits of reorienting production to the specifications of the export market versus strengthening the industry’s practices and quality consciousness to increase productivity and provide India’s own consumers with a better-quality and safer product. Given the size and anticipated growth of the domestic market, there could well be far greater financial and social benefits from a program centered on improving the domestic supply chain rather than on prospective exports. Doing so may also serve as a means of deflecting import competition from exporters such as the Philippines, assuming that on-going trade reforms will lead to a similar degree of import liberalization as has occurred for other fruit.

The emerging dynamics in the domestic market, especially the modernization of retail, will likely have a far more significant impact on Indian farmers and traders than the export market. As the food retail sector modernizes, the focus will initially be on convenience and quality, but over time more emphasis will be given to food safety parameters in the modernized sector. The growth of the modern food retailing sector will likely induce extensive changes in the structure of production and product aggregation. Greater supply chain coordination will occur in parallel with more traditional supply chains involving multiple intermediaries and sales through wholesale markets. The more coordinated supply chains for the domestic market could also provide an improved platform for exports of certain fresh fruits and vegetables, although the value-addition that will occur in the domestic market will likely dwarf that which could be obtained through exports. Prospects for exports of fresh horticultural produce to developing countries and processed products to high-income markets are the strongest. India exports a diverse range of horticultural products. Among its various fresh horticultural exports, India has had the greatest success with supplying onions and mangoes to other developing countries. Exports of fresh produce to high-income countries are small and have not exhibited much dynamism. India has had considerably more success in exporting processed horticultural products—including mango pulp, processed gherkins, dehydrated onions, and various traditional foods—to high-income markets. Although greater public sector attention has been devoted to promoting fresh horticultural exports to high-income countries, India's competitive prospects are likely to remain better in (1) fresh produce sales to rapidly growing developing countries and (2) processed food sales to higher-income countries. Such export supply chains also involve comparatively larger numbers of farmers and firms, providing scope for the benefits from trade to spread more broadly.

Annex Tables

Annex table 2.1: State-level progress in adopting model APMC Act, as of June 2008

State	Status of APMC Act Amendment
Andaman and Nicobar (UT)	No APM Act
Andhra Pradesh	Model Act adopted
Arunachal Pradesh (UT)	Model Act adopted
Assam	Model Act adopted
Bihar	APM Act repealed
Chandigarh (UT)	CF, PM allowed.
Chhatisgarh	Model Act adopted
Daman and Diu (UT)	No APM Act
Dadra & Nagar Haveli	No APM Act
Delhi	DM allowed
Goa	Model Act adopted
Gujarat	Model Act adopted
Haryana	Draft Amendment Bill submitted to government; CF allowed.
Himachal Pradesh	Model Act adopted
Jammu & Kashmir	Amendments under consideration by state government
Karnataka	Model Act adopted
Kerala	No APMC Act
Jharkhand	Amendments under consideration by state government
Lakshadweep (UT)	No APM Act
Madhya Pradesh	Model Act adopted
Maharashtra	Model Act adopted
Manipur	No APM Act
Meghalaya	Amendments under consideration by state government
Mizoram	Amendments under consideration by state government
Nagaland	Model Act adopted
Orissa	Model Act adopted, only covers PM and CF
Punjab	CF, PM allowed.
Rajasthan	Model Act adopted
Sikkim	Model Act adopted
Tamil Nadu	DM, CF, PM allowed under existing Act
Tripura	Model Act adopted
Uttar Pradesh	DM, PM allowed selectively
Uttarakhand	Amendments under consideration by state government
West Bengal	Amendments under consideration by state government

Source: Ministry of Agriculture.

Note: DM = direct marketing; CF= contract farming; PM = private sector market development.

Annex table 2.2: Incidence of market cess and sales and other taxes levied in different states, 2002

State	Regulated market cess	Commission charges	Sales and other state taxes levied at regulated market	Sales tax: Intermediate products		
				Basic	Sur-charge	Total
Andhra Pradesh	All: 1%(except fish 0.5 %)	F&V: 4%; other: 1-2%	All commodities (except maize, jowar, ragi, bajra, coarse grains): 4%	12%		12%
Arunachal Pradesh	All: 2%	Nil	Nil	NA	NA	Na
Assam	All: 1%	Nil	All: 4-8% (except rice, maize, jowar, ragi, bajra, coarse grains)	12%	10%	13.2%
Delhi	F&V: 1%; foodgrains: 1%	F&V: 6%; foodgrains and pulses: 2%; chilies: 2.5%	F&V: nil; oilseeds: 3%; methi: 7%	8%		8%
Gujarat	All: 0.5%; entry fee for cattle, Rs 10/head; for vehicle, Rs 10/truck	F&V: 6%; foodgrains 2%	Spices: 3%; aniseed: 2%; cotton: 4%; isabgo: 2%; cumin: 2%; ajwain: 2%; others exempted; Octroi: 0.2-4%	12%		12%
Goa	All: 1%	Nil	Betelnut: 2%; cashew: 2%; coconut, F&V, cattle, and milk exempted from sales tax	8%	10%	8.8%
Haryana	All: 2%	F&V: 5%; other: 2.50%	F&V: nil; foodgrains: 4%; pulses: 4%; oilseeds: 4%	12%		12%
Karnataka ^a	Foodgrains: 1%; Cattle: Rs 5/head; Sheep/goats: Rs 1 /head; industrial and export sales exempted	F&V: 5%; foodgrains: 2%	Foodgrains: nil; pulses: 2%; oilseeds: 4%	16%	15%	18.4%
Kerala			4 to 8%	20%	15%	23%
Madhya Pradesh	All: 2%	Nil	NA, Development cess from traders only 1-5%	12%	15%	13.8%
Maharashtra	All: 0.75-1.0%; entry fee: Rs.10/truck	F&V: 7-8%; other: 2-4%; spices: 7%	All exempted	13%	10%	14.3%
Meghalaya	All: 1%	F&V: nil; other: nil	Nil	12%	0.1%	12.01%
Nagaland	All: 2%; live stock: Rs 5/head	F&V: 2 %; other: 2%	Nil	NA	NA	NA
Orissa	All: 1%	All: 2%	NA	13.12%		13.12%
Punjab	All: 2%	All: 2.5%	Purchase tax: 4%; rural development tax: 2 %; infrastructure tax: 1%	12%	10%	13.2%
Rajasthan	All: 1.60%	F&V: 6%; other: 2%	F&V: nil; foodgrains: 4%; pulses and oilseeds: 2%; coarse grains: nil; surcharge on sales tax: 15%	16%	15%	18.4%
Tripura	All: 2%; entry fee Rs 1/head	Nil	Nil (for all agricultural commodities)	12%		12%
Uttar Pradesh	All: 2%	F&V: 3%; other: 1.50%	Foodgrains: 4%; pulses: 2%; oilseeds and other: 4%; rural development tax: 0.5%	16%		16%
West Bengal	Cereals: 0.50 %; other: 1%	No fixed rates	Purchase tax on jute: 4%	10%	15%	11.5%

