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MTID Discussion Paper No. 87
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The Dragon and the Elephant: Agricultural and Rural Reforms in China and India

Ashok Gulati, Shenggen Fan and Sara Dalafi

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ACKNOWLEDGMENTS

This discussion paper summarizes the findings of a number of studies that were prepared for two international conferences devoted to comparing the rural development and agricultural reform experiences of China (the dragon) and India (the elephant) over the last several decades. These events, held in New Delhi and Beijing, brought together many prominent Chinese and Indian scholars and policymakers and were organized by the International Food Policy Research Institute (IFPRI) in collaboration with the Jawaharlal Nehru University, New Delhi, and the Chinese Academy of Agricultural Sciences, Beijing. The research papers produced for the conferences are being compiled and edited by IFPRI for publication.

Comparative analyses were carried out across 10 themes of particular relevance to rural development in the two countries: (1) land reforms, (2) human and social development, (3) public investment, (4) agricultural research and development (R&D), (5) irrigation and the water sector, (6) domestic agricultural marketing, (7) World Trade Organization (WTO) and agricultural trade liberalization, (8) agricultural and rural diversification, (9) the rural nonfarm sector, and (10) antipoverty programs and safety nets. The overall goal of this multifaceted comparative endeavor (and this discussion paper) is to draw key lessons from the reform experiences of India and China and provide policy insights for the continuing reform processes in these two countries as well as for other developing and transition economies. A platform for future dialogue and networking among policymakers, advisors, and researchers from the two countries has been formed, and it is expected that many such activities will be initiated from both countries in the future.

In addition to the contributors to the forthcoming manuscript, whose names are cited in the study, special thanks go to the keynote speakers at the conferences, who not only inspired us with their wisdom and commitment but also provided critical insights into the discussion. In particular, we would like to express our gratitude to (in alphabetical order) G.K. Chadha, Peter Hazell, Justin Y. Lin, C.H. Hanumantha Rao,

Manmohan Singh, Joachim von Braun, and Huqu Zhai. Sincere thanks also go to Deki Pema for editorial assistance.

ABBREVIATIONS

AMS	Aggregate Measure of Support
APMC	Agricultural Produce Marketing Committee
APP	Antipoverty Program
BOP	Balance of Payment
CSO	Central Statistical Organization, India
EU	European Union
FCI	Food Corporation of India
FDI	Foreign Direct investment
GATT	General Agreement on Tariffs and Trade
HRS	Household Responsibility System
HYV	High-yielding (seed) Variety
GHG	Greenhouse Gas
GMO	Genetically Modified Organism
IMF	International Monetary Fund
IPR	Intellectual Property Rights
MDG	Millennium Development Goal
MEP	Minimum Export Price
MFN	Most Favored Nation
MSP	Minimum Support Price
NBS	National Bureau of Statistics, China
NGO	Non-Governmental Organization
NPR	Nominal Protection rate
NSS	National Sample Survey
NTB	Non-tariff barrier
PDS	Public Distribution System
PIM	Participatory Irrigation Management
PPP	Purchasing Power Parity
QR	Quantitative Restriction
R&D	Research and Development
RNF	Rural Nonfarm
RPS	Retention Price Scheme
SEB	State Electricity Board
SOE	State-owned Enterprise
TOT	Terms of Trade
TVE	Township and Village Enterprise
URAA	Uruguay Round Agreement on Agriculture
WDI	World Development Indicators
WTO	World Trade Organization
WUA	Water users' association

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EXECUTIVE SUMMARY

China's and India's rapid rise in the global arena has not only captured the attention of the world but has also set into motion a rethinking of the very paradigm of economic development. In fact, the new developments in these two countries may be enough to revise the conventional development economics textbook. Chinese premier Wen Jiabao's visit to India in April 2005 has brought these two countries closer together than ever before in their long and ancient history. China and India signed a number of agreements centered on economic cooperation and partnership, the implementation of which could change the world's geopolitical and economic landscape in the future.

Today, China and India together account for 40 percent of the world's population. Both have implemented a series of economic reforms in the past two and half decades: China initiated this process at the end of the 1970s, while India began in the early 1990s. These reforms have led to rapid economic growth, with a growth rate of 8–9 percent per annum in China and 6–7 percent per annum in India. Despite similar trends in the reforms, the two countries have taken different reform paths; China started off with reforms in the agriculture sector and in rural areas, while India started by liberalizing and reforming the manufacturing sector. These differences have led to different growth rates and, more importantly, different rates of poverty reduction. They also have fundamentally different implications for growth and poverty reduction in the future.

What can we learn from the process of economic reform in these two countries? Does the sequencing of reform and an agriculture-led package matter? What could other developing countries and countries in economic transition learn from the experiences of India and China? What could these two countries learn from their own as well as each other's experiences? How can the two largest developing countries cooperate in their agricultural and economic development and work together at multilateral negotiations, such as those conducted through the WTO, to address the concerns of developing countries?

A number of studies looking into key aspects of reform and their relationship to outcomes, presented at two international workshops held in New Delhi and Beijing, try to offer some answers to these questions. These papers are currently being prepared by IFPRI for publication, and this discussion paper is a synopsis presented as a forerunner to the book.

Different reform path: lessons learnt

The comparative study shows that agriculture-led reform and development not only provide the necessary conditions for the manufacturing and service sectors to grow and reform, but also lead to larger reductions in poverty given the same rate of growth. The Chinese reform starting with agriculture ensured that the majority of the population benefited from the initial reforms, as the population was overwhelmingly dependent on the primary sector. The breathtaking reduction of poverty, from 33 percent of the population in 1978 to 3 percent in 2001, is primarily attributed to the acceleration of agricultural growth during the same time period. The most substantial decline occurred in the first reform phase, when agricultural GDP grew at 7.1 percent per annum and rural poverty dropped from 33 percent to 15 percent in a matter of just six years (1978–84). The large number of prospective beneficiaries contributed to the achievement of consensus and created political support for the subsequent stages of the reform process. The success of the early agriculture-led reforms also increased the demand for nonagricultural goods and released a surplus of labor and capital into the rural nonfarm sector. As the rural nonfarm economy thrived, it provided farmers and rural areas with an additional investment source outside agriculture and its allied sectors, and it put pressure on the urban economy to reform as well, since nonfarm enterprises in rural areas became more competitive than the state-owned enterprises. These successes in turn triggered macroeconomic reforms favoring the opening up of the economy and the adoption of measures such as the special economic zones to increase foreign investment.

In India, in contrast, reforms followed an opposite path, starting with macroeconomic and nonagricultural reforms since they were prompted by macro

imbalances. The reforms led to impressive rates of economic growth in the 1990s, but they were limited to nonagricultural sectors and did not have as significant an impact on poverty reduction as the reforms in China did.

With regard to the sequence of reforms, it is clear that opening up the economy in the absence of adequate market institutions and incentives is detrimental to sustainable growth and poverty reduction. An ex post assessment of China's experience indicates that at the outset policymakers first created a strong incentive structure and the institutions needed for agricultural production to take place efficiently and for markets to operate smoothly. It was only in the second stage, in the mid-1980s, that the process of liberalizing and opening up markets began. The growth impact of incentive reforms relating to land use rights and agricultural production management (through the household responsibility system) and rises in procurement prices from 1978 to 1984 was much larger than the impact of market liberalization reforms after 1984. Gains would have been smaller if markets had been opened up before adequate incentives were in place, as incentive reforms were instrumental in the emergence of markets that prevented the negative consequences of a sudden institutional void caused by the abrupt collapse of the central planning system's mechanisms for resource allocation.

