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Rapid growth of selected Asian economies

Lessons and implications for
agriculture and food security

Synthesis report



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Foreword

Asia and the Pacific region is the most economically vibrant region in the world today, having achieved and maintained accelerated economic growth in recent decades. As a result, within one generation, many people in this region have escaped from the poverty trap. Ensuring an enabling policy and economic environment, supported by adequate investment and strengthened human and institutional capacities have fuelled this growth; advances in the agriculture and rural sectors have played their part and, in turn, they have benefited from good overall economic performance. Among recent trends, growth in China and India is noteworthy in terms of its sheer scale and the degree of regional and global impact that is being manifested at an increasing rate. In these two major countries, as in other Asian economies, the agriculture sector continues to play a pivotal role in almost all stages of development; smaller vibrant economies in the region, such as Thailand and Viet Nam have demonstrated how effectively they have made agricultural growth and trade contribute to reduction of poverty and food insecurity. Even in the Republic of Korea — regarded as a paragon of manufacturing-based export-led growth — agriculture has nevertheless played a crucial role in the initial stages of development.

Despite Asia still having the largest number of food-insecure people, the current trends of economic growth and agricultural performance indicate that the region stands a good chance of reaching the first Millennium Development Goal (MDG1) — halving the proportion of hungry people by 2015. However, achieving the World Food Summit (WFS) goal of halving the number of undernourished will require significant acceleration of hunger reduction efforts in the next ten years. Achievement of MDG1 and the WFS goal could be accelerated if the positive impacts of rapid growth in the larger economies are captured by other countries in the region, including in their own agriculture and rural development sectors. These sectors are an essential conduit for the benefits of economic growth to reach the less favourably placed segments of the population.

As a part of their mandate to analyse the driving forces of change in the region and the emerging policy assistance needs of member countries, the Regional Office for Asia and the Pacific and the Policy Assistance Division of the Food and Agriculture Organization of the United Nations (FAO) launched a study to improve understanding of these major developments and their implications. In this context, they conceived and carried out a diagnostic study on *China, India and selected Asian economies: implications of rapid economic growth for agriculture and food security in Asia and Pacific Rim countries*. The study has been elaborated by national experts and covers the experience of five selected Asian countries — China, India, Republic of Korea, Thailand and Viet Nam. In the cases of China and India, the study analyses their recent phenomenal growth and the implications for their own agriculture sectors and those of other countries, particularly in the region but also further afield. For the Republic of Korea, Thailand and Viet Nam, the study covers similar ground but draws particular attention to the lessons of experience from policies, institutional reforms and programmes implemented in these countries which might be of value to a wider regional audience.

Considering the recent volumes of literature on the strides made by China and India, the FAO case studies have not sought to duplicate the work of others but instead have drawn on them where appropriate, building further analysis and interpretation on existing knowledge. The studies help to gauge the existing and emerging impacts on countries in the region; in addition, the Chinese and Indian experience gives important insights into the major factors driving economic growth, highlights being the roles of the agriculture and non-agricultural sectors and the major policy and institutional changes that have facilitated agricultural growth, poverty reduction and food security. They also draw attention to crucial challenges to surmount if growth is to be sustained in these two countries.

The experiences of the Republic of Korea, Thailand and Viet Nam provide interesting examples of major success in economic transition and the accompanying evolution of agricultural development and food security. Although the countries differ in stages of development and in their historical

contexts, initial conditions and economic systems, each has made significant strides in addressing poverty and food security by adopting policy and institutional measures tailored to specific contexts. Documentation of their experience is expected to provide relevant lessons to a number of countries that are presently grappling with similar issues, including the reduction of inter-sectoral disparity, adjustment of domestic policies in tune with the new rules of international trade and sustaining agricultural growth and rural development to eradicate poverty and hunger.

The results of the diagnostic study are presented in a set of three volumes. This volume is a synthesis of the main findings and conclusions of the five country case studies supplemented by additional information from various published sources. The volume concludes with a summary of lessons learned designed to assist countries in accelerating and/or sustaining agricultural and rural development to achieve the MDG of poverty and hunger eradication. The second volume presents the country case studies of China and India — experiences of rapid growth and its implications for the region and beyond, while the third volume describes the experiences and lessons from the country case studies of Republic of Korea, Thailand and Viet Nam.

We hope that readers, particularly those concerned with agricultural development policy, will find the diagnostic study interesting and useful in their work. This work needs to be addressed further and FAO invites other national and regional institutions that are active in analytical and policy fields to join forces for future endeavours.



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Abbreviations and acronyms

AMS	aggregate measurement of support
CGIAR	Consultative Group on International Agricultural Research
DDA	Doha Development Agenda
FDI	foreign direct investment
FTA	Free Trade Agreement
GDP	gross domestic product
GTAP	Global Trade Analysis Project
HRS	Household Responsibility System
ICOR	incremental capital output ratio
MDGs	Millennium Development Goals
MSP	minimum support price
NSS	National Sample Survey
SOEs	state-owned enterprises
TFP	total factor productivity
TVEs	township and village enterprises
UPA	United Progressive Alliance
WDIs	World Development Indicators
WTO	World Trade Organization

1. Introduction

1.1 The context

The Asian region is undergoing rapid socio-economic, geopolitical and even cultural transformation; this has been stimulated by structural reforms, macroeconomic stabilization and concomitant disciplinary measures, effectively capitalizing on opportunities arising out of globalization, market liberalization and new institutional arrangements (e.g. the World Trade Organization [WTO] and regional treaties). In the late 1990s, the region underwent an unprecedented economic crisis but many now believe that it has not only survived but has emerged stronger and better equipped to weather potential upheaval in the future. Many countries have been making steady headway and a few have regained and even surpassed the very high economic growth rates of earlier times.

The significant changes that continue to unfold result not only from external influences, but also largely from internal dynamics, particularly the nature and effective application of public instruments for governing the economies as a whole and the agriculture sector in particular. Enabling policy and economic environments, including unique rural development models, have led to many success stories.

Asian countries have the potential for tremendous achievements in agriculture and food security. Crafting policies and strategies to achieve this will, however, require recognition that Asia has great diversity in many aspects, including agricultural trade and food security situations as well as in the structure of the agricultural economies. A shared and positive development is that almost all the countries of the region have become self-sufficient (or nearly so) in food and many have emerged from being heavy importers to exporters. In South Asia, agricultural imports as a share of total export declined to 11 percent in 2002 from 24 percent in 1980; the corresponding change for Southeast Asia is from 10 to 6 percent.

With respect to food security, despite the impressive gains made in food production and overall development, the Asian region still has the largest absolute number of undernourished people in the world. Even major net food exporters suffer from food insecurity in places. Other countries are net food importers (although relatively food secure), food-insecure countries that do not trade in food, food-insecure importers, self-sufficient countries that are relatively food secure and food-secure exporters.

In the face of rapid transformation, conventional strategies may be inadequate to address persistent pockets of poverty, inequity and food insecurity. There is a need for fresh perspectives, taking into account domestic changes as well as the regional impact of some countries' rapid growth. The diagnostic case studies summarized in this report address an important recent phenomenon, the rapid growth of China and India — the world's most populous countries — and the implications of this growth for policies and strategies for agriculture and food security (both domestic and external), particularly in Asia but with attention also to the greater Pacific region. In addition, the case studies cover the Republic of Korea, Thailand and Viet Nam. With differing historical contexts and economic systems, the experiences of these countries present interesting examples of major success in economic transition and of associated progress and agricultural development.

1.2 Organization of this report

This synthesis report summarizes the main findings and conclusions of the five country studies, supplemented by additional information from various published sources. Section 2 deals with the two giants, China and India — achievements, prospects for future growth, challenges, domestic and external policy implications and lessons learned. Section 3 presents the experiences of the smaller

countries, the Republic of Korea, Thailand, and Viet Nam — achievements, challenges and lessons learned. The report concludes with an overview of policy implications for sustainable agricultural and rural development, both for the countries themselves and for other countries in Asia and further afield, and lessons learned from the agricultural and rural development strategies and policies pursued by these countries for poverty and hunger reduction.

2. The phenomenal growth of China and India

Of the many successes in recent times, two stand out: China and India. The two countries are economic giants and while they grow at the rates observed in recent years (decades in the case of China) it is obvious that their transformation will have profound effects, not just internally but for the rest of the world. Such effects, already in evidence, are a combination of new market opportunities arising from enhanced purchasing power and greater competitiveness of these mega-economies as producers of certain products. It is important for smaller economies to be able to put in place policies and strategies that anticipate the changes so as to best capitalize on emerging opportunities, at the same time attenuating in the difficulties of subsectors that cannot meet the challenges.

Both China and India have experienced impressive growth in agriculture, a Green Revolution, followed by rapid industrial growth and a sharp decrease in relative poverty. They also share common problems associated with rapid growth such as the widening rural–urban income gap, regional disparities and environmental degradation. But the preconditions, the driving forces behind the growth and the incentive structures were in both cases very different. In this section the policy and institutional changes that have led to these transformations are discussed separately for each country. Then China and India are compared and contrasted in terms of prospects for future growth, the likely impact that this growth will have on their domestic economies and the implications for other Asia–Pacific countries. The challenges that both countries face in sustaining agricultural and economic development and meeting Millennium Development Goals (MDGs) are identified. Finally, the lessons learned are highlighted.

It is clear that the rising incomes in these two countries will continue to create pressure for structural reform of their agriculture/rural and food sectors to cope with shifting demands and evolving consumer tastes. Changing incomes will also offer expanded two-way trade opportunities with countries in the region and the rest of the world.

The continued growth of these two populous countries will therefore significantly affect the balance and direction of trade, trading opportunities and the shape of the playing field for smaller countries in the region. It calls for timely diagnosis of the growth pattern in these emerging economies in order to put policies in place to optimize gains and minimize losses and marginalization.

Both China and India have large agriculture sectors. The Chinese experience shows the crucial role agricultural development has played in the initial years of reform. In India, which is not as industrialized as China, agriculture continues to be a critical sector. While agriculture's share in the GDP has been decreasing, the sector still employs a substantial part of the workforce. Performance in this sector is therefore of great significance for future achievement of the MDGs. This is true especially for Goal 1, eradicating extreme poverty and hunger, with the specific target of halving — between 1990 and 2015 — the proportion of people living in extreme poverty and hunger. As China and India still have many poor people (significant numbers in India) further reduction in poverty in these two countries would dramatically impact the overall numbers of poor in the region as well as change the global scenario in this regard. Their recent rapid development therefore has implications for their domestic policies, particularly concerning rural poverty, inequitable wealth distribution, natural resource management and sustainability.

There is potential to draw lessons from the developmental experience of both China and India, i.e. how they have responded to adjustments with respect to trade liberalization, globalization, agriculture,

rural development and poverty eradication despite their contrasting approaches to development. In addition, both countries are emerging as dominant players in the field of agricultural research and technology generation in the region. This is of particular significance for smaller countries that are refocusing their research efforts in the face of relative decline in support from regional and international research institutions/bodies, such as the Consultative Group on International Agricultural Research (CGIAR).

2.1 China — achievements

2.1.1 Overall economic growth

Increase in economic growth began with the sharp rise in GDP in agriculture in the early reform period (1979–1984). Rising incomes stimulated domestic consumption and high savings rates with savings appropriately transferred into physical capital investments in the non-agricultural sector. From the mid-1980s growth in the non-agricultural sector was stimulated by the growth of township and village enterprises (TVEs). Collectivization and the associated self-sufficiency of the commune also seem to have been an important precondition for the growth in the TVEs. This distinctly Chinese institutional development, not replicable elsewhere, was a major factor in contributing to the sharp decline in poverty.

Aided by the growth of TVEs, the average annual growth in GDP has reached 10 percent annually since 1980. Non-agricultural farm household income has come to exceed agricultural income in many parts of China. Reforms during the 1990s provided for trade and market liberalization, fiscal and financial expansion, devaluation of the exchange rate, expansion of special economic zones to attract foreign direct investment (FDI) and reform of state-owned enterprises. In 2004 China overtook the United States as the world's largest recipient of FDI; for a long time it has been by far the leading recipient of FDI among developing countries.

2.1.2 Growth in agricultural production and productivity

The China paper documents the rapid growth in agriculture in the early reform period, 1978 to 1984. The reforms in Chinese agriculture began in 1978. While the collectivization of agriculture is not generally regarded as a sound strategy for agricultural and rural development, there were certain policies under collectivization, e.g. education, health, development of rural infrastructure and agricultural technology, which laid the foundation for subsequent rapid growth in agriculture. Except during the famine years, the country achieved rates of production growth that outpaced the rise in population. From 1961 to 1978 China's cereal yields increased from 1.2 to 2.8 tonnes/ha. Subsequently yields have risen from 2.8 to 5.4 tonnes/ha. Following the adoption of the Household Responsibility System (HRS), agriculture grew at the phenomenal rate of 7 percent. The major policy factor explaining growth during this period, the HRS, gave as incentives the rights of individual farmers to control land and income from their agriculture. The egalitarian nature of these reforms, each household receiving a share of land equal in quality, ensured that the benefits derived from growth in the rural economy were widely shared.