Source: Ministry of Agriculture 2002.

Note: NA = not available; F&V = fruits and vegetables.

^a Karnataka charges an additional 1% sales tax and charges a resale tax of 1.73% (1.5% basic and 15% surcharge).

Annex table 2.3: Agricultural marketing schemes for the private sector: Provisions for government support

Agency	Scheme	Marketing	Storage	Processing	Grades, standards, SPS	Agricultural exports
Ministry of Agriculture						
A. Directorate of Marketing and Inspection	1. Grameen Bhandran Yojana 2. AGMARK Grading and Standardization		25% investment grant, 33.3% for NE and SC/ST			
B. Small Farmers Agribusiness Consortium	1. Agri-Clinic, Agribusiness Center 2. Venture Capital Assistance	Startup capital Rs 100,000 per trained graduate Equity participation up to 10% of project costs or 26% of total equity, up to Rs 7.5 million			AGMARK Certification	
C. National Horticulture Board	1. Construction, expansion, modernization of cold storage 2. Commercial horticulture development	20% investment grant, up to Rs 250,000; NE/Tribal/Hilly Areas, up to Rs 300,000	25% investment grant, up to Rs 5 million; 33.3% for NE, up to Rs 6 million			
Ministry of Food Processing Industries	A. Infrastructure development			25% grant for project costs, 33.33% in difficult area, up to Rs 40 million		
	1. Food parks 2. Packaging center	25% grant for plant, machinery, technical civil works in general areas, 33.33% in difficult areas, up to Rs 20 million				
	3. Modernized abattoirs			25% of plant, machinery, technical civil works, 33.33% in difficult areas, up to Rs 40 million		
	4. Integrated cold chain facilities		25% grant for plant, machinery, technical civil works in general areas, 33.33% in difficult areas, up to Rs 750,000			
	5. Irradiation facilities			25% grant for plant, machinery, technical civil works in general areas, 33.33% in difficult areas, up to Rs 50 million		
	6. Value-added centers			25% grant for plant, machinery, technical civil works in general areas, up to Rs 500,000; 33.33% in difficult areas, up to Rs 750,000		

Annex Table 2.3: (cont'd.)

Agency	Scheme	Marketing	Storage	Processing	Grades, standards, SPS	Agricultural exports
Ministry of Food Processing Industries	B. Modernization of food processing industries (upgrading, establishment, modernization)			25% grant for plant, machinery, technical civil works, up to Rs 500,000; 33.33% up to Rs 750,000 in difficult areas		
	C. Backward and forward integration					
	1. Backward linkages (contract farming)	Grant 10% of total purchases up to Rs 100,000 per year for 3 years				
	2. Forward linkages (market surveys, test marketing, brand promotion, and the like)	50% grant, up to Rs 500,000		50% grant for equipment and installation, up to Rs 300,000		
	3. Food fortification					
	D. Quality assurance, Codex standards, research and development (R&D)					
	1. Total Quality Management (ISO 9000/ 14000, HACCP, and so forth)				33% grant, up to Rs 100,000; 50% up to Rs 150,000, in difficult area	
	2. Capacity building for quality assurance				33% grant in general areas, 50% in difficult areas, up to Rs 300,000	
	3. Bar coding	50% grant for registration fees, 33% grant for equipment in general areas, 50% in difficult areas, up to Rs 300,000				
	4. Food processing R&D			33% grant for capital cost, 50% for difficult areas		
	5. Quality control laboratory				33% grant for general areas, 50% for difficult areas for equipment and setting up	

Annex Table 2.3: (cont'd.)

Agency	Scheme	Marketing	Storage	Processing	Grades, standards, SPS	Agricultural exports
Ministry of Commerce	1. Special Economic Zones: Export Promotion Industrial Parks (incl. Agribusiness Zones), Export Promotion Zones, Critical Infrastructure Balancing Scheme					20% Ministry of Commerce, 80% state government
	2. Market Development Assistance: participation in trade fairs, exhibitions					60%, up to Rs 1 million per event
	3. Market Access Initiative: opening of showrooms, warehouses, publicity, export market surveys, participation in exhibitions					Market study: 75% grant, up to Rs 7.5 million; Showrooms: 75%, 50%, 25% for 1st, 2nd, 3rd year for leasing and rent, up to Rs 5 million; publicity: 50% for 2 years, up to Rs 5 million per product per market, trade fairs 2/3rd of expenditures, up to Rs 5 million per event
	4. Export Promotion of Horticulture Products from NE Region	Transport subsidy: Rs 1/kg by road transport from NE state to Guwahati, Rs 2/kg by air freight from NE states to Kolkata				
	5. Vishesh Krishi Upaj Yohana (fruits, vegetables, minor forest produce)					Duty credit of 5% of FOB value of exports for each licensing year for imported inputs or goods
APEDA	A. Agri-Export Zones					5% import duty on capital goods, sales and other taxes/duties exemption on all inputs, duty-free diesel for generators
	B. Market development					
	1. Packaging development/design	50% grant, up to Rs 500,000				50% grant, up to Rs 200,000
	2. Surveys and feasibility studies					40% grant, up to Rs 100,000
	3. Brand publicity					
	B. Infrastructure development					
	1. Specialized transport units	25% grant, up to Rs 2.5 million				
	2. Mechanization of harvests	25% grant, up to Rs 500,000				
	3. Sheds for intermediate storage, grading, cleaning		25% grant for equipment, up to Rs 500,000			
	4. Mechanized handling for grading, sorting, washing, waxing, ripening, packaging					25% grant for equipment, up to Rs 1 million
5. Precooling facilities		25% grant for equipment, up to Rs 1 million				