In contrast, agricultural trade reforms were a point of departure rather than arrival of reform in Indian agricultural policy. The incentive structure of Indian agriculture was highly distorted at the outset of reforms, as the sector was, and still is, burdened with excessive regulations relating to private trading and most market activities. The liberalization of agricultural trade policies preceding incentive and market reforms in the domestic arena created a series of trade imbalances. Broad-based economic and trade reforms resulted in a new export orientation and improved the incentive framework of agriculture but left the sector more exposed to international competition because of persisting constraints to productivity improvement on the domestic front.

Another important feature of the reform experiences was the adoption of a gradual approach in China. Despite undisputed centralization of the reform process, the government in China took every step of the process with caution, making sure that each

new measure was successful prior to proceeding with the next policy intervention, and the reform measures have indeed borne plentiful harvest. At the same time, in China, a "mobilizing society," decisions are taken faster and state power is backed by mass mobilization. As a result, implementation of decisions was not only speedier but also more effective.

In the context of a highly pluralist society such as India, consent is more difficult to achieve, allowing for neither the setting of clear objectives nor timeframes for transition. As a result, the pace of change is reduced. India is a "debating society" in which political differences are expressed freely, policymaking is exposed to pressure by various interest groups, and there are thus long debates before decisions are taken. Reforms were further slowed at the implementation level by the regulatory environment and the enforcement bureaucracy.

However, a simplistic conclusion cannot be drawn from this discussion, as the lack of a more elaborate debate on major changes and reforms can also lead to disastrous courses of action, such as China's Great Leap Forward in 1958 that led to the Great Famine of 1959–61, in which an estimated 30 million people died. The privatization of social services in China, in more recent times, is another case in point. This process of marketization is a matter of grave concern as it further augments the widening rural-urban gap, regional disparities, and income inequalities. It is not only further compromising those already poor and vulnerable but also rapidly becoming a vital cause of new poverty. This poverty could, with justification, be explained as a result of the social protection system not keeping pace with the larger socioeconomic changes. However, a much more fundamental reason could be the lack of an appropriate political environment that allows for debate, contestation, and a voice for those who are adversely affected. It is therefore urged that reform and development outcomes be seen comprehensively—that is, including the processes involved rather than just the culmination characteristics.

It is evident that commitment to redistribution is the key to achieving success in development. In the current post-reform scenario, in which both China and India are

witness to spatial as well as social disparities, there is need to formulate and reformulate policies by resorting to the redistributive ethos as the guiding principle of state policy.

Further, the evidence from the two countries indicates that countries, or regions within a country, with more favorable "initial conditions" in terms of roads, electricity, and access to health and education services are in a better position to reap greater benefits as well as experience faster growth. Higher education levels, better health, and equal access to social services and production assets are not only pro-growth during the transition process, but also lead to greater poverty reduction given the same growth rate.

Future challenges

While remarkable progress has been made in both countries in terms of growth and poverty reduction, much remains to be done given the sizeable share of the population still living in poverty. The two countries are confronted with the formidable challenge of sustaining the high growth rates achieved in the past. To this end, India and China face four major challenges, specifically: accelerating growth, improving efficiency, and at the same time ensuring that this growth is both equitable and sustainable. However, it is not an unknown playing field by any means, and there are lessons that each country can learn from its own experiences as well as from those of the other—lessons that could greatly aid the two nations and other developing countries in realizing local, national, and global goals.

Growth, particularly rural and agricultural, is vital in addressing poverty, besides being important for employment and creating markets for industrial products. Rural growth encompasses the challenge of improving productivity, increasing public investment in education and rural infrastructure, and reorienting policy toward diversification.

To promote efficient growth, inefficient agricultural subsidies, particularly in India, must be phased out. The challenge is to do this without causing political instability. Further, the policy and institutional environment must be made more conducive to the efficient and pro-poor provision of public services. Greater economic integration with

world markets, the further opening up of the two economies, and an increase in bilateral and multilateral trade would definitely improve efficiency. The WTO offers an opportunity to join hands and create a third force of countries besides the European Union (EU) and the United States in negotiations within the framework of the Uruguay Round Agreement on Agriculture (URAA). A large part of the challenge again is on the political front.

Growing inequality between rural and urban areas, between regions, and between different age groups, although less marked in India, is a cause for serious concern in both countries. Inequality in China has more than doubled in the last two decades, with the Gini coefficient jumping from 0.21 in 1978 to 0.46 in 2000 and placing China among the highly unequal economies of the world. The income Gini coefficient was 0.33 in 2000 for India. Chinese rural education and health systems have deteriorated rapidly since the reforms. Ironically, these are the very two sectors that provided free and egalitarian services for millions of Chinese farmers and that led to China's rapid rural growth and poverty reduction. However, the transition from free rural public education and health services to privatized services will hinder China's future national growth, particularly rural growth, and further widen the rural-urban gap. India's democratic system has prevented the outright withdrawal of the public provision of free rural social services. This highlights the importance of having mechanisms in place so that the voice of the poor can be heard.

Another critical policy is the allocation of adequate resources as well as the skillful design and scrupulous implementation of effective and appropriate redistributive mechanisms targeted toward less advantaged groups and areas. In devising mechanisms to address the risks involved in increased privatization of social services, China could learn from India's long experience of a vast array of government safety nets and welfare programs targeting the rural population. To improve targeting, China could draw from the experience of India in the use of a greater variety of targeted and participatory programs, directed to specific sections of the poor as opposed to the broader income- or area-based approaches traditionally implemented in China.

The challenge of sustainable growth relates in particular to energy consumption, water resource use, environmental degradation, and financial sustainability. Energy consumption in India and China has not only been increasing at one of the fastest rates in the world during the past two decades, but it is also expected to grow more rapidly in the future. In addition to the supply-side implications, both countries suffer from major energy-related environmental problems. Heavy reliance on coal (which meets more than 50 percent of the energy needs in both countries) has meant that carbon emissions are rising fast, and it is expected that carbon emissions will continue to increase throughout the decade. The question is whether the current energy-intensive and trade-led growth pattern, especially in manufacturing, can be sustained in the long run. This implies that future growth in the agricultural sector should be energy efficient and that the agricultural sector, in the near future, must come up with innovations to provide renewable energy for the manufacturing and service sectors.

The sustainable use of water resources is fundamental from both the economic and environmental points of view. Both countries face the thorny challenge of effectively implementing policies to conserve water and raise use efficiency without compromising food production or causing adverse welfare effects on the poorer farmers. In both countries there is vast scope for improvement in water use efficiency through institutional and management reforms of existing water systems. India's experience with water users' associations, participatory watershed schemes, and community-based rain harvesting can provide useful examples to learn from.

The challenge of financial sustainability applies, in particular, to India's budget deficit situation, which was one of the major triggers of macroeconomic reforms in 1991 and which remains alarmingly high. Meeting the growth target calls for cutting expenditures—particularly subsidies—and improving revenue collection by the tax authorities as well as by input suppliers such as the state electricity boards and water canal authorities. In addition, to raise the growth rate from 6 percent to 8 percent, the rate of savings needs to increase from 23 percent of GDP to 29–30 percent, which would

bring India closer to China, where the savings rate has hovered around 35–40 percent throughout the reform period.

Reform of China's banking system and exchange rate regime are major issues that must be addressed before long-term, efficient, and sustained growth can be achieved. This has become particularly pressing after China's entry into the WTO in 2001, as a result of which foreign banks are allowed to enter the Chinese financial and banking markets, and the exchange rate policy must conform to WTO rules. India's experience can offer important and relevant lessons for China.