Since 1984 the annual growth in agricultural GDP has been approximately 3 to 4 percent but over a much larger base. The primary engine of agricultural growth during this period has been labour-intensive technological change — in particular the use of modern varieties and inputs such as chemical fertilizers and irrigation. The growth has been sustained by public investment in rural infrastructure and in research and technology development.

Rapid agricultural growth has taken place against the backdrop of significant structural changes in China's economy. While agriculture accounted for more than 35 percent of the GDP in 1970, it fell to 15 percent in 2004. Rising incomes and urbanization have been among the driving forces for significant changes in the level and pattern of food consumption. The farming sector has diversified production

to meet changing food demands. Meat consumption (pork and poultry) shot up and with it the demand for feedgrains (maize and soybeans). Consumption of aquatic products also showed very rapid growth.

As a result of market and trade liberalization, what is witnessed in general is the gradual shift from land-intensive commodities to high-value labour-intensive commodities such as horticultural crops, livestock and fisheries. Trade policy and exchange rate reforms have given a further boost to agricultural production for export. The ratio of total exports to the GDP increased from 6 percent in 1980 to 36 percent in 2004 and, while agriculture's share of exports declined from 3 to 2.5 percent, the US dollar value of net agricultural exports increased 100-fold over the two decades.

2.1.3 Poverty reduction

Based on China's official poverty line, poverty has declined from over 33 percent to less than 3 percent of the total rural population, and as indicated earlier most of this occurred in the early reform period. Based on the dollar-a-day poverty line index, the incidence of poverty dropped from 33 to 16 percent from 1990 to 2002. The estimated decline in numbers in this period was from 377 to 203 million. Overall economic growth (as measured by per capita GDP) has been a primary source of rural poverty reduction in China. The TVEs have played an important role in contributing to rural poverty reduction. However, the effect of economic growth on poverty reduction has weakened since the 1980s. Agricultural growth, not just economic growth, matters for poverty reduction. The widening urban-rural income gap affects poverty reduction and suggests that in the future growth has to be more broadly based. More specifically, growing inequality within the rural sector weakened poverty reduction. Provinces starting with relatively high inequality saw slower progress against poverty, due both to lower growth and a lower growth elasticity of poverty reduction (Ravallion and Chen 2004).

Trade liberalization, on the other hand, has been a source of regional income disparities. The coastal areas benefited from growth in agricultural exports, whereas central China, the largest producer of soybeans and edible oils, has been hurt by trade liberalization.

2.1.4 Food security

One measure of food security is the change in per capita food availability. Between the early 1960s and early reform years daily per capita food availability in China increased from 1 717 kcal to 2 328 kcal. By 2000 it exceeded 3 000 kcal per day, a level nearly comparable to most developed countries. Over time the food security picture has changed. Initially most farm households produced food for their own subsistence. With the passage of time, however, markets have developed and agriculture has become a more commercial enterprise. Farmers face market price risks, but as almost 50 percent of the land area is irrigated, production risks are lower than in most other countries. Diversification of farm household incomes, with at least one family member in non-farm employment, helps to improve food security.

2.2 India — achievements

2.2.1 Overall economic growth

In contrast to China, the sweeping economic reforms in the 1990s in India were not directed at agriculture. In addition, growth in agriculture in this country did not result in an immediate increase in growth in either the rural or urban non-farm sector.

India's growth performance after independence until the 1960s was moderate, edging up slowly in the 1970s and 1980s to about 5.5 percent *per annum*. After the 1991 reforms, however, growth has been much faster: An annual average of 6.8 percent in 1992 to 1997 and 5.6 percent during 1997 to

2002. The average annual growth rate for the decade 1993 to 2004 was 6.2 percent. India's high growth performance has therefore commenced later than China's, but appears to have reached sustained high levels over the past 15 years.

Much of the growth in the economy since the 1990s has centred on the services sector covering communication services, hotels, restaurants, tourism, finance, insurance and real estate, including information technology — outsourcing work to India has become a global phenomenon. Growth of the primary and secondary sectors has not fared as well: Regulations and infrastructural bottlenecks restrict growth in these sectors. The dramatic success in information technology contrasts with the rest of the economy and in particular the agriculture sector. As with China, rural–urban and regional income disparities have widened in India as well. The solution seems to lie largely in removing the constraints to growth in the industrial and agriculture sectors, a process that is now underway.

2.2.2 Growth in agricultural production and productivity

Prior to the mid-1960s India relied on imports and food aid to meet domestic requirements. However, two years of severe drought in 1965 and 1966 convinced the Indian leadership that foreign imports could not be relied on for food security. Consequently, the goal of foodgrain self-sufficiency was adopted; this has shaped Indian agricultural policy ever since. In this context significant policy reforms were carried out that focused in particular on the production of cereal grains, and concomitantly, the goal of foodgrain self-sufficiency (Gulati *et al.* 2005).

India's Green Revolution began with the decision to import seeds of high-yielding varieties of wheat and large-scale adaptive research. The initial increase in production was centred on the irrigated areas of the Punjab, Haryana and western Uttar Pradesh. Total foodgrain production soared and by the early 1980s India became self-sufficient. Gulati *et al.* (2005) attributes this success to the price incentives provided to farmers, the dynamism of the national research system and the availability of credit and inputs such as improved seeds, canal irrigation and fertilizer. The success of this coordinated approach demonstrated that even in a country as diverse as India, the government can play an important role in setting the agriculture sector on a high growth path.

The Green Revolution technology spread to rice and, using tubewells, to other parts of India. When gains from the new technology reached their limits in the states of initial adoption, the technology spread in the 1970s and 1980s to the states of eastern India — Bihar, Orissa and West Bengal. But the benefits of the new technology extended principally to the irrigated areas which account for about one-third of the harvested crop area. In the 1980s the policy also shifted to “evolution of a production pattern in line with the demand pattern” leading to a shift in emphasis to other agricultural commodities like oilseed, fruit and vegetables. Impressive strides were also made in other subsectors such as dairying, fisheries and livestock, and meeting the diversified food needs of the growing population.

In India, as in China, the agricultural economy is undergoing structural changes. Between 1970 and 2003 the share of agriculture in the total GDP fell from 43 to 22 percent. The growth of agricultural GDP was approximately 3.6 percent *per annum* during the early Green Revolution period (1970s) and in this period growth in agriculture led to a decline in poverty. However, the greatest increase in productivity occurred in the 1970s and 1980s and the greatest decrease in poverty in the 1980s and 1990s.¹ The growth rate of agricultural GDP rose gradually from less than 2 percent in the 1960s and 1970s, to approximately 3 percent in the 1980s, to over 4 percent during the five years following

¹ This follows from the “official” estimates of poverty reduction, based on a comparison of National Sample Survey (NSS) estimates for 1993 and 1999. Without an adjustment of the latter for changes in the sample design and recall periods, the rural poverty ratio fell from 37.27 to 27.09 percent over this period. However, with an adjustment for these changes, the poverty reduction is lower. The estimates vary with the procedure used. For details see Sen and Himanshu (2005) and other contributions in Deaton and Kozel (2005).

the financial reforms in 1991, but declined sharply thereafter to 2 percent, during 1997–1998 to 2003–2004.

How can this decline be explained? In part it is because the benefits of the Green Revolution technologies had been largely exploited, although this may be questioned as India's crop yields on average are relatively low when compared with other countries, with stark regional variations in productivity. With increasing budgetary pressures, the government has faced a trade-off. As the India report points out, resources used for subsidies increased while expenditure on public goods — rural infrastructure and agricultural research — was largely neglected.

A recent study (World Bank 2005) draws attention to the concentration of benefits of minimum support prices (MSPs) in a few states where wheat and rice procurements were high. Moreover, transfers to large farmers were several times larger than the amounts to marginal farmers. As the share of subsidies grew, from 1.2 percent of the GDP in 1981 to 3 percent in 1999, public investment declined. The latter in turn slowed down agricultural growth (Gaiha and Kulkarni 2006).

There are signs that this policy is being changed under the present government, which came to power in 2004.

The lack of major institutional changes in Indian agriculture may also be part of the explanation. China, in its de-collectivization process, created millions of smallholder farmers. In India, on the other hand, land reforms were successful in some states, but not in others. While 80 percent of operated holdings in India are small, 2 ha or less (1995–1996),² there is a large landless population. In China only 2 percent of holdings were larger than 2 ha in 1997.³ As India is a federal state and most agricultural issues are dealt with at the state level, uniform institutional change is far more difficult to achieve than in China.

2.2.3 Poverty reduction

Beginning in the late 1960s there was a significant decline in poverty. From the late 1970s to the late 1980s the poverty ratio fell from 51 to 39 percent (based on India's official poverty line), due largely to gains in agricultural production and productivity. According to the "official" estimates, there was a substantial drop in rural poverty during 1993–1999, from 37.27 to 27.09 percent. However, with an adjustment for changes in sample design and recall periods in the 55th round of the NSS (i.e. for 1999), poverty reduction is lower. In the later period, apart from decelerated agricultural growth and productivity, a sharp rise in food prices contributed to a lowering of poverty reduction. The drop in the proportion of the population below the dollar-a-day poverty index from 42 percent in 1990 to 34 percent (at the national level) in 2002 seems to have been largely due to the growth of the industrial and service sectors. Yet due to fairly rapid population growth, absolute numbers in poverty increased from 351 to 357 million in the same time period.⁴

One difficulty that India faces in achieving further poverty reduction is the unequal distribution of landholdings and the large landless population mentioned earlier. Two options are relevant in this context. One is to raise the productivity on smallholdings through easier access to credit, extension and new technology. The other is to facilitate a shift from agriculture for the large mass of landless labourers into faster growing non-farm opportunities.

There are also significant regional variations within India, such as between states or between districts or between agroclimatic regions identified in different rounds of the NSS. A more recent analysis of

² Agriculture Census Division, Ministry of Agriculture, Government of India.

³ Abstract of the *First national agricultural census of China*, Food and Agriculture Statistics Centre, Beijing, 1999; (http://www.fao.org/es/ess/census/wcares/china_2000.pdf).

⁴ United Nations Population Division, *World population prospects: the 2002 revision*.

the 60th round of the NSS data for rural India in 2004 points to a lower poverty ratio (22.9 percent). However, some of the more populous states (Uttar Pradesh, Madhya Pradesh, Orissa) still have high proportions of poor.

2.2.4 Food security

India achieved national food security and there were several positive developments associated with the Green Revolution period. Per capita availability of food increased as did per capita generation of income. Indian agriculture became much more insulated from the effects of drought. There was greater commercialization and diversification of cropping patterns from foodgrains to higher value crops, even for small and marginal farmers. There were also improvements in the livestock and fisheries sector. Consumption patterns also changed, even for the bottom 30 percent of the population, with the shares of non-cereal food (fruit and vegetables, dairy products) increasing.⁵ Nonetheless, food security and hunger remain a problem particularly in rural areas and in less-advanced states. Besides, undernutrition of children continues to be pervasive with 53.2 percent of children under five falling in this category by international standards (World Bank 2006).

2.3 Future scenarios for China and India and their implications

In the country studies for China and India, analysis was undertaken using the Global Trade Analysis Project (GTAP) model and projections of future growth were made to 2020. Through this exercise the implications of rapid growth for production and consumption of agricultural products and trading opportunities for other countries in the region and the world have been assessed, based on certain assumptions.

2.3.1 Prospects for growth and domestic implications

The analysis conducted in the China case study projects average annual growth in GDP of 8 percent for 2006 to 2010 gradually slowing to 6–7 percent in the following decade. Several factors favour this strong growth performance, including macroeconomic stability, high domestic savings, increased spending on research and development, continued high levels of FDI, improved market environment and trade liberalization and the commitment to greater equity — granting higher purchasing power to lower income groups. Also noted are obstacles that will tend to reduce growth particularly in the long run — a decline in the domestic savings rate, an ageing population and pressures on the natural resource base for sustained agricultural production.

