ISSN 1020-6221

POLICY ASSISTANCE SERIES 6

FAO Regional Office for Asia and the Pacific

RAP
PUBLICATION
2009/15

Agricultural reforms and trade liberalization in China and selected Asian countries: lessons of three decades

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Regional Office for Asia and the Pacific
Food and Agriculture Organization of the United Nations
Bangkok, 2009

ISBN 978-92-5-106367-5

Contents

Foreword

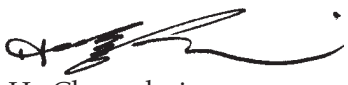
Examining Asia's agricultural reform and trade liberalization experiences and lessons learned, in the context of the current global food and financial crises, presents an occasion to reflect on past achievements and consider future opportunities. Between 1980 and 2005, more than 700 million people in the Asia-Pacific region were rescued from extreme poverty. This was due to the implementation of policy reforms – primarily by China and to a lesser extent by India and other countries – that led to strong economic and agricultural growth.

Despite these successes, over 900 million people in the region continue to live in extreme poverty. Lifting them out of poverty requires learning important lessons from the diverse experiences of different countries of the region in order to strengthen and adopt policies and strategies with proven records of success, and modify or discard those policies that have failed.

The success of future reforms in Asia will indeed depend on grounding such reforms in a sound understanding of relevant policy instruments to use in particular country contexts. Success will also depend on each country's ability to adapt to new challenges emerging from the recent food and financial crises. Pressure on land and water resources, shocks from more frequent natural disasters, and social and political tensions due to rural-urban and agricultural-industrial transformations remain formidable hurdles for agriculture. As a whole, the Asia-Pacific region is also expected to face reduced demand for exports, declining foreign direct investment, dwindling remittances from workers abroad and lower tourism earnings due to the current financial crisis. Yet, if the 1997 Asian financial crisis is any indication, the agriculture sector has a crucial role to play in preventing more people from falling into poverty, by absorbing the unemployed who return to their homes and farms.

Given their keen interest in learning from Asia's recent agricultural policy experiences and in facilitating discussions on how to further strengthen reforms, the Food and Agriculture Organization of the United Nations (FAO) and China's Ministry of Agriculture convened a Policy Forum on *Agricultural Reforms and Trade Liberalization in China and Selected Asian Countries: Lessons of Three Decades* in Beijing from 19 to 20 February 2009. This volume synthesizes the salient points that emerged in the presentations, panel discussions and session deliberations. The publication also incorporates eight technical papers which address the four key Forum themes: Chinese agricultural policy reforms and performance over the past 30 years; Asia's changing agricultural policy landscape; agricultural trade liberalization; and the implications of the global food and financial crises for food and agriculture.

We are encouraged by the results of this important effort to engage in continued policy dialogue as a means to harmonize agriculture and rural development policies that lead to sustainable economic growth. We hope that readers, especially those concerned with agricultural reform and trade liberalization as drivers of economic growth and poverty alleviation, will find this report interesting and useful to their work. As FAO continues to encourage such dialogue, we call on other national and regional institutions that are active in analytical and policy fields to join forces for future endeavours.



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Acknowledgements

The FAO Regional Office for Asia and the Pacific and the Policy Assistance and Resources Mobilization Division are pleased to express on behalf of FAO profound gratitude to the senior government officials of China who collaborated with us in this work. In particular, we express our gratitude to Ni Hongxing, Director-General of the Agricultural Trade Promotion Centre of the Government of China's Ministry of Agriculture, our partner in convening the February 2009 Policy Forum in Beijing.

The technical papers in this volume are principally the work of distinguished national experts and their collaborators, namely: Jikun Huang, Director and Professor, Centre for Chinese Agricultural Policy, Chinese Academy of Sciences; Scott Rozelle, Professor, Department of Agricultural and Resource Economics, University of California at Davis; Zhang Hongyu, Director-General, Department of Sectoral Policy and Law, Ministry of Agriculture, China; Sumiter Singh Broca, Policy Officer, FAO's Policy Assistance Branch for Asia and the Pacific; Sisira Jayasuriya, Professor, Department of Economics and Finance, La Trobe University, Australia; Ni Hongxing, China; Yong-Kyu Choi, President of the Global Agricultural Policy Institute, Republic of Korea; Larry Chee-Yoong Wong, Senior Fellow, Institute of Strategic and International Studies, Malaysia; and Ramesh Chand, Indian Council of Agricultural Research National Professor, National Centre for Agricultural Economics and Policy Research, India. We are grateful to all of them for their willingness to collaborate with FAO in this undertaking. The studies reflect their technical expertise, experience and insight on the issues covered.

We express our high appreciation of the resource persons from different parts of Asia and the Pacific region who contributed insightful comments and suggestions on the technical studies and shared their perspectives during the deliberations at the Beijing Policy Forum.

Among its own staff, FAO acknowledges the leading role played by the Policy Assistance Branch for Asia and the Pacific in Bangkok, particularly Purushottam K. Mudbhary, Chief of the Branch, who conceptualized this work and organized and coordinated the technical studies and inputs of resource persons and the collaboration of the Agricultural Trade Promotion Centre. Sumiter Singh Broca, and Upali Wickramasinghe, Policy and Programme Development Consultant, also played a vital role in the development, review and publication of the technical papers. Teow Choo Ti, former FAO Senior Economist, provided valuable assistance in synthesizing the Forum proceedings. Brett Shapiro, Tarina Ayazi and Kate Braband provided editorial assistance in the preparation of this publication.

Acronyms

AGDP	Agricultural Gross Domestic Product
APMRA	Agricultural Produce Market Regulation Act
ASEAN	Association of Southeast Asian Nations
CGIAR	Consultative Group on International Agricultural Research
CWE	Cooperative Wholesale Establishment
DDA	Doha Development Agenda
DS	Domestic support
ES	Export subsidy
FAO	Food and Agriculture Organization of the United Nations
FCI	Food Corporation of India
FDI	Foreign direct investment
GDP	Gross Domestic Product
HRS	Household Responsibility System
ICT	Information and communications technology
IMF	International Monetary Fund
ISI	Import substitution industrialization
LAC	Latin America and Caribbean
MDG	Millennium Development Goal
MENA	Middle East and North Africa
MOAAI	Ministry of Agriculture and Agro-based Industry
MSP	Minimum support prices
MV	Modern seed varieties
NAMA	Non-agricultural market access
NRA	Nominal rate of assistance
OECD	Organisation for Economic Co-operation and Development
OTDS	Overall trade-distorting support
NSDP	Net State Domestic Product
PDS	Public distribution system
PIN	Production index number
PPP	Purchasing power parity
R&D	Research and development
RAP	FAO Regional Office for Asia and the Pacific
RLCL	Rural Land Contract Law
RMB	Renminbi or Chinese Yuan
RRA	Relative rate of assistance
Rs	Rupees
SCM	Supply chain management
SOE	State-owned enterprise
SPS	Sanitary and phytosanitary
SSM	Special safeguard mechanism
STC	State Trading Corporation
TFP	Total factor productivity
TRQ	Tariff rate quota
UNDP	United Nations Development Programme
UR	Uruguay Round
WTO	World Trade Organization

PART ONE

Synthesis of the policy forum proceedings

Synthesis of the proceedings of the forum on agricultural reforms and trade liberalization in China and selected Asian countries: lessons of three decades

I. Introduction

China has experienced a remarkable transformation of its economy since the introduction of economic reforms three decades ago. The economy grew at an average rate of over 9 percent during the entire period. The incidence of poverty fell drastically; over 200 million people were lifted out of poverty. Farmers also were able to diversify their sources of income, reducing their vulnerability to shocks in agriculture. It is estimated that farmers now derive more than half of their income from off-farm wages. Agricultural production also experienced rapid growth. China's cereal production rose 80 percent in three decades to reach 429 million tonnes in 2006. Significantly, per capita grain production increased by one-fifth in the same period.

Reforms in agriculture have made a substantial contribution to China's miraculous economic growth and poverty reduction. The reforms began with the introduction of long-term land use rights for farmers. This was followed by investment in rural infrastructure and relaxation of marketing and pricing restrictions. China gradually dismantled its state-dominated procurement and distribution system and fostered a free market system which increasingly became competitive, integrated and efficient. While policy reforms in land rights, marketing and pricing provided strong incentives for farmers to raise productivity, the investment in rural road networks and other infrastructure reduced transaction costs and enabled linkages with urban markets. The initial reforms created the much needed incentive structure for farmers to work harder and raise productivity. While that process was ongoing, China also invested in agricultural technology and extension services, which further enhanced farmers' capacity to raise productivity. This was followed by comprehensive and substantial trade liberalization as part of the process of accession to the World Trade Organization (WTO). Trade liberalization opened Chinese agricultural markets to competition, resulting in higher structural and functional efficiency. China's willingness to reduce agricultural trade protection is unprecedented among developing countries.

However, China faces many challenges. The rapid economic growth has greatly benefited the coastal belt, leading to a widening gap between the eastern and western parts of the country. Rural farms, many of which are run by women and the aging populace, are facing China's fierce market competition on their own. Opening the agricultural sector to global competition has generated new trials for farmers. They now need to improve product quality to satisfy the ever increasing demand for quality products, traceability and standardization. The natural resource base is also under severe stress because of intensified agricultural and industrial production. Furthermore, China has to deal with social stability issues associated with rural-urban and regional income inequities. The rapid socio-economic and environmental transformations will make it imperative to develop appropriate safety nets to tackle emerging risks and uncertainties.

The success of future policy reforms in China and other Asian countries will depend on their ability to adapt to new challenges; the more daunting of these challenges include the stalemate in the Doha Round of trade negotiations, the ever-worsening environmental degradation and the current food and financial crises. Success will also depend on the extent to which reforms are grounded in a sound understanding of a country's context and goals.

China's remarkable economic growth and the role of agriculture in its economic revival have generated consuming interest among policy-makers. The consensus is that there is much to be learned from

the Chinese experience. The 30th anniversary of Chinese reforms in 2008 is opportune. For this reason, the Food and Agriculture Organization of the United Nations (FAO) and China's Ministry of Agriculture convened the "Policy Forum on Agricultural Reforms in China and Selected Asian Countries: Lessons of Three Decades" on 19-20 February 2009 in Beijing.

The Forum had two objectives: to learn from three decades of the region's agricultural policy experiences and to forge ways to strengthen reform. It deliberated on agriculture policy performance, process and prospects and, in this context, discussed the deadlocked Doha Round of trade negotiations, recent soaring food prices and the current financial crisis.

The agenda covered eight presentations and four panel discussions (see Annex 1). The Forum carried out its deliberations in four themes:

- Three decades of Chinese agricultural policy reforms and performance;
- The changing agricultural policy landscape in Asia;
- Agricultural trade liberalization;
- Global food and financial crises.

Eight technical papers were presented and are included in Part Two of this report:

- Agricultural development, nutrition and the policies behind China's success;
- China's rural reform: review and outlook;
- Food and agriculture in the Asia and Pacific region: past performance and future prospects;
- Agricultural policy reforms in Asia: an overview of trends, issues and challenges;
- Implications of trade liberalization for agriculture and farmers in China;
- Trade negotiations under the Doha Development Agenda: state of play;
- Global food and financial crisis: a Malaysian's perspective;
- Global food and financial crisis: experiences and perspectives from India.

FAOATPC (Agricultural Trade Promotion Centre) brought together 64 government policy-makers, development agency officials, academics and private sector players from eight countries and resource persons from the Asian Development Bank, FAO and the United Nations Development Programme (UNDP) to share experiences and insights (see Annex 2). The participants were from Australia, Bangladesh, China, India, Republic of Korea, Malaysia, Philippines and Thailand. After intensive deliberations over two days, the Forum adopted a summary statement of proceedings at its close (see Annex 3).

This report of proceedings is in two parts. Part One is a synthesis of the analyses, observations and conclusions that emerged from the presentations and panel discussions. Part Two consists of the eight technical papers (Chapters 1–8).

II. Three decades of Chinese agricultural policy reforms and performance

2.1 Achievements

China has experienced spectacular economic growth in the past three decades. Gross domestic product (GDP) increased more than 9 percent per year, poverty fell significantly from an absolute level of 260 million to 15 million and nutritional status improved markedly with the number of low body-weight children declining by half. By the end of 2007, China had achieved many of its Millennium Development Goals (MDGs).

Agriculture contributed noticeably to this outstanding economic performance. Agricultural GDP grew at an average of 4.5 percent per year in the 30 years ending 2007. Rural household incomes improved rapidly at nearly 6 percent per year since 2000. In fact, the agriculture sector has been considered to be the foundation for the rise of the industrial and service sectors.

In the development process, significant structural changes occurred in the Chinese economy. Agriculture's contribution to GDP declined from 40 percent in 1970 to only 11 percent in 2007. Its share of the total labour force fell from 80 percent to 40 percent while non-farm employment accelerated. By 2000, non-farm income exceeded farm income in the household and by 2007 it represented nearly 60 percent of household income.

Within the agricultural sector, major structural shifts occurred in response to significant changes in employment, income and consumption patterns accentuated by urbanization and market liberalization. Output of livestock and aquatic products, fruits and vegetables, edible oil crops, sugar crops and tobacco grew at the expense of cereals. In the cereals subsector, the area under maize cultivation expanded, replacing rice and wheat. There was also marked diversification in agricultural production by area and household with a shift towards higher total value product.

2.2 Approach and blueprint

Two decisions stand out in understanding China's winning formula. One was the decision to undertake reform gradually in stages (i.e. to de-collectivize and privatize to establish the socialist market economy in a sequence of steps). In agriculture, the government started with the collective farming system and state monopolies in procurement and distribution; it first adopted the household system of production in 1978. This revolutionary decision transferred land use and income rights to individual households, providing incentives for farmers to work harder. At the same time, the government invested heavily in technology which allowed farmers to maximize returns from their increased labour and managerial inputs. From 1985, the government progressively:

- liberalized domestic marketing with producer price incentives via the "quota" and "off-quota" state procurement system and permitted farmers to sell part of their marketable surpluses on the free market;
- set up a competitive and integrated free market with supportive price policies and the necessary physical and institutional market infrastructure;
- expanded off-farm employment through township and village enterprises (TVEs);
- provided production subsidies and support services and facilities to further raise productivity; and
- minimized taxes and fees to support incomes, living standards and savings of rural residents to achieve rural-urban and regional equity.

In short, policy reformers got the policy essentials and the sequencing right. The importance of gradual reform to allow monitoring, evaluation, backtracking and new initiatives cannot be overemphasized. From the perspective of all players, it gave the reforms what one participant called "intertemporal consistency and credibility".

A gradual approach to policy reform that enables review and reorientation has been proven to be sound and practical during the process of change. The initial surge in annual agricultural GDP growth of 7.1 percent during 1979–1984, which was propelled by the household responsibility system (HRS), could not be sustained. Agricultural GDP growth showed signs of slowing down. New ideas, policies and programmes were needed. The government acted with significantly increased public expenditures and private investments in the agricultural sector and soaring expansion of off-farm employment through TVEs. Growth then picked up again; agricultural GDP resumed a commendable, though slower, growth rate of 4.0 percent during 1985–1995 and 3.4 percent from 1996–2004.

The second far-reaching decision was to be productivity-driven, farmer-centred and service-oriented in the approach to reform. This meant that investments that increased total factor productivity (e.g. research and development, output and input distribution efficiency, irrigation, mechanization, fertilizers and chemicals) had priority. Policy reforms were undertaken mainly for the benefit of farmers. There was increasing devolution of authority to the local farming communities. Farmers were increasingly empowered to initiate and implement change. The state committed itself to a regulatory and servicing role, monitoring and regulating the market to ensure competition, transparency and fair practices and providing support services such as finance and credit, research and extension.

2.3 Policy

The relative success of Chinese agriculture has been traced to a favourable socio-economic environment for growth. These pro-development and growth-enhancing forces may be beyond the direct control of agricultural policy-makers, but they should be assessed when formulating agricultural policy. The driving forces that comprised this favourable setting for growth in China were:

- macroeconomic stability covering interest rates, exchange rates, wage rates and general price levels;
- a relatively high domestic savings rate directed at capital formation and investment;
- a national plan of action for technology transformation;
- human capital with widespread basic education;
- adoption of integrated competitive markets;
- government commitment towards food security and balanced nutrition;
- openness to direct foreign investment.

Within this favourable growth environment, Chinese agricultural policy radically transformed the sector. The policy regime covered seven areas: cultivated land management, agricultural technology, efficient markets, rural infrastructure and services, water resources, off-farm employment and liberalization of international trade. These policies are elaborated below.

China transformed land policy in 1979. It began to dismantle the collective production system and initiated the HRS. This essentially divided and contracted the collectively-operated agricultural land to individual households on the basis of family size and labour. While the land remained collectively-owned, control and income rights passed to individuals. By 1984, almost all land had been contracted to individual households for 15 years. Average farm size was 0.6 ha. The impact was spectacular. Output and incomes rose. Total factor productivity (TFP) increased by 3 percent per year for 25 years starting in 1985 compared with near-zero growth under the collective production system.

This defining policy on cultivated land management has been supplemented with other legislation and rules of operation to resolve issues related to tenure security. For example, the duration of contracts has been increased from 15 to 30 years for renewals and a new Rural Land Contract Law (RLCL) permits rentals and inheritance. However, without titled ownership, security of tenure is still weak. Farmers cannot use the land as collateral to access financing.

Another major institutional change related to the HRS was the establishment of farmers' associations which aimed to empower farmers and decentralize decision-making. The movement has grown. Fourteen percent of villages now have farmers' associations and 3.8 percent of farmers participate in activities of the associations. This movement is expected to advance farmers' rights and interests within the framework of the new socialist market economy.

China started its agricultural research and development (R&D) reform policy in the mid-1980s. The nationwide programme involved a marked increase in R&D investment, especially in biotechnology. After stagnating for a decade, government-sponsored R&D increased by 5.5 percent annually during 2000–2005 and by 15 percent per year thereafter. The policy-makers also tried to reorganize to raise R&D productivity through competitive bidding for grants and commercialization. Technology imports, especially for horticulture, livestock and dairy, were encouraged. The technology advancement programme yielded significant returns. TFP rose steadily and incomes increased in all provinces and for all crops.

China adopted policies to liberalize, privatize and integrate agricultural markets gradually in a series of steps. Starting with statutory state procurement and distribution, it introduced state quota and off-quota procurement and permitted private sales by farmers in the early 1980s. It then moved on to encourage private traders and set up local markets while withdrawing from state procurement and distribution. From the mid-1990s, the government took comprehensive and concerted action to privatize state-owned agricultural trading enterprises, promote private trading, establish primary and wholesale markets and provide regulation and support services. Initially markets were fragmented, price discovery was difficult and trading volumes were limited, but achieving market integration was crucial for the structural and functional efficiency of the agricultural markets. Significant effort and resources were invested. By the turn of the century, there was significant success in commodity market integration. The impact of integrated and efficient free markets, regulated and supported by the government, has undoubtedly boosted commercialization of agriculture, restructuring of the sector, specialization of farmers, marketable surpluses, employment and incomes in the past decade.