Of particular significance is the fact that remarkable development and growth, in both China and India, were achieved even as aid as a percentage of GDP continued to be low. This is in direct contrast to many other developing countries and regions where aid levels are at much higher levels but commensurate development and poverty reduction outcomes have not been realized. This situation calls into question the very basis of current policy prescriptions that accompany aid packages, not only raising issues related to the efficiency and effectiveness of external aid but also, conversely, revealing the extraordinary, if underestimated, capacity of national initiatives and policy actions to turn the tide of poverty.

China and India have made tremendous progress in terms of economic growth and poverty reduction, but it is only the beginning of the journey and much more remains to be achieved. It is in this context that both countries stand to gain from cooperating, sharing, and learning from each other so that mistakes are avoided and strengths are enhanced. The lessons are also relevant to other developing countries and are equally valuable in the fight against global hunger and poverty.

THE DRAGON AND THE ELEPHANT: AGRICULTURAL AND RURAL REFORMS IN CHINA AND INDIA

Ashok Gulati, Shenggen Fan, and Sara Dalafi[1]

1. INTRODUCTION

Over the last 25 years, China and India experienced a dramatic turn around in their economic conditions and achieved unprecedented levels of prosperity. In 1978, India's per capita GDP of $1,255 in purchasing power parity (PPP) terms (constant 2000 price) was lower than the average for Sub-Saharan Africa, which stood at $1,757. Since then it has climbed steadily upward, resulting in more than a twofold increase and reaching $2,732 in 2003. Even more spectacularly, the Chinese GDP per capita, which stood at $ 1,071 in 1978, jumped to $4,726 in 2003. China's GDP per capita growth rate, as presented in Figure 1, is almost double that of India.[2]

During the reform period, China not only achieved dramatic economic growth but also successfully reduced rural poverty (Figure 2), with the number of poor declining from 33 percent in 1978 to 3 percent in 2001, according to official sources, or to around 11 percent as per World Bank estimates of 1998 (World Bank 2000). Despite ongoing controversies regarding the measures of poverty, it is undeniable that both benchmarks depict a steep decline in the incidence of poverty and that a reduction of this magnitude over such a short time is by any standard an extraordinary event. India also did reasonably well, and poverty showed a downward trend before and after reforms, although the outcomes were not as dazzling as in China. According to official estimates, rural poverty in India dropped from 34.3 percent in 1989–90 at the outset of reforms to 27.1 percent in 1999–2000, the year for which the latest National Sample Survey (NSS)

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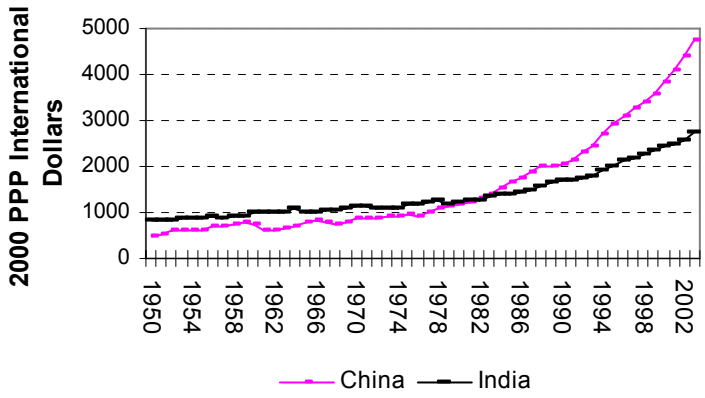
[2] According to the World Bank income-based classification, lower middle-income countries are those with a GNI per capita of $736–2,935 in current U.S. dollars in 2002–03 (Atlas method). With a GNI per capita of $960 in 2002, China is part of this group, while India, with a GNI of $470, enters the low-income countries group. For details see http://www.worldbank.org/data/countryclass/OGHIST.xls.

data are available (India, Ministry of Agriculture 2004). Together these two countries accounted for a substantial drop in global poverty levels, from 29.6 percent (or 1.3 billion) of the world's population in 1990 to 23.2 percent (or 1.16 billion) in 1999 (World Bank 2003a).[3]

Figure 1—Growth in GDP per capita in China and India

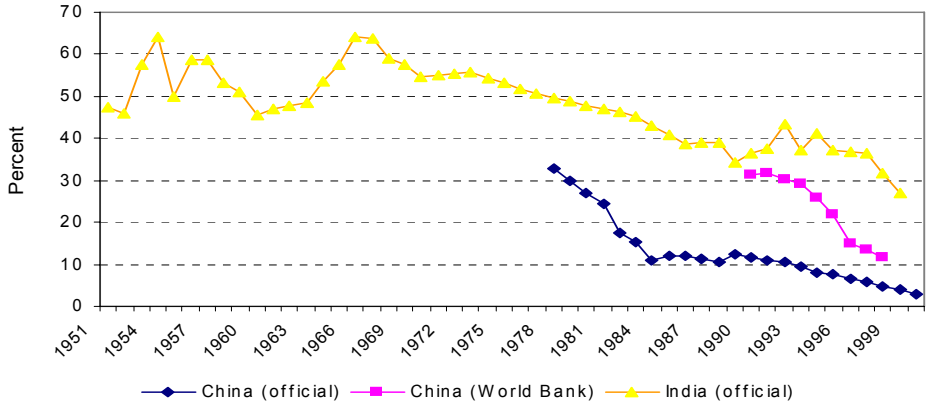


Source: WDI (2005) and Maddison (2002).

Note: The figures are expressed in 2000 international dollars. The data for 2000–2003 are taken from WDI (2005), while the data for 1950–99 are extrapolated using the trend of per capita GDP growth from Maddison (2002). There have been conflicting reports on China and India's per capita GDP. Maddison (2002) reported China and India's GDP per capita measured in 1990 PPP were $439 and $619 respectively in 1950, and $3,259 and $1,818 in 1999. Therefore, the ratio of China to India's per capita GDP increased from 0.7 to 1.8. But the World Bank (WDI, 2005) reported a very different trend: as late as in 1978, China's GDP per capita was only $674 measured in 2000 international price, 56% of India's $1,224. But in 2003, GDP per capita in China increased to $4,726 and India's to $2,732. The ratio between China and India's per capita GDP, thus, jumped from 0.56 in 1978 to 1.7 in 2003. While we believe the World Bank has done a reasonably good job in estimating GDP in international price in more recent years, but it is not clear to us how the World Bank did it for earlier years. On the other hand, Maddison (2002) has documented his estimate for all the years from 1950 to 1999. However, his series only ran to 1999. Therefore, for our purpose in this paper, we used the World Bank latest estimates from 2000 to 2003, and then we used Maddison's trend to backcast the numbers before 2000.

[3] Excluding poverty decline in China, world poverty actually increased in absolute terms, from 917 million to 945 million people.

Figure 2—Rural poverty rates in India and China



Sources: China, NBS (2002) for China; and Indiastat (2004) and Fan, Thorat, and Rao (2004) for India.
Note: The official poverty line in India is defined as Rs. 49 per month at 1973–74 prices which is very close to the international poverty line of one dollar per day. For example, Datt and Ravallion reported that one third of India is under poverty in the mid-1990s if the one dollar per day 1993 purchasing power parity is used. The official poverty rate is 35% from 1992 to 1997. China's official poverty line used here is equivalent to $0.66 per day (1985 PPP).