While China's growth rate is projected to decline somewhat in the near future, the India study suggests that GDP growth could be rising from the current levels of 6–7 percent to 7–8 percent. It should be noted that these growth projections apply to two economies of considerably different size. Nevertheless, how does one explain the different trends? Part of the explanation is related to the incremental capital output ratio (ICOR). In India it is currently about four and expected to decline. In China while the ICOR was four in the early 1980s it has steadily risen since then and in 2002 was 5.4 (Restall 2006). In short, despite reforms in state-owned industries in China, India uses capital more efficiently. Also favouring India is the demographic dividend, with the percentage of the population in the 15 to 59 age group increasing from 59 percent in 2001 to over 63 percent in 2011 which could add 1 percent to GDP growth. In China, by contrast, the ageing population and sharp decline in population growth due to the one child policy will eventually slow overall economic growth.

⁵ Whether this implies a lower calorie intake and a higher prevalence of undernutrition is not so obvious for two reasons: one is that even the poor substitute between different sources of calories as relative prices change; and the second is a preference for variety as incomes rise. On balance, the effect of higher incomes is stronger and likely to result in higher calorie intake in rural India (Jha *et al.* 2006).

The picture for agriculture is somewhat mixed. The land area used in crop production is gradually shrinking in both countries due to urbanization and in some instances environmental degradation. Thus for staple crops, production growth depends on an increase in yields. China has already achieved high yields in staple crops, and further gains will depend on technological breakthroughs. Indian crop yields are low in comparison with China and other countries. This is attributed in part to limited investments in research and extension beyond the early Green Revolution years. In both China and India the yields for the principal Green Revolution crops, rice and wheat, have plateaued, due in part to falling groundwater tables and environmental degradation. However, if priority can be given to investment in research and development and infrastructure, there appears to be ample scope, particularly in India, for increasing yields and agricultural productivity.

As a result of continued rapid economic growth and increase in income per capita, demand for high income elasticity products, like milk, livestock and horticultural products will continue to grow. China and India are committed to maintaining cereal grain self-sufficiency. The projections for both economies indicate that food security can be maintained at a national level without resorting to significant imports. The baseline scenario presented in the China study, for example, indicates that in 2020 China will maintain or surpass self-sufficiency in rice, horticulture, pork and poultry, fish and processed foods, and come close to self-sufficiency in wheat, fibre and beef and mutton. In the case of India, despite low current growth rates of output for many crops, the expectation is that self-sufficiency can be maintained in rice, wheat, coarse grains, sugar, cattle and meat, fish and other foods. The country should also come close to self-sufficiency in other crops and milk. However, both countries will need to adopt policies that ensure food security at a regional and household level where hunger and poverty still persist.

China's agricultural production structure is expected to shift more towards labour-intensive products such as vegetables, fruit, fish and processed foods, while self-sufficiency in land-intensive products such as oilseed, fibres and coarse grains is predicted to fall further from current levels. The largest increases in Indian agricultural production are predicted for oilseed, sugar, fibres, milk, fish, other agricultural products and other foods, while negative or low growth rates are expected in cattle and meat, rice, wheat, coarse grains and other crops. Nevertheless, for some of the high growth products India will continue to require significant imports, especially of oilseed, fibres and other agricultural products.

The dollar-a-day-poverty index had fallen to 16 percent in China in 2002 while it was 34 percent in India. Poverty is projected to continue to decline in India. With a GDP growth rate of 8 percent or more the poverty rate should fall from 26 percent in 1999–2000 to 14 percent in 2010 and then to 8 percent in 2015. There appears to be an implicit assumption in these figures that the reduction in poverty will come largely from growth in employment in the non-farm sector. The analysis of the Chinese experience suggests that the impact of rapid economic growth on poverty reduction tends to slacken eventually if the rural sector does not grow hand in hand. As incomes have grown, the impact and effectiveness of general economic growth on poverty reduction have weakened.

Greater reductions in poverty are feasible depending on reduction in income inequality and institutional reforms. If, for example, the historical growth rate of per capita income is maintained and income inequality measured by the Gini coefficient declines by 10 percent in India, the proportion of dollar poor will fall by about 13 percent. If, on the other hand, the overall governance index takes the average value of the top 30 performers in the World Bank sample — a modest increase — the proportion of dollar poor will fall by over 7 per cent. Similar results are obtained for other Asian countries (e.g. Bangladesh, China, Indonesia and Thailand).⁶ From this perspective, decentralization assumes greater significance.

⁶ The governance indicator is a composite of four institutional quality indicators viz. voice and accountability, political stability and absence of violence, control of corruption and rule of law, constructed by Kaufmann *et al.* (2003). For a more detailed analysis with disaggregated institutional quality changes and larger reductions in income inequality, see Gaiha *et al.* (2006).

2.3.2 Implications for Asia and the greater Pacific region

Trade liberalization, globalization, and pressures to meet WTO and FTA agreements are generating a substantial growth in trade. China will have the largest impact on Asia and the Pacific region because China's economy is two-and-a-half times larger than that of India, it is growing faster and it is more integrated with the rest of the world. For example, China received some US\$60 billion of FDI last year while India received only US\$5 billion. FDI and multinational investments are a means of importing technology and entrepreneurial and management skills. By 2020 China is projected to be the world's second largest importer and exporter.

At the level of the overall economy, both China and India will be major importers of energy and minerals principally from Australia, the Russian Federation, the Middle East, South America and Africa. China is projected to drop from 92 percent self-sufficiency in energy in 2001 to 67 percent in 2020. Recognizing this as a potential constraint to growth, China is taking steps to improve efficiency in the use of energy. The high total factor productivity (TFP) growth projection in the China country report indicates that reliance on energy imports can be reduced by as much as 60 percent and minerals by 50 percent. Aided by FDI and information technologies, China and India along with other developing countries are finding it increasingly easier to transfer technology from developed countries to exercise their comparative advantage in manufacturing. However, both countries have historically made low use of external resources, relative to their economic size, and national initiatives will continue to play an important role in determining their growth paths.

As noted previously, both China and India are projected to be self-sufficient in cereal grains and do not provide a serious threat to global food security. India is projected to continue its current role as a major net exporter of rice. Both China and India will be major importers of oilseed, plant-based fibre and forestry products. Soybean meal, for example, will come from destinations as distant as Brazil. In China there is already a trend in trade away from land-intensive crops such as food and feedgrains and sugar, and towards export of labour-intensive, high value commodities — horticultural crops, livestock, and aquaculture products. Table 1 provides a summary of the predictions of the two country reports with regard to net exports and imports in 2020. The use of different scenarios in the China report indicates that China presents considerable opportunities for other agricultural exporters under the baseline and high GDP growth scenarios, but these opportunities are significantly reduced under the high TFP growth scenario. The Indian data, on the other hand, under-represent opportunities for catching up in productivity via technological change.

Table 1. Net export share of world exports in 2020, China and India (percent)

	China			India	
	Baseline scenario	High GDP growth	High TFP growth		
Food and feed crops	-5.9	-6.6	-3.6	Rice	10.8
Processed food	2.2	2.3	4.4	Wheat	1.0
Animal products	-0.6	-1.9	7.9	Coarse grain	0.2
Fibre	-9.1	-11.3	-7.9	Oilseed	-12.8
Energy	-6.9	-8.8	-4.1	Sugar	0.9
Minerals	-21.4	-27.8	-16.3	Plant-based fibre	-18.1
Textiles and apparel	26.8	29.6	24.6	Other crops	-2.1
Manufactory	2.1	2.1	2.0	Cattle and meat	1.7
Services	-4.2	-4.2	-5.2	Other agric. products	-8.4
Total	1.5	1.6	1.5	Milk	-0.3
				Fish	0.2
				Other food	1.3
				Forestry	-14.6

The China report examines changes in the patterns of agriculture and food trade that are likely to emerge by 2020. Interestingly, Chinese exports to India are predicted to increase by 179 percent over their 2001 level, while Indian exports to China are predicted to grow by only 79 percent. The Indian study did not undertake a comparable analysis, but the figures presented in the China report tend to reflect the relatively narrow range of India's net agricultural exports at present — mainly rice, followed by wheat and sugar. The major diversification in China's exports is predicted to take place in South and Southeast Asia, while exports to Japan, Republic of Korea, Hong Kong Special Administrative Region, China and Taiwan Province of China are predicted to remain fairly stable. Less important growth areas for China include the Russian Federation, Australia and New Zealand, and Central and South America. On the import side, however, major growth in agricultural trade should come from the more developed Asian countries as well as most other parts of the world excepting Southeast and other Asian countries. For the developing countries in Asia, China is emerging as a significant competitor in agricultural products. In particular the current trade surplus in agricultural products that the Southeast Asian region enjoys with China is predicted to turn negative. Meanwhile many Asian countries will find it difficult to compete with non-agricultural exports from India and China such as textiles, given the comparatively low wages in these two economies.

Finally both China and India will be major importers of energy and minerals principally from Australia, the Russian Federation and the Middle East. China is projected to drop from 92 percent self-sufficiency in energy in 2001 to 67 percent in 2020. Recognizing this as a potential constraint to growth, China is taking steps to improve efficiency in the use of energy. The high TFP growth projection in the China country report indicated that reliance on energy imports can be reduced by as much as 60 percent and minerals by 50 percent.

2.4 Challenges and implications for domestic policy reform

The challenges facing China and India for sustaining rapid economic growth and meeting the MDGs are similar in nature. First there is the matter of continuing to reduce poverty and hunger and maintaining food security. Two other serious issues concern the widening rural-urban income gap and the degradation of the environment. Also of concern is the need to restructure agriculture and markets to meet more diversified consumer and export market food demand, and the need to adopt policies that enable both countries to maintain comparative advantage in commodity production. How these challenges are addressed will determine to a large degree the success in meeting the MDGs, the ability to sustain growth and the role that these economies will play in world markets.

2.4.1 Food security and poverty

Two important questions related to achieving the MDGs of poverty and hunger reduction need to be answered. How does the growth in agriculture and in the non-agricultural economy affect poverty alleviation? What can be learned from the experience of China and India?

Ravallion and Chen (2004) for China and Ravallion and Datt (1996) for India conclude that there is a strong link between poverty reduction and increased agricultural productivity.⁷ The China case study provides several interesting results on key factors that have determined the changes in rural poverty in China. Overall economic growth has been a key primary source of rural poverty reduction. But while economic growth is an essential and necessary condition for nationwide poverty reduction, it is not a sufficient condition. As incomes have grown the impact and effectiveness of general economic growth on poverty reduction has weakened. Fan *et al.* (2002) for China and Fan *et al.* for India (2002) examine the poverty impact of various agricultural investments and subsidies. Their

⁷ See also Timmer (2005) on the link between agricultural productivity and poverty.

research suggests that there are important multipliers at work and that the impact of these multipliers changes over time. In addressing the question of poverty impact of agriculture *per se* the links between the agricultural and non-agricultural economy, including rural non-farm employment, need to be examined.

Taking the aforesaid views into consideration, it can be observed in China that the TVEs provided a strong link between agricultural and non-agricultural economy which undoubtedly accounted for the sharp drop in poverty. Also fostering poverty alleviation has been the egalitarian nature of the reforms under the HRS. By contrast, the links between the agricultural and non-agricultural economy have been less strong in India and have been hampered by a host of regulations which have slowed the development of both agriculture and industry. Overall growth in the GDP is increasing in India while growth in the agricultural GDP has been declining which does not speak well for reducing rural poverty.

Based on projections using the GTAP model both country studies conclude that they can meet domestic cereal grain demands without reliance on significant imports. Since the food shortages of the mid-1960s, foodgrain self-sufficiency has been a dominant feature of Indian agricultural policy. China also sets a high priority on foodgrain self-sufficiency. However, maintaining self-sufficiency in wheat production will almost certainly require improved management of water resources in the Punjab and neighbouring states and in the North China Plain.

Foodgrain self-sufficiency at the national level does not ensure food security at the regional or household level. It is a paradox that with more than 260 million people below the official poverty line in 1999–2000, India is one of the leading exporters of rice. Poverty incidence is expected to continue to fall in India from 26.1 percent in 1999–2000, reaching 8 percent in 2015 well beyond the MDG. But achieving this goal would appear to depend on the success of the reforms, which target the growth in agriculture, to rise from the sluggish 1.5 percent to 4 percent *per annum*.

From the experience of both China and India, the policy implications seem clear. Attention must be given to raising agricultural productivity and incomes in those areas that have thus far not benefited from new technologies or trade liberalization. At the same time emphasis should be on creating jobs in the non-farm sector, whether rural- or urban-based. For China this will require continuing reform of state-owned enterprises (SOEs) and encouragement of labour-intensive private industry. India's continuing reforms should foster growth in employment in both the manufacturing and service sectors.

Addressing uneven progress in poverty reduction at a disaggregated regional level in both India and China calls for greater priority apropos public investment in less-favoured areas. There is little trade-off between production and poverty reduction in India (Fan and Hazell 2000). Corroborative evidence from China suggests that returns to agricultural research and development in the poorest (western) region are 15 percent above the country average. Moreover, 140 people are brought out of poverty per 100 000 Chinese yuan of extra research investment, as against 30 nationally (Fan *et al.* 2002).