Annex Table 2.3: Agricultural Marketing Schemes for Private Sector: Provisions for Government Support, cont'd

Agency	Scheme	Marketing	Storage	Processing	Grades, Standards, SPS	Agricultural exports
APEDA	6. Pre-shipment treatment			25% grant for equipment, up to Rs 1 million		
	7. Integrated postharvest handling systems			25% grant, up to Rs 2.5 million		
	C. Quality development		25% grant, up to Rs 1 million			
	1. Cold storage facilities					
	2. Quality management (HACCP, ISO, Total Quality Management)				50% grant, up to Rs 200,000 per system	
	3. Quality assurance laboratories				50% grant, up to Rs 500,000	
	4. Quality management training				50% grant, up to Rs 50,000	
	5. Local and International study tours					
	D. R&D					
	R&D for export enhancement				50% grant, up to Rs 1 million	50% of cost of travel
E. Horticulture, Processed Food and Poultry Products Transport Assistance						Flowers by air: least of FOB, 25% of air freight, specific rate; flowers by sea: least of 10% of FOB, 25% freight, specific rate. Other by air: 10% of FOB, 25% freight, specific rate; other by sea: least of 10% of FOB, 33% of freight, 50% of ocean freight, specific rate

Source: Ministry of Food Processing Industries (2005a); Ministry of Commerce Annual Report 2004/05 [not in refs]; Patnaik 2005.
 Note: Difficult areas are J&K, HP, Uttaranchal, Sikkim, NE, A&N, and Lakshadweep.

Annex table 3.1: Selected characteristic of households growing high-value crops

Household characteristic	NSS 59th Agricultural households	Marketing survey					
		Total	Maize	Potatoes	Tomatoes	Mangoes	Turmeric
Land owned (ha)							
Tamil Nadu	0.8	1.7**	2.3**	0.8	1.4**	2.9***	4.1*
Maharashtra	1.8	3.7***	3.4*	2.2	3.7***	3.0**	6.0**
Uttar Pradesh	0.8	1.0	1.2	1.4***	1.4	0.8	1.5
Orissa	0.8	1.4***	1.5***	1.6***	1.4***	2.5***	1.1
Literate household heads (%)^a							
Tamil Nadu	71	84**	88	94*	65	78	94
Maharashtra	74	94***	78	97***	87*	97***	99***
Uttar Pradesh	60	60	76**	70	49	50*	63
Orissa	64	79***	71	87***	84***	87***	79**
SC/ST household head (%)							
Tamil Nadu	27	10***	5***	14	13***	5***	0***
Maharashtra	31	5***	18	0	9***	0***	1***
Uttar Pradesh	28	31	13**	10***	37	47**	4**
Orissa	44	55	73**	36	43	35	86***
Female household head (%)							
Tamil Nadu	15	4***	4***	1***	6***	2***	6***
Maharashtra	9	1**	2***	0	1***	0	0
Uttar Pradesh	7	4***	5***	3***	1***	3***	2***
Orissa	10	1***	2***	0***	1***	1***	0
Katcha house ownership (%)^b							
Tamil Nadu	24	3***	0***	0	10	3***	0***
Maharashtra	4	0***	1***	0	0	0	0
Uttar Pradesh	19	38**	26	17	23	58***	17
Orissa	47	36**	41	32***	32***	45	39
Value of livestock/poultry (Rs 000s)							
Tamil Nadu	6	16**	13**	7	17**	7	43**
Maharashtra	9	36*	18*	29**	22***	21**	75*
Uttar Pradesh	7	12**	12*	18***	21**	9	13
Orissa	4	10***	11***	13***	10***	13***	11***

Source: Fafchamps et al. 2006.

Note: * denotes significantly different from the NSS state average at 10%, ** at 5%, *** at 1%. Some entries could not be tested due to zero variation in observations in data. [what is SC/ST?]

a A person who can both read and write a simple message with understanding in at least one language.

b A "katcha" house has neither brick or cement walls or metal roof.

Annex table 3.2: Farmers' sources of credit

Credit source	Percentage of farmers accessing credit				
	TN	OR	MH	UP	All
Bank	9	17	24	4	11
Credit institution	0	1	0	0	1
Moneylender	39	9	1	37	23
Friend or relative	14	8	4	4	6
Other source	0	3	0	8	5

Source: Fafchamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; UP = Uttar Pradesh.

Annex table 3.3: Constraints to increased high-value crop production

Constraint	Proportion of villages facing constraints by state (%)				
	TN	OR	MH	UP	All
Irrigation shortage	86	85	98	79	87
Lack of credit	69	60	10	49	46
Lack of inputs	14	50	2	41	27
Bad roads	20	25	12	13	17
Lack of knowledge	11	38	7	31	22
Labor shortages	14	18	37	13	23
Insecurity	3	10	10	3	6

Source: Fafchamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; UP = Uttar Pradesh.