How these successes were accomplished is a mystery that needs to be unraveled and scrutinized—to better understand the processes of growth so that it can contribute to the continuing reforms in these two countries, and also to draw lessons and highlight implications for other countries, especially those of the developing world. What reforms made these outcomes possible? Was it the result of only macroeconomic reforms, or was it the cumulative effect of a series of micro reforms in agricultural and nonagricultural sectors, or both? Why did China grow faster and lift a larger number of people out of poverty than India? What role do the initial conditions of land distribution, rural health, education, and infrastructure play? Do they explain the disparity in growth rates and poverty outcomes in the post-reform period? What could other developing countries and countries in transition learn from the Chinese and Indian experiences, and what can China and India learn from each other? What are the challenges confronting India and China? Are there areas in which the two countries can cooperate?

Many separate studies have been undertaken in the past to analyze agricultural and rural reforms in China and India, but few have compared the sequencing and consequences of these reforms. The reasons justifying such a comparative effort are numerous. First, these two countries are big players in the global economy, together accounting for 37 percent (2.3 billion) of the world's population (WDI 2004), producing 17.6 percent of global GDP (in PPP U.S. dollars), and commanding nearly 5 percent of total global trade volumes (World Bank 2003a). Based on World Bank projections, China and India will continue to show strong economic growth, and by 2030 their combined GDP will account for nearly 41 percent of the global economy in PPP terms.[4] By 2040 some expect China to overtake, on an individual basis, the G3 countries (the United States, Japan, and Germany) to become the largest economy, with India following after the United States (Wilson and Purushothaman 2003). In fact, in PPP terms, China was already the second largest economy after the United States in 2004, while India's GDP was fourth after that of the United States, China, and Japan (WDI 2005). In agriculture, China and India are jointly the largest producers of rice, wheat, and cotton, with their production of these commodities accounting for 51, 28, and 36 percent of the global share, respectively (FAOSTAT 2003). Thus, as these two countries integrate into the world economy, with the weight of their large territories and human resources, and, more importantly, with their greater than average economic growth rates, they have the potential to increasingly affect global affairs, including politics, trade, the environment, and energy conditions.

Second, despite their remarkable achievements both China and India continue to be characterized by some of the typical features of developing countries: low income per capita and a majority of the population living in rural areas and dependent on agriculture for their livelihood. In 2001 the rural population was 71.8 percent of the total in India and 63.3 percent in China (WDI 2004), while the share of the population engaged in agriculture was still as high as 58 percent of the overall workforce in India and 50 percent

[4] The calculations assume an annual growth rate of 5 percent for both China and India, and 2 percent for the world economy.

in China.[5] The Indian experience is particularly useful for African countries. The Green Revolution, initiated in the late 1960s, successfully spread to smallholders and transformed India from a food-deficient agrarian society with rampant poverty to a food-surplus country with a relatively well-developed and diversified rural sector despite the still high incidence of poverty. But in Africa, the Green Revolution is yet to come. China's successful transition from a rigid centrally planned economy into a largely market-driven economy provides important lessons for other previously centrally planned polities in the former Soviet Union and Central Asia where the transition has been less successful.

Third, China and India also account for the bulk of the world's poverty. Taking the poverty line of one dollar per day (in 1985 PPP dollars) used by the World Bank, China still had nearly 106 million rural poor in 1998 (World Bank 2000), and, according to official data, India had about 196 million rural poor people in 1999–2000.[6] The rural poor of the two countries together account for more than a quarter of the 1.2 billion poor worldwide.[7] Thus, the achievement of the Millennium Development Goal (MDG) of halving the number of poor by 2015 is critically dependent on the success of these two countries in combating rural poverty. Given China's relatively more remarkable achievements in poverty alleviation, the comparative study of the reforms and rural development can offer valuable lessons for India as well as other developing countries in their endeavor to eliminate poverty.

Finally, comparing the experiences of India and China is essential for promoting mutual understanding. In the past, collaboration was constrained by political, ideological, and diplomatic factors. If these two countries can come together to improve reciprocal understanding, great gains could accrue in the future. This improvement in relations will not only contribute to development by inducing more trade and investment and more

[5]China, Ministry of Agriculture, 2003. *China Agricultural Development Report*. Beijing: China Agricultural Press, and WDI 2003; NBS 2003.
[6] Calculated by the authors using the official poverty rate reported by NSS and rural population data by FAO (2005).
[7] World Bank 2001 and 2003a; India, Ministry of Agriculture 2003.

scientific and technological exchanges and cooperation, but will also offer opportunities for neighboring countries in the region to benefit from these two powerhouses of growth. This would increase regional prosperity and stability in Asia, thereby strengthening global peace.

The paper is organized as follows. The next section outlines the main policy and institutional reforms that were introduced in agriculture and rural areas in China and India. Section 3 is devoted to distilling the policy lessons and the future challenges facing the two countries, based on evidence outlined in the previous section and, equally importantly, from various studies prepared for the New Delhi and Beijing conferences. The concluding section wraps up the discussion with suggestions and recommendations for the future.

2. OVERVIEW OF REFORMS AND DEVELOPMENT

Despite differences in timing and sequence, change in both countries was prompted by the political will to implement market-oriented reforms in order to improve economic performance and efficiency in resource allocation as well as to gradually integrate with the global economy. In India's case, short-term contingencies such as severe fiscal and current account deficits were major factors pushing the reform movement. Overall, change in both countries implied a progressive transition from an autarkic to a more deregulated and open policy environment with an increased role for the market and the private sector.

2.1 TRANSFORMATION OF AGRICULTURE AND RURAL AREAS IN CHINA

The Chinese reforms can be divided into four phases: the first (1978–84) was marked by institutional and pricing reforms aimed at improving production incentives. The second stage (1985–93) saw the implementation of domestic agricultural marketing reforms, with reference here being made in particular to the grain market. Policy changes in the third phase (1994–2001) were dictated by China's efforts to enter the WTO and were characterized by broad-based trade liberalization. WTO entry in 2001 marked the

start of the fourth stage, with a series of policy adjustments consisting of an acceleration of domestic institutional, marketing, and trade reforms that are currently under way for the economy in general and for agriculture and the rural sector in particular.

2.1.1 Pre-Reform Era, 1949–77

A brief outline of the major policy changes that occurred during the pre-reform years (1949–77) is given to set the context for the discussion on the agricultural and rural reforms.

Land Reform and Collectivization, 1949–56

Until the 1949 revolution, land ownership followed a feudal pattern, with 70 to 80 percent of agricultural land being held by 10 percent of the landlords (China, Ministry of Agriculture 1989). Most farmers were landless peasants who rented land from the landowners, usually at exorbitant rates. Between 1949 and 1952, land was confiscated by the government, without compensation, and redistributed equally among the farmers.

From the very outset of the first five-year plan (1952–57) the government needed to deal with the pressing issue of how to increase agricultural production to meet the needs of the industrial and urban sectors. After the distribution of land to farmers, grain purchases and supply to cities at low cost by the government became progressively harder (Yao 2004). Thus, beginning in 1952, the government adopted the collective mode of production along the lines of the Soviet model and encouraged farmers to "voluntarily" pool their land and other resources into larger production units called "cooperatives." By 1956 most agricultural production was undertaken in cooperatives, each made up of nearly 200 families (Lin 1990; Putterman 1990).