2.4.2 The widening income gap

In addition to the rural–urban income gap, especially that between agriculture and new, dynamic industries, there are regional disparities such as between the coastal and the central and western provinces in China or between the Punjab and Haryana and the states of Eastern India. Further within regions there is the disparity between those that have become commercialized, for example through contract farming and those that follow traditional practices. For example, in India disparity exists between the more commercialized farmers in the Punjab and Haryana as opposed to those in Bihar and Orissa.

The issue here is not necessarily absolute poverty but what Hayami (2005) describes as relative poverty. The less favourable areas need better education and health services and equal access to social services. Gulati *et al.* (2005) argue to this end that China and India should accelerate growth, improve efficiency and at the same time ensure that growth is both equitable and sustainable. To improve efficiency, India should phase out inefficient agricultural subsidies and efforts should be focused on developing infrastructure and new agricultural technologies. However, for many the path out of poverty lies not in agriculture but in non-farm opportunities. Both countries are experiencing rapid migration from rural to urban areas. But too little attention is paid to facilitating migration of rural workers to urban jobs where investments in the rural economy have a low payoff.

Both China and India are committed to addressing the income gap, but the approaches will be very different. China recently approved a 15 percent increase in the money earmarked for agricultural development and rural services. Also China has initiated the “Five Balanced Development Strategies: balanced development between rural and urban, between economic growth and social progress, among regions, between human intervention and environmental conservation, and between internal and external economies”. The proposed strategies and reforms are bold but there are many barriers to achieving the lofty goals of the programme.

The UPA Government came to power in India in May 2004 and the National Common Minimum Programme forms the bedrock of economic policy with the highest priority for agriculture and a holistic approach to agriculture and rural development. But India faces a different set of policy and institutional constraints. Rationalizing subsidies and extending reforms that liberalize industry to agriculture through the removal of regulations and restrictions to trade seem to be crucial. India also must address the problem of a high variability in income and livelihoods among regions and states.

To illustrate, large segments of rural households in the semi-arid tract of rural south India experience long spells of poverty even without negative crop shock. A study showed about 40 percent of the sampled households were poor for three years or more (Gaiha and Imai 2004). Following a (large) negative crop shock, or substantially lower crop incomes (relative to a trend), the share of persistently poor rises (by about 10 percent). When crop shocks occur in consecutive years — droughts lasting two to three years are not uncommon in this region — the proportion of persistently poor among small landowners rises sharply (by about 32 percent).

These and other related findings point to the need for combining risk reduction and mitigation measures with those designed to raise productivity of smallholdings and expansion of employment opportunities for the landless in non-farm activities.

2.4.3 Environmental issues

Rapid economic development challenges the ability of China and India to manage resources, sustain agricultural growth rates and meet food security and poverty reduction objectives. In both countries, economic development has taken precedence over protection of the environment.

The environmental issues can be summarized under five main headings: air, water, soil, habitat destruction and biodiversity losses. Of particular concern to the sustainability of agricultural growth and to food security are problems relating to misuse of land and water resources.

Soil problems — erosion, fertility losses, salinization and desertification — are reducing the land area suitable for cultivation. Overuse of fertilizer (China’s use of nitrogen is three times the world average) is resulting in both environmental problems and problems related to food and water safety. For example, the high levels of nitrates found in the drinking water in many cities in North China pose a threat to the health of infants.

Of immediate concern to both China and India is the growing scarcity and competition for water and declining water quality. The overexploitation of groundwater has contributed to the slowing of growth in grain production in two of Asia's breadbaskets, Northwest India and the North China Plain. This has important implications in particular for the long-term growth in wheat production in these regions.

The Indian National Common Minimum Programme, a politico-economic agenda that guides new government policy decisions, lists among its reform priorities stopping the misuse of water and the unsustainable use of land. In China and India major schemes are underway both to conserve water and to reallocate water between basins — for example from the Yangtze (north). These are long-range projects. Meanwhile, institutional changes are being tested and implemented with mixed success to improve the efficiency of water use and provide equitable allocation of water among competing uses and users. This includes programmes and projects designed to transfer operation and management responsibilities to local user groups — known as irrigation management transfer. Removal of policy distortions and efficient use of the common property resource, e.g. groundwater, to avoid overexploitation present the biggest challenge.

Some recent evidence, for example, suggests that a perverse incentive structure embodied in the MSPs and water and power subsidies have acted as a deterrent to the shifting of wheat and rice production to northern and eastern states in India, which possess highly favourable agro-ecological conditions. Existing major producers such as Haryana, the Punjab and Tamil Nadu are constrained by increasing water scarcity.⁸ For a regionally more differentiated agricultural strategy that would be sustainable over the longer term, it is vital that these states shift to a more diversified agricultural pattern, growing less water-intensive and higher value crops. Simultaneously, larger investments in rural infrastructure (e.g. roads, better maintenance of surface irrigation) and agricultural support services (e.g. research and extension) are a major priority.

An analysis of 48 water users' groups in Tamil Nadu (a south Indian state) offers useful insights into efficient use of scarce water resources. Specifically, where the water allocation rules are crafted by the farming community — rather than the elite or the government — there is greater compliance. Compliance is positively correlated with social homogeneity, small group size and proportional cost-sharing rules, but negatively correlated with inequality in landholdings. Finally, expanded market linkages and access by the elite to private sources of water tend to result in greater violations of water allocation rules (Bardhan 2000). Promotion of water users' groups and building of their capacity are thus vital for sustainable development.

2.4.4 The restructuring of agriculture

A selective description of agricultural transformation is given below mirroring salient features of the Chinese and Indian experiences.

As incomes rise, food consumption moves at first toward less diversification. Households give up consumption of inferior sources (maize and root crops) for preferred cereal grains (rice and wheat). This is followed by diversification into horticultural crops and livestock products (including fisheries). This transformation, caused by a rise in incomes, began in China in the early reform period (1978–1984) and occurred in India largely as a result of the 1991 reforms. The result of (mostly) trade and domestic policy reforms in India was to improve the terms of trade for agriculture and generate private investments in horticultural and livestock products (Gulati *et al.* 2005). Farms become more specialized, but agriculture as a whole becomes more diversified to meet changing consumer demands and the potential for exports. Finally, as suggested above, farm household incomes are likely to become more diversified with an increasing share of income earned from non-farm activities. Countries, regions of countries and farm households may, of course, be at different stages in this

⁸ For illustrative evidence, see World Bank (2005); Gaiha and Kulkarni (2006).

transformation process. The challenge is to provide as wide a scope as possible for participation in the transformation process at the farm level.

Farms in Asia are small (2 ha or less) and in many instances are getting smaller. There is currently a sharp debate among academics as to whether small-scale agriculture can continue to play its historical role. In short, how will agriculture be commercialized? Can small farms have productive cultivation let alone provide the minimum output required to earn a livelihood? Does commercialization of agriculture imply larger farms?

Increasing commercial orientation, vertical integration and coordination of the farming sector with large-scale food processors, wholesalers and retailers who have private standards of food quality and safety could affect the viability of small farms. Evidence from China and India and elsewhere in Asia, however, suggests that small-scale farms will continue to have a role to play. But restructuring of agriculture implies a change in the farm household unit to accommodate changes in domestic and export marketing. While there are economies of scale in distribution and marketing, there are few, if any, economies of scale in the production process. In fact, as demonstrated in China with both family plots under collective agriculture and with smallholdings under the household responsibility system, small-scale farming can be more efficient than large-scale enterprises. At the same time the high degree of fragmentation in farm holdings, particularly in China where the farm may be divided into five or more scattered plots, presents an obstacle to efficient management. Furthermore, there are advantages for farms to work together or to form groups to share services such as extension or tractor provision or for contracting with private sector marketing firms.

The farm size issue has important policy ramifications. The skewed land tenure situation in India suggests that large farms are likely to be more commercially oriented. In China and other parts of Asia there is often a restriction on farm size to maintain an egalitarian policy.

But there are grounds for optimism. Although emerging high value food chains are a threat to smallholders — specifically because of the difficulties of food safety and traceability requirements, and economies of scale in marketing — these value chains offer new opportunities as well. Indeed, smallholders enjoy considerable advantages over large commercial farmers and, given intermediation and internalization, could integrate into the emerging supply chains. Intermediation may take a variety of forms in which public–private agencies cooperate (e.g. food safety standards could be laid down by national governments and private agencies could help smallholders implement them, rural infrastructure could be strengthened by the public sector with private financing, suppliers could help finance the provision of inputs, provide extension). Internalization, on the other hand, involves organizations of producers — especially small producers — negotiating production and marketing arrangements with supermarkets and/or their suppliers (Lipton 2006).

2.4.5 Maintaining competitive agriculture

A traditional response to the widening rural–urban income gap has been to subsidize agriculture. Countries have taxed agriculture in the early stages of development and then subsidized agriculture. The transition from tax to subsidy tends to occur when the share of agriculture declines to 15 percent of the GDP.

The experience of India shows that continuing the current pattern of subsidies can be costly. They absorb funds that could be more effectively used for measures to enhance agricultural productivity — rural infrastructure and agricultural research. Furthermore, WTO and FTA agreements are putting pressure on developing countries to reduce protection. China has viewed this as an opportunity to promote trade liberalization and decrease the highly protected state-owned industries. Trade liberalization has brought about a sharp shift in trade of goods in a manner consistent with comparative advantage. The export of less labour-intensive bulk commodities such as grains has declined while the export of labour-intensive higher valued commodities such as horticultural crops

and animal products has risen. In India trade liberalization has been undertaken since the early 1990s. Contingent on domestic reforms, the India study argues that present high levels of bound tariff for agricultural commodities can be further reduced, barring certain sectors identified as sensitive (notably edible oils and dairy products), as India is cost competitive in agricultural products.

The India country study refers to the “spaghetti bowl” of trade agreements that India has with trading partners and the same would hold true for China. Multilateral trade agreements are preferable to discretionary regional agreements although progress in negotiating the former has been slow. This fact notwithstanding, it is clear that Asia is moving toward a more liberalized trading environment. This stands in sharp contrast to the developed countries who continue to protect their farm economies. Subsidies to farmers in these countries are extremely large despite promises made in the Uruguay Round to reduce them significantly.

2.5 Lessons learned

For both China and India the prospects for continued fast economic growth appear to be excellent. Both studies identify possible constraints to growth and reforms needed to ensure that growth continues at a fast pace. To this end, several lessons, both positive and negative, can be drawn from the experience of the two countries.

Agricultural reforms. The initial conditions and institutional structure of agriculture determine to a large degree the nature of reforms needed to increase agricultural production and productivity in the early stages of economic development. Both governments have undertaken reforms and adopted policies that have accelerated agricultural and economic growth. Chinese agriculture benefited from a major reform awarding decision-making and control over income to smallholders. India’s reforms, although less drastic and not specifically targeted at agriculture, provided the incentives and technologies that farmers needed to increase productivity and incomes.

Provision of public goods and services. Public goods in the form of infrastructure, education, research and technology are essential to initiate and sustain growth in agricultural production and productivity. In China, growth in total factor productivity came principally from institutional change and subsequently from technology. The slowing of growth in Indian agriculture in recent years has been attributed mainly to neglect of public goods needed for agricultural and rural development and to distortions resulting from the excessive use of farm subsidies and price support.

Poverty reduction. Poverty reduction is stimulated by growth in both the agriculture and non-agricultural sectors. This is particularly illustrated by the success of China in the early reform period in developing TVEs. Whether rural- or urban-based, growth in non-farm employment is a critical factor in poverty alleviation. In both India and China, policy and institutional reforms are currently needed to promote non-farm employment.

Income disparities. An inevitable consequence of rapid economic growth is an increase in income inequality. This is reflected in the growing disparity between rural and urban incomes and the growing regional disparity. Even as the percentage of those in poverty is declining, relative poverty is increasing and in some instances causing civil unrest. Both China and India are attempting to address this problem initially by reducing taxes and approving money for employment (creating rural employment schemes), but the long-term solution to rural–urban disparity lies in developing non-farm employment opportunities that lead to a rise in labour productivity in agriculture.

Environmental degradation. Another consequence of rapid economic growth is environmental degradation. Air, soil and water pollution are widespread. Environmental issues tend to be overlooked in favour of policies that promote growth in the short term. The objective should be sustainable growth. Eventually a point is reached where overexploitation can inhibit further growth. For both

China and India this point seems to have been reached with regard to water resources and efforts are being made to improve water-use efficiency.