The government increased spending significantly after 1995, following a steady decline of public investments in agriculture (in terms of percentage of agricultural GDP); however, it may not have reversed the percentage decline. It also recently eliminated agricultural taxes and minimized fees. The level of public goods investment per capita has increased, targeting is better and quality has improved. Public investments in agriculture have been directed at physical infrastructure (e.g. rural roads and irrigation), institutional infrastructure (particularly banking and credit, research, extension and other farm support agencies), free rural school tuition, health insurance, farm subsidies (for cost control, technology adoption, income support and food security) and welfare payments. Giving farmers access to services to enhance productivity and supplement incomes, more than anything else, has encouraged savings and investments in rural China.

Because of widespread and severe water shortages, China prioritized water policy reform. It focused on institutional and physical infrastructure and R&D to find new sources of water, extend water-saving agricultural technologies and improve water resource management. This led to increased use of ground water resources through tubewells, highly efficient surface water management, expansion of irrigated agriculture and significantly improved flood control. Water policy reform also permitted private sector participation in the supply and marketing of water resources, leading to higher water-use efficiency. These reforms have contributed much towards agricultural sector

productivity and growth, but more needs to be done. In the longer term, new pathways must be found to cope with the escalating demand for water in the face of dwindling supplies exacerbated by climate change.

China accepted the need to move a large part of the growing rural labour force to the manufacturing, industrial and service sectors. It adopted policies to create off-farm employment in township and village enterprises and in urban areas. By 2003, half of the country's rural labour force derived at least part of its income from off-farm employment. Labour mobility has been instrumental in lifting rural welfare. In recent years, there has been a rash of policies to assist out-migration. These policies included assistance to obtain legal residential status, access health and education services and provide labour protection. However, major constraints to out-migration and urbanization remain. Labour mobility is held back because of slowdowns in job creation in township, rural and urban enterprises, poor human capital and other administrative factors.

The policy decision to move underemployed farm labour to areas with higher job-creation potential (i.e. townships, cities and other urban settings) was radical and far-reaching. It reflected the groundbreaking acceptance that rural and urban development should be conceptualized, planned and executed as an integrated whole. Out of this has emerged one issue requiring further study: the rapid rise of off-farm employment may distort the statistics on the actual farming population and this may require new definitions and estimates for policy-making.

China significantly liberalized international trade for agricultural commodities in the past decade. It minimized tariffs, removed non-tariff barriers and largely privatized exports and imports. For example, the average agricultural tariff rate fell from 40 percent to 11 percent in the most recent decade. Chinese imports have benefited consumers of vegetable oils, soybean and cotton by increasing supply and stabilizing prices. China has facilitated the restructuring of the sector towards those commodities for which the country has comparative advantages in the long run.

In the later stage of reform and to a limited extent, Chinese exports of fruits, vegetables, aquatic products and tea supported domestic producer prices, created employment and incomes and raised TFP in specific localities.

It should be noted that agricultural trade liberalization was unavoidable given China's aspirations for accession to the WTO at the time. On balance, agricultural trade has raised consumption, permitted fast-paced growth of textiles and clothing exports (from cotton and wool imports) and helped restructure the agricultural sector. The trading pattern is still evolving. The impact on the rural poor is being questioned now. Specifically, what are the massive and still growing imports of resource-intensive commodities (e.g. soybean, cotton and wool) doing to the concerned small-scale farmers in the short run? Are programmes in place to help these farmers adjust to the competition? This will be discussed further below.

There were factors other than the aforementioned policy setting and policy regime that propelled the Chinese agricultural revolution. These forces were political, social and cultural in nature and have been deemed "China-specific factors". The country's transformation from a planned to a socialist market economy perhaps provided the crucial enabling environment. The Chinese capacity for mobilizing and organizing farmers to execute policy was another major factor contributing to agricultural success. The people's inherent hard-working, thrifty and far-sighted character was yet another important input. These China-specific political, social and cultural factors require more research. They would provide interesting material for further study of Chinese achievements in rural development.

2.4 Effects, issues and constraints in the process of policy change

Chinese agricultural policy reform has encountered many unexpected issues and led to many unintended consequences. Fortunately, the gradual and sequenced approach to policy reform involved continuous adjustment based on developments that took place. Specifically, five developments arose during the process of reform that required policy review and reorientation.

First, there were uncertainties regarding land tenure because the collectively-owned land was originally contracted to households for only 15 years and sometimes was also redistributed for reasons including adjustments in the size of holdings. There were inequities in distribution and other inadequacies of legislation and administration regarding inheritance and transfer. Remedial measures have been taken: land-use contract renewals of 30 years after the first 15 years have been issued and the recent RLCL permitted transfer and exchange of land for rental and inheritance purposes. The government recognizes that security of tenure is the critical incentive for farmers to invest in the long-term productivity of the land and it is finding ways to provide that.

Next, as policy reforms boosted GDP and household earnings, differences in income emerged among regions and households and along the rural-urban divide. A decade into reform, it became clear that eastern China grew faster than central and northern China. By the turn of the century, there was evidence that urban per capita income was more than three times per capita income in rural areas. There was also increasing income disparity among households within rural areas in the same locality. The widening gap has been attributed to unequal natural and man-made resource endowments and faster growth of the non-agricultural sector than of the agricultural sector. Redressing the increasing income differential appeared to be paramount among national priorities. Every effort was made to build a more egalitarian society. For rural China, this meant moving the hard-core poor in marginal areas out of agriculture, raising productivity by advancing technology, building infrastructure and providing support services, promoting labour migration, minimizing taxes and fees, strengthening education and other supportive measures.

Another critical element for success was creating off-farm employment in rural and township enterprises and in the urban industrial manufacturing and service sectors. As in many other countries, growth slowed after an initial spurt because of constraints in consumer demand, capital, technology and management. Picking up the pace of creating non-farm jobs required commitment to integrate rural-urban development, openness to foreign direct investment (FDI) and technology transfer and willingness to adapt.

There was increasing environmental degradation and water scarcity because of intensified production and climate change. Soil erosion, air and water pollution, salinization, food contamination, deforestation, desertification and water shortages reached alarming proportions. China has taken many drastic and far-reaching measures to contain and resolve these problems. These include replacing farms in fragile areas with forests, conserving and moving water over long distances, banning damaging chemicals and harmful practices and building land and water conservation infrastructure. However, the scarcity of land and water resources remains at odds with the rising per capita demand for food and other agricultural commodities.

Agricultural policy regime change in China initially included international trade liberalization as a requirement for accession to the WTO and subsequently as a policy choice. Agricultural exports of labour-intensive products, like fruits, vegetables and tea, have had limited impact on the domestic market because they represent only a small fraction of total production. However, imports of resource-intensive products, such as soybeans, vegetable oils, cotton and wheat, constituted significant proportions of total supply and have affected domestic prices, farmers' incomes and consumers' household budgets to a noticeable extent. The search for optimum international trade policy is hampered by difficulties in assessing the impact of international trade on income distribution, specific subsectors and regions and the poor.

The Chinese agricultural policy reforms and the spectacular performance of the sector should be examined in the context of the changing agricultural policy landscape in Asia. Only from such a vantage point can policy-makers identify and understand lessons and radical initiatives.

III. Changing agricultural policy landscape in Asia

3.1 Economic growth and poverty reduction

The Asia and Pacific region achieved significant economic growth in the past 45 years, but performance was patchy with East and Southeast Asia growing earlier and much faster after 1980. The GDP per capita started at around the same level in 1980 and rose from 1 000 to 5 000 dollars (in constant 2005 international dollars, purchasing power parity (PPP)-adjusted) in East and Southeast Asia and only to 2 300 dollars in South Asia during 1980–2007.

Such commendable economic growth led to a dramatic fall in poverty in the region. The decline in the poverty level (both in percentages and absolute numbers) occurred mainly in East and Southeast Asia, reflecting the spectacular gains in China. South Asia also advanced in its fight against poverty, but its progress was slower; even though the proportion of its population living on less than US$1.25 per day fell, there has been a slight increase in the absolute number of people living at that level since the mid-1990s. It appears that East and Southeast Asia are well on their way to attaining the first MDG of halving the percentage of the population living in poverty and hunger; however, this does not seem possible for South Asia.

South Asia's disproportionate lag in poverty reduction, despite noteworthy advances in per capita GDP, raises the issue of agriculture's contribution in both subregions. Agricultural GDP per capita doubled in 40 years in East and Southeast Asia, but it increased by less than 40 percent in South Asia. This begs the question: Does GDP growth originating in agriculture contribute more to poverty reduction than growth derived from other sectors? The regional experience supports the contention that agricultural growth is more effective in reducing poverty than non-agricultural growth. This experience may be attributed to the fact that the majority of the poor live and work in the agricultural sector and many do not benefit from employment and incomes generated in the non-agricultural sector in some developing countries. In other countries, where the linkage (through labour and capital flows) between the agricultural and non-agricultural sectors is stronger (e.g. China, Malaysia and Thailand), non-agricultural GDP growth was just as effective in poverty reduction. Given the accelerating participation of farmers in non-farm jobs, it is important to have unequivocal definitions of the farmer and farming population.

Even if the first MDG is reached in Asia in 2015, there still will be substantial numbers of poor people living below the poverty line. Other measures to eradicate poverty are clearly needed. It is important to determine what kind of economic growth is desirable.

3.2 Agricultural growth

Agricultural GDP grew steadily in Asia and the Pacific. Over four decades (1965–2007), index numbers of real agricultural GDP per capita more than doubled in East and Southeast Asia and increased by less than 40 percent in South Asia. Agriculture's contribution to GDP, starting at about the same level, fell from nearly 40 percent to 8 percent in East and Southeast Asia and to 20 percent in South Asia. East and Southeast Asia experienced much more robust non-agricultural GDP growth.

Income growth has resulted in dramatic increases in food consumption in East Asia from 1 600 to nearly 3 000 kcal per capita per day and in Southeast Asia from 1 800 to 2 700 kcal per capita per day. South Asia has experienced a much slower increase from 2 000 to 2 400 kcal per capita per day Dietary diversification also occurred, especially in East and Southeast Asia where vegetable oils and fats and livestock products comprised an increasing share of total caloric intake.

Agricultural production increased steadily in the four and a half decades ending in 2005, but net agricultural output per capita stagnated until the early 1970s in East and Southeast Asia and the early 1980s in South Asia. Crop land area expansion had been a major source of production growth, but this is no longer feasible because new land is scarce. The solution may be increasing cropping intensity. This option will require expansion of irrigation; there is the possibility of doing this because only 40 percent of total crop land is currently irrigated.

Increasing yield is another way of raising production where land is limited. China and Indonesia achieved high land productivity and high labour productivity. Determinants of yield growth, other than biotechnology, include fertilizers, tractors and irrigation. While these inputs are leveling off in East and Southeast Asia, there is no such tendency in South Asia. It follows that TFP growth offers the way to future expansion of output.

3.3 Government expenditures in agriculture

One of the most important determinants of TFP growth is adequacy of physical and institutional infrastructure. The required areas of investment may differ among countries, but they normally consist of rural roads, markets, irrigation and drainage, banking and credit, research, extension and training, farmers' organizations and a host of other development essentials. However, government expenditure on agricultural infrastructure as a proportion of total budgetary expenditure at central, state and local levels has been falling. According to a recent study of 19 countries in the region, this declined from 8.5 percent in 1990 to less than 2 percent in 2001, before recovering to 4.5 percent in 2004. This decline in government expenditure on agricultural infrastructure in many developing countries may be attributed to:

- competing demands from non-agricultural sectors like health, education, social welfare and industry;
- structural adjustment programmes which significantly reduced agricultural subsidies and other forms of farm support;
- declining real prices of agricultural commodities which discouraged investments in agriculture.

Another reason for the neglect of agriculture in some countries in the 1960s and 1970s was the adoption of inward-looking import substitution industrialization (ISI) strategies as a result of pessimism about exports. Policy regimes taxed agricultural export commodities to raise state revenue, supported staple food production and protected manufacturing. Overvalued exchange rates, trade contraction and loss of competitiveness ensued. Concerned countries took remedial action by adopting new strategies that abolished or minimized agricultural export taxes, removed or reduced import restrictions for some essential commodities, moved towards market exchange rates and generally subsidized agriculture.

3.4 Prospects

FAO projections to 2050 suggest that demand for food will continue to grow because of increases in population and per capita income. Composition of diets will continue to shift towards fruits and vegetables, vegetable oils and livestock products as incomes rise and urbanization and globalization accelerate.

The region is expected to meet the rising demand for diversified diets comfortably. Much of the additional supply will come from increases in yield and cropping intensity. Agricultural land expansion is likely to play a marginal role with several large countries expected to lose agricultural land to industry, housing and desertification. Protecting existing cultivated land from losses to urbanization has become a major issue in land-scarce Asian countries.

R&D will play a critical role in raising yields through improvements in TFP. Available evidence suggests that there is potential for increasing the productivity of land, labour and capital through advances in biotechnology, fertilizer and safe pesticide use, mechanization and irrigation. However, spending more on R&D is only one part of the solution. The other is revamping the system of R&D in many developing countries. It is no longer sufficient to fund from government budgets, allocate by maintenance costs of R&D agencies and programme on the basis of scientists' recommendations. More efficient systems and methods are needed, such as commercializing R&D, operating joint ventures with the private sector (including foreign multinationals), collaborating with universities, implementing farmer and community-driven R&D programmes and operating within the Consultative Group on International Agricultural Research (CGIAR). China is paving the way with such initiatives in hybrid rice and livestock R&D programmes.

Future TFP and yield depend on the quality of land and labour and the availability of water. There is growing evidence that shows that natural resource degradation is already starting to affect the elasticity of supply of many commodities. Given the abundance of hard-core poor who cultivate fragile, marginally productive land, there may be a case for moving them out of agriculture. There are programmes of this nature in China to retire aged farmers and transfer fragile agricultural land to reforestation projects. This idea merits attention in many parts of Asia.

There is also recognition that the relatively high population growth rate of the rural poor has been a constraining factor in poverty alleviation. Ways to address this issue will assume added importance in planning for the future.

However, this optimistic outlook does not take into full consideration the impact of two major disconcerting developments – climate change and biofuel utilization. FAO projections suggest that even in the face of climate change, global production can meet demand, but adequate supply alone is not enough. Food security also requires physical and economic access to food and utilization in ways that satisfy tastes and nutritional needs. Climate change is likely to affect all these dimensions of food security through its impact on employment, income, health and the prices of water, energy and food. A comprehensive assessment is currently being attempted.

Another disturbing development is the growing use of cereals, sugar, oilseeds and vegetable oils to produce biofuels as substitutes for fossil fuels. This is underpinning the prices of feedstock commodities, animal feeds and livestock products. As a consequence, the food security of poor households has eroded and the costs of food imports have escalated for developing, food-deficit countries. On the other hand, farmers benefit from higher prices and farm incomes and the rural population gains from opportunities derived from cheaper fuels. The costs and benefits of biofuel development are still being debated and evaluated.

To some extent, the changing agricultural policy landscape in Asia has been driven by the forces of globalization. Among them, agricultural trade liberalization following the Uruguay Round (UR) Agreement on Agriculture and the establishment of the WTO stand out as driving forces in agriculture and rural development. This is discussed below.

IV. Agricultural trade liberalization

4.1 Profile

International trade of agricultural commodities is important to developing Asia because the agricultural sector is crucial to food security, rural employment and social stability. In China and India, the agricultural sector is home to more than 50 percent of the population, employs half of the labour force and accounts for about one-sixth of GDP and one-third of total consumer goods purchases.

Traded commodities (e.g. cereals, pulses, fruits, vegetables and cotton) are predominantly produced in family-operated small farms in East Asia and South Asia. Another group of traded commodities (e.g. tea, rubber and palm oil) are produced in South and Southeast Asia in small-scale family holdings and large commercial plantations.

Farms are typically small. Average farm size is 0.3 ha in Bangladesh, 0.6 ha in China, 1.1 ha in India and 0.7 ha in Viet Nam. Production systems are largely subsistence-oriented, characterized by low productivity, diverse activities, small marketable surpluses and regional differentiation. This is a region of great diversity, however, and there are exceptions to this generalization about Asian agriculture. The degree of commercialization varies widely among commodities, regions and communities. Within the same country, highly efficient commodity production and distribution systems coexist with traditional subsistence farming systems.

Resource endowment (i.e. land and water) is limited and becoming scarce as already dense populations grow and agriculture intensifies. Climate change, population pressure, deforestation and exploitative farming practices cause environmental degradation and increase the frequency and impact of natural disasters. These erode the productivity of farms in Asia.

Producers of traded commodities, exemplified by the players in China, are not well-off, despite the spectacular progress in poverty alleviation. Chinese per capita rural income in 2006 was US$1.30 per capita per day, which was only one-third of average urban income. Unemployment is rampant. Producers are vulnerable to the vicissitudes of the international marketplace in a liberalized trading environment. The same can be said of small-scale producers of traded commodities in South and Southeast Asia.

With the exception of a few plantation-produced commodities like rubber, palm oil and tea, developing countries are not competitive in producing agricultural commodities. Restructuring towards comparative advantage is difficult because of constraints of natural resources, skill, climate and livelihood.

4.2 Patterns

Patterns of agricultural trade vary widely among countries, but some generalizations are possible. Traditionally, countries that produced raw materials imported food. For example, Southeast Asian countries, such as Indonesia, Malaysia and Philippines, exported rubber, palm oil, coconut oil and pepper and imported rice, wheat and maize. Food-surplus countries like Thailand (and increasingly Viet Nam) exported rice and rubber and imported food items they could not produce, such as wheat. Largely agriculturally self-sufficient countries, like China and India, traded marginally to supply food to coastal or border areas, to supplement domestic supplies of foods like vegetable oils and soybeans and to provide raw materials to manufacturers. Before 1990, the widely followed model was to support food production, minimize food importation and promote raw material exportation through subsidies, taxation and tariffs. However, a contradiction emerged in some countries when raw material exports were taxed to generate revenue for the government.

Radical change was introduced during the process of accession to WTO membership in the 1990s. China, for example, lowered the average tariff rate for agricultural products from 54 percent in 1992 to 18 percent in 2001 and subsequently to 11 percent in 2007, making the country among the most open in its agricultural markets. Subregional arrangements within the Association of Southeast Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC) and bilateral free trade agreements also reduced tariffs and other trade barriers to some extent. The trend in the region has been towards abolishing state trading monopolies, privatizing international trade, eliminating export taxes, improving supporting physical and institutional infrastructure, reducing import tariffs and opening up domestic markets to foreign competition.

Agricultural trade flourished after this opening of the markets. In China, total trade (exports and imports) grew 9.2 percent annually to reach US$78 billion during 1978–2007 – a 13-fold increase. The growth rate of Chinese imports in recent years has been faster than the growth rate of exports, which has changed the status of the country from a net exporter to a net importer. International trade of agricultural commodities also expanded rapidly in other countries, especially in India and Southeast Asia. Most South and Southeast Asian countries remain net exporters of agricultural commodities.

Within this trend of steadily rising agricultural trade, two developments are noteworthy for policy-making. The first is that intra-regional trade is increasing rapidly; more Asian countries are trading and the quantum of trade is growing fast. Countries that traditionally have been "small" traders, like Bangladesh, Cambodia, India, Viet Nam and even dormant Myanmar, increasingly are making their presence felt in the international marketplace for commercial imports of rice and other essential commodities and for exports of rice, other food surpluses and raw materials. The second noteworthy development is that, starting from a small base, regional trade in fruits and vegetables is accelerating. Labour-rich countries (e.g. China, India, Indonesia and Philippines) and resource-rich countries (e.g. Malaysia and Thailand) increasingly are exporting their competitive fruits and vegetables to neighbouring countries and also importing more from them.