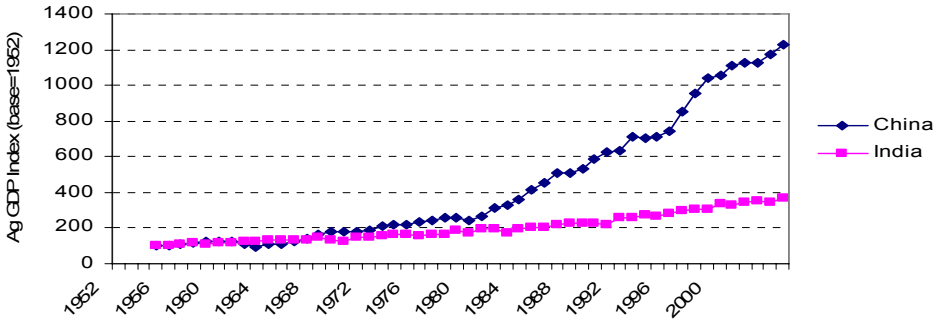
The government exercised complete control over production by enforcing centrally set targets related to area, yield, output, and so on for each crop. Agricultural produce was subject to the fulfillment of compulsory quotas at fixed procurement prices. Farmers could sell any surplus at the higher above-quota prices (for grains these were

about 30 percent higher than the quota price). Trade was monopolized by state agencies, and although private trade was permitted it was limited to the county level and was allowed only for a few commodities such as tea, tobacco, sugar, eggs, hogs, and so on (Sicular 1988a).

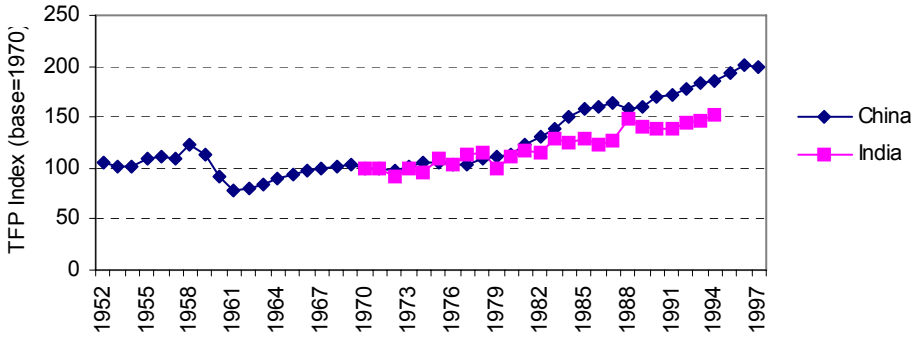
In terms of public investment, top priority was assigned to irrigation, which grew at an impressive rate in the pre-reform period (Fan, Zhang, and Zhang 2002). Irrigated area as a percentage of arable land grew from 23.25 percent in 1953 to 26.17 percent in 1957, an increase of 5 million hectares during the first five-year plan period. All these policies led to rapid growth in both agricultural production and productivity, with annual growth rates of 5.3 percent and 2.7 percent, respectively, from 1953 to 1956 (Figure 3).

Figure 3—Growth in agricultural output and productivity

a) Agricultural output



b) Total Factor Productivity



Sources: a) Authors' calculations based on NBS 2002 and Indiastat 2003.
b) China: Fan, Zhang, and Zhang 2002. India: Fan, Hazell, and Thorat 1999.

Great Leap Forward and Communization, 1957–60

In the leaders' view, mobilization of the masses could overcome any obstacle and allow China to turn overnight into a first-world economy. The second five-year plan (1957–62) set the goal of reaching the level of steel production of the United Kingdom. This required a further dramatic increase in agricultural production, and the government embarked on an even larger scale of production in agriculture. Advanced cooperatives were merged into "communes," where peasants worked and dined together in collective halls. At the height of the commune movement in 1958–59, the average collective had grown to 5,000 households covering 10,000 acres. The communes owned virtually all means of production, and agricultural labor was rewarded as much on the basis of need as on accumulated work points.

This period also recorded a high but unsustained level of investment in agricultural research, power, and irrigation—growing at 58.9, 50.0, and 47.2 percent per annum, respectively (Fan, Zhang, and Zhang 2002). Coupled with the fact that the state was able to easily mobilize people to work on public projects, investments gave a major impetus to infrastructural development.

However, farm activities were not well attended to during this phase. Farmers were engaged not only in major public works, but also in the production of steel as part of the frenzy to catch up with Western countries (Yao 2004). Over reporting of farm output—a common practice in a system without adequate checks and balances—meant that the procurement of the surplus for the cities left less food available to rural areas. In addition, the nature of the incentive structure of collective farming was not conducive to increasing production and productivity. Under the work point system, the role of the farmer was limited to mere supply of labor; income was not related to work effort, and farmers did not have any say in production decisions, which were the responsibility of commune leaders.

Farm output and productivity began to decline sharply: by 6 percent and 5 percent per annum, respectively (Fan, Zhang, and Zhang 2002). Droughts and floods in most of

China in 1959 worsened the situation, leading to a famine of staggering proportions, the so-called Great Famine that took place in 1959–61. Without access to foreign assistance and a free press to uncover what was happening in the field, an estimated 30 million people died of starvation (Becker 1996; Lin 1990; Lin and Yang 2000). This was one of the largest human tragedies in history that resulted from a combination of policy and natural failures. The problem of information asymmetry between the top and the bottom of the power chain due to the misreporting of output by lower levels of authority was a critical cause of this systemic failure. This catastrophic episode revealed the risks involved in a centralized command system; although on one hand it could effectively mobilize resources to foster rapid growth, on the other it could lead to an immense waste of resources in the absence of checks and balances (Desai 2003).

Economic Adjustments and Cultural Revolution, 1961–77

The disastrous results of collective agriculture under the Great Leap Forward led to a phase of policy adjustments after 1961. Extreme views on gigantic-scale agriculture were put aside and production was reorganized into smaller units called "production teams," which were subunits of the commune and consisted of only 20 to 30 neighboring families. These teams were much smaller than even the cooperatives of the early 1950s. By 1962, production teams were the basic unit of operation and accounting in most rural areas. Between 1961 and 1965, controls on household production were relaxed and farmers were allowed to cultivate private plots for self-consumption and, to a limited extent, to sell their produce from private plots at the local markets (Chow 2002). As a result of these measures, production and productivity recovered rapidly, growing at 9 and 4.7 percent per annum, respectively, between 1961 and 1965 (Fan, Zhang, and Zhang 2002).

However, during the decade of the Cultural Revolution (1966–76) agricultural production and productivity growth were again depressed by policy failures. The government reinstated many controls that had been loosened during the three-year adjustment period from 1962 to 1965. Although production was still organized in the smaller unit of

production teams, it was nonetheless tightly controlled by the government. No market transactions of major agricultural products were allowed outside the procurement system, and market exchanges of land between different production units in the commune system were outlawed. Although an increasing amount of resources was poured into irrigation expansion and infrastructure development in the rural areas,[8] the weak incentive structure in agricultural production overrode the positive effects of these investments. Agricultural production in this period slowed to 2.6 percent, and there was virtually no gain in total factor productivity, thus calling for intervention in the late 1970s (Fan, Zhang, and Zhang 2002).

It must be pointed out that although the commune system entailed immense costs in terms of efficiency, it benefited the rural population in significant ways (Yao 2004). Provision of free access to education and health services contributed to improving literacy and life expectancy. Effective in engaging the masses in collective public works, the collectives also provided rural areas with a critical base of irrigation facilities and other public goods. Thus, the commune era created favorable "initial conditions" in terms of human development and basic infrastructure that China could capitalize on with the start of reforms.