Annex table 3.4: Postharvest operations performed by farmers

Crop/state	Percentage of farmers performing postharvest activity				
	Drying	Cleaning	Grading	Packaging/ crating	Milling/ grinding
Maize					
TN	94%	65%	36%	48%	51%
OR	34%	38%	20%	35%	21%
MH	58%	61%	26%	6%	55%
UP	99%	96%	37%	26%	32%
Total	71%	70%	29%	17%	45%
Potatoes					
TN		65%	96%	98%	
OR		26%	50%	17%	
MH		52%	65%	8%	
UP		73%	69%	57%	
Total		63%	72%	54%	
Tomatoes					
TN		20%	89%	69%	
OR		13%	37%	12%	
MH		71%	88%	66%	
UP		98%	99%	89%	
Total		44%	74%	55%	
Mangoes					
TN		3%	30%	4%	
OR		25%	19%	20%	
MH		19%	94%	55%	
UP		80%	99%	88%	
Total		47%	90%	67%	
Turmeric					
TN	3%	3%	30%	4%	1%
OR	5%	25%	19%	20%	3%
MH	3%	19%	94%	55%	0%
UP	19%	80%	99%	88%	38%
Total	88%	74%	67%	34%	5%
All farmers					
TN		47%	73%	68%	
OR		25%	25%	22%	
MH		51%	72%	34%	
UP		82%	78%	68%	
Total		58%	70%	49%	

Source: India Agricultural Marketing Survey 2005, authors' calculation

Note: TN = Tamil Nadu; OR = Orissa; MH = Maharashtra; UP = Uttar Pradesh.

Annex table 3.5: Determinants of postharvest practices to improve quality

Variable	Dependent variable: Farmer performs postharvest activity
Main crop (reference: turmeric)	
Maize	-0.249**
Potatoes	-0.264**
Tomatoes	-0.173**
Mangoes	-0.184**
State (reference: Orissa)	
Tamil Nadu	0.091**
Maharashtra	0.165**
Uttar Pradesh	0.216**
Age of household head	0.001
Females as share of adults in household	0.058
Member of SC/ST	0.008
Land owned (ha)	0.00
Education of household head	
At least primary education	-0.024
At least secondary education	0.032*
Education beyond secondary	0.019
Source of postharvest information (reference: traders/buyers)	
Other farmers	0.147**
Agricultural Officers	0.092*
Others	0.042
Agricultural extension agent visits village	-0.039
Price difference for high quality (Rs/kg)	0.128***
Place of sale (reference: farmgate)	
Regulated market	0.073*
Unregulated market	0.076**
Village retail market	0.067**
Elsewhere	0.055*
Observations	1541

Source: India Agricultural Marketing Survey 2005, authors' calculations.

Note: Probit analysis. Significant at the 1% level (***), 5% level (**), 10% level (*).

Annex table 4.1: Wholesale market revenues in Tamil Nadu, Orissa, Maharashtra, and Uttar Pradesh, 2005

Market revenues 2004	State				
	TN	OR	MH	UP	All
% of markets able/willing to give account	35	100	53	94	70
Revenues (Rs millions):					
Mean	1.62	2.88	6.56	21.85	9.13
Median	1.2	1.59	4.11	18.68	3.6
Minimum	0.05	0.02	0.59	3.34	0.01
Maximum	5	20.4	27.51	68.49	68.48
No. observations	7	20	10	16	53
Distribution of revenues					
Percentage kept by Market Committee/authority:					
Mean	50	77	71	30	58
Median	50	90	95	29	58
Percentage transferred to government:					
Mean	..	13	3	61	36
Median	..	8	1	65	20
Total expenditures by Market Committee (Rs millions):					
Mean	..	1.77	5.68	4.64	3.57
Median	..	0.54	2	3.16	1.16
Distribution of expenditures					
Maintenance, security, and management (%):					
Mean	..	19	44	19	26
Median	..	15	42	10	20
Improvement/acquiring (%):					
a. Equipment:					
Mean	..	8	5	1	5
Median	..	5	0	1	1
b. Facilities:					
Mean	..	9	19	6	10
Median	..	5	17	2	3
c. Infrastructure:					
Mean	..	22	14	1	14
Median	..	0	9	0	1

Source: India Agricultural Marketing Survey 2005; authors' calculation.

Note: TN = Tamil Nadu; OR = Orissa; MH + Maharashtra; UP = Uttar Pradesh.

Annex table 4.2: Use of auctions in wholesale markets

	TN	OR	MH	UP	All
Proportion of markets with auctions (%)	45	5	90	83	55
If auction, who is auctioneer (%):					
Commission agent	78	0	56	53	58
Wholesaler	0	100	22	7	14
Employee of market authority	56	0	56	53	56
If auction, auction system used (%):					
Open outcry	77	100	100	100	95
Bids written on chit/paper	11	100	0	0	2
Electronic bidding	0	0	0	0	0

Source: Fafchamps et al. 2006

Note: TN = Tamil Nadu; OR = Orissa; MH + Maharashtra; UP = Uttar Pradesh.

Annex table 4.3: Information provided before the auction

Information provided before auction begins (%)	TN	OR	MH	UP	All
Quantity offered for sale	78	100	67	87	77
Package/bag size	78	0	61	80	70
Reservation price	67	0	50	87	65
Place of origin	89	100	22	67	53
Name of farmer/seller	78	100	28	80	58
Name of broker/commission agent	67	0	28	73	51
Type of seed/variety	56	0	41	53	48
Grade/size	89	100	33	80	63
Percentage broken	78	0	28	60	49
Moisture content	22	0	28	33	30
Application of pesticide	11	0	6	20	12
Organic/nonorganic farming	22	0	6	13	12
Other quality information	33	0	11	47	28

Source: Fafachamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH + Maharashtra; UP = Uttar Pradesh.

Annex table 4.4: Market associations and dispute resolution

	TN	OR	MH	UP	All
Markets where association exists (%):					
Trade association	55	50	80	89	70
Farmer association	0	0	35	11	12
Worker association	15	5	35	56	27
Porter association	30	0	65	6	26
Proportion of disputes resolved by (mean, %):					
Buyers-sellers themselves	70	71	45	72	64
Market Committee	0	21	44	6	18
Trader association	10	3	6	4	6
Courts	0	0	0	1	0.4

Source: Fafachamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH + Maharashtra; UP = Uttar Pradesh.