4.3 Impact

As mentioned earlier, it has been difficult to assess the impact of trade liberalization, especially on income distribution, specific subsectors and the poor. Some early lessons are provided from the experiences of large developing countries like China and India during their run-up to WTO accession and after membership.

China and, to a smaller extent, India saw exports of labour-intensive commodities (e.g. fruits and vegetables, aquaculture, livestock products and tea) soar from the mid-1990s to the present. Since they began from a small base, the quantities are still relatively small, except for tea. The export volumes represented only a small fraction of total national production. In China, for example, exports' share of total national production in 2006 was 1.3 percent for vegetables, 2.1 percent for fruits and even less for aquaculture and livestock products. Therefore, domestic supply, prices and farm incomes have been little affected so far. With time, developing Asian countries can grow labour-intensive non-traditional exports.

Agricultural exports' potential and prospects have improved with the internationalization of food habits and the growing importance of processed foods in world trade. Positive factors for agricultural trade include the rise of supply and supermarket chains, increased FDI in agriculture, vertical integration in agribusiness and expanded use of contract farming and other innovative practices. These will help developing countries meet the ever growing demand for food safety and higher standards of quality and health and overcome other technical and non-technical barriers to trade.

There are however, obstacles to export-led agricultural growth in developing Asian countries. These include:

- rising production costs because of increasing wage rates and costs of water and fertilizers;
- persistent trade barriers, especially technical barriers to trade and new barriers such as those linked to intellectual property rights, animal welfare and others;
- inertia and inflexibility of subsistence-oriented production systems typical of many Asian farming communities.

Importing agricultural commodities has had quite a different impact. Most Asian countries experienced a surge of agricultural imports in the past 15 years as a result of lower tariffs, higher effective demand and improvements in communications and shipping. In some countries, import volumes of essential commodities like cereals, vegetable oils and oilseeds and re-exported commodities (after processing) such as cotton and wool reached sizable proportions of domestic production. China, India, Indonesia and Malaysia are examples of countries that import large volumes of agricultural commodities.

If imports constitute a large proportion of supply, producer prices will depend on international markets. Inefficient producers likely will be impacted negatively in times of abundance and falling import prices. Importation can create disincentives for local production, at least temporarily, when large volumes of low-priced agricultural imports push down domestic prices to the point where farm-gate prices are not remunerative to producers. There may be a *prima facie* case for supporting local production if low international prices are the result of distortions from subsidies and other unfair practices of exporting countries. As countries open domestic markets to imports, programmes are essential to support domestic producers in adjusting to the new competition or in shifting to other enterprises.

Based on experiences of major agricultural commodity-exporting countries like Indonesia, Malaysia, Thailand and Viet Nam, there was consensus that agricultural trade holds much promise for the future. It could spearhead agricultural GDP growth in countries with favourable agricultural endowments like abundant arable land and labour and good climatic conditions. Exports generate employment, income and foreign exchange earnings. Imports stabilize domestic prices, raise food security and contribute to general welfare. The opening of domestic markets to foreign products can provide opportunity for restructuring the sector towards those commodities for which the country has comparative advantage. It could promote competition, technology transfer and FDI. Cases in point are FDI in the palm oil and poultry industries in the region, especially within ASEAN and China. As marketable surpluses are generated, they could be exported to trading partners within the multilateral/bilateral trade arrangements and beyond. International trade expansion should be a key component of a country's agricultural policy regime.

However, quick, radical trade liberalization may not be universally beneficial. Each country has unique goals, natural resources, trade balances and socio-economic circumstances which have to be fully considered. It is becoming increasingly clear that there is a trade-off between the pace of import liberalization and poverty alleviation. If alleviating poverty has priority, gradual trade – especially import liberalization – is the sound option.

Another argument for selective and gradual market opening is that domestic market imperfections – like fragmentation and lack of competition and transparency – have often precluded the poor from the benefits of trade liberalization. Within the borders of a country, structural and functional market efficiencies are crucial for the benefits of international trade to reach poor farmers and consumers. In short, import and export liberalization initiatives should be conducted in tandem with improvements in domestic marketing efficiency. This important linkage between international trade liberalization and institutional change is often overlooked.

It is important for developing countries to look at what is in store for further international trade liberalization. Special attention must be paid to the current trade negotiations under the Doha

Development Agenda (DDA). The manner in which the negotiations end will determine the direction and pace and the winners and losers of future trade in agricultural commodities.

4.4 Trade negotiations under DDA

Trade negotiations under the DDA were suspended on 29 July 2008. Consensus on modalities covering the three pillars of the Agreement on Agriculture (i.e. domestic support, market access and export subsidy) could not be reached. Wide differences among interest groups on method, procedure and pace continued to prevail. The technical, procedural and political variations were overwhelming.

There was also significant convergence of views among Asian countries, especially on the important role of agriculture in food security, poverty alleviation and environmental preservation. Such common ground led to the crucial acceptance of the need for special and differential treatment for developing countries in all aspects of the prospective Agreement on Agriculture.

The stalemate will endure unless remaining core issues can be resolved. The more critical agricultural trade issues are the special safeguard mechanism (SSM) for developing countries, tariff simplification, special consideration for sensitive products and the reduction rate of the United States cotton subsidy.

Political will, particularly from the major players (i.e. China, India, the European Union and the United States), is vital to finalize the Doha Round successfully. In the current economic crisis, the multilateral trading system is being severely tested. Re-emergence of protectionism is possible, even probable. Agreement must be reached soon. Otherwise, the seven-year-old Doha Round will go into prolonged hibernation.

Regional cooperation should be reinforced to bring about a successful outcome in the trade negotiations under the DDA and expand international trade and investment. Collective action could be in the form of:

- strengthening regional groupings on key remaining issues in future negotiations;
- promoting regional, subregional and bilateral preferential trade agreements;
- fostering regional food security arrangements;
- attracting FDI to agribusiness;
- expediting agricultural technology transfer;
- facilitating employment of migrant workers.

Led by the remarkable GDP and gains in household income and savings and propelled by globalization, trade and technology advances, most of developing Asia has geared up for even more radical reform in the second decade of the twenty-first century. The thrust will be towards conservation of resources, environmental protection, higher TFP, balanced nutrition, food safety and rural-urban equity. Attempts will be made to harness advances in biotechnology and international trade to power the changes. However, unforeseen problems have emerged which may blunt the drive in agricultural and rural reform. These are the food crisis of 2007–2008 and the financial turmoil leading to the global economic crisis in 2008–2009. The new risks and uncertainties associated with these unexpected events make it imperative for policy-makers to reassess plans and programmes for the next decade.

V. Global food and financial crises

5.1 Advent

Unconventional market forces and underlying trends in supply and demand drove food commodity prices to a peak in the first quarter of 2008, causing a major food crisis. Prices of all other agricultural commodities rose in tandem. The FAO international food price index surged 53 percent in that quarter compared with the same period in 2007. The food crisis has been attributed to weather-related production shortfalls, the steady decline of global cereal stocks, high fertilizer and shipping costs because of escalating oil prices, diversion of food commodities to biofuel production, speculation in financial markets, long-term government neglect and insufficient public investment in the agricultural sector.

The food crisis was not long-lasting. Several Asian developing countries, notably China, India and Malaysia, were able to contain domestic price increases of major food cereals within affordable levels and protect household food security. They succeeded through statutory market regulation, direct price intervention and trade policy. These three types of interventions translated into regulation of private sector procurement, stocking and movement, state procurement, buffer stocking, open-market operations and public distribution of subsidized food and government interventions in international trade through export/import controls, tariff adjustments and direct state-trading.

Other Asian countries, like Bangladesh, Indonesia, Nepal, Philippines and Sri Lanka, were less successful in stabilizing prices because they were food-deficit countries. Most of them had difficulty securing international supplies of cereals – especially rice – at regular (pre-crisis) prices.

The financial crisis that manifested in mid-2008 was caused by excessive sub-prime mortgage lending and a collapsing financial system in the United States. Effects of these developments were felt globally. Forecasted 2009 global economic growth had already been lowered from 3.5 to 0.5 percent by the International Monetary Fund (IMF) at the time of the Forum. Since then, it has been further reduced to minus 1.3 percent. For most countries, GDP growth for 2008 had fallen far short of expectations and forecasts for 2009 have also been reduced significantly. Other indicators that economies are on a downtrend are falling commodity and oil prices, factory closures, cutbacks in employment and wages, and declining – even crashing – stock markets. In developing countries, state revenues are likely to fall, budgetary allocations for agriculture may be cut and agricultural R&D programmes probably will be curtailed.

The financial crisis seems to have turned into an economic crisis as remedial measures and stimulus packages appear inadequate and the loss of confidence worsens and spreads worldwide. Since the beginning of the fourth quarter of 2008, monthly trade figures have been in rapid decline. A protracted global economic downturn is expected.

5.2 Interplay of forces

The food and financial crises may have different underlying causes, but public and private responses released forces which jointly impacted agricultural production, consumption and trade. The food crisis pushed governments to spend more on subsidies to consumers and producers in order to stabilize prices and raise food output. However, the current economic crisis is curbing effective demand for food, feed and fuel and is therefore lowering prices. The unfolding agricultural market scenario is rising supply, declining purchasing power and lower than expected prices leading to a drop in investments, rising unemployment, falling household incomes and more poverty. After that, another crisis cycle may start.

There are other possible ramifications of the food and economic crises in relation to agricultural and rural development. There may be:

- food and agricultural price volatility as governments resort to short-term taxation, subsidy and trade policies to protect domestic food security;
- rising speculation on agricultural commodities in financial markets;
- unstable currency exchange rates.

This will in all likelihood erode macroeconomic stability necessary for rapid agricultural GDP growth.

Next, government revenues will probably fall, leading to smaller expenditures on sustainable agriculture and rural development. This contraction in government investment – especially in R&D – may blunt the region's thrust at TFP increases to expand future production.

The financial crisis may then work its way into the real economy through increasing scarcity of capital. As banks recall loans, tighten terms and cut lending, farmers will have difficulty obtaining investment and operating capital.

Furthermore, indebtedness of the rural poor (i.e. small-scale farmers, landless labourers and the rural unemployed) is bound to escalate as commodity prices fall, job markets shrink and consumption loans increase. This will further erode the agricultural growth environment.

As in the Asian financial crisis of 1997/98, the ongoing economic turmoil will probably cause significant numbers of laid-off non-farm workers with rural roots to move back to the farms. This will severely strain the carrying capacity of the farming sectors because the number of off-farm workers is now many times what it was in the last financial crisis.

These possible effects of the food and financial crises are based on past experience, especially from the Asian financial crisis of 1997–1999. However, things need not happen this way if timely, remedial fiscal and monetary measures and supportive employment and income-generating programmes are implemented. Beyond these mitigating actions, it is even more important to stress that because food and financial crises cannot be totally avoided in the future, governments must prepare to mitigate their impact, ease the suffering of the poor and take corrective action by setting up appropriate permanent safeguards.

5.3 Safeguards

As developing Asian countries confront the food and financial crises and try to prepare for what might be a prolonged, deep economic recession, they have emerged with short-term monetary and fiscal responses. Most governments have guaranteed bank solvency and deposits, lowered interest rates significantly and declared stimulus spending packages to hold back losses in employment and income and to stimulate their economies. Examples are the significant first-round monetary-easing and stimulus-spending packages in China, Malaysia and Thailand. The focus will be on building physical infrastructure, reinforcing agriculture and rejuvenating industry and social welfare and the bulk of the spending will be targeted at the poor who live mainly in rural areas. The scale of the stimulus spending can be seen in the Chinese package, which is currently four trillion renminbi (RMB) (US$586 billion) or 7 percent of GDP per year over two years.

Beyond these short-term measures, there is a need to strengthen and devise new lasting safeguards for the poor. The region has had a wealth of good experience with targeted, subsidized food distribution, income transfers to the poor, subsidies for subsistence farmers and employment guarantees for farmers, the rural landless and disaster victims. These should be reinforced and established for the long term to help overcome future crises. India's enduring National Rural Employment Guarantee Scheme, which provides a minimum of 100 days of guaranteed wage employment per year to at least one adult member of every rural household, is a relatively successful initiative to be studied and emulated if feasible. At the same time, new initiatives – like the one in

China to establish a permanent nationwide safety net for the rural poor through welfare payments – should be encouraged.

Such welfare assistance should be supported by institutional mechanisms that enable government market interventions to protect the vulnerable from externally generated price volatility and economic shocks. As India and Malaysia have shown, institutional mechanisms (e.g. various market acts, public distribution systems, disaster relief procedures and export-import rules) must be permanently in place to allow quick state responses to impending crises.

Another permanent safeguard worth considering is a reinvigorated, rejuvenated and reinforced agricultural sector. As indicated above, there is increasing recognition that growth in agricultural GDP is relatively more effective than growth in non-agricultural GDP in alleviating poverty, narrowing income inequality and advancing food security. The savings generated and the labour freed by productivity gains in the agricultural sector can provide the foundation for growth in the industrial and service sectors.

In rounding up this discussion on permanent safeguards, the importance of capital availability for investment in agriculture should be emphasized. An adequately capitalized agricultural sector can harness the new forces of biotechnology, supply chain distribution and environmental preservation to surmount food and financial crises. Biotechnology, appropriately targeted to meet the needs of small-scale farmers, can accelerate TFP gains, product development and employment creation. The rise of supermarket chains can help farmers access larger markets, capture a larger share of value added in distribution and improve allocation of resources. Environmental preservation programmes will improve natural resources, optimize their utilization and raise their productivity. Driven by these forces, a well-capitalized agricultural sector can help overcome any economic downturn in the foreseeable future. It is imperative that rural credit and finance be accorded the highest priority.

VI. Conclusions

Drawing from China and selected Asian countries, the Forum attempted to capture the essence of three decades of agricultural policy experience. To begin, a favourable setting is required for sustained rapid agricultural GDP growth and corresponding successes in rural development and poverty alleviation. Such a growth-enhancing setting has been identified as including macroeconomic stability, a relatively high savings rate, commitment to technology transformation, widespread basic education, an efficient marketing system, a government pledge to ensure food security and openness to FDI. These preconditions for success are usually beyond the control of agricultural policy-makers; however, they should at least be aware of the strengths and weaknesses of the growth environment.

Within a given growth environment, a sound approach and feasible blueprint make an agricultural policy success story. In the Asian (and especially Chinese) context, the tried and tested approach has been policy change that was gradual and sequenced, productivity-driven and farmer-centred. This translated into monitoring and evaluation of policy impacts, devolution of authority, prioritization of productivity-enhancing investments, acceptance of labour migration and integration of rural-urban development.

A general policy blueprint for agricultural success was far more difficult, if not impossible, to prescribe. Differences in socio-economic and farming conditions require specific policy regimes for each country; however, proven policies, increasingly substantiated by Asian experiences, can provide guidance for policy-makers. Unique to the Chinese case were the shift from a planned to a socialist market economy and the associated change from the collective to the individual HRS which launched the agricultural revolution. China's subsequent step-by-step policy initiatives can serve as one among other successful policy reform models. The Chinese policy reform success story included four major thrusts that were sequenced and sometimes overlapping:

- getting prices and markets right through appropriate price support policies and setting up competitive integrated markets;
- creating off-farm employment for farmers on a massive scale;
- raising TFP by boosting investments in physical and institutional infrastructure, especially irrigation, rural transportation, R&D and banking and credit and other support services;
- extending income support and welfare services and minimizing taxes and fees of rural residents.

It is noteworthy that China's policy regime targeted growth and social security. From the very beginning, it adopted the FAO "twin track" approach of combining economic and social investments for sustainable agriculture and rural development.

Going forward, more policy change is urgently needed. The 2007–2008 food crisis and its aftermath and the ongoing global economic turmoil may have placed new stresses and strains on the agricultural economies of developing countries. It appears that the agricultural sector faces additional demands on its production systems while suffering falling commodities prices, scarcity of capital and rising unemployment. However, things may not turn out as feared. An alternative viewpoint was presented at the Forum. From lessons learned in the Asian financial crisis, enlightened governments know that the relatively high carrying capacity of the agriculture sector will be useful in absorbing the discharged urban workers with rural links. Moreover, in an economic crisis, food security assumes the highest priority. Thus it is possible for new investment opportunities, additional public and private capital and management skills to emerge in the agricultural sector. Already, stimulus spending packages in several countries (e.g. China, Malaysia and Thailand) are being channeled to the rural sector for infrastructure, credit and employment generation programmes. It may turn out that economic crises favour investments in sustainable agriculture and rural development.

The region's agriculture is also being confronted by a number of serious challenges. The more formidable among them include global climate change, environmental degradation, water shortages, increasing incidence and impact of natural disasters, continuing barriers to agricultural trade, food price instability, persistent rural unemployment, rural-urban income inequity, aging and feminization of the farming community and rising oil prices.

In pursuing broad-based inclusive growth for poverty alleviation and food security (the World Food Summit and MDG goals), developing countries may wish to strengthen their agricultural policy regimes in accordance with the Forum's ten-point reform guidelines. The recommended guidelines, derived from the Asian experience, include:

- building institutional infrastructure, especially in the critical areas of property rights, land tenure, farmers organizations and rural banking and credit;
- reinforcing marketing institutions and services for private trade;
- promoting international agricultural trade aimed at creating employment, raising rural incomes and improving food security;
- raising R&D investment directed at lifting TFP, adapting to climate change, overcoming water depletion, redressing environmental degradation and adjusting to high energy costs;
- increasing investments in physical infrastructure, especially for irrigation, transportation and post-harvest operations;
- establishing comprehensive food quality and safety systems;
- promoting rural enterprises with tax incentives, access to credit, R&D support and market development;
- extending safety nets through food subsidies, welfare payment and work programmes for subsistence farmers, the rural landless, natural disaster victims and the unemployed;

- upgrading rural human capital through better education, particularly rural primary education;
- supporting and protecting domestic and foreign migrant agricultural labour.

In agricultural policy reform, regional cooperation is essential in this era of trade liberalization and globalization. In the conventional sense, this can help through information exchange, technical assistance and training, but today this is not enough. Regional policy cooperation must go beyond the usual transfer of technical know-how in order to maximize its contribution. It must find new pathways towards harmonizing agricultural and trade policies among countries in the region. Only with such policy harmonization can developing countries restructure their agricultural economies optimally at least cost and realize their full potential in production, consumption and trade. This can begin with more frequent and in-depth policy dialogue among concerned countries of the region.

PART TWO

Technical papers[1]

[1] The views expressed in these papers are the authors' and not necessarily those of FAO.

Chapter 1

Agricultural development, nutrition and the policies behind China's success[2]

by
Dr Jikun Huang[3] and Dr Scott Rozelle

I. Introduction

The emergence of China is one of the miracle growth stories of the last part of the twentieth century and the early part of the twenty-first century. Its economy has been the fastest growing when compared with the economies of the world since 1980 (World Bank, 2002). Growth has occurred in all sectors, including agriculture. Poverty has fallen. In the past 30 years, more than 230 million Chinese rural residents have escaped poverty, based on China's official poverty line; the absolute level of poverty fell from 260 million in 1978 to 14.8 million in 2007 (NSBC, 2008). Moreover, the general welfare for most of the population has increased markedly. Many indicators of nutritional status have improved. For example, the number of children with low body weight fell by more than half (Turgis, 2008). In fact, by the end of 2007 China had achieved many of its MDGs.