Technology development. By developing country standards, the investments in research and technology development in agriculture are low. However, both countries have well-established research systems and the capacity for developing new technologies exceeds that of smaller neighbouring countries. Although the spread of technologies will be governed in part by the protection of intellectual property rights, other Asian countries have in the past and should in the future benefit from technology developments in both China and India.

Commercialization of agriculture. In both China and India there are sections of agriculture that are becoming more commercialized to meet consumer demands for a wider variety of products of good quality. A central question is whether the process of commercialization will require a change in farm size. There are clearly economies of scale to be gained in marketing and distribution, but the argument in favour of small-scale agriculture rests on the fact that there are no significant economies of scale to be gained in agricultural production. Besides, in the context of emerging food supply chains, smallholders enjoy certain advantages (e.g. smallholders adapt more easily to contract farming, geographically dispersed small units facilitate risk-spreading for supermarket suppliers).

Agricultural credit. While agricultural credit remains an important concern, the case for a competitive credit market is reinforced by growing commercialization. In India, largely richer households have benefited from expansion of rural banking. In contrast, most marginal/landless farmers do not have a bank account or borrow from a formal source. Most rural borrowers — especially marginal and small landholders — thus rely heavily on informal sources. Informal loans are usually of a short-term nature. Other features that make such loans attractive are easy access, flexible repayment schedules and limited reliance on collateral requirements (Basu and Srivastava 2005). Although group lending through self-help groups has helped overcome informational failures, reduced transaction costs for the borrowers and lenders and enabled women to supplement household incomes through off-farm activities, its usefulness for agriculture is limited.

Risks and insurance. Agricultural production faces a variety of risks. These are related to weather, pests, disease, input supply and prices. Prevalence of risk is not new and farmers and other segments of the rural population have developed ways of reducing and coping with these risks. Insurable risks are a subset.⁹ As traditional mechanisms of risk management are inadequate — mainly because of the highly covariate nature of agricultural risks (e.g. floods or droughts, an unanticipated drop in price), public intervention through some form of crop or weather insurance is a priority. A merit of weather/rainfall insurance is that it pays the insured when rainfall falls short of a specified target, irrespective of actual crop yields. Client behaviour and characteristics do not determine the occurrence of the event or the actual damage. However, there are also a few hurdles. One is reinsurance. An insurance company may not be able to handle many claims, when, for example, there is a regional drought. A large company could diversify its portfolio by selling insurance in different agroclimatic regions.

International trade. International trade is being significantly impacted by WTO and FTA policies. With more liberalized markets China is becoming one of the world leaders in international trade. The impact on agricultural trade will be felt not only in Asia but also in the Pacific Rim countries. A similar pattern could emerge for India with reforms that increase the competitiveness of industry and agriculture. Both countries will be major importers of energy, minerals and forestry products.

⁹ Damage caused by a typhoon is an insurable risk — the probability can be obtained from weather records, the damage is total and the victim cannot influence the occurrence of the typhoon or the damage it causes. Crop damage due to pest attack, on the other hand, is usually an uninsurable risk as its probability is hard to assess, the damage caused is difficult to verify and value and farming practices could influence its occurrence and the damage caused.

3. Other rapidly growing Asian economies — Republic of Korea, Thailand and Viet Nam

In drawing lessons to address poverty and hunger, the adaptability of the experiences of China and India to small country situations needs to be carefully analysed. In this context it would be useful also to study relatively small economies which have shown spectacular and resilient growth and have achieved reduction in poverty and undernutrition within a short period of time. The experiences of three countries — the Republic of Korea, Thailand and Viet Nam — are of interest in this regard. The Republic of Korea achieved extremely rapid growth beginning in the 1960s and is now among the high-income countries. Thailand has had export-led growth with innovative marketing, product diversification, agribusiness and value addition. The recent experience in Viet Nam offers evidence that increasing agricultural exports and integration into international markets can contribute both to economic growth and to reducing poverty, especially when combined with investments in infrastructure and policies that encourage agricultural and rural development (FAO 2003).

3.1 Republic of Korea¹⁰

Korea, one of the so-called “East Asian tigers”, achieved extremely rapid economic growth and industrialization following the upheaval resulting from the Korean War (1950–1953). This growth was marked by the ability of the economy to absorb surplus agricultural labour, increase the productivity of farm labour and avoid a serious discrepancy between rural and urban incomes.

3.1.1 Achievements

Korea was a colony of Japan prior to the Second World War. Although Korea benefited from the Green Revolution in the 1970s, it also experienced significant growth in agriculture prior to the Second World War. Between 1925 and 1935 rice yields grew in Korea and Taiwan Province of China at more than 2 percent *per annum* (Kang and Ramachandran 1999). By 1960, when Korea began its industrial takeoff, rice yields were 4 tonnes/ha, more than twice the level of neighbouring China. Even more important, farming was practised traditionally by tenants, but in 1950 a comprehensive land reform created smallholder agriculture. Thus the agricultural economy was in a position to support rapid economic development.

From the 1960s through the 1980s Korea’s economy grew at 9 percent *per annum*. Per capita income grew at 7 percent *per annum*. Agricultural growth exceeded 4 percent in the 1960s but gradually declined to 3 percent in the following two decades and 1 percent in 1990 to 2003. The contribution of agriculture to GDP declined from 27 percent in 1970 to 3 percent in 2004. This was accompanied by a decline in the labour force in agriculture from 45 to 7 percent.

The shifts in agricultural policy in Korea are instructive. From 1960 to 1969, agriculture was taxed and grain prices were kept low with the import of PL480 shipments. Beginning in the 1970s there was a shift in policy to subsidizing agriculture. The share of agriculture in GDP at that time was about 15 percent. A two-price system was adopted for rice, high for producers and low for consumers, which was extremely costly for the government.

By the 1980s emphasis was placed on the commercialization and spread of capital intensive farming. However, Korean agriculture remains rice dominant, and for the farm households roughly 50 percent of income comes from farming. Self-sufficiency in rice remains a strong political objective in part due to relations with the Democratic People’s Republic of Korea.

¹⁰ In this report, the Republic of Korea is also referred to as Korea for the sake of brevity unless otherwise specified.

3.1.2 Challenges

A major challenge facing Korean agriculture is to obtain a “soft landing” on the WTO/FTA plateau. The WTO Doha Development Agenda (DDA), yet to be completed, will pressure the Korean Government to lower tariffs. A study undertaken by the Korean Rural Economic Institute projects that the lowering of tariffs could result in a decline in farm income of 7.5 to 35.6 percent depending on the speed of the tariff reductions. The Korean Government wants to lower tariffs gradually, but is encountering strong opposition from Korean farmers who do not wish to be exposed to the uncertainties of global markets.

The government is taking a strong hand in encouraging sustainable agriculture. Plans are to reduce the amount of chemical fertilizers by 40 percent over the coming decade and to emphasize the use of livestock manure. The government will also continue to invest in agricultural research and development and rural infrastructure in an effort to close the gap between rural and urban incomes.

The Korean Government has been slow to ease regulations related to farmland ownership and farm size. Reforms are now taking place in the distribution system of agricultural products which should speed the commercialization of agriculture. However, there is a widening income gap between the larger commercially oriented farmers and small farmers.

In one sense Korea is typical of other Asian countries undergoing rapid industrialization — the widening rural–urban income gap (reduced in the case of the Korea by heavy subsidies for agriculture); the ageing agricultural population and environmental issues related to intensification. From the outset in Korea, the government has played a major role not only in agricultural but also in industrial development. Government policy has clearly influenced the allocation of resources and slowed the rate of diversification at the farm level.

3.1.3 Lessons learned

The following lessons have been learned from the Korean experience.

- Rapid economic growth has been accompanied by a sharp reduction in the share of agriculture in the GDP and in the employed labour force. Industrial growth can be designed to absorb surplus agricultural labour and hence increase farm labour productivity.
- As agriculture’s share in the GDP declines the government will be under increasing pressure from the farming community to subsidize agriculture and take steps to close the rural urban income gap.
- Steps should be taken early on in the agricultural transformation process to allow for the restructuring of agriculture — land consolidation and farm size adjustment — to promote commercialization and attract private investment in agriculture.
- The WTO and FTA agreements are already beginning to have an impact on the economy where agriculture has been heavily subsidized in the past. Steps must be taken to gradually reduce tariffs while providing other measures to support agriculture that are not trade distorting.

3.2 Thailand

Thailand, a middle income country, has achieved remarkable success in agricultural and economic development. Agriculture was taxed to support industrial growth until the mid-1980s. Although agriculture’s share of the GDP has fallen to less than 10 percent, Thailand has maintained its strength in the export market. At the same time there has been a shift to high-value crops particularly by professional farmers who, working independently or together with private marketing firms and with government agencies, are pioneering innovative technologies and management practices.

3.2.1 Achievements

Thailand experienced rapid agricultural and economic growth over three decades from the 1960s to the 1980s. Throughout much of this period the GDP grew at 7 to 8 percent and agricultural GDP at 4 to 5 percent. Agricultural growth was spurred on in part by the fact that Thai farms were larger than in most other Asian countries (6 ha as opposed to 2 ha) and forest areas could be brought into cultivation. From 1960 to 1980 the main source of agricultural growth was land and labour. Subsequently, the largest contributor to agricultural growth was capital accumulation followed by technological progress. Technical progress as measured by total factor productivity, accounted for 25 percent of agricultural growth in 1980 to 1995.

The incidence of poverty declined from 57 percent in 1962–1963 to 10 percent in 2002. Until the mid-1980s the decline in poverty was due principally to the growth in agriculture. But since then, the cause of poverty reduction has been principally the growth in industry. Evidence shows that in this latter period growth in the rural economy was highly linked to growth in industry.

The mid-1980s witnessed major changes that impacted on agricultural growth. The limits to expansion of the land area were reached. There was a global depression in prices which, coupled with a rise in wage rates, resulted in a cost-price squeeze for farmers. Water shortages were also experienced in many areas. Finally, the liberalization of financial markets as a result of the Plaza Accord led to heavy foreign investment in Thai industries, with a negative effect on agriculture described in the Thai report as the “Dutch disease”.

Growth in agriculture declined. Nevertheless, several steps were taken by farmers, private marketing firms and by the public sector to ensure continued strength in exports and to meet the growing domestic demand for a broader range of quality foods. The government ended taxation of exports. Farmers mechanized to reduce labour costs and invested in water pumps and pond digging to overcome the growing scarcity of water. To meet changing consumer demands they switched to the production of higher value commodities: horticulture, livestock and fisheries. Professional farmers either singly or in groups developed contracts with marketing firms introducing new technologies and management practices. In short, this restructuring of agriculture, to the degree that has occurred, has forged new linkages among farmers, marketing firms and government agencies. There also are spillover effects in terms of public goods that benefit the whole farming community.

Thailand has developed a successful strategy for dealing with employment in the northeast with its poor soils and lack of irrigation. Farm family members are employed in local industries or in Bangkok to supplement farm household income. The amount of time devoted to crop production has been sharply reduced. By contrast, in the south the agricultural labour force is fully employed primarily in rubber production and Thailand has surpassed Malaysia as the world’s leading rubber exporter.

While meeting new domestic demands, Thai agriculture has maintained its strength in exports being a world leader in exports of rice, cassava and rubber and having a global reputation for the quality of its exports. Thailand has supported the move toward trade liberalization recognizing that it would give a boost to export prices. With the slow progress on the Doha Round negotiations, Thailand has signed a number of FTAs, the main benefit of which is to gain access to foreign markets not only for traditional exports but for a wide range of agricultural products.

3.2.2 Challenges

As agriculture’s share of the GDP shrinks, there is an almost universal tendency to provide various price-support and subsidy schemes driven by the desire to boost agricultural incomes. Thailand seems to be no exception. The several schemes tried so far by the Thai Government to provide farm support have been generally unsuccessful. But, by and large, to date these programmes have

not been at a level to cause major distortions in the economy or disrupt Thailand's comparative advantage.

Thailand must continue the shift to higher value and safe food products if it is to remain a major exporter of agricultural products and to supply an increasingly sophisticated domestic consumer demand. This restructuring of agriculture will require more sophisticated and intensive management provided either by individual farmers-entrepreneurs or by contract farming. There is a need to promote professionalism in farming, to provide farmers with information on new farming techniques and to lower the cost in establishing business relations with modern food marketing firms. Farmers' groups may achieve economies of scale in obtaining extension services and in dealing with marketing firms.

Technological change has been one of the main driving forces in the growth of agricultural productivity and Thailand will have to continue to invest in research if it is to remain competitive. However, there is a need to prioritize public sector research to focus on those areas not covered by the private sector. Furthermore, there is currently in the public sector a shortage of qualified research and extension workers due to an unattractive reward system.