2.1.2 Reform Period, 1978 to the Present

Two decades (1956–76) of policy failures due to the excesses of the Great Leap Forward and the Cultural Revolution had left the country in a state of economic and social disarray. The time was ripe for a radical change in the conduct of economic affairs, as the government needed to restore its credibility in the eyes of the masses and make good on the long-standing promises of economic prosperity (Chow 2002). Reforms

[8] Investment in irrigation, agricultural research, and power grew at 8.2, 9.5, and 14.0 percent per annum, respectively, between 1966 and 1977. Agricultural research investment grew from 0.3 to 0.5 percent of GDP during the 1970s. Between 1962 and 1975, irrigated area as a share of arable land grew from 32.9 percent to 47.6 percent or from 31 million hectares to 43 million hectares. New advances in rural electrification drastically increased power consumption, from 1.6 billion kilowatts in 1962 to 18.3 billion kilowatts in 1975.

started in agriculture, and the compulsion to reform came from the perception at the top that stagnation of agricultural productivity was a bottleneck hindering further development of the overall economy. Moreover, with the bulk of the population living in rural areas and with up to 70 percent of the workforce depending on the primary sector for its livelihood, drastic and timely intervention was needed to get the country back on the track of economic growth, as it was only a matter of time before peasant unrest would explode. Besides, considerations related to China's status in the international arena also gave a fillip to undertaking a new economic course. The successful performance of other East Asian countries, thriving under an export-oriented market model, contributed to undermine the faith of Chinese policymakers in the central planning system (White 1991; Chow 2002). The leaders were eager and determined to see China occupy its position as a world power, and the only way to achieve this goal was through much higher rates of agricultural and overall economic growth. Improvement in incentives for farmers and the use of market mechanisms for the allocation of resources began to be regarded as the only way to boost efficiency and attain higher growth.

Decentralization of Agricultural Production and Increases in Procurement Prices, 1978–84

One of the first initiatives to increase incentives and raise agricultural output was the sanctioning of a new production management system called the "household responsibility system" (HRS), which marked the end of collective farming and the decentralization of agricultural production to the household level. The HRS was a "two-tier" land tenure arrangement. Land was still owned by the communes but use rights and production decisions were decentralized from the production teams to individual households. Farmers were free to decide what to cultivate and could sell the surplus in the market after they had met the state quotas, which were set at around 15–20 percent of output (Yao 2004). The revolutionary impact of the new reform lay in the fact that it separated user rights from collective ownership and shifted these rights directly to

producers, thereby linking performance to work efforts. Thus it improved incentives and eliminated the free-rider problems inherent in the old collective system.

The introduction of the HRS was an example of China's gradual approach to policy changes, that of "crossing the river while feeling the rocks." The HRS was not introduced from the top by government decree but, starting in the mid-1970s, was pushed from the bottom as more and more counties abandoned collective farming due to its growing inefficiencies (Lin 1989). The government did not sanction the new production system until 1979, when after extensive experimentation it seemed to work well in the various localities that had implemented it (Yao 2004; Chow 2002). By 1984 the HRS had been adopted nationwide.

Another major step taken during this phase was the government decision to increase grain procurement prices. After a decade of price stagnation, the government raised both in- and above-quota prices for major agricultural commodities. By 1979 quota prices for rice and wheat had been increased by 18 to 22 percent. Above-quota prices for grains, which were 30 percent of the quota price until 1978, were raised to 50 percent of the quota rate. For cotton, quota prices were increased by 20 percent, and an above-quota price of 30 percent was first introduced in 1979 (Sicular 1988b and 1995). In addition, quota prices for oil crops were raised by 26 percent, sugar crops by 22 percent, and animal products by 23 percent. In contrast, the average rate of inflation was 2.39 percent between 1978 and 1984, with the overall retail price index rising from 100 in 1978 to 117.7 in 1984 (calculation based on NBS 2001). Since all these price increases were covered by the central government budget, the budget deficit as a percentage of GDP increased from 0.28% in 1978 to 4.23% in 1979. Food subsidy as a percentage of GDP also increased gradually from 0.31% in 1978 to 4% in 1981. But due to rapid overall economic growth, the budget deficit had been under control after 1981 and was often less than 1% of GDP. Some major fiscal and financial indicators are presented in Appendix 1.

This period also saw the implementation of a series of far-reaching market reforms aimed at reducing the scope of government planning and procurement while gradually expanding the role of free markets in the allocation of resources. After 1978,

plan targets for yield, output, sown area, and so on were applied to fewer and fewer crops, and they became more a guide than a mandate. This reform indirectly encouraged crop diversification based on local comparative advantages, as farmers were no longer constrained by plan targets. Further, quota levels for grains were lowered by as much as 20 percent between 1978 and 1982 (Sicular 1988a) and the number of commodities subject to public procurement was gradually reduced, leaving more agricultural produce to be sold on the free market (China, Ministry of Agriculture 1989).[9] By the mid-1980s marketing activities were completely liberalized for nonstaple products such as fruits and vegetables, although the government still retained a tight hold over commodities regarded as strategic for food security, including cereals, cotton, and edible oils, which accounted for the bulk of the sown area (Huang and Rozelle 2004).

In trade, the state monopoly was broken as private individuals and businesses were allowed to engage in trade alongside state agencies. Rural markets and periodic fairs were encouraged, and the number of products that could be exchanged as well as the distance within which they could be traded was increased.

The impact of these reforms, particularly the HRS, was impressive in terms of agricultural performance and poverty reduction. Many regard the change in farming institutions from collectives to households as the major driver of growth during this phase, with the change in procurement prices and other marketing interventions playing a secondary role (Fan, Zhang, and Zhang 2004; de Brauw, Huang, and Rozelle 2004).[10]

Agricultural production increased by 6.6 percent and productivity by 6.1 percent per annum from 1979 to 1984. There was a sharp increase in output and yields of the main agricultural commodities, with production of grain, cotton, and oil seeds increasing at a rate of 4.8, 7.7, and 13.8 percent, respectively, as opposed to 2.4, 1.0, and 0.8 percent from 1952 to 1978 (Chen, Wang, and Davis 1999).

[9] The commodities under procurement dropped from more than 100 in 1978 to fewer than 40 by 1984.
[10] Lin (1992) attributed 60 percent of agricultural output growth and 80 percent of productivity growth over the period 1978–84 to the HRS and the rest to output price changes. McMillan, Whalley, and Zhu (1989) claimed that 80 percent of productivity growth came from the HRS and 20 percent from procurement price increases.

From Table 1 it is clear that agricultural GDP grew at a much higher rate in the reform period (7 percent between 1978 and 1984) relative to the rate of 2.3 percent in the pre-reform period from 1952 to 1977. Accordingly, there was a rapid increase, of 15.5 percent per year, in rural real income per capita (from 220 yuan in 1978 to 522 yuan in 1984, at 1990 prices), contrasting sharply with the pace of the pre-reform period of 2.3 percent per annum (Fan, Zhang, and Zhang 2002).

It must be noted that of all China's reform stages, this phase of reforms showed the most substantial decrease in poverty. According to Chinese official estimates, between 1978 and 1984 rural poverty declined from 33 percent to 11 percent of the population (China, NBS 2002). In actual numbers it meant that the number of people living in poverty declined from 260 million to 89 million in a matter of six years. This was and is an unprecedented achievement in the history of development. At the same time, however, there was a considerable increase in income inequality due to decollectivization and the dismantling of the egalitarian redistribution mechanisms embedded in the communes. Inequality as measured by the Gini coefficient grew from 0.21 in 1978 to 0.26 in 1984 (Fan, Zhang, and Zhang 2002.)