While past accomplishments are impressive, there are still great challenges ahead. Income disparity, for example, rose with the economic growth. There are significant income disparities among regions, between urban and rural populations and among households in the same area (Cai *et al.,* 2002; World Bank, 2002). There also are differences among regions in nutritional status (Chen, 2004). In China's poorest areas, there is still a high incidence of anaemia which hurts the educational performance of rural students and leads to long-term behavioural problems and chronic poverty (Chen, 2004).

A big part of the improvement in the income and nutritional status of the poor has come from agriculture. However, while the average annual growth rate of China's agricultural sector was much higher than its population growth in the reform period, high input levels in many areas of China and diminishing marginal returns may mean that increasing inputs will not provide large increases in output. Many have predicted that in the future almost all gains will have to come from new technologies that could significantly improve agricultural productivity (Fan and Pardey, 1997; Huang *et al.,* 2003; Huang *et al*., 2002a, 2002b, and 2004). Trade liberalization and tension between environmental protection and development will further challenge China's agricultural and rural economy.

How has China achieved this growth and how will China maintain it? At a time when the rest of the world has been struggling to keep many of the indicators associated with the MDGs from deteriorating, how has China been able to move so aggressively towards meeting its MDGs? What is the policy basis that has helped produce this success?

The overall goal of this paper is to examine the policies, especially agricultural policies, which China has used to develop its agricultural economy, reduce poverty and improve the nutrition of

[2] This paper was originally produced for the World Food Programme in December 2008 and was presented at the Policy Forum on Agricultural Reforms and Trade Liberalization in China and Selected Asian Countries: Lessons of Three Decades, 19–20 February, Beijing, China. It is published here with permission.

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the nation. In this paper, three objectives are pursued. First, the paper briefly describes the progress China has made in developing its agricultural sector and reviews the nation's achievements in reducing nutritional problems. Second, it reviews a number of important policy initiatives that China's government has used in its efforts to support the development of agriculture and reduction of poverty. Finally, the paper discusses the policy implications and lessons of the findings.

II. China's agriculture in the context of economic development

2.1 Overall economic growth

China's leaders implemented reform measures that have gradually liberalized the institutional and market structure of the economy. Although there is a cyclical pattern in China's growth rates, China's economy outperformed almost all other countries in Asia and has had the fastest growth rates in the world since 1980.

In the early reform period, annual growth rates of GDP increased considerably from 4.9 percent in 1970–1978 to 8.8 percent in 1979–1984 (Table 1). High growth was recorded in all sectors. Institutional reform that transferred collective agricultural production systems to individual household production was the main source of agricultural growth in the early reform period (Lin, 1992; Huang and Rozelle, 1996). The growth of agriculture provided the foundation for the successful transformation of China's reform economy. At the same time, rising income in the initial years of reform stimulated domestic demand and the high savings rate was appropriately transferred into physical capital investments in non-agricultural sectors in both rural and urban areas. This led to annual growth rates of 8.2 percent in industrial GDP and 11.6 percent in service GDP (Table 1). During this same period, as family planning effectively lowered the nation's population growth rate, the high economic growth also implied high per capita GDP growth. The annual growth rate of per capita GDP more than doubled between the pre-reform period, 1970–1978 (3.1 percent), and 1979–1984 (7.4 percent).

It is worth noting that despite the Asian financial crisis, China maintained an average annual growth rate of 8.2 percent from 1996 to 2000 (Table 1). China was able to keep the crisis from spreading across its borders, partly because of the more insulated nature of its financial sector. In addition, since the size of its domestic capital market was so large, China was better able to weather the international financial crisis. During this time, China's growth rates were among the highest in the world.

Table 1: Annual growth rates of China's economy 1970–2007
(in percentages)

	Pre-reform 1970–78	Reform period				
		1979–84	1985–95	1996–00	2001–05	2006–07
GDP	4.9	8.8	9.7	8.2	9.9	11.8
Agriculture	2.7	7.1	4.0	3.4	4.3	4.4
Industry	6.8	8.2	12.8	9.6	11.4	13.2
Service	NA	11.6	9.7	8.3	10.1	12.4
Foreign trade	20.5	14.3	15.2	9.8	25.3	19.4
Import	--	12.7	13.4	9.5	24.9	16.2
Export	--	15.9	17.2	10.1	25.7	22.1
Population	1.8	1.4	1.4	0.9	0.6	0.5
Per capita GDP	3.1	7.4	8.3	7.2	9.0	11.3

Note: Figure for GDP (in real terms) from 1970 to 1978 is the growth rate of national income in real terms. Growth rates are computed using the regression method. Trade growth is based on current value in US dollars.

Source: NSBC, Statistical Yearbook of China.

Since the beginning of the twenty-first century, China's economic growth has accelerated, in contrast to the stagnation of growth in the rest of the world. Annual GDP growth rose from 7.3 percent in 2001 to about 10 percent in recent years, with an average growth rate of 9.9 percent in 2001–2005 and 11.8 percent in 2006–2007 (Table 1).

2.2 Structural changes and the role of agriculture in China's economy

2.2.1 Change in the economic structure of the agricultural, industrial and service sectors

Rapid economic growth has been accompanied by significant structural changes in China's economy. Whereas agriculture accounted for more than 40 percent of GDP in 1970, it fell to 30 percent in 1980, 20 percent in 1995 and only 11 percent in 2007 (Table 2). The industrial share of GDP rose and fell from 1970 to 1985 and then gradually started to increase after the late 1980s; it rose from 41 percent in 1990 to 49 percent in 2007. In contrast to agriculture, the service sector expanded rapidly. Its share of the national GDP increased from 13 percent in 1970 to 21 percent in 1980 and 40 percent in 2007. This trend is expected to persist in the coming years because China will continue to promote its structural adjustment policies and economic reforms in response to domestic demand and changes in external trade patterns.

Structural changes in the economy have also had a significant impact in employment patterns. Agriculture employed more than 80 percent of the nation's total labour force in 1970. This has declined significantly to 60 percent in 1990 and 41 percent in 2007, including part-time agricultural labour (Table 2). The industrial sector's share of employment doubled from 1970 to 1985, remained at about 20–24 percent in 1990–2005 and reached 27 percent in 2007 (Table 2, row 5). The service sector's share of employment rose even more rapidly from 9 percent in 1970 to 19 percent in 1990 and 32 percent in 2007.

Table 2: Changes in structure of China's economy 1970–2007
(in percentages)

	1970	1980	1985	1990	1995	2000	2005	2007
Share in GDP								
Agriculture	40	30	28	27	20	15	12	11
Industry	46	49	43	41	47	46	48	49
Services	13	21	29	32	33	39	40	40
Share in employment								
Agriculture	81	69	62	60	52	50	45	41
Industry	10	18	21	21	23	22	24	27
Services	9	13	17	19	25	28	31	32
Trade to GDP ratio	NA	12	23	30	40	44	64	67
Export/GDP	NA	6	9	16	21	23	34	37
Import/GDP	NA	6	14	14	19	21	30	29
Share of rural population	83	81	76	74	71	64	57	55

Source: National Statistical Bureau, China Statistical Yearbook, various issues and China Rural Statistical Yearbook, various issues.

In rural areas, more than 40 percent of the labour force was employed in the non-agricultural sector in the late 1990s (de Brauw *et al.,* 2002). Expanding non-agricultural employment has contributed substantially to the growth of farm household income since the late 1980s (Rozelle, 1996). Non-agricultural farm household income exceeded agricultural income in 2000 for the first time and its share rose to nearly 60 percent in 2007 (NSBC, 2008).

There are many factors that have simultaneously contributed to China's structural changes in economic composition and employment. The rapid economic growth, urbanization (Huang and Bouis, 1996), market liberalization (Lardy, 1995; Huang and Rozelle, 1998) and China's open-door policies (Branstetter and Lardy, 2005), among many others, have had a significant impact on consumption and demand (both internal and external) patterns. These, together with the rapid development of factor and output markets, largely explain the changes in China's economic structure in the past two to three decades (Brandt *et al.*, 2005; Sonntag *et al.*, 2005).

2.2.2 More liberalized economy and rapid growth of the external sector

Rapid economic growth has also been associated with remarkable changes in China's international trade. Throughout the reform era, foreign trade has been expanding even more rapidly than the GDP. Annual growth rates of foreign trade reached nearly 15 percent in the 1980s and early 1990s (Table 1). China's foreign trade still grew at nearly 10 percent annually between 1996 and 2000 when the Asian and world economies were hit by the Asian economic crisis. Since China's accession to the WTO in late 2001, the growth of both imports and exports has been tremendous. The average annual trade growth rate reached 25.3 percent in 2001–2005 and was 19.4 percent from 2006–2007 (Table 1).

With the rapid growth of China's external sector, foreign trade has played an increasing role in the national economy since the beginning of the reforms. China's ratio of exports to GDP increased from less than 6 percent in 1980 to 23 percent in 2000 and further to 37 percent in 2007 (Table 2). Over the same period, the ratio of imports to GDP also increased from 6 percent to 21 percent and 29 percent. These ratios indicate that China is ranked as one of the most open economies in the world.

The rapid expansion of China's external economy is explained largely by China's long-term development strategy to open its economy. Prior to economic reform, China adopted a highly centralized and planned foreign trade regime (Lardy, 2001). This system, however, has been substantially decentralized by granting more firms direct foreign trading rights. There have also been significant reductions in export subsidies and import tariffs since the late 1980s. By 1991, all export subsidies were phased out, although China occasionally applied them for specific products (e.g. maize and cotton) to avoid a large fall in domestic prices before China's WTO accession (Huang *et al.*, 2004). Reduction of import tariffs has also been remarkable. China's average tariff was as high as 56 percent in the early 1980s. This was gradually reduced to 47 percent in 1991, 23 percent in 1996 and about 15 percent on the eve of WTO accession in 2001. Within the agricultural sector, there has also been a significant reduction in import protection. The simple average agricultural import tariff fell from 42.2 percent in 1992 to 23.6 percent in 1998 to 21 percent in 2001 (MOFTEC, 2002).

China's openness to imports progressed even faster than the decline in formal trade barriers might indicate. The government extended many special privileges to firms involved in export processing and strategically important commodity imports to balance domestic shortages. Thus, actual tariff revenues have been far below the average formal tariff rates. For example, tariff revenues as a percentage of total import values was about 17 percent in the mid-1980s and only slightly more than 2 percent in 2004 (Lardy, 2001; Branstetter and Lardy, 2005).

2.3 Agricultural development

2.3.1 Agricultural production growth

The growth of agricultural production in China since the 1950s has been one of the main accomplishments of the country's development. Except during the famine years of the late 1950s and early 1960s, the country has enjoyed rates of production growth that have outpaced the rise in population. Although yields and total production rose during the pre-reform period, TFP did not and rural incomes were stagnant (Rozelle *et al.*, 2008).

After de-collectivization in 1978, price increases and the relaxation of trade restrictions (discussed more in the next section) on most agricultural products accompanied the rise of China's food economy. Between 1978 and 1984, grain production increased by 4.7 percent per year and the output of fruit rose by 7.2 percent annually (Table 3). The highest annual growth rates in real value terms in the same period were for cotton at 19.3 percent, oilseeds at 14.9 percent, livestock products at 9.1 percent and aquatic products at 7.9 percent.

Table 3: Annual growth rates of China's agricultural economy 1970–2005
(in percentages)

	Pre-reform 1970–78	Reform period			
		1979–84	1985–95	1996–00	2001–05
Agricultural GDP	2.7	7.1	4.0	3.4	4.3
Grain production	2.8	4.7	1.7	-0.7	1.1
Rice:					
Production	2.5	4.5	0.6	0.4	-0.8
Area	0.7	-0.6	-0.6	-0.5	-0.8
Yield	1.8	5.1	1.2	0.8	0.0
Wheat:					
Production	7.0	8.3	1.9	-0.6	-0.4
Area	1.7	-0.0	0.1	-1.6	-3.1
Yield	5.2	8.3	1.8	1.0	2.7
Maize:					
Production	7.4	3.7	4.7	-1.3	5.6
Area	3.1	-1.6	1.7	0.8	2.7
Yield	4.2	5.4	2.9	-0.9	2.9
Other production					
Cotton	-0.4	19.3	-0.3	-1.9	5.3
Soybean	-2.3	5.2	2.8	2.6	1.4
Oil crops	2.1	14.9	4.4	5.6	0.8
Fruits	6.6	7.2	12.7	10.2	21.0
Meats (pork/beef/poultry)	4.4	9.1	8.8	6.5	4.9
Fisheries	5.0	7.9	13.7	10.2	3.6
Planted area					
Vegetables	2.4	5.4	6.8	9.8	3.1
Orchards (fruits)	8.1	4.5	10.4	2.0	2.4

Note: Growth rates of commodities are based on production data.

Sources: NSBC, 1985–2006 and MOA, 1985–2006.

Agricultural growth remained remarkable for all agricultural products except for grain and cotton in 1985–2000. Fishery production experienced the fastest growth in 1985–1995 (13.7 percent annual growth, Table 3). Although its annual growth rate fell in the following period, it still recorded 10.2 percent in 1996–2000. Over the same period, meat production and vegetable sown areas expanded at 7–9 percent annually. Other cash crops, such as oil crops, soybean and fruits, also grew at rates much higher than population growth.

Overall growth of the agricultural sector has remained at an average of nearly 4 percent of the annual growth rate in recent years (Table 3). It appears that the production growth of many individual agricultural commodities, in terms of volume, fell between the early and late reform periods, indicating that China has been shifting from quantitative targets to value-added and quality food production.

2.3.2 Structural changes in agricultural production

China's agriculture has undergone significant change since the early 1980s. Rapid economic growth, urbanization and market development are key factors underlying the change. Rising income and urban expansion have boosted the demand for meats, fruits and other non-staple foods. These changes have stimulated sharp shifts in the structure of agriculture (Huang and Bouis, 1996; Huang and Rozelle, 1998). For example, the share of livestock output value rose from 14 percent to 35 percent between 1970 and 2005 (Table 4). Aquatic products increased at an even more rapid rate. One of the most significant signs of structural changes in the agricultural sector is that the share of crops in total agricultural output fell from 82 percent in 1970 to 51–52 percent in 2005–2007.

Table 4: Output value shares in China's agricultural economy 1970–2007
(in percentages)

	1970	1980	1985	1990	1995	2000	2005	2007
Crop	82	76	69	65	58	56	51	52
Livestock	14	18	22	26	30	30	35	34
Fishery	2	2	3	5	8	11	10	10
Forestry	2	4	5	4	3	4	4	4

Source: NSBC, China's Statistical Yearbook, various issues and China Rural Statistical Yearbook, various issues.

Within the crops sector, the importance of the three major crops – rice, wheat and maize – have waxed and waned. The share of major cereal grains increased from 50 percent in 1970 to a peak level of 57 percent in 1990 and then gradually declined to less that 50 percent in 2005 (Table 5). Most of the fall has been due to decreasing rice and wheat sown areas. In contrast, the share of maize areas nearly doubled from 10.8 percent in 1970 to 19.2 percent in 2007 (Table 5). The increase in area for maize, China's main feed grain, is correlated with the rapid expansion of the nation's livestock production during the same period.

In addition to maize, other cash crops, such as vegetables, edible oil crops, sugar crops and tobacco, have expanded rapidly in area in recent years. In the 1970s, vegetables accounted for only about 2 percent of total crop area; by 2007, the share had increased by nearly six times (Table 5). Fruits experienced similar rates of expansion. The area devoted to edible oil also grew by two to three

Table 5: Shares of crop areas sown 1970–2007
(in percentages)

	1970	1980	1985	1990	1995	2000	2005	2007
Rice	22.1	23.1	21.9	22.3	20.5	19.2	18.6	18.8
Wheat	17.4	19.7	20.0	20.7	19.3	17.1	14.7	15.5
Maize	10.8	13.7	12.1	14.4	15.2	14.8	17.0	19.2
Soybean	5.5	4.9	5.3	5.1	5.4	6.0	6.2	5.7
Sweet potato	5.9	5.1	4.2	4.2	4.1	3.7	3.0	2.4
Cotton	3.4	3.4	3.5	3.8	3.6	2.6	3.3	3.9
Rapeseed	1.0	1.9	3.1	3.7	4.6	4.8	4.7	3.7
Peanut	1.2	1.6	2.3	2.0	2.5	3.1	3.0	2.6
Sugar crops	0.4	0.6	1.0	1.2	1.3	1.0	1.0	1.2
Tobacco	0.2	0.3	0.9	0.9	1.0	0.9	0.9	0.8
Vegetable	2.0	2.2	3.2	4.3	6.3	9.8	11.4	11.3
Others	30.1	23.5	22.5	17.4	16.3	17.2	16.2	14.9
Total	100	100	100	100	100	100	100	100

Source: NSBC, China's Statistical Yearbook, various issues; China Rural Statistical Yearbook, various issues.

times. Field interviews reveal that the livelihoods of the poor rely more on crops than on livestock and fishery. Within the crop sector, poorer farmers produce more grains than cash crops. These figures might suggest that the poor have gained somewhat less from the diversification of agricultural production during the reform period than farmers who are better-off.

2.3.3 Driving forces of agricultural growth

Past studies have already demonstrated that there are a number of economic factors that have simultaneously contributed to agricultural production growth during the reform period. The earliest empirical efforts focused on measuring the contribution of the HRS, which gave farmers land-use rights. This policy enabled the farmers to become richer. These studies concluded that most of the rise in productivity in the early reform years was a result of institutional innovations, particularly the HRS (McMillan *et al.*, 1989; Fan, 1991; Lin, 1992).

More recent studies show that since the HRS was completed in 1984, technological change has been the primary engine of agricultural growth (Huang and Rozelle, 1996; Fan, 1997; Fan and Pardey, 1997; Huang *et al.*, 1999 and Jin *et al.*, 2002). Improvements in technology have by far contributed the largest share of crop production growth, even during the early reform period. The results of these studies show that reforms other than de-collectivization also have high potential for affecting agricultural growth. Price policy has been shown to have a sharp influence on the growth (and deceleration) of grain and cash crops during the post-reform period. Favourable output to input price ratios contributed to the rapid growth in the early 1980s. However, this new market force is a two-edged sword. A deteriorating price ratio caused by slowly increasing output prices in the face of sharply rising input prices was an important factor behind the slowdown in agricultural production in the late 1980s and early 1990s.

Irrigation has played a critical role in establishing the highly productive agronomic systems in China (Wang, 2000). The proportion of cultivated area under irrigation increased from 18 percent in 1952 to approximately 50 percent after the early 1990s (NSBC, 2001). However, rising demand for domestic and industrial water uses poses a serious constraint to irrigated agriculture. Increasing water scarcity has come to be seen as a major challenge to the future food security and well-being of people, especially in the northern region.