In restructuring toward land-intensive but less water-intensive commodity production there is a need to re-examine land and water policy. In the process of commercialization, laws are needed to facilitate land transfer and the increase in farm size. In the case of water, there is a need to shift from ineffective supply augmentation to demand management. Institutional reform or innovation is needed to establish water rights and regulate the allocation of water among sectors.

As Thailand expands FTAs and comes under increasing pressure from the WTO it will be necessary to make some adjustments in domestic agriculture, for example shifting out of commodities such as fruit and dairy products for which the temperate zones have a comparative advantage. At the same time it will be necessary to negotiate with trading partners to remove restrictions on Thai exports.

Although institutional quality evolves gradually and in complex ways, careful attention must be given to strengthening specific components: political stability, regulatory quality, rule of law and control of corruption, as failure to do so may impair growth rates and success in poverty reduction.

3.2.3 Lessons learned

The following lessons have been learned from the Thai experience:

- In the early stages of development growth in agriculture was the main contributor to poverty reduction but as the share of agriculture in the GDP fell below 20 percent, industrial growth became the main cause of poverty reduction. Growth in the rural economy is now highly linked to growth in industry.
- Rapid economic growth, particularly manufacturing growth, can be an important source of poverty reduction. But as poverty incidence is heavily concentrated in the rural areas, rural non-farm employment opportunities are critical in the formulation of a poverty reduction strategy. Rural non-farm employment opportunities will help reduce the rural-urban income gap.
- Growth in agriculture can be sustained when macroeconomic policies allow comparative advantage to play a role and policies designed to support or protect agriculture do not lead to trade distortions.
- Promotion of public-private partnerships in which smallholders, business interests, agro-industry and the state are cast in roles that are negotiated and contested over time would help

to accelerate the integration of smallholders in rapidly expanding high value agricultural chains.¹¹

3.3 Viet Nam

Viet Nam, a low-income country, is one of the fastest growing Asian economies, being outpaced only by China. As noted hereunder, there is a remarkable similarity in the policies and institutions adopted by China and Viet Nam as both countries shifted from planned to market economy.

3.3.1 Achievements

Viet Nam faced a series of crises — both external and domestic — following the war with the United States. The transition from a planned to a market-oriented system began with the promulgation of *Doi Moi* (Renovation) in 1986. But the decision to decollectivize agriculture (resolution 10 of the Politburo) was in large measure influenced by a disastrous crop year and shortfall in rice production in 1987. This was followed by the liberalization of the markets beginning in 1989. Devaluation of the currency and other measures led to control of inflation and provided macroeconomic stability. Another critical piece of legislation was the 1993 land law which increased the security of tenure and allowed for transfer of land-use rights.

These steps laid the foundation for rapid economic growth. Between 1990 and 2003 the Vietnamese economy grew at 7.5 percent and the GDP in agriculture grew at 4.2 percent. The share of agriculture, forestry and fisheries in GDP fell from 39 to 22 percent. Over roughly the same period (1990 to 2002) the dollar-a-day poverty index dropped from 50.7 to 13.1.

This same period saw a rapid growth in agricultural exports. Viet Nam became the world's second largest exporter of rice, coffee and pepper. Seafood exports rose dramatically surpassing rice and coffee in export earnings as world prices fell for the latter two commodities. Agricultural exports accounted for 38 percent of export earnings in 2003, increasing from 31 percent in 1995.

As in the case of China, total factor productivity in agriculture showed the largest gains in the early reform period (1985–1990). The Viet Nam study suggests that this was due to a dramatic increase in the quality of labour used for agriculture, but future gains will need to come from technological change.

3.3.2 Challenges

Despite the decline in poverty and as a consequence of the rapid industrial growth, the rural–urban income gap is widening. There is also a growing regional disparity in income within agriculture and pockets of food poverty. There is a need in some regions to support agricultural and rural development and in others to facilitate migration to industry. The industrial sector has been unable to absorb all of the surplus labour from the agriculture sector. This has been due in part to the restrictions on the expansion of labour-intensive private enterprises. Better incentives for the development of firms generating non-farm employment are needed.

As a result of the egalitarian nature of the land reform, farm operating units are highly fragmented. Steps need to be taken to facilitate consolidation and increase in size of landholdings to improve the efficiency of production and farm incomes and facilitate commercialization. Forty percent of all

¹¹ Some evidence from Northern Thailand unravels the risks and opportunities of globalization in rural areas. By embracing a diverse portfolio of farm and non-farm activities, farmers have been able to secure higher incomes and living standards. In fact, households deeply involved in the global economy were able to cope with the economic crisis better. As the restructuring and integration of activities into a global network accelerated, their vertical integration — especially in fruit production — is mediated by local and often quite small business interests (Rigg and Nattapoolwat 2001).

households are engaged in some degree of commercial production (90 percent in the Mekong Delta). A new stratum of commercial farms has emerged and policies should be adopted to facilitate increase in these numbers. At the same time, a strategy must be pursued that supports most of the farming community with lower levels of commercialization and to facilitate migration particularly from regions where agriculture is less productive.

The creation of non-farm employment has moved slowly. Only in the Red River Delta has the number and proportion of off-farm households increased rapidly. Contrariwise, in the Mekong Delta and the southeast heavy out-migration to the cities may be having a negative impact on sustainable rural prosperity.

The rapid growth of exports has involved certain risks. For example, the expansion of coffee production was a major factor contributing to the decline in world coffee prices; this was reflected in a loss of income by coffee producers. Another major concern is the need to improve the quality of exports to enhance competitiveness in world markets.

There are signs that agricultural output and productivity growth are decelerating; expansion of off-farm employment opportunities has not kept pace with growth in the rural population and the labour force; poverty reduction is slower in rural than urban areas; pressure on land and natural resources has increased; growth in export earnings has slowed. All of these factors suggest the need to identify the policies and investments that will sustain agricultural and rural development in the future.

Not only is poverty in rural areas considerably higher than in urban areas, but vulnerability to various risks — in the sense of lack of resilience against them — is high as well (Ligon and Schecter 2004). There are three sources of such risks: poverty of a household (poverty risks); illness, injury or death of an earning household member (idiosyncratic risks); and markets (e.g. price fluctuations) and nature (e.g. failure of rains, floods) (aggregate risks). In Viet Nam, poverty is the single largest component, followed by aggregate and then idiosyncratic risks.¹² These findings suggest that raising incomes of the poor will help to reduce their vulnerability but not eliminate it as other sources of vulnerability call for other protective mechanisms (e.g. weather insurance).

Yet another challenge is the spatial configuration of poverty in Viet Nam. The incidence of poverty in Viet Nam is highest in the northern uplands and lowest in the southeast. The variation across districts is large. In some districts, particularly remote locations in the upland areas, over 90 percent of the population is poor. In others, particularly in or near the large urban centres, less than 5 percent of the population is poor. Mapping of poverty density, however, provides a different perspective on the spatial distribution of poverty. Poverty density is greatest where the incidence of poverty is the lowest. In other words, only a small percentage of Viet Nam's poor live in the poorest areas. Most of the poor live in the Mekong Delta and the Red River Delta. The cost-effectiveness of antipoverty interventions would depend on whether their costs vary with population density. Electrification and extension, for example, may cost more in per capita terms in areas with low population density, while land-intensive options (e.g. roads) may be more expensive in a high density area (Minot and Baulch 2005).

¹² In this context Adger (1999) argues, on the basis of research in coastal Northern Viet Nam, that vulnerability rose during the transition to a market economy as local community's protection mechanisms weakened (agricultural cooperatives, for example, ceased to allocate resources for coastal defence) and inequality grew (e.g. through privatization of mangrove forests and their conversion into aquaculture). The latter was linked to shrinking of resources for coping with extreme weather events.

3.3.3 Lessons learned

The Viet Nam country paper lists nine lessons learned. These can be summarized briefly as follows:

- Land reform and the revival of the household sector were crucial elements in the success of the reforms. But this is a one-off effect, and further growth in agriculture must depend heavily on technological change.
- The success in export promotion has contributed to falling world prices affecting the imputed gains. The government and the private sector need to be more attuned to these risks.
- There is scope for further gains in the export market by improving quality.
- There is a need to continue to develop commercial farming, to consolidate and increase farm size and to expand the use of new technologies. Extension services can help in the adoption of practices more closely linked to farmers' market needs.
- Despite recent advances, economic development and poverty reduction, the disparity in incomes is increasing and food poverty persists in some areas. Careful targeting of public investments in these areas could have a high payoff in terms of social welfare.
- Finally, gradualism has been one of the key factors contributing to the success of the reform process, a conclusion that has been applied to China as well (Gulati *et al.* 2005; Stiglitz 2002). More specifically, maintaining reform momentum and political and institutional continuity made a significant difference to growth and poverty reduction in Viet Nam. The rapid growth during the 1990s was the result of a significant shift in economic policies — from those that reinforced a poverty trap (exchange rate overvaluation, hyperinflation, lack of incentives in the rural sector, severe limitations on the private sector) — to a different set that could support a higher level of economic activity (Pritchett 2003).

4. Lessons from the five countries

What has been learned from the experiences of these five countries? What does this suggest for the future direction of strategies and policies designed to maintain food security, further reduce poverty and promote the restructuring of agriculture? The degree of relevance of specific country experiences and the lessons emerging differ from country to country depending on resource endowments, policy and institutional set up and the stage of development. Yet there tends to be a common path for agricultural and economic development marked by a common set of achievements and problems encountered, which some have described as a uniquely Asian experience. This commonality allows us to relate country experiences and provides an opportunity for other Asian countries and developing countries elsewhere to learn from these experiences.

4.1 Role of agriculture in economic growth

Economic development begins with the development of agriculture. This is because in the early stages of development agriculture accounted for one-third to one-half of the GDP and employed two-thirds or more of the labour force. What were the prerequisites for rapid agricultural growth? The country studies showed that some combination of agrarian or land-to-the-tiller reforms, investments in research and extension and in irrigation were essential in all cases except Thailand. Thai agricultural growth was fuelled by extension of the crop area and by exports of rice and upland crops. All countries, except India, were able to sustain growth rates of 4 percent or more in agriculture for a decade or more (Table 2).

Table 2. Growth rates of GDP by sector in selected Asian economies

	China	India	Korea	Thailand	Viet Nam
Total					
1960s	5.2	3.4	8.6	8.4	na
1970s	5.8	3.6	9.5	7.2	na
1980s	10.3	5.7	9.0	7.6	4.6
1990–2003	9.6	5.9	5.5	3.7	7.5
<i>Agriculture</i>					
1960s	1.6	1.9	4.4	5.6	na
1970s	3.2	1.9	3.2	4.7	na
1980s	5.9	3.1	2.7	3.9	2.8
1990–2003	3.5	2.7	1.0	1.7	4.2
<i>Industry</i>					
1960s	11.2	5.4	17.2	11.9	na
1970s	8.7	4.5	15.4	10.0	na
1980s	11.1	6.9	11.5	9.8	4.4
1990–2003	12.3	6.0	5.9	4.9	11.3
<i>Services</i>					
1960s	3.1	4.6	8.9	9.1	na
1970s	3.7	5.2	8.5	7.3	na
1980s	13.5	6.9	8.7	7.3	7.1
1990–2003	8.8	7.9	5.7	3.0	6.9

Source: World Bank, Development Indicators, various issues.

Of particular note were the land reforms in China, Viet Nam and, at an earlier stage, Korea. De-collectivization of agriculture in the first two countries gave a huge boost to agricultural productivity. Indian agricultural growth, on the other hand, relied initially on Green Revolution technologies and later on links to the development of industry and services. Land reform was initially patchy and it is noteworthy that agricultural growth in India has not reached the high levels experienced in the other four countries.

Moreover, in the early stages of development, agriculture provided labour and capital (often in the form of export earnings) to the industrial sector and in turn provided a market for industrial products. Agricultural exports have played a key role in China, Thailand and Viet Nam. Additionally, in Thailand the mix of commodity exports has changed over time, maintaining comparative advantage and aiding a revival of the agricultural economy after the 1997 crisis. Except for India, the high rates of agricultural growth were associated with growth rates in industry of 10 percent or more. As the experience of India and other countries shows, without the appropriate institutional and policy structure, agricultural growth contributes less to growth in the overall economy.

As agriculture grows rural incomes rise but not as fast as incomes in the rapidly growing non-agricultural economy, widening the rural–urban income disparity. This phenomenon has been especially significant in China, Thailand and Viet Nam and is accompanied by a decline in agriculture’s share of the GDP (Table 3). In the initial stages of development, low productivity growth in Thailand was linked to extension of the cultivated area, but in land-scarce Viet Nam and China, land reform led to increased productivity through increased intensity of labour inputs. Ultimately, however, if labour productivity is to grow there must be a decline in the agricultural labour force. One needs to be cautious about interpreting the population data in Table 3. However, with the notable exception of Korea, the decline of the labour force in agriculture has not kept pace with the decline in the share of agriculture in the GDP. The urban–rural gap in the other countries has therefore widened.