Table 1—GDP and its growth by sector in China

	GDP			
	Total	**Agriculture**	**Industry**	**Services**
	(billion yuan, 2002 prices)			
1952–56	318	146	77	94
1957–62	450	146	167	138
1962–65	449	174	152	122
1966–70	635	444	155	196
1971–75	921	513	276	258
1976–80	1,213	556	409	342
1981–85	1,872	748	636	600
1986–90	3,077	956	1,118	1,124
1991–95	4,899	1,177	2,109	1,711
1996–2000	7,814	1,442	3,807	2,600
2001	9,703	1,566	4,876	3,268
2002	10,479	1,612	5,354	3,513
	Annual Growth Rate (%)*			
Pre-Reform Period				
1952–56	8.39	6.59	13.48	6.91
1957–62	-3.44	-3.61	-3.85	-2.81
1963–65	17.65	14.10	21.23	18.43
1966–77	6.83	4.40	10.26	5.03
1952–77	***5.43***	***4.24***	***8.08***	***4.01***
Reform Period				
1978–84	9.76	6.33	10.25	11.93
1985–93	8.81	11.20	6.82	9.65
1994–2002	8.82	4.89	9.24	11.32
1978–2002	***8.24***	***4.01***	***8.88***	***9.66***

Source: Calculations based on data from NBS 2003.
Note: Values are simple averages for the time period indicated.
* Growth rates are calculated by fitting a linear regression trend line to the logarithmic annual values.

Domestic Marketing Reform and the Rise of the Rural Nonfarm Sector, 1985–93

The success of the early reforms encouraged the government to continue improving incentives in agricultural production through administrative as well as market-oriented interventions. These interventions were, however, punctuated by policy reversals to ensure that the new measures did not undermine procurement and self-sufficiency in strategic commodities such as foodgrains.

Against the backdrop of rising cereal production, which had grown steadily from 280 million tons in 1980 to an all-time high of 366 million tons in 1984, ensuring the country's food security (FAOSTAT 2004), the procurement system was changed from a mandatory quota to a contract system in 1985.[11] Quantities for state purchase were to be negotiated between state agencies and farmers and were priced using a unified "proportionate price," which replaced in- and above-quota prices and was a weighted average of the two. The advantage for the government was in the easing of budget pressures, as it was no longer compelled to buy growing volumes of output beyond the contracted amounts. However, the indirect effect of the reform was to decrease grain production by 7 percent in 1985; it did not recover to the 1984 level until 1989, primarily because the proportionate contract prices were lower than the old above-quota and market prices and thus farmers were unwilling to conclude contracts with state agencies (Sicular 1988a).

To again boost production of grains and cotton, the reform was reversed and the contract system was made mandatory, amounting in practice to a return to the old quota system. Further, a new wave of quota price increases was implemented between 1986 and 1988. The resultant renewed growth in grain output in the late 1980s led to further liberalization of the grain market. Following two years of regional experiments, the rationing system for urban consumers was dismantled in 1993. The intervention was intended to address budgetary pressures due to increasing price subsidies. The fiscal drain was linked to the growing gap between the ration (retail) price for consumers and the plan prices, since the latter were rising while consumer prices were fixed (Sicular 1988a). By 1985 the total price subsidy had grown to 3 percent of GDP and 13 percent of total revenues (NBS 2001). Of this subsidy, 76 percent was spent on price increases for grains, cotton, and edible oils.

[11] Half of the increased grain production went to the increased domestic demand while the rest went to the stock. Therefore, grain stock as a percentage of domestic consumption increased from 43% in 1980 to 59% in 1984.

A grain buffer stock policy was established for the first time in 1990 with a "special grain stock" and a related "grain risk fund" financed at both the central and provincial levels. In response to the drop in grain prices due to domestic oversupply, the government reinstated unlimited purchase of output by state grain bureaus, and the quota system was turned into a de facto price support system in the late 1990s. However, the price support policy was criticized, as it proved to be fiscally burdensome and difficult to implement due to lack of storage capacity (Ke 2004). With the growth in grain output this measure led to an increase in the price subsidy, as prices for grain, cotton, and edible oil increased by 3.6 percent per year in real terms between 1990 and 2000 while expenditures for supporting agricultural production and operating expenses, including stock maintenance, grew by 7 percent per year in real terms between 1994 and 2000, as opposed to 2.2 percent in the 1978–89 period (calculations based on NBS 2001).

By the early 1990s the compulsory grain quota had declined to 13 percent, down from 20 percent in the mid-1980s, while the number of products under procurement declined further, to less than 10 percent by 1991. As state procurement was steadily abandoned, the share of all farm produce sold at market prices soared, and by 1993 nearly 80 percent (up from 5.6 percent in 1978) of farm produce was sold on free markets. As a result, a dramatic expansion of private trade took place, in terms of both the number of business units operating and the volumes traded. Between 1980 and 1993, rural periodic markets increased from 38,000 to 67,000, and retail businesses soared from 1.7 million to 10 million, with trade on rural markets rising by 12 percent a year and retail sales by 8 percent per year (Sicular 1995). These remarkable developments are testimony to the entrepreneurial spirit of Chinese farmers, which flowered as soon as long-standing restrictions were lifted.

In contrast to output markets, reforms in the area of agricultural inputs lagged behind during the 1980s (Ke 2004). China's major agricultural input, chemical fertilizers, was under government control in terms of pricing as well as distribution until the early 1990s when the fertilizer market was liberalized as part of the concessions to enter the WTO. The government's grip on the input market was presumably kept longer for fear

that giving up control over such a strategic sector without adequate market mechanisms in place would cause disruption in agricultural production (Huang and Rozelle 2004).

The effects of the new wave of marketing reforms on agricultural performance were therefore more moderate than those of the institutional and price reforms of the previous stage. The HRS had been widely adopted and had exhausted its revolutionary impact, while its deficiencies in terms of imperfect land use rights began to take a toll on the performance of the sector. Agricultural production and productivity grew by 3–4 percent and 2 percent per annum, respectively, from 1985 to 1993, which, while respectable, was not as remarkable as in the previous phase (Fan, Zhang, and Zhang 2002).

As a result, in this phase the percentage of rural poor dropped from 15 percent to 8 percent of the population. This was only a modest decline in view of the fact that in the mid-1980s a formal poverty alleviation policy had been adopted for the first time with the introduction of major antipoverty programs (Zhang, Rozelle, and Huang 2004); the results lend credence to the argument that this type of spending is inefficient (Fan, Zhang, and Zhang 2004).

A consequence of the first and second waves of reforms was the emergence of a dynamic rural nonfarm (RNF) sector, which contributed to the growth and diversification of the rural economy and farmers' income (Zhong and Zhu 2004). Almost absent in 1978, this sector accounted for nearly 25 percent of the GDP by the mid-1990s (Fan, Zhang, and Zhang 2002). The impressive rise of the RNF sector in China was specially stimulated by the growth in agricultural labor productivity and rural incomes, which increased demand for nonagricultural goods and services and released surplus workforce and capital for investment in township and village enterprises (TVEs). It is worth noting that the growth of rural businesses also put pressure on the urban economy to reform, since TVEs had over time become more competitive than the state-owned enterprises (SOEs). The need to reform the urban sector in turn triggered macroeconomic changes starting in the mid-1980s.

Pre-WTO Trade Liberalization, 1994–2001

China had submitted its formal bid to join the General Agreement on Tariffs and Trade (GATT) in 1986 but a long negotiation process was required before China was officially admitted into the WTO in December 2001. During this interval, China's foreign trade regime was gradually changed to introduce an export-oriented and more open trade system. Major reforms included regional open door policies, foreign direct investment (FDI) liberalization, fiscal and exchange rate measures, and market access (tariff and nontariff) improvement (Huang et al. 1999). Entry into the WTO had the positive effect of granting "most favored nation" (MFN) status on a permanent basis, which eliminated the uncertainty related to the yearly renewal of the status by the United States and other major foreign commercial partners (Agrawal and Pravakar 2003).