2.3.4 Agricultural trade

While agricultural production was growing fast, agricultural trade was growing faster. The value of food and feed exports increased about four times, from approximately US$3.2 billion in 1985 to US$12.8 billion in 2000, and almost doubled in 2000–2005 (Table 6). Imports of food, feed and fibre also rose rapidly. However, from 1985 to 2005, exports of food and feed have risen faster than imports and since the early 1980s, China has been a net exporter of food and feed. Significant increases in fibre imports and a large deficit of fibre, mainly cotton, has been largely due to the rapid expansion of the export-oriented textile industry in China.

In the same way that trade liberalization has affected growth in the domestic economy (Lardy, 2001), changes in the external economy have affected China's agricultural trade patterns (Huang and Chen, 1999). Despite the overall positive growth of the agricultural trade, the share of agriculture in total trade fell sharply as trade expanded because growth in non-agricultural trade was much higher.

Disaggregated, product-specific trade trends in agriculture show equally sharp shifts (Table 6). The data presented in Table 6 suggest that exports and imports are moving increasingly in a direction that is consistent with China's comparative advantages. In general, the net exports of land-intensive bulk commodities, such as grains, fibre crops, oilseeds and sugar crops, have fallen, reflecting the increase in imports. At the same time, exports of higher-valued, more labour-intensive products, such as horticultural and animal (including aquaculture) products have risen. Grain exports accounted for nearly one-third of food exports in the mid-1980s. After the late 1990s, horticultural, animal and aquatic products accounted for about 70 to 80 percent of food exports (Table 6).

Table 6: China's food, feed, fibre and non-agriculture trade 1985–2005
(in million US$)

	SITC	1985	1990	1995	2000	2005
Exports						
Food and feed		3 183	7 515	10 900	12 804	23 420
Live animals and meat	00-01	429	1 221	1 822	1 619	2 234
Dairy products	02	34	79	75	104	180
Fish	03	154	1 370	2 875	3 661	7 527
Grains	04	917	614	281	1 812	1 836
Fruit and vegetable	05	433	1 760	3 401	3 362	7 431
Sugar	06	65	318	321	257	502
Coffee and tea	07	312	534	512	545	1 061
Animal feeds	08	225	758	351	303	497
Other foods	09	62	82	286	608	1 182
Oilseeds and vegetable oils	22, 04	552	780	975	533	971
Fibre	26	892	1 096	753	1 085	1 186
Non-agriculture		21 557	53 481	137 126	235 314	737 347
Imports						
Food and feed		1 437	4 460	8 825	8 648	20 747
Live animals and meat	00-01	24	68	115	667	691
Dairy products	02	29	81	63	217	461
Fish	03	41	102	609	1 217	2 904
Grains	04	829	2 353	3 631	662	1 640
Fruit and vegetable	05	16	83	185	516	1 349
Sugar	06	262	389	935	177	451
Coffee and tea	07	18	30	73	94	222
Animal feeds	08	79	305	423	909	1 307
Other foods	09	21	46	88	283	354
Oilseeds and vegetable oils	22, 04	118	1 003	2 702	3 906	11 368
Fibre	26	1 023	1 975	4 108	2 846	6 854
Non-agriculture		37 335	46 91	119 150	213 599	632 352
Net export						
Food and feed		1 746	3 055	2 075	4 156	2 673
Live animals and meat	00-01	405	1 153	1 707	952	1 543
Dairy products	02	5	-2	12	-113	-281
Fish	03	113	1 268	2 266	2 444	4 623
Grains	04	88	-1 739	-3 350	1 150	196
Fruit and vegetable	05	417	1 677	3 216	2 846	6 082
Sugar	06	-197	-71	-614	80	51
Coffee and tea	07	294	504	439	451	839
Animal feeds	08	146	453	-72	-606	-810
Other foods	09	41	36	198	325	828
Oilseeds and vegetable oils	22, 04	434	-223	-1 727	-3 373	-10 397
Fibre	26	-131	-879	-3 355	-1 761	-5 668
Non-agriculture		-15 778	6 570	17 976	21 714	104 996

Source: UNCOMTRADE.

2.4 Food security and nutrition

Ensuring national food security is one of the central goals of China's agricultural policy. China's effort and success in increasing food and fibre supply to meet its growing population in the past 50 years has been well recognized. Per capita food availability reached 3 040 kcal per day in 2000, a level that is 14 percent higher than the average of developing countries and 8 percent higher than the world average (FAO, 2002). China feeds more than 20 percent of the world's population with about 9 percent of the world's cultivated land. Moreover, China shifted from being a net food importer to a net food exporter in the early 1980s (Table 6). China is a developing country with one of the highest degrees of food self-sufficiency. Domestic food security in China contributes significantly to world food security. Given China's status as a net food exporter, it is clear that the increase in domestic food availability was achieved almost exclusively through increases in domestic production.

At the macro or national level, grain security has received the highest attention from national leaders. China had aimed for full self-sufficiency in total grain consumption before the 1990s. Since the late 1990s, leaders have set a target of achieving a grain self-sufficiency rate higher than 95 percent. To achieve these targets, China has invested heavily in irrigation and other agricultural infrastructure (Wang, 2000), research and extension (Huang *et al.*, 2000) and domestic production and marketing of chemical fertilizer and pesticides (Nyberg and Rozelle, 1999). In fact, China has been a net exporter of grain since the 1990s. Although China imports high quality Indica rice, it also exports Japonica rice and has been a net exporter of rice since the early 1980s. Imports of wheat have declined from more than ten million metric tonnes annually in the 1980s to nearly zero in recent years (NBSC, 1986–2007). Although in the coming decade, China will have to import maize to partially meet its growing demand for livestock feed, it was one of the world's major maize exporters from the late 1990s to early 2000. Annual maize exports reached more than 12 million metric tonnes in 2002 and 16.4 million metric tonnes in 2003. Despite maize exports declining significantly in recent years, China has not yet shifted from being a net exporter to a net importer of maize.

At the micro level, household or individual food security depends on factors related to various forms of entitlements to income and food-producing assets. Also important are the links between domestic and external markets and the access of small, low-income and resource-poor producers and consumers to external markets.

Access to food in rural China has changed over time. In the early years of the reform, de-collectivization policies gave all farm households in China a piece of land. During this time, however, markets did not function well. As a result, most farmers produced mostly for their own subsistence and access to food was primarily through the land that was allocated to farmers by the state.

As China has changed, so has the food economy and nowhere has the change been more noticeable than in access to food. Starting with a mostly subsistence agricultural economy, Chinese agriculture has become noticeably commercialized. On average, the share of total production that was marketed ranged from 54 percent for grain to more than 90 percent for fish in 2001 (Huang *et al.*, 2004). Even the poorest farmers marketed nearly all products they produced, though the rate of commercialization was less than among the richer Chinese farmers in 2001.

China's rural consumers still face a number of uncertainties in access to food, the nature of which is likely to differ from other countries. Production is often thought to be one of the most important sources of risk that will affect rural residents. In China this is less likely to be so. A much higher share of China's land (nearly 50 percent) is irrigated (NSBC 2001). A higher share of households (around 80 percent) is diversified by having at least one family member employed off-farm (de Brauw *et al.*, 2004). Giles (2000) showed that risks in China come from a number of non-traditional sources such as wages and rural to urban migration policy. With an increasing number of households relying on markets to procure their food, households also face rising market price risks.

Stability of food supplies and access to food by the poor are the other dimensions of food security. In this regard, the government has developed its own disaster relief programme. It also runs a national food-for-work scheme, although this is less for disaster relief and more for long-run investments. The nation's capacity to deal with emergencies has been demonstrated repeatedly during the reform period. For example, the government responded massively and in a timely fashion during the floods in the 1990s. Through these types of action, China's government has proven that its capacity to deal with the consequences of natural disasters is adequate. During the 1980s and early 1990s, one of the major constraints that affected the stabilization of food supply in China was the poor marketing and transportation infrastructure (Nyberg and Rozelle, 1999). However, transportation and market infrastructure have improved remarkably since the early 1990s. Huang and Rozelle (2006) showed that China's domestic food markets have been highly integrated since the late 1990s. The percentage change in price for every 1 000 kilometers of distance from port was only about 5 percent, which is very comparable with the figures in the United States.

2.4.1 Improvement of nutrition and challenges[4]

China's agricultural reforms had a huge impact on the capacity of farmers to feed the nation's population. The rural standard of living was significantly improved, leading to a dramatic fall in poverty. Based on China's official poverty line, the prevalence of people whose income was below US$0.60–0.70 per day fell from 33 percent of the population in 1978 to 3 percent in 2004. In 2002, China's households dedicated an average of 40 percent of their total expenditures to food, compared with 55 percent in 1990, indicating a great improvement in the standard of living.

Agricultural reforms had huge consequences for food security and the improvement of Chinese nutrition. In 1969–1971, 387 million people suffered from malnutrition (46 percent of the population). The number of undernourished people decreased from 304 million in 1979–1981 (30 percent of the population) to 193.6 million in 1990–1992, to roughly 150 million in 2001–2003 (12 percent of the population). This is in stark contrast to India, where the total number of undernourished people did not change dramatically over the last decade, barely decreasing from 215 million people in 1990–1992 to 212 million in 2001–2003 (representing 20 percent of the population).

Since 1978, staple food grain production in China grew significantly and therefore per capita food consumption increased. Daily energy intake reached about 3 000 kcal per capita in 2001–2003, compared with 2 330 kcal in 1979. As a comparison, the world's daily energy intake attained 2 804 kcal per capita. In Japan for example, average food consumption reached 2 761 kcal per day in 2002. By the late 1990s, per capita food availability in China already far exceeded the United Nations' minimum requirement of 2 100 kcal. The nutritional status of the Chinese population improved substantially. Rapid economic growth and food market development have boosted food demand. The market also offered more diverse and higher quality food.

Although the Chinese diet has always been principally plant-based, there have been significant changes to the Chinese dietary pattern since the economic reforms in the late 1970s. Currently, households generally consume fewer cereals (49 percent of total energy consumption) and more fruits and vegetables (7 percent). The daily consumption of fruit reached 38 grams per capita in 2004, compared with only 12 grams per capita in 1990. The daily protein intake increased from 54 grams in 1979 to 82 grams in 2003. The daily consumption of animal products rose in urban and rural areas, increasing the percentage of good quality protein from 17 percent of the total protein intake in 1992 to 31 percent in 2002. In 2004, the typical person in China ate about 77 grams per day of meat compared with 57 grams in 1989. The daily fat intake rose from 33 grams in 1979 to 90 grams in 2003. Energy sources have shifted from carbohydrates (69 percent in 1989 compared with 60 percent in 1997) to fat (19 percent in 1989 compared with 27 percent in 1997). These trends usually constitute positive developments in the diets of adults.

[4] This section is based on (and taken from) the material provided to us by the World Food Programme. The citation for this work is: Turgis et al., 2008.

Since the 1970s, the average height and weight of children have increased. This is a clear sign of better nutrition and health. Moreover, in 1998–2005, only 4 percent of infants were born with a low birth weight and the average weight of newborn babies reached 3 309 grams in 2002. The prevalence of underweight children under the age of five was 19.1 percent in 1990, compared with 11.2 percent in 2000. The prevalence of stunting among children under five fell from 33.4 percent in 1990 to 16.1 percent in 2000. Eight percent of the children under the age of five suffered from moderate or severe underweight status from 1996 to 2005. According to the Chinese Health Ministry, the average height of six-year-old boys rose from 112.3 cm in 1975 to 118.7 cm in 2005. The average height of girls of the same age rose from 111.5 cm in 1975 to 117.7 cm in 2005. They were more than 6 cm taller in 2005 than they were 30 years ago.

Despite major improvements, food insecurity remains a fundamental issue for many poor and remote households. Chronic malnutrition in rural areas may be due to constraints in local food production, shortage of income, limited access to public health services, distribution bottlenecks, lack of information and technology, inadequate water and sanitation and poor understanding of nutrition. The prevalence of underweight children under the age of five is greater in rural areas: 13.9 percent in 2000 compared with 3 percent in urban areas. Furthermore, the prevalence of stunting of children less than five years of age reached 20.5 percent in rural China in 2000, compared with 2.9 percent in urban areas. The prevalence of underweight children less than five years of age in western China is considerably higher than in eastern China: the average prevalence of underweight children among preschool children, aged zero to five, was 21.6 percent in western rural areas in 2000 and 9.6 percent in eastern rural areas. These figures highlight the issue of the improper use of complementary foods in infants in rural areas. Compared with the urban residents, rural males were 4.9 centimeters shorter in 2002 and females were 4.2 centimeters shorter. Differences in daily intake between urban and rural areas are still significant. In 2004, urban households consumed 80 grams per day of pork, compared with 54 grams per day in rural areas. While urban inhabitants consumed 25 grams of milk and dairy products daily in 2004, rural per capita consumption barely reached 6 grams.

Although China has achieved overall household food security, micronutrient deficiencies remain a major nutritional challenge, especially in some poor remote areas. Children under the age of two and pregnant women are highly vulnerable to iron deficiency anaemia, especially in rural areas of western provinces such as Guangxi, Guizhou or Xinjiang. The prevalence of anaemia decreased slowly in recent years; its prevalence dropped from 15.4 percent in 1992 to 12.9 percent in 2002 for rural males and from 20.8 percent to 18.8 percent for rural females. Moreover, while the average calcium intake among city and suburban residents was roughly 430 milligrams per day in 2004, it was only about 380 milligrams per day in rural areas and villages.

III. The policy environment

The rapid growth and radical transformation of China's economy and its agriculture did not happen without the input of government policy. In this section we explore a number of the main policies that have enabled China's economic change. Policy-makers have created and implemented policies in many areas to push forward China's reforms, however, this section will focus mainly on six areas: cultivated land management policy, agricultural R&D, marketing and pricing policy, fiscal policy and investments (in infrastructure and public services), labour mobility efforts and other policies.

3.1 Land policies

Prior to the economic reforms in 1978, China's cultivated land was farmed by groups of farmers in collectives. There was a single head of the collective who assigned work to the members. Members jointly carried out the tasks, including plowing, planting, fertilizing and harvesting, and were awarded work points for the number of days that they worked. At the end of the year, after paying an in-kind

tax to the state, the collective members divided the harvest among themselves based on the number of work points each member earned. While the system was established to take advantage of economies of scale, during the entire Socialist Period (i.e. 1950–1978), the increase in TFP in agriculture was essentially zero (Rozelle *et al.*, 2008). Per capita income in rural China was the same in 1978 as it was in the early 1950s.

In response to the perception that the system of collective agriculture was not working, China initiated the HRS in 1979. This reform radically altered the organization of production in agriculture and the incentives facing rural households (Rozelle *et al.*, 2008). The HRS reforms dismantled the collectively run agricultural organizations and contracted agricultural land to households, mostly on the basis of family size and number of people in the household's labour force. Most importantly, after the HRS reforms, control and income rights belonged to individuals. Land was not privatized, however. The ownership of land remained with the village of about 300 households or with a small group – "cunmin xiaozu" – of about 15–30 households. While farmers did not have the rights to sell their land, they were able to keep all of the grain and other earnings from the harvest. In the language of economics, farm households became the residual claimants to their efforts.

By 1984, about 99 percent of agricultural land was contracted to all individual households for 15 years. The average farm size was about 0.6 hectares. The size of farms varies among regions, ranging from more than 1 hectare in the Northeast to nearly 1 hectare in North China to about 0.5 hectares in the Southwest and 0.2 to 0.3 hectares in the South. Because the multiple cropping index increases from one in the Northeast to two or three crops in South China, there are fewer variations in sown area among China's regions than there are in farm size.

The impact of the HRS reforms could not have been more dramatic (Lin, 1992). Productivity rose. Output rose. Incomes rose. It is often thought that this rise in the vibrancy of the rural economy was one of the real triggers for economic reform in China (Rozelle *et al.*, 2008).

During the 1980s and 1990s, there were concerns about the long-term sustainability of the reforms. There were those who worried that land rights were not secure. Contracts were only for 15 years in the early 1980s. There was concern that productivity was flagging due to weak land rights (Wen, 1995). A lot of research by others (summarized in Brandt *et al.*, 2002) showed that the system of land rights initiated by the HRS reforms was mostly beneficial to farmers and that the cost of insecure tenure rights in terms of output was not that high, at least in the short run.

Although most policy debate has abated, leaders did seem to come to a consensus. One of the most important changes in recent years has been that the duration of the land use contract was renewed for an additional 30 years after the first contract of 15 years expired. This happened in the late 1990s. By 2000, about 98 percent of villages had amended their contract with farmers to reflect the longer use rights (MOA, 2001). Cultivated land is not private, but use rights were granted to 2028.

With the issue of use rights resolved, the government is now searching for a mechanism that permits the remaining full-time farmers to gain access to additional arable land and increase their income and competitiveness. One of the main efforts is the new RLCL. The Standing Committee of the National People's Congress approved the law in 2006. According to this law, although the property rights for the ownership of the land remains with the collective, the contract holders have almost all of the other rights that they would have had under a private property system. In particular, the law clarifies the rights for transfer and exchange of the contracted land. This element may already be in effect as researchers are finding that increasingly more land in China is being rented. Part of the law also allows family members to inherit the land during the contracted period. The goal of this new set of policies is to encourage farmers to raise the productivity of the land.

Even after the passing of the RLCL, village leadership in some parts of China continued trying to interfere with the legislated rights of farmers (Rozelle *et al.*, 2008). Others wanted to strengthen the

rights of farmers with respect to their cultivated land (Zhang *et al.*, 2008 discusses this). In response to this ongoing debate, China's central leadership has started to think about how to further strengthen the rights of rural families over their cultivated land. The recent pronouncements coming out of the Third Plenary Session of the 17th Central Committee of the Communist Party of China are basically an attempt to try to push forward the implementation of the RLCL. There is a perception that despite the RCRL, tenure security is still weak. With weak tenure, farm size and the quality of the investments are limited. Without secure tenure, rural residents do not have the asset base to access loans, to finance moves to the city or to expand their off-farm businesses. The debate in China is now on whether or not the rural economy is ready for indefinite, titled land security. Fully secure tenure will probably not occur immediately, but the possibility will get stronger with the continued efforts of reformers.

3.2 Development and dissemination of agricultural technology

The importance of agricultural research and extension in increasing agricultural productivity in developing countries is now widely recognized. Successful development has been shown to be tied closely to productivity growth in the agricultural sector (World Bank, 2008). In a country like China, where small farms and poor households dominate agriculture, it is even more important.

During the reform era, it was not always clear whether China would be able to maintain the pace of technological advance needed to maintain farm incomes in a dynamic economy. De-collectivization played the key role in boosting productivity (Lin, 1992) in the early stages of reform; however, since 1985 the evidence suggests that technological advance has been the main engine of productivity growth (Huang and Rozelle, 1996). China was one of the first countries to develop and extend Green Revolution technology in the 1960s, 1970s and 1980s. China's scientists developed hybrid rice in the late 1970s and until the mid-1990s, China was the only country in the world to have commercialized this new technology.

Despite these and other successes, China's system of agricultural research faced great challenges by the late 1980s (Pray *et al.*, 1997). Research investment, almost totally publicly funded, was declining. Incentives were poor and funding was being allocated in ways that did not always reward excellence. The system was not responding to many demands for new technologies and the extension system was in shambles.

Nationwide reforms in research were launched in the mid-1980s (Pray *et al.*, 1997). The reforms attempted to increase research productivity by shifting funding allocation from support of institutions to competitive grants, supporting research useful for economic development and encouraging applied research institutes to support themselves by selling the technology they produced. In addition, in the late 1980s and early 1990s, new horticultural seeds, improved breeding livestock (Rae *et al.*, 2006) and better dairy technologies were mostly imported (Ma *et al*., 2006).