Annex table 4.5: Determinants of crop losses in wholesale markets

Explanatory variable	Dependent variable: % of crop spoilage losses
Crop (reference: maize)	
Potatoes	5.022
Tomatoes	15.510**
Mangoes	7.511*
Turmeric	-5.478
State (reference: Tamil Nadu)	
Orissa	8.943*
Maharashtra	10.760*
Uttar Pradesh	7.143
Distance between buying and selling location	0.005
Days between receiving product from seller and delivering to buyer	0.147**
Market infrastructure/facilities:	
Paved road	-1.172
Parking facility for all vehicles	-9.295**
Availability of warehouse	-5.584*
Availability of cold storage	-0.386
Availability of grading machine	-2.109
Availability of fumigation equipment (yes=1)	-13.516*
Availability of drying machine	-7.773
Market location (urban=1)	6.655**
Constant	-29.306**
Observations	1222

Source: India Agricultural Marketing Survey 2005; authors' calculations.

Annex table 4.6: Socioeconomic characteristics of traders

Characteristic	TN	OR	MH	UP	Total
Type of trading activity (%):					
Wholesaler only	25	9	10	43	25
Commission agent only	14	0	6	20	10
Wholesaler and retailer	39	91	20	6	44
Wholesaler and commission agent	13	0	22	29	15
Wholesaler, retailer, and commission agent	7	0	43	1	5
Traders with commission agent or wholesaler among close relatives (%)	26	11	41	21	20
Median no. commission agents or wholesalers known personally (but not a relative) by trader	10	0	8	9	5
Age (yr)	43	42	41	36	39
Proportion that are male (%)	98	97	100	100	99
Education, percentage of traders who have:					
No formal education	20	21	2	32	24
Primary	11	29	2	3	13
Middle	18	19	21	15	17
Secondary	34	30	53	40	37
Undergraduate or more	16	1	22	9	8
No. observations	386	400	411	400	1,597

Source: Fafchamps et al. 2006.

Note: TN = Tamil Nadu; OR = Orissa; MH + Maharashtra; UP = Uttar Pradesh.

Annex table 4.7: Determinants of marketing margins

Explanatory variable	Gross marketing margin (log)
Crop (reference: maize)	
Potatoes	0.063**
Tomatoes	0.062**
Mangoes	0.113**
Turmeric	-0.035**
State (reference: Tamil Nadu)	
Orissa	-0.017
Maharashtra	0.014
Uttar Pradesh	-0.078**
Distance between buying and selling location	0.0001**
Days between receiving product from seller and delivering to buyer	0.00002
Paved road (yes=1)	-0.014
Parking facility for all vehicles (yes=1)	-0.017
Availability of warehouse (yes=1)	-0.002
Availability of cold storage (yes=1)	0.007
Availability of grading machine (yes=1)	0.009
Availability of fumigation equipment (yes=1)	0.002
Availability of drying machine (yes=1)	-0.036
Market location (urban=1)	-0.027**
No. traders/market area (ln)	-0.006*
Dummy for periodic markets	-0.043**
Constant	0.179**
Observations	967
Pseudo R squared	.02

Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: Median regression is used in the analysis; * denotes significant at 5%; ** significant at 1%.

Annex table 5.1: Distribution of processors and exporters surveyed

Crop	Number of firms				Total	Processed products/exports
	Domestic	Export		Total		
	Processed	Unprocessed	Both			
Mangoes	120	3	17		140	Fresh, pickled, sauce, juice, pulp
Turmeric	91	21	5	4	121	Dried, powder
Maize	33	6			39	Feed, popcorn, maize powder, starch
Potatoes	28	3			31	Fresh, chips, papad
Tomatoes	29	1			30	Fresh, sauce pickles

Source: India Agricultural Marketing Survey 2005.

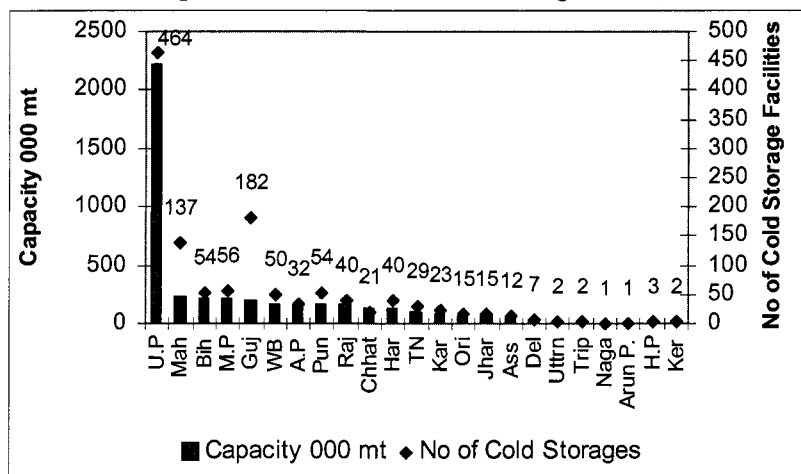
Annex table 5.2: Role of quality in processors' and exporters' transactions

	Sample size	Firms that purchase raw materials directly from farmers (%)	Firms buying from regular suppliers (%)	Firms reporting that buyers purchase based on quality (%)	Firms reporting that they buy from suppliers based on sanitary conditions (%)	Firms reporting that buyers purchase based on sanitary conditions (%)
Mango processor	120	51	65	88	44	58
Mango exporter	20	90	75	100	60	90
Turmeric processor	91	34	69	89	63	73
Turmeric exporter	30	10	77	93	83	90
Maize processor	33	33	79	89	63	70
Maize exporter	6	33	83	100	67	83
Potato processor	28	0	75	89	86	86
Potato exporter	3	0	100	100	100	100
Tomato processor	29	41	90	93	76	76
Tomato exporter	1	100	100	100	0	1

Source: Authors' calculations.