Table 3. Percent of GDP and population in agriculture for selected Asian economies

	China	India	Korea	Thailand	Viet Nam
Percent GDP in agriculture					
1970	35	43	27	26	na
1980	30	35	15	23	na
1990	17	31	8	12	39
2003	15	22	3	10	22
Percent total population in agriculture					
1970	78	68	43	75	77
1980	74	64	34	64	73
1990	72	58	16	57	71
2000	65	52	7	44	66

Source: For GDPs — World Bank, Development Indicators; for population in agriculture — FAO AgroStat.

The country studies indicate that in the early stages of development agriculture is taxed to provide support for industrial development. But as agriculture's share of the GDP declines to about 15 percent, countries have shifted from taxing to subsidizing agriculture. This occurred in Korea in the early 1970s and in Thailand in the mid-1980s. The Thai report notes that while there are strong political pressures for subsidies, the various schemes introduced have for the most part been a failure. Against these pressures to subsidize agriculture there are countervailing pressures, brought on by FTAs and WTO membership, to liberalize trade. To the extent that free trade policies prevail, the form of subsidization of agriculture may change from commodity-specific subsidies, which are considered trade distorting to decoupled direct payments to farmers to ensure a reasonable level of living in agriculture.

Finally, all five country studies report that the growth in agriculture is slowing down. There are a number of factors that help to explain this decline. For the past two decades there has been a secular decline in the real price of agricultural commodities. Support for agriculture among multilateral lending agencies has declined and national budget allocations for agriculture have also declined. With foodgrain prices remaining low and most countries enjoying near self-sufficiency there is complacency about food security.

The lessons for countries, particularly the least developed ones with a large share of population in the agriculture sector, are to support agricultural growth and rural development to address the problems of poverty and hunger and to create a sustainable basis for rapid economic growth. Experience in the countries studied and elsewhere in Asia shows that in the early stages of development agricultural growth has a more direct and greater impact on poverty reduction.

In view of the declining share of agriculture in the GDP and its structural transformation, an emerging concern is whether the focus on agriculture as a sector with positive externalities must shift to specific crops/activities that are globally competitive (e.g. fruits and vegetables, dairy products). Combining this focus with the imperatives of poverty reduction and food security does not, however, weaken the emphasis on raising the productivity of smallholdings. Indeed, this reinforces it along with expansion of employment opportunities for the landless in non-farm activities.

Having said this, there is a need to address the problems of further agricultural and rural development with a two-pronged strategy. The first prong should have the elements to accelerate agricultural productivity growth, diversification and competitiveness — a favourable macroeconomic and policy environment, application of modern technology, investment in irrigation, development of post-harvest infrastructure and improvements in the legal framework for related investment and

commercial activities. Some of these needs are elaborated in Section 4.4. The second prong should consist of measures to address production and nutrition issues particularly in the relatively less-endowed and remote regions with high incidence of poverty. This would be achieved through research on and development of suitable crops, infrastructure development and strengthening linkages with the non-farm sector. As the Viet Nam report notes, food insecurity persists at rather high levels in some areas where farmers are unable to shift to more productive activities due to lack of resources and remoteness. Careful targeting of public investments in these areas could have major benefits at relatively low cost.

4.2 Poverty, food security and income inequality

This section discusses three subjects that are closely linked — poverty, food security and income inequality. Despite progress in reducing the incidence of poverty over the past several years there were an estimated 688 million people living below the dollar-per-day poverty line in Asia in 2002, the majority of them living in rural areas. What is the appropriate strategy for reducing rural poverty and achieving food security at the household level? How does the growing disparity between rural and urban incomes influence poverty reduction? In answering these questions there is a need to examine the experience reported in the country papers.

All five countries have achieved notable success in poverty reduction. In Korea the incidence of poverty is less than 2 percent. China, Thailand and Viet Nam have already achieved the MDG target of halving the proportion of people living in extreme poverty between 1990 and 2015 (Table 4). India is also well on track to hit its poverty target. The India study estimates that overall economic growth will lead to a decline of the proportion of the population in poverty to less than 10 percent by 2015 and the absolute numbers in poverty will also decline.

Table 4. US\$1-a-day poverty index and magnitude of poverty

	Index		Magnitude ('000)	
	1990	2002	1990	2002
China	33.0	15.9	377 055	203 153
India	42.1	34.0	351 245	356 785
Thailand	10.1	2.2	5 651	1 354
Viet Nam	50.7	13.1	33 446	10 509

Source: United Nations Population Division, World Population Prospects: the 2002 Revision.

Does poverty reduction come from agricultural or non-agricultural development? This would seem to depend on the stage of development and the various linkages and multipliers between the farm and non-farm sector. Growth in agriculture results in an almost immediate impact in terms of increased employment of rural labour in a host of non-tradable activities. The studies report that most farm households supplement their income from non-farm earnings thus having an immediate impact on poverty reduction and food security.

The most rapid reduction in poverty in China and Viet Nam was achieved in the early reform period with the decollectivization of agriculture. This was followed in China by the growth in TVEs providing a major source of rural non-farm income. While China reports that overall economic growth has been the main source of poverty reduction in recent years, agricultural growth also matters. Furthermore, as incomes have grown the impact and effectiveness of economic growth on poverty have weakened. In Thailand, the sharp decline in poverty incidence from 1962–1963 to 1986 was due to agricultural growth. But with the subsequent slowdown in agricultural growth and the declining share of agriculture in the GDP, overall economic growth rather than growth in farm

income has exerted more influence on poverty reduction. Therefore, developing countries in Asia must reverse the deceleration in agricultural growth. This will require appropriate restructuring of agriculture with changing market demand and trade opportunities. Even if the incremental capital output ratio (ICOR) for agriculture has increased and investment in agriculture is therefore less attractive, this is a necessary trade-off if poverty and income inequality are to be addressed.

Food security at the national level implies *inter alia* that adequate supplies of food are available through domestic production and/or imports to meet the consumption needs of the country's population. The global food supply for several commodities has been solved, but the problems of economic access to food have not. There are large areas, particularly rain-fed areas, which have not witnessed growth in agricultural productivity as a result of new technologies. Furthermore, at local and household levels, fluctuations in access to food occur due to weather-related production shortfalls or natural calamities or seasonal fluctuations in price and employment opportunities. In addition, the poor also suffer from the nutritional problem of physical absorption due to illness or parasites.

Viet Nam, China and India have regions experiencing food poverty. In India there is evidence that high foodgrain prices have reduced food consumption among some of the poorest segments of society who cannot afford to supplement their diets with other foods (Chand *et al.* 2004).¹³ Food poverty is widespread in the non-irrigated areas which also face risks due to the failure of the monsoons.

In China, Viet Nam and Thailand despite the fact that overall incidence of poverty has fallen, the rural-urban and intersectoral (agriculture-non-agriculture) income gap has increased. This relative poverty can be a source of social unrest. China has reduced taxes on farmers and provided direct acreage support for cereal grain production. Thailand has introduced a range of price-support and agricultural restructuring programmes since the 1980s which have been largely unsuccessful. There is, however, potential for forging more effective partnerships among smallholders, local business groups and the state in the context of expanding high value agricultural chains.

Rapid economic growth places serious pressures on the environment and threatens food security. As the country reports point out, policies to promote growth have taken precedence over policies to improve the management of natural resources, while production is increasingly constrained by their (mis)management. Of immediate concern is the overexploitation of groundwater in the North China Plain and in Northwest India, two of Asia's most important granaries. While this may have contributed to food security and growth in the short term, there are obvious adverse implications for food production over the long term.

In summary, there is a clear link between agricultural growth, coupled with off-farm rural employment, and poverty reduction. However, disadvantaged rural areas continue to need support in education, infrastructure and technology development. Further important challenges stem from relative poverty, which can become a source of social tension, and the threat posed to sustainable food production by current levels of environmental degradation.

4.3 Restructuring of agriculture

Rising incomes and urbanization lead to a change in diets and demand patterns for farm products. That is to say, the process of restructuring is driven by market demand.

The process of agricultural transformation involves diversification in the agriculture sector to meet changing domestic and trade demands. The China study for example illustrates how net exports

¹³ Whether a lower calorie intake from cereals necessarily implies a higher prevalence of undernutrition is not so obvious as even poor households substitute between different sources of calories with changes in relative prices and exhibit a preference for variety in food (Jha *et al.* 2006b).

have gradually shifted from land intensive to higher value labour-intensive products since the early 1980s. Elsewhere in Asia diversification from cereal grains to higher value commodities was stimulated by the sharp drop in cereal grain prices beginning in the 1980s, one of the consequences of the Green Revolution.

The first step in transformation at the household level involves a shift from the production of food staples to higher value commodities, for example from production of rice and wheat to horticultural crops, livestock and/or fisheries. This shift may involve either diversification or specialization in commodity production. There may also be a diversification or concentration in farm household income sources. This first step in transformation is well underway throughout Asia. The India report indicates that even small and marginal farmers are beginning to change their production patterns in response to changing demand.

The next step is to move beyond basic commodity production in order to access value-added supply chains from the modern retail sector where the value added comes in the form of quality, timeliness, food safety and labour standards in production (Timmer 2005). It is difficult to judge from the country studies or other sources just how fast this transition is occurring. The Korean report refers to full-time farmers, the Thailand report to a group of "professional farmers" and the Viet Nam report to an emerging group of commercial farms. What characterizes these groups is that their income comes almost entirely from farming, and they may also be more innovative and have larger farms and better access to resources, such as credit and new marketing structures, than other farmers.

The restructuring is well-illustrated in the case of Thai agriculture. Farms on the frontier of transformation are shifting to higher value products that can be further processed, increasing specialization in certain products with higher productivity, diversifying produce and export markets and enhancing product quality and safety. Contract farming has expanded. The participation of supermarkets and convenience stores in the retail sector is rapidly increasing, bringing new technologies and marketing innovations. Based on a socio-economic survey, professional farmers' incomes were almost 75 percent above the average and more than 80 percent of their total income came from farming.

Many farm households in Asia, however, are involved in transformation of a different sort. These farm households are increasingly augmenting their incomes from non-farm activities. Labour has become more mobile. The distinction between rural and urban is becoming blurred as households further occupy or have representation in both rural and urban worlds, and earn a living in both agricultural and non-agricultural activities (Rigg 2005). The rate of rural migration is mostly the result of the perceived urban-rural differential in living conditions and employment opportunities largely among the younger population. The consequence of urban migration will have important effects on the ageing rural population that remains in farming.

Restructuring brings challenges. First, it will be necessary to stay at the forefront of technological innovations. The public sector will need to continue to support research in those areas where the private sector cannot fully capture the returns. Second, although farms are likely to remain small, farmers will have to organize themselves so that they can exploit the economies of scale from joint investment in services such as extension or from joining together to deal with marketing firms (referred to as internalization earlier). Third, there is a need in some situations to promote professional farming as an occupation and to assist farmers with information that will reduce the high cost associated with the adoption of new farming techniques and establishing business relations with modern marketing firms (referred to as intermediation earlier). While some farms will become more specialized in production, others will choose to diversify as a means to reduce risk.¹⁴

¹⁴ To a large extent crop choice is determined by the land potential available to small farmers. So, while high value crop production may promise higher rewards, the option is not open to all small farmers. For some small farmers, commercialization can offer the possibility of diversification into non-staples, but not a total specialization. A case in point is rice farming systems (Pingali 2006).

Finally, there is a need to put the restructuring of agriculture in perspective and prevent the process of agricultural transformation from becoming decoupled from the task of poverty reduction. The move to diversify to higher value commodities has already been noted. At the same time, there will be a continuing need to raise the productivity of staple food crops for farmers who continue to grow them. Low-cost foodgrains in Asia will be important to the poor directly because they devote such a large share of their budget to them, but also indirectly because the low real wages made possible by cheap food make labour-intensive activities more profitable (Timmer 2005).

4.4 The role of policy

The growth in agriculture and in the overall economy and how the benefits of growth and development are shared in society are governed by macroeconomic and agricultural policies. While emphasizing the importance of a stable macroeconomic environment, the country studies are concerned primarily with agricultural policies. These policies should achieve the following objectives: accelerate growth, improve efficiency and at the same time ensure that growth is both equitable and sustainable.

The five studies provide rich and insightful analyses of the policies that have been associated with the growth in agriculture and economic development. The following four are considered to be the most important: (1) a favourable macroeconomic policy environment; (2) clear and transparent property rights; (3) technology; and (4) market access and price policy.