After declining between the early 1980s and the mid-1990s (Pray *et al.*, 1997), investment in R&D also began to rise. Funding was greatly increased for plant biotechnology, although only Bt cotton has been commercialized in a major way to date (Huang *et al.*, 2002; 2003). China now ranks among the global leaders in agricultural biotechnology. In the late 1990s China invested more in agricultural biotechnology research than all other developing countries combined. Its public spending on agricultural biotechnology was second only to the United States and, according to some projections, China will soon outspend the United States government on plant biotechnology research. Investment in government-sponsored R&D increased by 5.5 percent annually between 1995 and 2000 and by over 15 percent per year after 2000 (Hu *et al.*, 2007). During the past decade, China's increase in investment in rural R&D has been the most rapid of any large nation.

The investment in R&D has been paying off. During China's early reform period, the yields of major food crops rose steadily (Table 7). Some of that yield increase arose from greater efficiency in use of

inputs and some of it appears to be as a result of technological improvements. This is because indices of aggregated inputs (i.e. measures of land, labour and material inputs) for rice, wheat, and maize fell for all the crops during the early 1980s (Table 7).

Although there was concern about the effect of the slowdown in R&D spending during the 1980s and early 1990s, the analysis shows that the growth of output continued to outpace that for inputs (Table 7) and productivity trends continued to rise (Table 8). During this time and also during the early reform period, China's TFP rose at the healthy rate of about 2 percent per year. Such rises, which occurred in all provinces and with all crops, could not have helped but increase the incomes of all farmers, regardless of whether the crop was being protected or taxed.

Table 7: Annual growth rate of yield and total input cost of main grain crops in China 1985–2004
(in percentages)

Crop	1985–1994		1995–2004	
	Yield	Input	Yield	Input
Early Indica	0.05	1.72	0.08	-2.31
Late Indica	1.37	2.12	0.80	-1.16
Japonica	1.79	3.99	0.17	-1.99
Wheat	2.84	2.58	1.38	-0.22
Maize	3.66	1.87	1.04	-0.63
Soybean	0.71	2.24	1.06	-1.36

Data source: Jin *et al.*, 2007.

Table 8: Annual growth rate of grains' TFP and decomposition into technical efficiency (TE) and technical change (TC) in China, 1985–2004 (in percentages)

	1985–1994			1995–2004		
	TFP	TE	TC	TFP	TE	TC
Early Indica	1.84	-0.03	1.88	2.82	0	2.82
Late Indica	1.85	0.26	1.59	2.92	0.21	2.71
Japonica	-0.12	-0.37	0.26	2.52	0.15	2.37
Wheat	0.25	1.08	-0.83	2.16	1.06	1.10
Maize	1.03	0.61	0.42	1.70	-0.23	1.94
Soybean	0.11	0.19	-0.09	2.27	-0.08	2.35

Data source: Jin *et al.*, 2007.

While it is possible that the extension of new technologies might have favoured well-off farmers at the expense of poorer farmers, in the case of China this does not seem to have happened. In papers by Huang *et al.* (2002, 2007), it was shown that poor, small-scale farmers are just as likely as better-off farmers to adopt new technologies when they are released. A paper by Jin *et al.* (2001) showed the TFP in poorer areas also rose very quickly. There is no measurable negative impact of the extension of new agricultural technologies on the poor in China.

3.3 Policies to encourage market integration and efficiency

Price and marketing reforms were implemented gradually (Sicular, 1995) and have been key components of China's transition strategy from a centrally-planned to a market-oriented economy. Initially, there was little effort to move the economy to one in which most resources and factors were allocated according to market price signals, however, over time the government's position on market

reform has evolved. As officials in charge of the overall economic reforms began to be committed to using markets as the primary means to allocate resources for the economy, their commitment to allowing markets in agriculture also deepened (Sicular, 1995).

As markets began to emerge, China's leaders took steps to encourage the efficiency of markets and, perhaps more importantly, stepped aside and allowed them to expand in an environment with minimal distortions. Above all, national and regional governments invested in hardware, such as roads, landline telephones and cellular technology, which reduced transaction costs and accelerated the flow of information and goods (Park *et al.*, 2002). Many regional and local governments invested in marketing sites and tried to attract commercial interests to set up businesses. Finally, except for a short period in the late 1990s, government officials stepped back and allowed the entry of private traders and private transport and did little to interfere with markets. Licensing fees and taxes were low or non-existent. Markets were encouraged for agricultural outputs and inputs.

In assessing the health of the rural economy, it is important to understand how China's markets function. Markets, whether classic competitive ones or some workable substitutes, increase efficiency by facilitating transactions among agents to allow specialization and trade and by providing information about the relative scarcity of resources through a pricing mechanism. With better markets, producers can begin to specialize, become more efficient and increase their incomes.

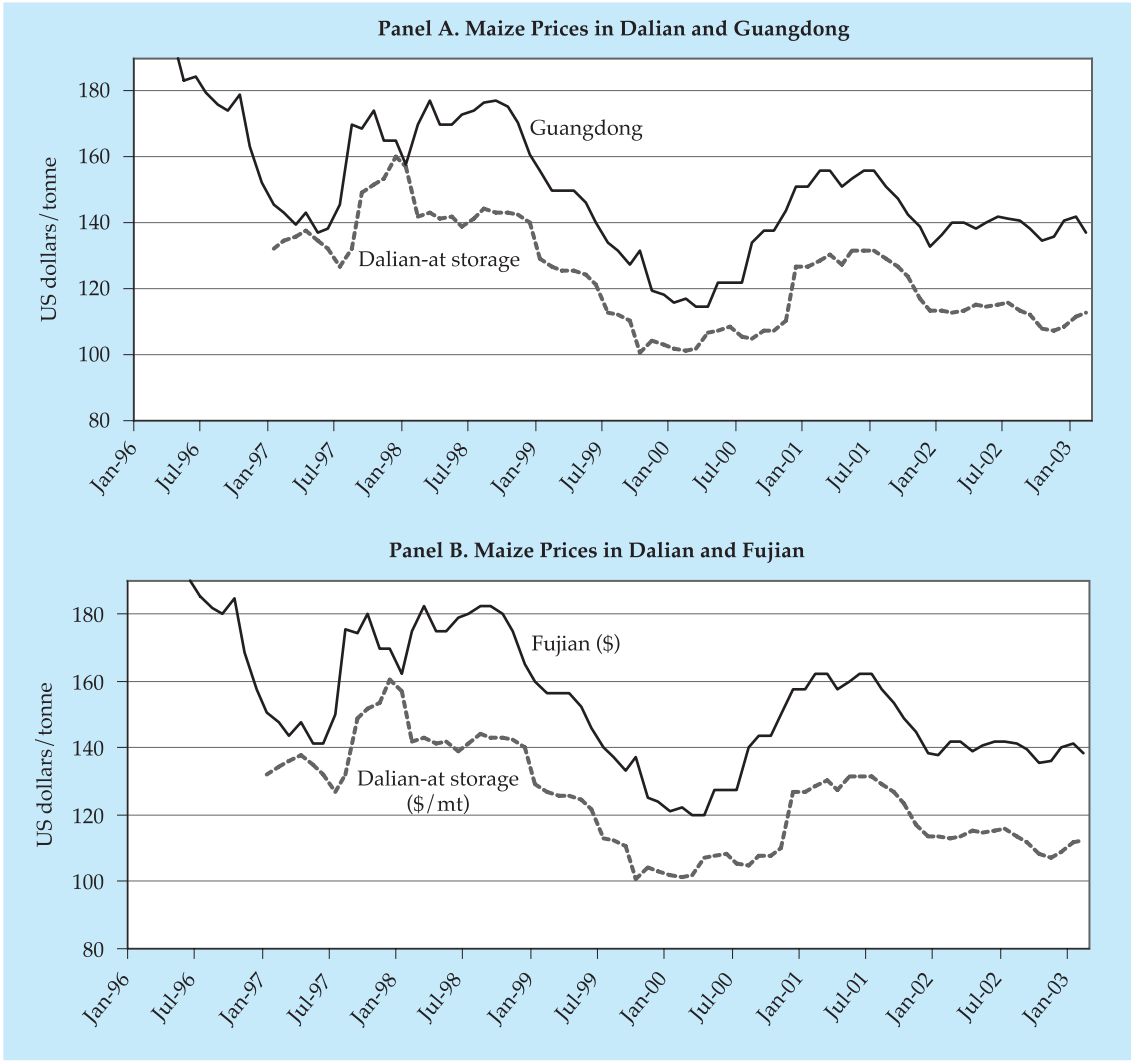
According to price data from private reporting stations and information firms, it appears that China's markets function relatively well. For example, maize prices in different cities of Northeast China track each other closely (Figure 1). Soybean prices in markets of different regions of the country move almost in perfect concert with one another (Figure 2). When systematically looking at the integration of markets across time, it can be shown that the share of markets that are integrated has risen from around 50 percent in the early 1990s to nearly 100 percent in the early 2000s (Table 9). Rice markets have also been shown to function as well as or better than those in the United States in terms of the efficiency of moving commodities among China's producing and consuming regions (Huang *et al.*, 2004). Horticultural, dairy and livestock markets are all dominated by millions of small-scale traders who are operating in extremely competitive environments (Rozelle *et al.*, 2008).

The improvement in markets has allowed individual producers to specialize as never before. According to one national survey, the number of villages that have become specialized producers of a single commodity rose from less than 20 percent in 1995 to nearly 40 percent in 2004 (Rosen *et al.*, 2004). Such integration has allowed relatively small-scale and poor farmers to participate in emerging markets and to accrue the substantial income gains associated with moving from subsistence to a market orientation (Wang *et al.*, 2007; Balat and Porto 2006). In fact, in a recent survey of the greater metropolitan Beijing area, it was found that poor farmers living in poor villages were the main beneficiaries of new demands for horticultural commodities.

Most importantly, according to de Brauw *et al.* (2004), when markets in China have begun to become more competitive, they have led to rising productivity and efficiency. The link between improved markets and rising incomes is important. Even where market and trade liberalization has reduced protection and adversely affected income, the rising productivity and efficiency effects have at least partly offset these negative impacts. This interpretation is supported by the modelling work in Huang and Li (2003) which finds that when trade policy positively affects some prices (e.g. horticultural crops) but negatively affects others (e.g. wheat), farmers mitigate the downside effects by transferring production into the commodities with rising prices.

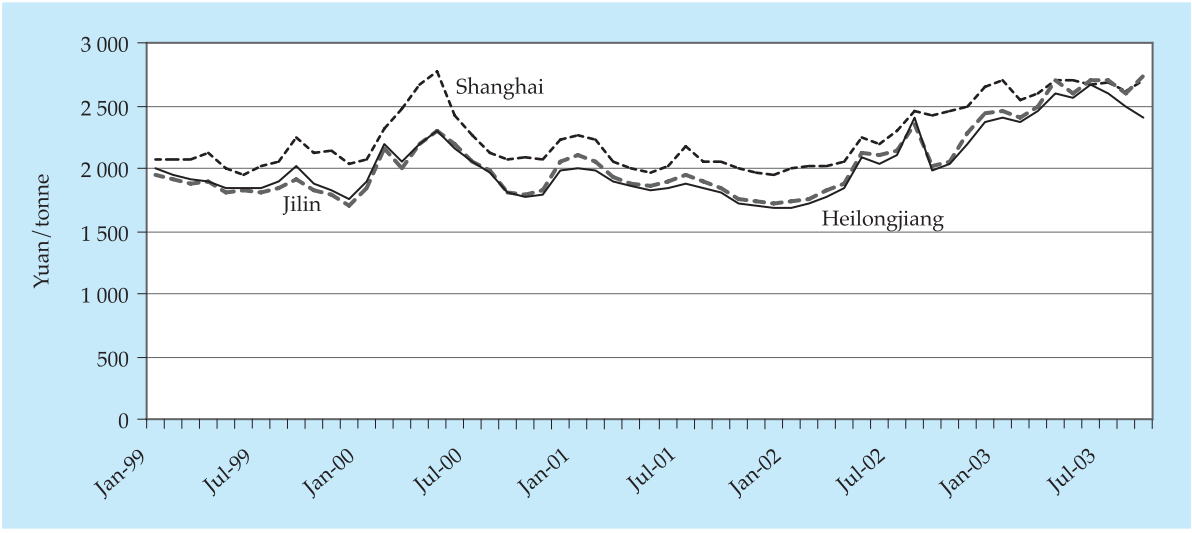
In the wake of China's domestic market liberalization, policy-makers in recent years have been concerned about the possible effects on incomes if there were ever a severe drop in agricultural prices. The fear of the government is that low prices might adversely affect both national food production and farmer incomes. In response, the government began to plan for such a contingency by announcing a "minimum agricultural pricing policy." According to its design, the policy is

Figure 1: Maize prices in Guangdong, Fujian and Dalian January 1996 – February 2003



Source: Huang and Rozelle, 2003.

Figure 2: Soybean prices in key markets across China, 2001–2003



Source: Huang and Rozelle, 2004.

Table 9: Percentage of market pairs in rural China that tested positive for integration based on Dickey-Fuller test 1988–2000

Commodity	1989–95	2000–2003
Maize	28	98
Soybeans	28	100

Note: Results are for two periods from the same data set. For results for 1989–1995 for maize, see Park *et al.* (2002). Results for soybeans for 1989–1995 and all results for 2000–2003 are from the authors (Huang and Rozelle, 2006).

supposed to work by authorizing managers of grain reserves to begin to buy grains (e.g. rice, wheat and maize) aggressively when the market price reaches a pre-set minimum. Although the policy does not authorize the grain managers to give farmers a certain price for any grain sold to them, it does authorize them to procure grain and place it in storage. With less grain on the market, prices should be stabilized.

Unfortunately, it is impossible to know how well this policy works, because it has never been tried. Since its conception over the past several years, price pressure has been high. The biggest issue in China's agricultural pricing was how to keep prices from rising. Therefore, it is unclear how this policy will work when prices begin to fall.[5]

3.4 Public fiscal reforms and investment in agriculture

China has implemented several reforms to strengthen its fiscal revenue and public investment. The government has made considerable progress in shoring up public finances since the early 1990s. The 1994 fiscal reforms have reversed the unsustainable trend of ever lower budget revenues and increased the central government's share in the total national revenues. China's government spending (including extra-budgetary and social security funds) was about 25 percent of GDP in 2006, comparable with the lower-income countries in the Organisation for Economic Co-operation and Development (OECD) and higher than most East Asian countries, including East Asian newly industrialized economies. Overall, China has maintained a prudent fiscal policy with deficits and debt that are low in terms of GDP and higher government spending that has appropriately stimulated the economy.

Government expenditures in most areas of agriculture have increased gradually during the reform period, but the ratio of agricultural investment to agricultural gross domestic product (AGDP) had monotonically declined from the late 1970s to the middle 1990s. In 1978, officials invested 7.6 percent of AGDP in the agricultural sector. By 1995, the proportion of AGDP committed to investment fell to 3.6 percent (NSBC, 2001). Moreover, a significant capital outflow from agriculture to industry and rural to urban areas occurred during the 1980s and 1990s through the financial system and government agricultural procurement (Huang *et al*., 2006; Nyberg and Rozelle, 1999). After the mid-1990s, the nation significantly increased its investment in agriculture and rural development and reduced and eventually eliminated agricultural taxes after 2005/2006.

3.4.1 Investment at the local level

Any visitor to rural China's villages is usually struck by one thing: agriculture is still being carried out in many environments that can only be described as backward. Except in a few suburban and coastal regions, the infrastructure in rural China is extremely poor. Roads and bridges, irrigation

[5] For those interested in China's price management during the recent world food crisis, read Yang *et al*. (forthcoming).

Table 10: Number and size of public goods projects (regional population weighted) 1998–2003

Project	Number of projects	Average size (in 000 yuan)	Average size* (in 000 US$ PPP)	Accumulated distribution of projects (%)
Roads and bridges	1 266	112	62	21.2
Grain for green	892	67	37	36.1
School construction	850	99	55	50.3
Irrigation and drainage	819	65	36	64.1
Drinking water	636	75	42	74.7
Loudspeaker for village committee	379	60	33	81.0
Recreation centre	262	50	28	85.4
Build clinic	163	25	14	88.2
Beautify environment	157	24	13	90.8
Watershed management	151	298	166	93.3
Forest closure	140	34	19	95.6
Land leveling	124	136	76	97.7
Eco-forest	55	34	19	98.6
Land improvement	52	110	61	99.5
Build pasture	19	134	74	99.8
Other public project	10	244	136	100.0
N/mean	5 975	108		--

*The following conversion rate is used: 1.80 yuan = US$1 in PPP terms.

Data source: Luo *et al.*, 2007.

and drainage, drinking water, schools and health facilities are far from modern and decades behind the infrastructure in China's cities. Yet development economists know that for a country to modernize, its infrastructure has to be able to support the production and marketing activities of a complex economy.

Although the stock of infrastructure is poor, there have been improvements in recent years. Research has shown that, on average, each village in China had about one infrastructure project during the late 1990s. This is far higher than in most other developing nations in Asia. In recent years, the level of investment activity has risen sharply to almost one project per year (Table 9) (Luo *et al.*, 2007). Most of these projects are for development of public goods rather than orchards in which governments frequently invested during the 1980s. In addition, research suggests that this investment is being targeted fairly well, with increasing amounts going to the poor, minorities and remote parts of China.

Although the level of public goods investment per capita has risen from about US$40 to US$100 in PPP terms, it is still far below the levels that were enjoyed by rural residents in Japan during the 1950s and Republic of Korea during the 1970s (Luo *et al.*, 2007). Quality, while rising, is still low in many villages (Liu *et al.*, 2007). China is just beginning the process of narrowing the gap between rural and urban infrastructure and it will take an enormous and sustained effort to transform the rural economy.

3.4.2 Education and health programmes

Rural services, particularly education and health, are perhaps the weakest parts of the rural economy, despite the recognition by development economists of their importance. Rural education by any measure is abysmal. Fees until recently were high, even for elementary school. Buildings and

equipment are outdated and poor. Teaching quality is poor. There is evidence that even as the nation accelerates its drive towards industrialization and urbanization and agriculture becomes more complex and demanding, China is not providing enough education for its rural population. Fewer than half of the rural students who entered primary school continued onto high school. Tuition and associated fees represented an estimated one-quarter of total expenditure for many poor households. Partly because fees are so high, participation rates in high school grades 10–12 are less than 15 percent for the rural population in China's poor areas. A national survey found that nearly half of rural residents believe education has not improved in recent years (Liu *et al*., 2007).

There has been a new surge of government interest in improving and reducing the cost of rural education, especially in poor areas. In 2005, fees for elementary schools were eliminated in poor areas and in 2006 this was expanded to the entire rural economy. By 2007 all compulsory education (i.e. grades one through nine) was free. The income effects of such policies are potentially enormous. Huang *et al.* (2004) showed that the elimination of government tuition fees provided a benefit more than twice as large as the losses resulting from tariff reductions for China's protected crops. The nation has also launched a massive investment effort to improve the quality of facilities and teachers. There is still a long way to go, but the foundation of tomorrow's labour force, inside and outside of agriculture, is being built.