Annex Figures

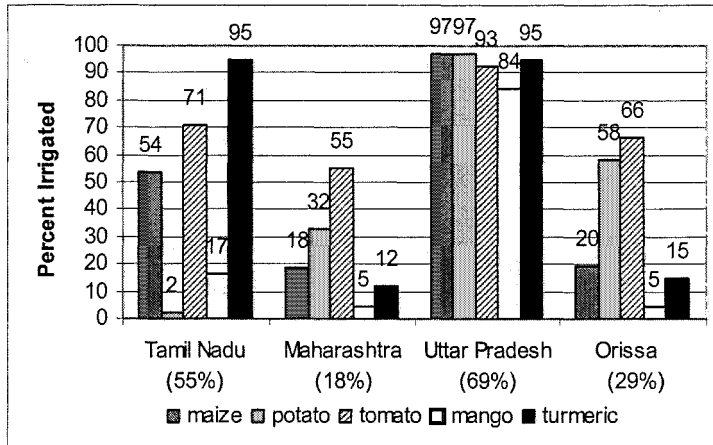
Annex figure 2.1: Cold storages established under NHB Cold Storage Scheme, 1999/2000 to January 2005



Source: National Horticulture Board. [need to add to refs?]

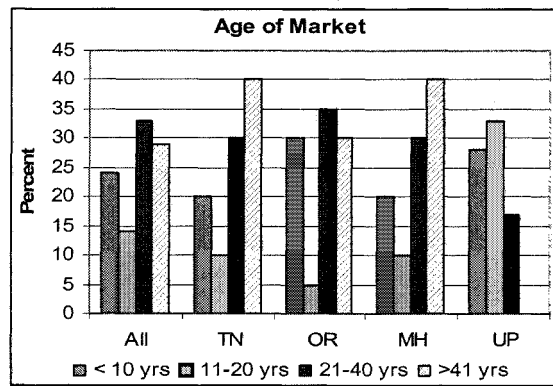
Note: Values in figure denote number of cold storage facilities established.

Annex figure 3.1: Irrigation use for tomatoes, potatoes, mangoes, maize, and turmeric in Tamil Nadu, Maharashtra, Uttar Pradesh, and Orissa



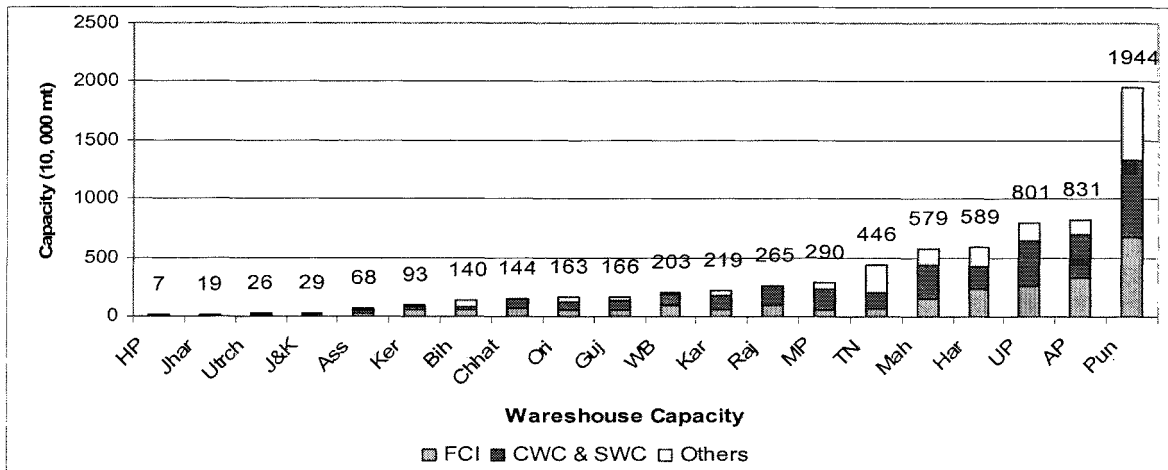
Source: India Agricultural Marketing Survey 2005; authors' calculations.

Annex figure 4.1: Distribution of wholesale markets by age in Tamil Nadu, Orissa, Maharashtra, and Uttar Pradesh.



Source: India Agricultural Marketing Survey 2005; IMRB 2006.

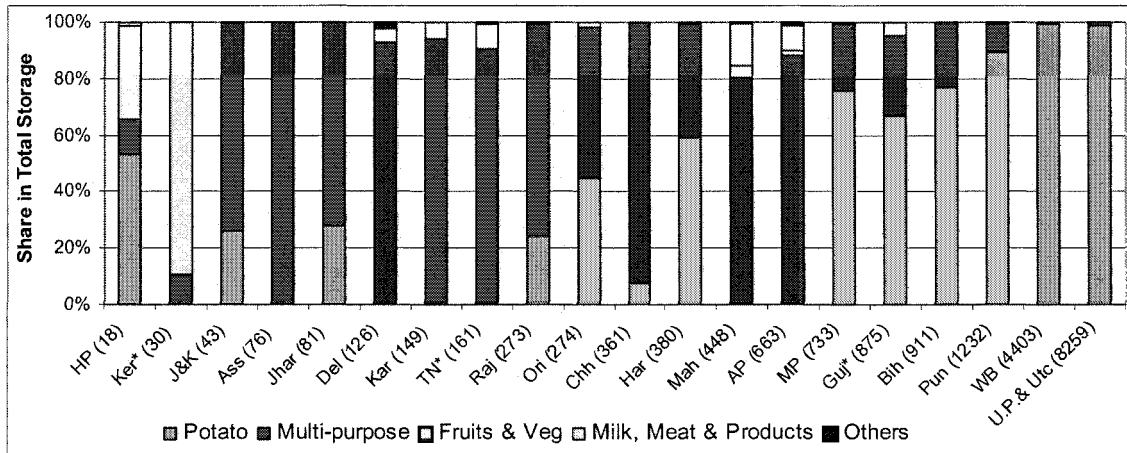
Annex figure 4.2: Warehouse capacity in India, 2004



Source: Department of Food and Public Distribution [2005?].