The important elements in a favourable macroeconomic policy environment are low inflation, exchange rate stability and an open trade policy. Maintaining a low rate of inflation insures low and stable food prices. An overvalued exchange rate penalizes exports and constrains agricultural growth. Viet Nam provides an example of a country that as a part of its reform process brought controlled inflation and stabilized exchange rate fluctuation. In China, Thailand and Viet Nam more liberalized trade has accelerated growth. Korea is concerned that liberalization will reduce the domestic price of rice against the government policy of maintaining high rice prices to benefit farmers. India in particular would benefit from greater flexibility in trade and a freer flow of goods and services among states within its borders, and a more competitive market for agricultural produce.

The huge benefit of the assignment of clear property rights, particularly on land, is demonstrated in the cases of China and Viet Nam. The broad objectives of land tenure policy are economic efficiency, equity and poverty alleviation. Agrarian reforms carried out in Korea, China and Viet Nam demonstrated that economic efficiency can be greatly enhanced and poverty reduced when smallholders have assured property rights and control over the use of land. Land reform has been successful in some states in India. The restructuring of agriculture opens up new issues in land reform. In China, India and Viet Nam households typically have five or more parcels of land. Land consolidation is needed, particularly to take advantage of the economies of scale offered by new production and marketing schemes under the restructuring of agriculture. The question of optimum farm size is also at issue as policy-makers must decide whether to relax restrictions imposed to assure greater equity. Korea and Japan are examples of countries locked into ultra small and high cost agriculture.

Policies that establish markets in tradable water rights could create incentives to economize on water and choose less water-intensive crops (in the dry season). Transferable water rights provide flexibility in responding to changes in crop prices and water charges as demand patterns and comparative advantage change and diversification of cropping progresses (Pingali 2006).

The success of the Green Revolution gave recognition to the importance of technological innovation in increasing agricultural productivity. The country studies report on the contribution of technology to gains in agricultural productivity and efficiency. Numerous studies point to the high returns to investment in agricultural research and the low level of funding. The limited budget and nascent

private sector research emphasize the need to re-examine public sector research policy. Public sector agricultural research will continue to be needed particularly for open-pollinated crops and other commodities where the private sector cannot reap the benefits of its investment. There is also scope for public–private sector partnerships in research with emphasis in the public sector on basic and in the private sector on applied research.

Access to markets, both output, input and credit is essential in providing the incentives for production. Policies and programmes designed to improve incentives and correct for market failures were part and parcel of the coordinated effort associated with the introduction of Green Revolution technologies in many Asian countries. The importance of this coordinated effort is stressed in the India report. New seeds, fertilizer and irrigation were tied together with price and marketing policies — support prices, public procurement and input prices. Although it might be difficult to replicate and sustain such a coordinated approach, it shows that both price and non-price incentives and support services are important in the early stages of technology adoption. As the agricultural economy progresses, further new innovations in marketing and information and in credit can be undertaken by the government and the private sector to overcome some of the traditional areas of market failure.

In India, private corporations are providing easy access to relevant information for farmers on, *inter alia*, prices, technologies and weather through low cost Internet service. Also the Government of India introduced a credit card system, the *Kisan* credit card, through which farmers can obtain short-term credit loans from banks. The implementation of the scheme has resulted in an increase in the flow of capital to the agriculture sector and a substantial reduction in borrowing from the informal sector. The Thai report mentions how contract farming is providing producers with new kinds of production technologies to increase yields and at the same time providing credit and lowering farmer risk.

As agriculture diversifies into high value agricultural commodities — fruit, vegetables and dairy products — at an accelerated pace, new contractual arrangements for production and marketing will be more widely used. In fact, some projections of supermarket shares in food retail sales show high rates of growth in supermarket shares in almost all selected countries during the period 2002–2015. While this would translate into lower food prices for consumers not just in major cities but also in small towns in rural areas, and have significant spillover effects through freeing up of resources (total factor productivity growth) and technological advancement, some concerns remain about the exclusion of smallholders.¹⁵ But there is a risk of overemphasizing it, as noted earlier in this report. The prospects for smallholders are not bleak as technology is scale-neutral for many commodities while organizational and marketing arrangements with agribusiness could be negotiated and strengthened in mutually advantageous ways.

One important aspect of agricultural growth and development policy relates to risk reduction. Millions of rural people in less-favoured environments¹⁶ remain highly vulnerable. Such risks are a serious concern in a region characterized by incomplete insurance markets, fragmented financial markets and rudimentary futures markets.¹⁷

Alternative technological approaches have been advocated, particularly for poor farmers in these areas. The potential of low external input and sustainable agriculture (LEISA) approaches, organic agriculture, and biotechnology in enhancing productivity and mitigating vulnerability is high. As risk reduction measures involve large investments over a long period (e.g. development of irrigation potential), risk-mitigating, coping measures (e.g. extensive relief) launching of public works and

¹⁵ On the spillover effects, see Timmer (2004).

¹⁶ Characterized by (i) dominant rain-fed agriculture; (ii) critical biophysical constraints such as low and uncertain rainfall, steep slopes and poor soils; (iii) socio-economic constraints such as poor access to markets, infrastructure and services.

¹⁷ For details, see Walker and Ryan (1990).

assistance for reconstruction assume greater importance in the short or medium term. While the private sector should be encouraged to participate in crop insurance, the impetus must come from the government in monitoring natural events, financing and in evolving a regulatory framework.¹⁸

4.5 Role of the government

Governments have multiple objectives for the agriculture sector: Extraction of agricultural resources, promoting agricultural and economic development, promoting food security, improving the welfare of the poor and protection of the environment as a resource, among other targets. While specific objectives depend on the role of agriculture in the economy and the stage of economic development, there has been a dramatic change in the interventions chosen and the emphasis given to specific objectives.

Since the reforms were initiated, several new factors have come into play. These include: (1) the decline in agricultural growth rate and in agriculture's share in the GDP noted earlier; (2) the weakening in the link between economic growth and poverty reduction as the economy develops; (3) the decline in financial support for agriculture at national and international levels; and (4) the gradual restructuring of agriculture to meet changing consumer demands coupled with the growing importance of the private sector in providing producers with new technologies and management practices.

What is the role of the government in this changing environment? The consensus on the appropriate role of the government has shifted toward less management of economic activities and fewer controls on prices and quantities of factors and outputs (Norton 2004). The government has a role in providing regulations to compensate for "market failure" in the private sector, for example, the failure to manage natural resources for sustainable development. More recent concerns have centred on "government failure" due to inappropriate institutional incentives, weak fiscal policies and capacity to enforce regulations for example. There should be greater attention to participatory approaches which give local groups more control over the management of resources.

Despite the declining relative importance of agriculture, there will be a continuing need for government interventions in what has been described as a two-pronged strategy: Supporting the continued growth and restructuring of agriculture to meet changing consumer demands and addressing food security, poverty and equity in less-developed regions. In both instances it will be necessary to define the roles of central, provincial and local governments, and the private sector.

The restructuring or diversification of agriculture is being led by private sector investments. The task here is to focus on those areas that complement private sector investments such as development of efficient market and transport infrastructure, working with the private sector to ensure food quality and safety issues and strengthening public-private sector research linkages. Governments will have to establish effective legal and regulatory frameworks, ranging from intellectual property protection to biosafety regulations.

Providing infrastructure has been and is likely to continue to be the major way in which the government provides support to the rural economy. Government investments in public goods — education, health, rural infrastructure, research and extension — should target areas where the supply of these public goods lags, which are likely to be where the poor are concentrated. In the case of research and extension, this may require decentralization to focus on more location-specific agro-ecological conditions and resource constraints. Apart from raising productivity, agricultural research must provide farmers with the flexibility to make crop choices more easily. Crop-specific research must focus on increases in yield potential, shorter duration cultivars and greater tolerance to pest stresses. System level research, on the other hand, has to address land management and

¹⁸ For more detailed discussions, see Gaiha and Imai (2004); World Bank (2001).

tillage systems that facilitate shifts of cropping patterns in response to changing incentives and farm level water management systems (Pingali 2006).

Central to the issue of food security and sustainable production is natural resource management. The country reports identify growing pressures on land and water. Resource degradation includes overexploitation of groundwater, soil salinity and waterlogging. Overuse of chemicals has resulted in human health hazards, nitrate and arsenic poisoning in drinking water, chemical contamination of fruit and vegetables.

In the past natural resource management has been an area not only of “market failure” but also of “government failure”. Despite the adoption of appropriate policies the government may lack the capacity to effectively manage resources or to enforce regulations. One potential solution is to allow greater participation by local units and user groups in the management of natural resources at the local level. The India report notes that the *Panchayats* (local administrative bodies) are being given greater powers and funds in the hope that the local communities will have a greater incentive to manage natural resources.

By and large, the experience with decentralization has been partial, uneven or simply too recent for a thorough assessment.¹⁹ Some grounds for optimism, however, exist. Fiscal decentralization accelerated economic growth and reduced poverty in China: An incentive structure designed for the competitive and profitable functioning of TVEs in China produced spectacular results. In the process, local governments in successful coastal provinces became self-reliant and fiscally prudent. Another example of an imaginative use of incentives was the Korean irrigation system that relied on locally recruited patrollers who are also end-users. Panchayati Raj in India, however, has had a mixed record, with some successes in Karnataka and West Bengal. In other states (e.g. Uttar Pradesh), there were numerous cases of “capture” by the local elite, and coordination failures with the bureaucracy. In Viet Nam’s recent initiative, on the other hand, poorer provinces are at a disadvantage, with income inequalities likely to grow as a result.²⁰

In the case of irrigation systems there has been a concerted effort by national governments backed by multilateral lending agencies to turn over management responsibilities to local water-user groups. At the same time there is a need for government institutions to regulate property rights and make decisions on the allocation of water among sectors. In general, local governments must have an important role in choosing the mix and scale of services, delivery systems, financing and remedial measures, if required. On the other hand, greater local autonomy must go hand in hand with greater accountability. Periodic audits must be combined with accountability of outcomes to the local community.

4.6 Concluding remarks

Despite very heterogeneous backgrounds, the five countries in this study have adopted policies and practices that have led not only to rapid economic growth but also to a sharp reduction in poverty. The case studies reflect the symbiotic relationship between the development of agriculture and the development of the rest of the economy. In the initial stages agriculture has provided the supporting role for economic development. Subsequently agriculture has helped to sustain rapid economic growth.

¹⁹ Decentralization has been variously used to refer either to the privatization, or deconcentration, or devolution of political, administrative and fiscal powers. Decentralization as used here, however, refers only to devolution, whether or not powers are devolved simultaneously or in varying degrees.

²⁰ The reference here is to the New Budget Law that became effective in 1997. The revenue assignment at each level of government is linked to its expenditure responsibilities. When revenues fall, each level of government tends to shift some expenditure responsibilities to lower levels. Hence the poorer the commune, the harder it is to maintain an existing range and quality of services provided (Gaiha 2003).

Yet rapid growth presents its challenges. For example, how does a country deal with the widening gap between the rural and the urban economy? How can agriculture accommodate the growing demand of the increasingly urban population for a variety of foodstuffs? How can rapid economic growth be sustained without serious damage to the environment? The case studies have documented the factors accounting for past successes. It will take a new set of creative policies and strategies to sustain economic development, protect the environment and continue to reduce poverty.

In particular, integration of smallholders in rapidly growing high value agricultural chains and expansion of employment opportunities for large masses of the landless in non-farm activities call for new initiatives and policies for equitable sharing of the benefits of growth in a globalizing world. Public-private partnerships are crucial for competitive market arrangements, strengthening of communication networks and a conducive macro policy environment. Contractual exchange, as an alternative to spot market trade, holds considerable potential in the context of agro-industrialization and global sourcing. But some concerns relating to transparency, reliability and enforceability of such contracts remain. New variants of contract farming — including mechanisms for technology transfer, sharing of risks and profits — are feasible and deserve close scrutiny. Capacity building of smallholders, easier access to credit, new technology, extension and insurance and policies designed for efficient use and management of natural resources (e.g. water) would go a long way towards sustainable rural development, poverty reduction and food security in Asia.

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This publication is part of a three-volume diagnostic study on lessons learned and implications for agriculture and food security in the context of rapid growth in selected Asian economies: China, India, Republic of Korea, Thailand and Viet Nam.

This first volume is a synthesis of the main findings and conclusions of the five country case studies supplemented by additional information and insights on the issues discussed from other sources and FAO's own experience in the region. The volume concludes with a summary of implications and lessons learned to assist countries in restructuring their agriculture sectors for accelerated and/or sustained agricultural and rural development in response to changing market and trade opportunities and to achieve the Millennium Development Goals of poverty and hunger eradication.

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