National and regional governments have also begun to build a rural health care programme. The New Cooperative Medical System lacked funding, but demand for its services was high. By 2007 the government was investing up to 40 yuan (RMB) or US$5.30 (US$22 in PPP terms) per capita in the programme. In 2008 it was announced the investment would rise even further. However, the programme is only covering a small fraction of rural out-of-pocket medical costs. Many individuals in rural areas report that they do not seek health care because it is too expensive. Keeping a healthy and well nourished population is an important part of China's past, present and future success and will remain a key challenge. For more information, see Yi *et al.* (2008).

3.4.3 Farm subsidies and taxes

The government launched a massive programme of direct subsidies in 2004 and this programme is projected to expand further in the coming years; the government currently is debating by how much to increase these direct subsidies. Designed in part to boost production of grains for national food self-sufficiency and in part as a rural income transfer programme, the national Subsidy Programme is a combination of four programmes: a subsidy for farmers in areas that grow grain, a nationwide seed subsidy programme, an input subsidy to help farmers cope with the rising costs of fertilizers and other inputs and a general transfer programme. Nearly 80 percent of farm households receive subsidies. Participation in the programme is as high in poor areas as it is in higher-income areas (Tan *et al*., 2006). By the second year, between the grain subsidy and seed subsidy programmes, many farmers were receiving about 20 to 30 yuan per mu[6] or US$3 to US$4 (US$11 to US$17 in PPP terms).

In addition to subsidies, the national government has eliminated almost all taxes and fees in rural villages. In 2001 and 2002, all fees were converted to a single agricultural tax that was not to exceed 8.5 percent of a household's or a village's gross value of agricultural output. However, no sooner had this been implemented then the tax was eliminated. By 2007, surveys showed that farmers were paying almost no taxes. Although farmers were being taxed by a number of different instruments before 2000, the elimination of taxes and the emergence of subsidies have become fixtures in the rural economy over a short period of time.

There is also a new low-income programme that is being launched nationwide. The idea of the programme is to begin to develop a social security system that can put a safety net under those in

[6] Fifteen mu are equivalent to 1 ha. Mu is a Chinese measuring unit for land.

Table 11: Off-farm employment participation by members of rural labour force by age cohorts in China 1990–2007

Age cohorts	Percentage with off-farm work in:		
	1990 (de Brauw *et al*., 2002)	**2004** (Zhang *et al*., 2008)	**2007** (Zhang *et al*., 2008)
16–20[a]	23.7	78.6	93.1
21–25	33.6	82.8	87.5
26–30	28.8	71.0	76.4
31–35	26.9	65.1	67.2
36–40	20.5	54.0	65.7
41–50	20.8	44.0	54.1

[a] excluding those who are in school

the rural economy. The current annual payments of around 200 RMB or US$26.30 (US$111 in PPP terms) are low; however, the coverage is quite broad. A recent survey by the Centre for Chinese Agricultural Policy has found that 6 percent of rural households nationwide and more than 10 percent of households in poor rural areas are being given these transfers. If the annual amounts are increased in the future, this will certainly play a key role in eliminating a large part of the remaining absolute poverty and poor nutrition.

When added together, the recent policy innovations in rural infrastructure, free rural school tuition, grain and other agricultural subsidies, tax reductions and health insurance subsidies are substantial. These government programmes have contributed significantly to the observed improvements in household incomes in rural areas.

3.5 Improving mobility of labour out of agriculture

China began the reform period under study with most of its work force in agriculture. According to development economists (e.g., Gillis *et al.*, 1996), if China is to be considered successful in modernizing the nation, it will have to significantly reduce the percentage of its total work force in agriculture by the time it reaches high-income status. In the early years of China's reforms, there were those who resisted this idea. Some officials thought that it would be more attractive if China could keep most of its rural labour force on the farm, thereby avoiding the massive urbanization typical of the more successful developing countries.

It is clear in recent years that there has been acceptance of the need to shift most of China's rural labour force from the agricultural to the industrial and service sectors and, in the process, to urbanize. This consensus is reflected in recent policies that grant rural migrants many more rights than they had in previous years. There are policies that help migrants obtain legal status in the cities and get more protection in the labour force and that try to facilitate migrants' access to health and education services. These changes are derived largely from a leadership that has accepted the fact that most of the labour force in developed countries are in the industrial and service sectors and most of the population is in urban areas.

So can this shift in policy be associated with changes in the rural labour force? The rate of migration out of agriculture is consistent with China's growth path and is one of the most rapid ever observed. More of the new employment opportunities are in cities and there are more than 170 million rural migrants in China's cities today. The 80 million self-employed persons in rural China are shifting into more sophisticated, capital-intensive and profitable industrial and service enterprises.

Have farmers benefited? Undoubtedly, migration is one of the driving forces of the increase in the welfare of the rural economy. Rozelle (1996) showed how getting access to a job off the farm was the most effective way for rural households to raise their incomes. In their paper, de Brauw and Giles (2008) link migration to rising rural incomes and falling rates of poverty.

During the 1980s and early 1990s, there was a downside to the rise of off-farm employment and migration: inequality rose within the rural sector because some families got jobs off the farm and saw their incomes rise while others did not (Rozelle, 1996). However, as the number of households with members in the off-farm sector has risen, most households now have at least one person working off the farm and income inequality within the rural areas is falling because of migration (Rozelle *et al.*, 2008).

Although more than 60 percent of the rural labour force already has off-farm jobs, there are still approximately 200 million rural people who do not. Many of the jobs in off-farm are low skilled and wages are still low. What are the constraints to making more permanent shifts of labour from rural to urban settings and from agricultural to industrial and service sectors? Having enough jobs is certainly one constraint, but beyond the need to create more jobs, there are other barriers. In almost all rapidly growing economies, low human capital is frequently seen as the most serious constraint to get off-farm jobs. These usual deterrents to out-migration are compounded by a number of factors specific to China. One is the *"hukou"* residence permit system which has restricted the mobility of labour into urban areas (Zhao, 1999). Another is the land tenure system, in which households that leave the agricultural sector are not able to collateralize their land. There are still villages in which out-migrating families are pressured to relinquish their land, despite the existence of policies to prevent that (Zhao, 1999).

3.6 Other policies

In addition to China's policies discussed above (i.e. policies regarding cultivated land, agricultural technology, promotion of markets, investment in agriculture and the rural economy and rural labour market initiatives), there are others that should be addressed. However, space limitations preclude coverage here. In this section, some of the omissions are noted and referenced to other papers.

The most glaring omission is probably that of agricultural trade policy. Trade is important because it provides export opportunities to farmers, increases industrialists' and consumers' access to better and less expensive commodities and allows China's policy-makers to receive price and other signals from world markets.

In fact, China has been very successful in its efforts to liberalize agricultural trade. Trade barriers have fallen. Rights to import have been extended in the case of most commodities to thousands of private traders and trading enterprises. Non-tariff barriers have also been reduced. There is a lot of evidence that China has responded to signals from world markets and made sharp adjustments in its production structure to better reflect its comparative advantage. At the same time, China has taken actions to try to minimize the impact on those who have been hurt by trade liberalization. The interested reader should consult Huang *et al.* (2004) for more details on these shifts.

There also has been a great deal of effort in water policy. Prior to economic reform, most of the state's effort was focused on building dams and canal networks. After the 1970s, however, China embarked on a course of action in which it historically had little experience. Greater focus was put on increasing the use of China's massive groundwater resources (Wang *et al.*, 2005). By 2005, China had more tube wells than any country in the world, except possibly for India. Initially, local governments invested with aid from county and provincial water bureaus. By the 1990s, the government was encouraging the huge shift in ownership that was occurring as pump sets, wells and other irrigation equipment went largely into the hands of private farming families (Wang, 2000). At the same time, private water markets (where farmers pump water from their own wells

and sell it to other farmers in the village) were also encouraged. The main policy initiative after the mid-1990s in the surface water sector was management reform to make water use more efficient. Today Chinese agriculture is one of the most irrigated in the world. China's surface water management and flood control are advanced and carefully maintained.

So what has been the effect of this effort in groundwater investment? On the one hand, new sources of groundwater are increasing agricultural cultivated area and have been shown to increase farm income and productivity (Huang *et al.*, 2006). The privatization movement has made water management more efficient (Wang *et al.*, 2008). However, China's groundwater in many places today is in crisis. Groundwater tables are falling and many wells are being pumped dry. While China's immediate future in these areas is not in danger, sustainability issues need to be addressed in the long run. For the interested reader, Wang *et al.* (2008) may be the best source for an understanding of China's agricultural water management policies, policy successes and continuing challenges.

Many policies and other factors beyond agriculture affect the agricultural sector. Other rural policies, such as those that govern township and village enterprise emergence and privatization and rural governance, certainly have large indirect effects on agriculture. Urban employment policies, residency restrictions, exchange rate management and many other policy initiatives also affect agriculture by influencing job availability, relative prices and quality of life on the farm. An edited volume by Brandt and Rawski (2008) is perhaps the best overall source about economic reforms and current and future economic policy issues.

IV. Summary and lessons

China's economic reform policies have had a dramatic effect on China's agricultural sector. They have increased output of food, driven prices down and improved supplies of non-grain food and raw materials for industry. These policies regarding pricing, property rights, market liberalization, investment and trade have also made producers more efficient. They have freed labour and other resources that are behind the structural transformation in the agricultural and rural economies.

Agriculture in China is beginning to play an effective role in the nation's development. China has been moving from a grain-based agriculture to a more diversified and high-value agriculture. Rising agricultural productivity has also provided a foundation for China's industrialization. Food prices remain low and the calories available for the population are more than sufficient. Rural incomes and productivity are both up.

Many of the improvements in welfare have been generated by individuals, through whom more than 200 million rural households have been able to move from grains to high-value crops, from crops to livestock and fisheries production and from agriculture to off-farm jobs in the city.

4.1 Main challenges in development

While the progress in agriculture has been notable, there are also many challenges ahead. Having mostly completed the transition from a planned to a market-oriented rural economy, China's main challenge has shifted to broader development issues. In the coming years, the development process will have to be fundamentally different from that of previous times when meeting the nation's food needs, poverty reduction and economic growth were the main goals. Challenges for the future include inequities and widening income gaps, the impact on the environment and natural resources and food security.

4.1.1 Equity and income distribution

China's rapid economic growth has been accompanied by widening income inequality. Regional income disparity has been increasing since the 1980s (Cai *et al.*, 2002; World Bank, 2002). Eastern China grew faster than Central or Western China. Rural reforms increased rural incomes at a faster pace than urban incomes during the early 1980s. This led to a decline of the urban to rural income ratio from 2.57 in 1978 to 1.86 in 1985. However, after the impact of the rural institutional reforms was exhausted, income growth in the urban sector was consistently higher than in the rural sector. By 2004, per capita income in urban areas was 3.21 times that in rural areas (NSBC, 2005). Rising income disparity within rural areas has also emerged. For example, the Gini coefficients in rural areas increased from 0.24 in 1980 to 0.31 in 1990 and to 0.37 in 2003 (NSBC-Rural Survey Department, 2004).

While land policy helped China increase agricultural productivity in the early reform period and contributed significantly to reducing China's rural poverty, land holdings are so small that farming activities alone cannot continue to raise the incomes of most rural households. The challenge is how China can effectively establish linkages between rural and urban areas and encourage the large labour shift out of agriculture. There is also a danger that small-scale, poor, undereducated farmers may not be in a position or have the incentive to make farming decisions that are conducive to long-term, sustainable development.

In the coming years, concerns about income inequality will need to be faced. Policies regarding investment in agriculture, investment in infrastructure, labour mobility and development of public services will play a major role in this issue.

4.1.2 Natural resources and the environment

While successful technological innovations will help China increase its agricultural productivity, China may face great challenges with water scarcity. Water shortages and increasing demands for water for industrial and domestic uses present obstacles to achieving large gains in the areas under irrigation and the total output from irrigation expansion (Lohmar *et al.*, 2003). This is particularly important in the North China Plain, where most of China's wheat and some maize are produced.

Trends in environmental degradation suggest that there may be considerable stress on the agricultural land base. While judicious use of modern technologies is essential to efficient food production, inappropriate use of technologies, such as excessive application rates or imbalances in the combination of inputs, can result in serious environmental problems and food safety concerns. China is now the world's leader in both chemical fertilizer and pesticide consumption. Intensive fertilization and pesticide use can have adverse effects and is generating concern about contamination of farm products and damage to the agro-ecosystem and human health. Environmental stresses have also been occurring in soil erosion, salinization, loss of cultivated land and a decline in land quality (Huang and Rozelle, 1995). Deng *et al.* (2006) showed that although China did not record a decline in total cultivated land from the late 1980s to the late 1990s, average potential productivity of cultivated land, or bio-productivity, declined by 2.2 percent over the same period. A large decline in cultivated land was recorded after the late 1990s due to industrial development and urban expansion.

Pressures on the environment undermined progress in food production and productivity in the past and they will remain major concerns for future nutrition.

4.2 Prospects for China's agriculture and lessons for other nations

China has achieved remarkable economic growth and structural change during nearly three decades of economic reform. During the 1980s, 1990s and early 2000s, China has become one of the fastest growing economies in the world. GDP grew at nearly 10 percent annually over the past 30 years.

During the reform period, rural and urban incomes increased noticeably. The rising income has also been associated with substantial reduction of poverty and significant improvement in food security.

China's rapid growth would not have been possible without its domestic economic transformation and its "open-door" policy. Successful growth of the agricultural sector facilitated the transition from a rural to an urban economy and from an economy based on agriculture to one based on industry and services. The growth in agricultural productivity enabled China to release its large pool of rural labour to industrialize its economy. Rising international trade and FDI also provided economic growth and facilitated China's structural changes towards more competitive sectors. The structural changes occurred not only between agriculture and industry, but also within the agricultural sector.

Food security has been one of the central goals of China's agricultural policy. Since the early 1980s, domestic reforms to boost agricultural growth and farm income have been applied throughout the economy, including land reform, reform of input and output markets, policies affecting the agricultural sector and macroeconomic policy. China has strengthened its ability to feed a growing population with extremely limited natural resources and has become a major food and agricultural exporter. Per capita availability of food, household food security and nutrition have all improved significantly. Increased domestic production is mainly responsible for increased per capita food availability.

China's experience demonstrates the importance of technological development, institutional change, market liberalization, public investment and other supportive policies in improving agricultural productivity, farmers' income and food security in a nation with limited land and other natural resources. Technology has been the engine of China's agricultural growth. Institutional arrangements and government food policies also played an important role in China's food production and the availability of food.

While challenges have emerged, optimism concerning China's future agricultural growth prevails. China has developed policies regarding land, R&D, marketing and infrastructure investment that worked in the past. However, China will need to create different policies in the future that balance the need for efficiency, equity and growth and that address sustainable food security for China and the rest of the world.

The results from this study also provide significant policy implications for other developing countries that can learn from China's agricultural policy regimes. There are also possible gains from interaction between China and other countries. For those countries whose agricultural economies are complementary to China, opportunities for trade will emerge as China grows and integrates with the global trading system. Countries with resource bases and agricultural export structures similar to China's will need to restructure and reinvest to compete effectively.

One of the challenges in policy-making is not only which policies to adopt, but in what order. China started with reforms that provided incentives for farmers to apply more effort and gave them the main benefits of their hard work. Although land was not privatized, use rights and income rights were. Farmers saw and exploited the opportunities to make their lives better. Meanwhile, the government invested in agricultural technology and made sure it was available to all farmers. The second stage of reform focused on optimizing markets and domestic prices. Throughout the 1990s, markets were encouraged by removing regulation for entry, building transportation and communication infrastructure and minimizing the state's activities in domestic trade. Labour markets were also liberalized and farmers were encouraged to search for employment off the farm, out of the village and in the self-employed sector. As domestic markets developed, it became clear that even better incentives and clearer price signals would be generated if China's external sector were liberalized. During this second period, the state's investments were mostly focused on regional projects such as inter-provincial roads and communication projects. Finally, as markets began to mature in the 2000s, the state gave an extra boost to the huge agricultural and rural sector by

investing in local communities and facilities, including roads, irrigation, drinking water, education and health and, eventually, direct subsidy programmes.

This record of China's experiences also suggests that agricultural development depends not only on implementing the right policies at the appropriate time, but also on factors specific to individual nations. It is far beyond the scope of this paper to discuss these factors in depth. For a discussion of this, the reader may refer to "*From Marx and Mao to the market: the economics and politics of agrarian transition*" by Swinnen and Rozelle (2006). In this book, the authors examine the development record of more than 20 transitioning nations between the early 1980s and the 2000s. They explain why some were successful and others were not and identify the factors that led to the success or failure. They argue that at least four groups of factors determine the order and pace of development policy implementation: the nature of a nation's agricultural technology, the extent to which the state commands fiscal resources, politics and how much political support there is for reform and development and cultural and other factors. Because of this, policy-making is more of an art than a science and good governance is a necessary condition for launching the development process and ultimately becoming successful.

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Chapter 2
China's rural reform: review and outlook

by
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The year 2008 marked the thirtieth anniversary of China's rural reform. As is known to all, China's reform originated in rural areas. The initial success of rural reform greatly boosted the confidence and enthusiasm of the government and people to push forward with reform more broadly. It led to steady reform in urban areas and eventually, the whole national economy. Over the course of its reforms, China scored remarkable achievements in development and made profound changes in its economy and society and in the prospects for rural areas. This report reviews the extraordinary course of the three decades of rural reform, sums up the experiences and lessons learned, analyses challenges and problems and puts forward proposals for intensifying rural reform.

I. Course of development and achievements

China's rural reform can be roughly divided into four stages. The first stage covered the period from 1978 to 1984. Rural reform started with replacing the peoples' commune system with the Household Responsibility System (HRS), which was the breakthrough in rural reform. Under the people's commune system, rural productivity was low and the national economy was on the verge of collapse. A quarter of the farmers were underfed and underclothed. The threat of hunger and malnutrition drove farmers to explore alternative systems for managing production. Among them, the HRS was the most important.

Within a short period, the HRS was adopted in many provinces and shook the peoples' commune system to its very foundation. Reform in this stage aimed to stop shrinking agricultural production and increase the yield of grains and other major agricultural products. The HRS proved that recognition of farmers' ownership in agricultural production and management strengthened incentives and raised earnings. From 1978 to 1984, the total agricultural production value at constant 1978 prices grew at an average of 7.7 percent per year and the total grain production increased by 102.54 million tonnes.

The second stage of reform was from 1985 to 1991. It featured the reform of the purchasing and sales system for agricultural products, the development of village and township enterprises and self-governance by rural residents. In this stage, rural reform was aligned to the market. Due to the first stage of reform, Chinese agriculture enjoyed supernormal growth and grains and other agricultural products flooded markets. Secondary and tertiary industries in rural areas grew rapidly.

The development of commercial production led to another problem – the slow pace of reform in distribution. Before 1984, the state's monopoly and quota purchases of agricultural products had been applied in rural areas for over two decades, covering over 130 items (i.e. almost all agricultural products, by-products, special and local products). Besides state monopoly purchases of grain, cotton, oil and other major agricultural products, the government executed state quota purchases and exclusive sales of live pigs, eggs, sugar, cocoons, jute and ambary hemp, cured tobacco and aquatic products. The state quotas accounted for over 90 percent of production. Most of the production

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and distribution was monopolized by state-owned businesses. This system prevented the development of free trade and precluded the possibility of restructuring the sector towards comparative advantage production systems.