Note: FCI, CWC, and CWC statistics are only up to 2003.

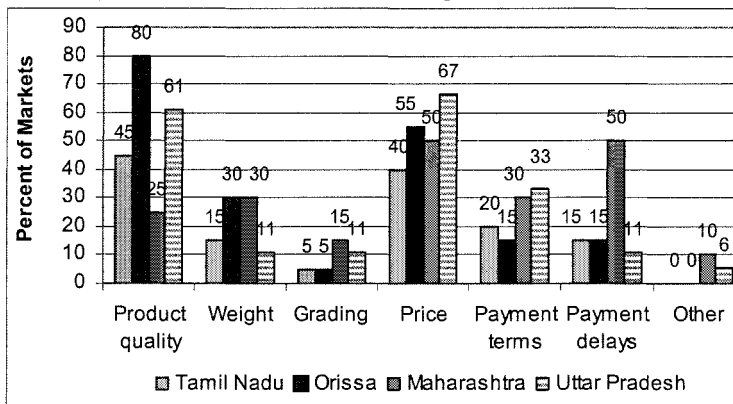
Annex figure 4.3: Cold storage capacity in India, 2004



Source: Directorate of Marketing and Inspection, MoA. [missing reference]

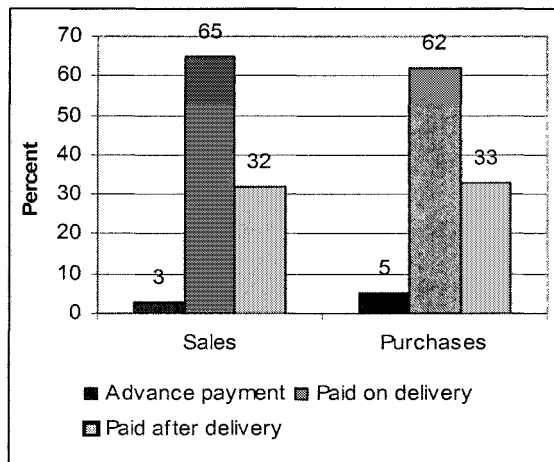
Note: * denotes statistics up to 2003. Numbers in parenthesis refer to cold storage capacity in tons in the state.

Annex figure 4.4: Main causes of market disputes



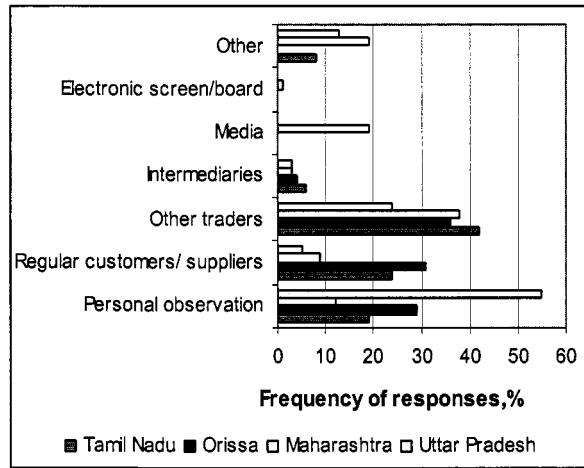
Source: India Agricultural Marketing Survey; authors' calculations.

Annex figure 4.5: Trade credit for traders



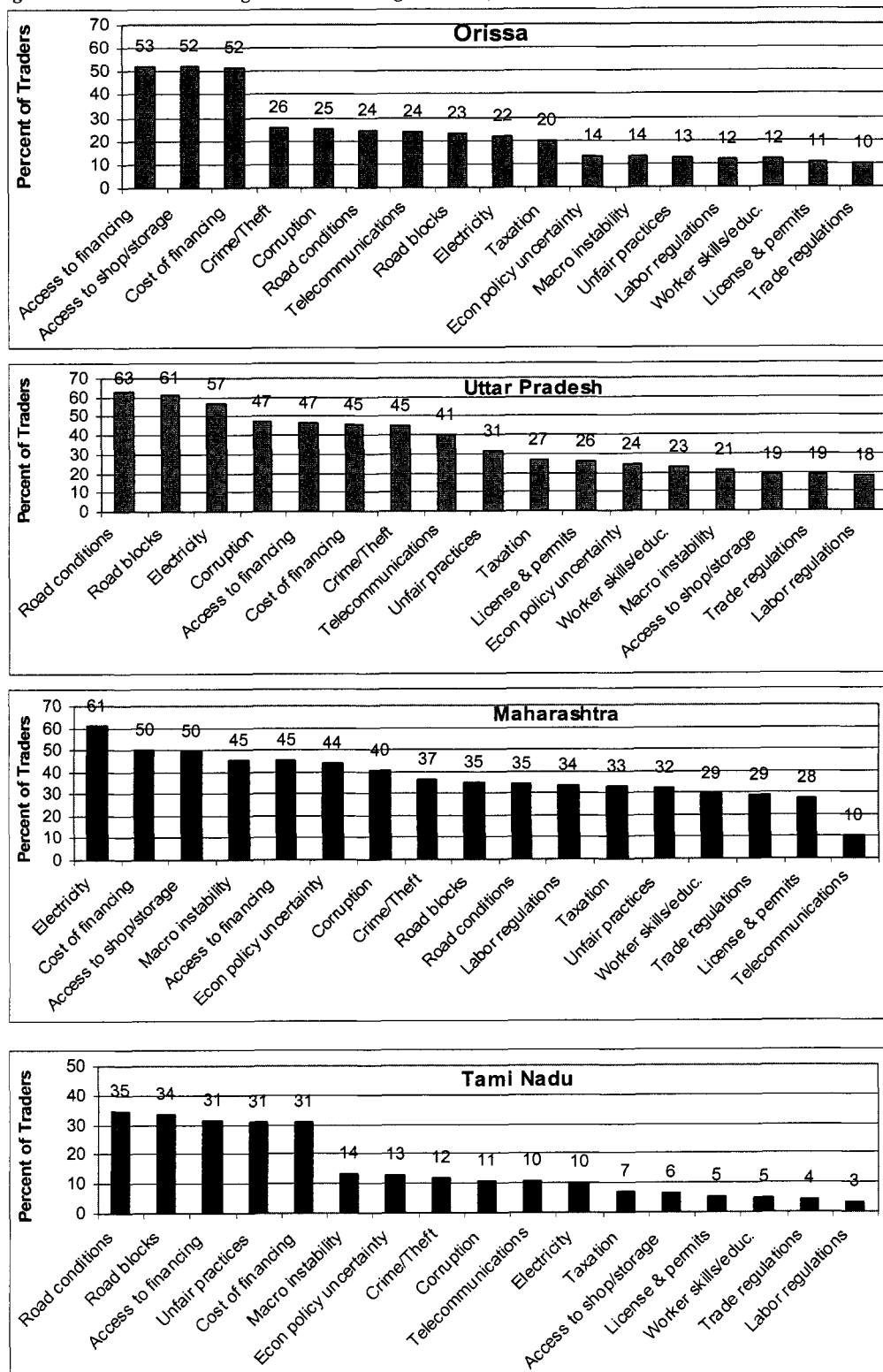
Source: Fachamps et al. 2006.