Although reduction of state monopoly and quotas purchases began in 1979, the distribution system was not overhauled until 1985 when the "double-track" system was implemented. Under this system, the government decided the purchase price for grains, cotton and other essential products and the market determined the prices for fresh foods and livestock products. Due to marketing problems encountered by producers, China stepped up the pace of reform and development of the agricultural market system beginning in 1984. Regional wholesale markets and some regulated wet markets developed rapidly, providing the model and operating system to replace planned distribution of major agricultural products.

In this stage, China also encouraged farmers to engage in industry, commerce and other non-agricultural activities and to set up village and township enterprises. This push towards income diversification and food security was accompanied by movement towards farmers' democratic political rights. Since 1982, when the village committee concept was written into the constitution, village committees were established across China. By the mid-1980s, there was support for rural residents' self-governance. Rural reform in this stage aimed to promote diversification of rural economic structure and liberalization of agricultural trade. However, many unexpected problems arose. These included violent fluctuations in agricultural prices, declines in grain production, stagnation of farm income, inflation and issues associated with state-owned enterprises (SOEs) and village and township enterprises. Consequently, China initiated a three-year rectification in 1988, to prepare for the next stage of reform and a new round of growth.

The third stage of reform was from 1992 to 1999. So far, in accordance with what was felt to be the needs of a socialist market economy, China had made a number of far-reaching reforms. These included establishing and improving the HRS in rural areas, reforming the agricultural products circulation system, promoting village and township enterprises, advancing rural economic restructuring and promoting rural labour migration. As rural reform intensified, there was scepticism over the policies and measures and the economic and political reforms slowed down. This reflected the people's concern over the unknown consequences, risks and uncertainties. They were apprehensive about the approach of "crossing the river by feeling the stones". After all, China's reform did not have any fixed model to follow. In 1992, when China's reform came to a crucial moment, Deng Xiaoping made important remarks settling the issue during his southern tour. Following this development, the 14th National People's Congress of the Communist Party of China identified the reform target as building a socialist market economic system. The Chinese economy was thus ushered into a new round of high-speed growth.

China's rural reform in this third stage focused on the competitive integrated marketing system. China strengthened the HRS by legislation to extend the land contract tenure from 15 to 30 years, improved the marketing system in line with the needs of the socialist market economy, stepped up village and township enterprise development, particularly in regard to ownership rules, operating systems, technology and management and promoted rural labour migration. The government took other supportive measures for migrant workers, such as issuing employment diplomas and reforming the household registration system in rural towns. Following these actions, the transformation from the centrally planned distribution system to the integrated competitive marketing system was almost complete. The open market played a dominant role in adjusting the supply and demand of agricultural products and allocating resources. Agriculture and the rural economy entered a new stage of development.

The fourth stage of reform began in 2000, following the 16th National Congress of the Communist Party of China. The government reformed the system of rural taxes and administrative charges, deepened the reform of grain and cotton circulation systems, opened agriculture to the outside

world, improved the environment for rural employment and pressed forward with building a new socialist countryside. In this stage of the development process, the guiding principles were a holistic approach to development, giving more to rural areas, decentralizing and devolving authority; linking industry to agriculture and integrating urban and rural development. Many far-reaching measures were taken including minimizing and eventually abolishing agricultural taxes and administrative charges, assuming WTO membership, adopting WTO rules and regulations, promoting international agricultural trade and launching comprehensive rural reform. Special attention was paid to township and village enterprises, compulsory education, local financial management, allocation and disbursement of public funds, staple food grain marketing, medical services, housing, social welfare and other building blocks of the new socialist countryside.

After 30 years of reform, China has developed a system of unified management combined with independent management based on the HRS contract. This system recognizes the farming household's dominant role in production. The rural economy is driven by market forces instead of a government plan. The market plays a fundamental role in allocating resources. The urban-rural socio-economic divide is gradually disappearing, and integrated, balanced urban-rural development is taking shape. China is more integrated with the world economy and its agriculture is opened wider to the outside world.

Recent statistics show that China's rural reform has brought about radical changes. First, agricultural production grew steadily. Due to rural reform, agricultural productivity improved and the production of grains and other major agricultural products grew rapidly. From 1978 to 2008, production increased for grain from 305 million tonnes to 529 million tonnes, for cotton from 2.17 million tonnes to 7.50 million tonnes, for meat from 8.56 million tonnes to 72.75 million tonnes and for aquatic products from 4.66 million tonnes to 48.90 million tonnes.

Second, the rural economy developed in a comprehensive and coordinated way. The agriculture, forestry and fishery subsectors feature quality production, regional specialization, efficient operation and improved management. The secondary and tertiary industries in rural areas developed rapidly with the value-added of village and township enterprises increasing from RMB 20.9 billion in 1978 to RMB 6.96 trillion in 2007 (equivalent to US$918 billion). The rural employment structure is gradually improving; the proportion of employees in the secondary and tertiary industries increased from 29.5 percent in 1978 to 57.4 percent in 2006. The development of village and township enterprises is leading the change in the rural employment structure and the growth of small towns.

Third, farmers' standard of living has risen. Farmers' income grew markedly with nominal per capita net income increasing from RMB 134 yuan in 1978 to RMB 4 140 yuan in 2007 (from approximately US$80 to US$546 at average exchange rates of 1.68 and 7.58 renmenbi per dollar in respective years). Farmers' quality of life has improved significantly. The Engel coefficient of Chinese rural residents dropped from 67.7 percent in 1978 to 43.1 percent in 2007. The absolute number of poor people in rural areas decreased from 250 million in 1987 to 14.79 million in 2007.

Fourth, rural infrastructure has developed at a rapid pace with significant increases in agricultural machinery and equipment, rural roads and vehicles and biogas and power supplies. There was steady progress in key ecological programmes (e.g. natural forestry protection, returning farmlands to forests and pastures to grasslands) and ecological protection was strengthened in western areas.

Finally, social services in rural areas advanced comprehensively. Tuition and miscellaneous fees were abolished for 140 million rural elementary and middle school students. A newly established type of rural cooperative medical care covered 86 percent of all counties and cities. The rural subsistence allowance system began by supplementing the livelihoods of nearly 35 million needy people.

II. Experiences and lessons learned

China has a huge population, limited arable land and uneven productivity. Promoting rural development through policy reform and system renovation has been difficult, but the government has learned some valuable lessons after three decades at this task. These insights, enumerated in the following paragraphs, may guide the efforts of other developing countries.

Raising productivity was the hallmark of China's rural reform. The Third Plenary Session of the 11th Central Committee of the Communist Party of China reviewed experiences and lessons in economic development after 1949 and reflected on the tortuous roads of agricultural development over the previous 29 years. People then began to have a clearer understanding of productivity and production systems. This plenary session shifted the focus of the party and the state to socialist modernization and passed the Draft Resolution of the Party Central Committee on Resolving Problems in Rural Development. It put forward the task of concentrating efforts on developing rural productivity. In the 1980s, the Party Central Committee released five priority documents, launching a package of important reform measures ranging from agriculture to the secondary and tertiary industries and from production to circulation. These measures drove forward the rapid development of the rural economy in that decade. After entering the new century and acting in accordance with the spirit of the 16th National Congress of the Communist Party of China, the Party Central Committee released another five priority documents with important measures to increase grain yield and farmers' income. It became evident that focusing on economic development and the development of rural productivity helped ameliorate the backwardness of rural areas, prepare conditions for socio-economic development and lay a solid foundation for steady development of the whole country.

Protecting and advancing farmers' interests was the starting point of China's rural reform. This farmer-centred approach to reform meant that the government was sensitive to the problems and issues confronting farmers and their needs. It placed high priority on the democratic rights and livelihoods of the rural people. Some of the more prominent examples of policy support in pursuance of farmer-centred development include self-governance at the local level, income diversification through township and village enterprises, commercialization of agriculture and development of cooperatives.

The Chinese production management system, known as "Unified Management Combined with Independent Management based on the Household Contract" was the cornerstone of the country's rural and agricultural reform. Commonly known as the HRS, it replaced the commune-based system of production. In the HRS, cultivated land was apportioned according to size and availability of labour in the family and contracted to the household initially for 15 years and subsequently for 30 years in the follow-up contract. Given rights to cultivate the land and claim the returns of their efforts, farmers responded with enthusiasm, raising TFP very significantly. Meanwhile, the state's role in "unified management" involved overseeing the HRS, regulating the market to ensure competition, monitoring supply and demand and providing support services such as R&D, credit, training and extension and disaster prevention and relief.

China's rural development policy focussed on establishing a free market and relegating the role of government to regulation and support; this was known locally as "macro-regulation". In this regard, the HRS identified farmers as major players in the market. The emancipation of rural productive forces created a large agricultural surplus which laid the foundation for the development of the market economy in China's rural areas. At the beginning of reform, the Chinese government encouraged farmers to develop market-oriented commercial production, but commercial production required free trade and flexibility in the allocation of land, labour and capital. This contradiction led to reform of the distribution system. In the mid-1980s, China began to take measures to phase out the state's monopoly on distribution and allow farmers access to open markets. The market-oriented reform policy involved establishing integrated competitive markets to conduct transactions and set prices in a fair and transparent manner. It was realized that optimum allocation of resources could

occur only with efficient structural and functional organization of the market. The government's role included monitoring and regulating the market to ensure competition, providing support services and intervening in the market to assist the poor.

China adopted a gradual approach to reform, with interaction between urban and rural areas, which researchers on reform models generally believe is noteworthy. Over the past 30 years, China's rural reform extended from production to circulation, agricultural to non-agricultural sectors and economic to social structures. Pilot projects, demonstrations and extension were used and partial, transitional and comprehensive steps were taken. A gradual approach to reform can reduce the inevitable frictions and contradictions that emerge. It can help balance the relationship among reform, development and stability, thereby facilitating transition to the new system. China's rural reform was not conducted in an isolated way; it was an open process. Reforms in rural and urban areas were interactive and mutually reinforcing. For example, after abolishing the system of state monopoly purchase of agricultural products, the government reformed the system in cities. Also, after allowing farmers to find jobs in cities, and with an increasing number of farmers working in urban areas, China launched the household registration system reform in small towns and medium and large cities in the late 1990s. Furthermore, as village and township enterprises restructured, state-owned industries in cities sought to complement the rural enterprises. The innovative and interactive reforms in urban and rural areas helped increase the two-way flow of products, personnel and capital. Isolation gave way to integration. This was conductive to balanced development in China.

China adopted the guiding principles of objectivity, flexibility and timeliness in its rural reform. Up until the seventies, controversy prevailed over the nature of socialism and the planned economy and capitalism and the market economy. Change was difficult, if not impossible, until basic issues were resolved. The planned economy at that time was characterized by the urban-rural divide and the competition between agriculture and industry. The gap between urban and rural livelihoods was widening and industrial development received priority in the allocation of resources. Other weaknesses of the planned economy included inadequate government support, relatively high taxes and fees, limited political rights, unemployment and lack of production incentives. As it embarked on the rural reform programme, the government assumed an open mind, overcame constraints of ideology and mindset, kept pace with the times and sought objectivity (i.e. "seeking truth from facts") in all its policy actions. By adopting these guiding principles, China rapidly progressed in developing a new society based on democratic rights, legal protection, equal opportunity and income equity for all rural and urban residents. It did so by concentrating efforts on integrating rural and urban development policy, balancing the allocation of resources, promoting linkages in employment between the town and countryside, according legal protection to all segments of society and providing incentives to raise productivity.

III. Contradictions and problems

Despite China's achievements, it still has small-farm, subsistence production systems. Sustainable agriculture and rural development with steadily rising incomes for all residents in the countryside are still distant targets. The internal and external environments for China's agricultural development have undergone more changes due to rapid industrialization, urbanization, commercialization and globalization. Rural reform and development face some new contradictions and problems. Six major problems are described in this section.

The first problem is that resource constraints may hold back agricultural development in the long term. In the future, as the Chinese population increases, the conflict between ensuring an adequate supply of agricultural products and having a large population with limited land and water resources will be more acute. China's arable land has declined and suffered degradation. Arable land area decreased from 1.95 billion mu (130 million ha) in 1996 to 1.826 billion mu (121.7 million ha) at the end of 2007, a cumulative decrease of 124 million mu (8.3 million ha) and an average annual

decrease of 12.3 million mu (0.82 million ha). The per capita area of arable land decreased from 1.59 mu (0.11 ha) in 1996 to 1.39 mu (0.09 ha) in 2007. The proportion of stable, high-yielding land is low because of the slow construction of agricultural infrastructure for water conservation and land improvement. Also China is losing arable area because more land is being requisitioned for urban and industrial use than is being returned for agricultural use. These developments have contributed to farm land being degraded and agricultural productivity being diminished. These developments have contributed to farm land degradation and diminished agricultural productivity.

Moreover, China's water resources for agricultural purposes are unevenly distributed and underutilized. In 2006, China's per capita water resources was only 24 percent of the world average. Eighty-one percent of China's water resources were located south of the Yangtze River and only 19 percent were north of the river. The utilization rate of irrigation water in China was only approximately 45 percent compared with 60 percent in the world's advanced countries. The utilization rate of natural rainfall on dry land was less than 50 percent on average. Furthermore, the incidence and impact of agricultural disasters increase with time. With global warming and deterioration of the ecological environment, weather-related disasters are causing more damage to agricultural production in general. An annual average of 574 million mu (37.27 million ha) of crops were damaged in the most recent three years. Over 73 billion jin[8] (36.50 billion kg) of grains were lost, resulting in 95 billion yuan (approximately US$12 billion) of direct economic losses. The scarcity and underutilization of agricultural resources and higher frequency and impact of natural disasters will limit the supply of agricultural products.

Second, it will be more difficult to balance the supply and demand for agricultural products. In recent years, yields of grains and other major agricultural products increased steadily. However, domestic grain supply is barely adequate and livestock products and vegetable oils are in short supply. There is also pressure to improve the quality and safety of agricultural products. In the recent global food situation, supply was tight, prices surged and trade patterns changed. Uncertainties remain in the international marketplace. Ensuring supply of agricultural products to an expanding population with increasing purchasing power will become more formidable in the future.

Third, the largely subsistence modes of agricultural production will likely slow down China's search for efficient commodity systems or supply chains. China has 250 million rural households, each working on an average of less than 0.5 ha of land. This situation will remain unchanged for a long time to come. Thirty-five percent of farmers participate in commercial agriculture and 13 percent participate in specialized farmers' cooperatives. Intensive agricultural production is not widespread and only 43 percent of pigs are raised in large-scale pig farms. Such backward modes of production can easily lead to disconnections between the production and distribution systems and disruption of supply and demand. The cost of collecting market information is high and farmers' capacity in analysing market information is limited, which may result in misallocation of productive resources.

Another problem is that limited institutional infrastructure may make it more difficult to intensify rural reform. It is clear that institutional shortcomings in local governance, farmers' organizations, finance and investment, R&D, agricultural support services and social welfare prevail in the rural and agricultural sectors. Consequently, farmers' bargaining power is weak, production systems remain subsistence-oriented, marketing is inefficient and livelihoods improve slowly. While institutional infrastructure has been strengthened over the past three decades, building institutions in the future to advance the livelihoods of rural people will be more difficult because the people are poorer and live in more remote and deprived locations. Until the state invests more to make up for the institutional shortcomings, the next stage of rural reform will be daunting.

China is currently in the midst of a far-reaching socio-economic transition. In spite of significant improvements in farm incomes, the urban-rural income gap is widening and this may jeopardize

[8] Chinese measuring unit for weight. Two jin are equivalent to 1 kg.

social harmony. The urban-rural income ratio increased from 3.11:1 in 2002 to 3.33:1 in 2007. The annual income growth rate of farmers was 2.7 percentage points lower than that of urban residents in 2007. The state support to farmers has already reached a high level, leaving limited potential for policy-driven income growth. Furthermore, relying on state financial input (e.g. subsidies and income transfers) to raise farmers' income will not be sustainable in the long-run. The foundation for self-sustaining income growth for farmers is still weak, but rural development is the key to national socio-economic advancement. Permanent rural residents account for over half of the total population and people employed in rural areas account for two-thirds of total employment. If the income gap cannot be bridged, prosperous farming livelihoods will be just an illusion.

Finally, regional development is uneven because of differences in resource endowment and socio-economic and cultural conditions. Some regions fared better than others in terms of incomes, nutrition, health and education. Finding ways to narrow the regional differences in the standard of living is a major challenge of the next decades.

IV. Perspectives on promoting China's rural reform and development

To begin to promote further rural reform, China must make effective use of domestic agricultural resources. Arable land is the basic resource for agricultural production and the guarantee for supply of essential products. In land resource utilization, China should give priority consideration to three critical tasks: ensure that arable land will not further decrease in area, improve land quality and optimize use of the land. Every effort should be made to hold on to the minimum of 1.8 billion mu (120 million ha) of arable land and improve its fertility, conserve and add to water resources and strengthen support infrastructure. While ensuring grain production for food security, other remunerative uses must be found to increase resource-use efficiency and maximize the total value of production.

Also, there should be an increase in the innovative application of agricultural science and technology because this is the key to productive agriculture. China must use science and technology to raise yields, develop new primary and processed products and lower production costs. Science must develop new high-yield varieties of grains within short development and application cycles. R&D should catch up with the advanced countries and develop local improved breeds of livestock. In horticulture, technology should provide an edge in productivity, processing and distribution. Technologies should be extended that save land, water, energy and labour, enhance agricultural resource-use efficiency and promote sustainable agriculture.

Moreover, China is able and should be willing to raise public and private investments in agriculture. In doing so, the country should direct investments to grain production to ensure long-term food security, labour-intensive enterprises (e.g. vegetables, flowers, livestock and aquatic products) to earn foreign exchange and natural resource improvement to raise TFP.

China should also strengthen institutional development and innovation. In transition from subsistence to commercial agriculture, the majority of farmers still use traditional modes of production. Such subsistence-oriented agriculture will not be able to move the country fast enough towards the targets of achieving food security through domestic production and generating income from products for which China has a comparative advantage. To expedite the process, it is imperative that China press ahead with institutional development, especially with innovations to train professional farmers through rural vocational schools and young farmer training facilities. Such professional farmer training innovations may include skills appraisal systems and training subsidy and loan schemes. The government also must reinforce rural institutional development to improve security of land tenure, rights to transact land and services to facilitate land transactions. Institutions, such as farmers' organizations, specialized cooperatives, rural industries associations and social services groups should be built to protect and extend farmers' rights and privileges.

As globalization accelerates, China has no alternative but to make better use of international and domestic agricultural markets. The country can make up supply shortfalls of essential food and other agricultural commodities with imports and can sell surpluses of other agricultural commodities on the world market. China's food security and the supply of essential commodities (e.g. vegetable oils, soybean and cotton) can be strengthened with improved access to the international marketplace.

Finally, China needs to strengthen government support services for sustainable agriculture and rural development. This means increasing the services, extending the coverage of the population and upgrading the quality of the support. Government support services should focus on agricultural management, integrated rural-urban development, finance and credit and R&D. It should also be directed towards social welfare in areas such as food security, food quality and safety, risk management, employment generation and income support.

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