Annex figure 4.6: Sources of price and market information by traders



Source: Fafchamps et al. 2006.

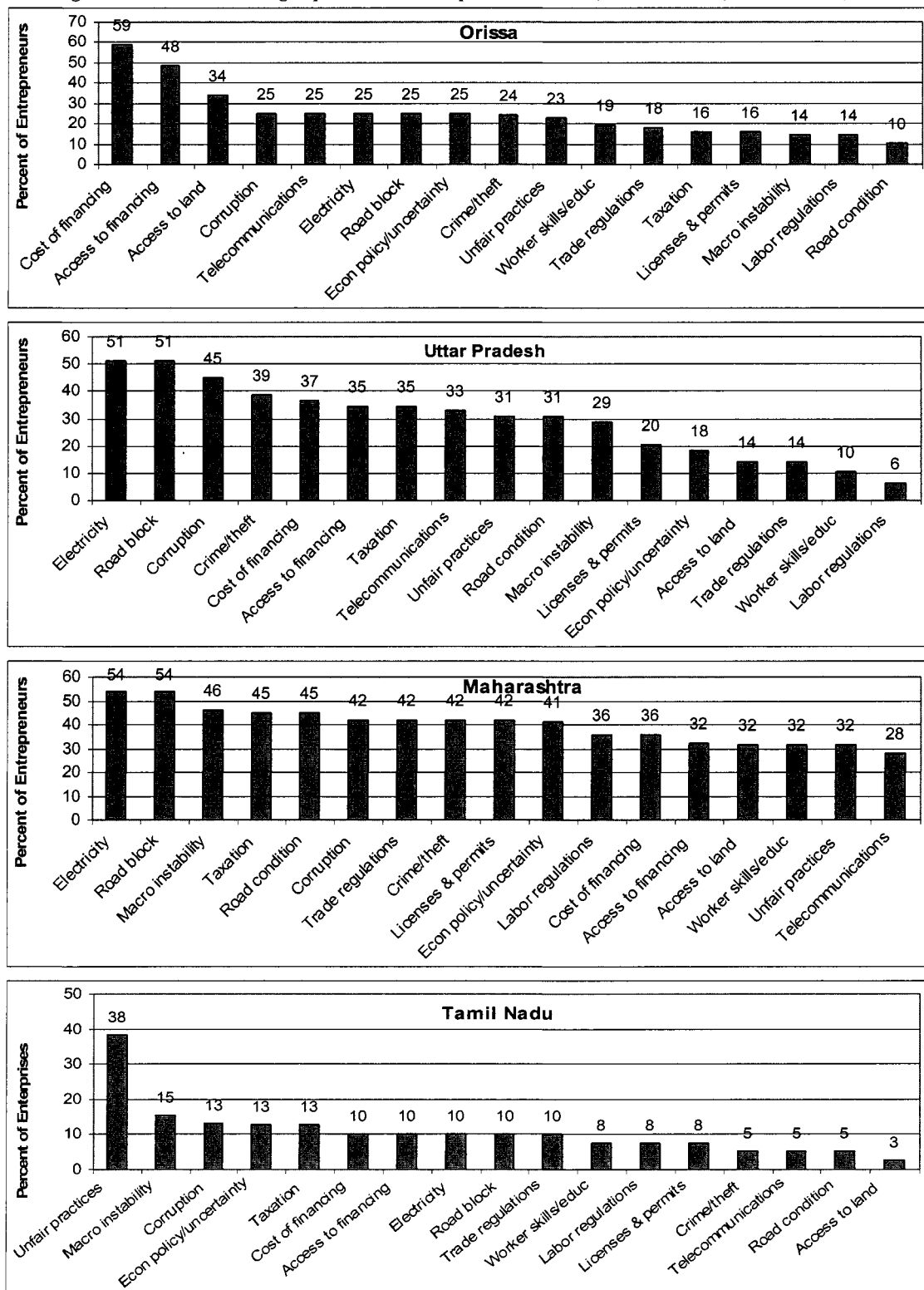
Annex figure: 4.7: Constraints to agricultural trading in Orissa, Uttar Pradesh, Maharashtra, and Tamil Nadu



Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: Figures represent constraints rated by trader as moderate, major, and very severe.

Annex figure 5.1: Constraints to agro-processors and exporters in Orissa, Uttar Pradesh, Maharashtra, and Tamil Nadu



Source: India Agricultural Marketing Survey 2005; authors' calculations.

Note: Figures represent constraints rated by processors and exporters as moderate, major, and very severe.

dumali-deininger

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