To boost exports and augment foreign exchange earnings, China had started making limited changes to the fixed exchange rate regime since the first phase of reform.[12] In 1993–94 the exchange rate system was further reformed and changed from a two-tier system (with an administered official exchange rate and a swap exchange rate) [13] into a unified managed exchange rate pegged to the U.S. dollar (Huang and Rozelle 2004). In the pre-reform period the overvaluation of China's domestic currency negatively affected the overall export environment, but after the launch of economic reforms in 1978 the exchange rate was steadily depreciated, correcting the anti-export bias.[14] The exchange rates over the last three decades for both China and India are presented in Appendix 1. However, since 1995 the nominal exchange rate has been fixed at 8.3 yuan per U.S. dollar (IMF 2002 cited in Huang and Rozelle 2004) and at the end of 1996 the yuan was made convertible on the current account of the balance of payment (BOP). With the currency made convertible, it is debatable how the exchange rate can be kept fixed even as the BOP current account is accumulating surpluses. Thus there is the

[12] In 1979 the government introduced the "foreign retention system" that allowed firms to keep foreign exchange subject to improvement in export performance.
[13] The swap rate was determined by a swap center, where foreign exchange could be traded by businesses based on demand and supply needs. The swap rate was higher than the government planned rate.
[14] The real exchange rate depreciated by about 400 percent from 1979 to the mid-1990s (Table Appendix 1).

question of whether the de facto undervaluation of the currency is actually providing hidden export subsidies. This controversy surrounding the Chinese exchange rate is now fueling debates in major international forums in the face of China's growing manufacturing exports.

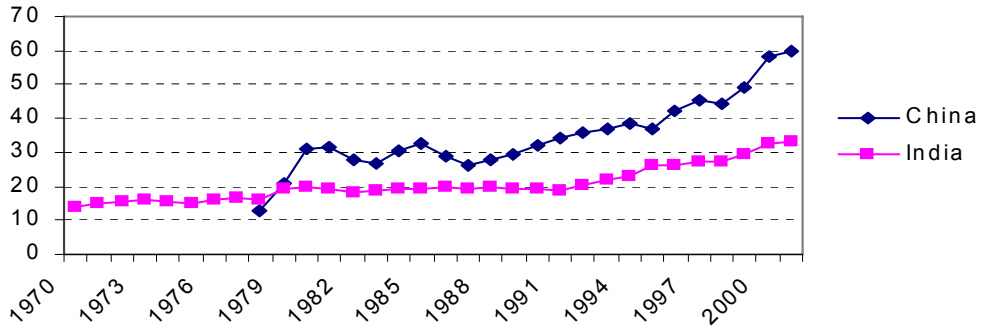
With regard to market access, following across-the-border reductions in product-specific rates, the weighted average import tariff declined from 47.2 percent in 1991 to 16 percent in 2000 (Huang and Rozelle 2002). In agriculture, the simple average tariff dropped from 42 percent in 1992 to about 21 percent by 2001 (Huang and Rozelle 2004). The evolution of nominal protection rates (NPRs) for major farm products reveals the extent of improvement in market access over the last two decades. In the late 1970s domestic prices for wheat, rice, and maize were 89, 10, and 92 percent above international prices, respectively, whereas these percentages fell to 26, –2, and 23 in 2000 (Huang and Rozelle 2003).

Exchanges of most agricultural commodities have gradually been removed from the monopoly of state agencies except for strategic crops such as grains and edible oils. The trading of these products had been exclusively managed by China Oils and Foodstuffs Corporation (COFCO) until the late 1990s when the agency was restructured to operate on commercial lines and its monopoly was broken to allow nonstate enterprises to enter the market for rice, wheat, and maize.

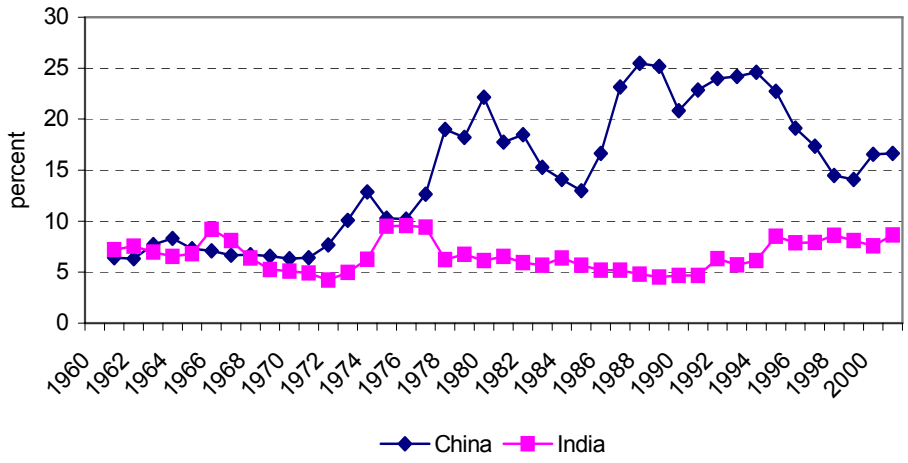
As a result of 24 years of reforms, China's foreign trade has been growing fast, at the rate of 18 percent per year between 1978 and 2002 (FAOSTAT 2004; WDI 2004). Trade has become a major contributor to economic growth, as it has risen from 15 percent of GDP at the start of reform in 1978 to nearly 60 percent in most recent years, as shown in Figure 4 (WDI 2004).

Figure 4—Share of trade in GDP in China and India

a) Percentage of total trade in GDP



b) Percentage of agricultural trade in agricultural GDP



Sources: WDI 2003; FAOSTAT 2003.

The lowering of tariff and nontariff barriers in view of WTO entry resulted in shifting trade patterns that favored products in which the country has a comparative advantage, including labor-intensive products such as horticulture and livestock at the expense of land-intensive commodities such as traditional cereal production (Huang and Rozelle 2004). Since 1985 the share of fruits, vegetables, and animal products has grown from 57 percent of total exports to 75 percent in 1997, while the share of grains and edible oils dropped from 33 percent to 21 percent in 1997 (Huang et al. 1999).

Therefore, on one hand, trade liberalization benefited those engaged in the production of labor-intensive products, favoring the diversification of agricultural output away from grains. On the other hand, less-developed areas in particular were penalized as they depended overwhelmingly on grain production. Farm households and groups affected included those lacking the opportunity to shift to nonfarm employment because of poor education, and those dependent on government welfare (Huang and Rozelle 2004). Decreasing protection and consequent higher exposure to foreign competition put effectively increasing pressure on the government to restructure state-owned enterprises, which traditionally provided several welfare benefits, ranging from pensions to health and unemployment insurance.

Post-WTO Adjustments, 2002 to the present

After China entered the WTO, reforms in the marketing of grains were stepped up and remnants of the procurement system were dismantled. The costly foodgrain support price system adopted a few years earlier was partially abandoned and was maintained only in the major producing regions of the northeast. This was not only dictated by fiscal opportunity but was also required to prevent excessive accumulation of stocks by state grain enterprises while cheap food imports were increasing. Starting in 2002, China took steps to liberalize the foodgrain marketing system entirely by adopting a plan to phase out state procurement over three years (Huang and Rozelle 2004).

Two major steps undertaken in 2004 were the reduction of the agricultural tax and the introduction for the first time of a direct income transfer to farmers. Beginning in 2004 the agricultural tax is to be reduced by 1 percent per annum until it is completely abolished in five years, and income subsidies averaging 300 yuan per hectare have been introduced in 13 major grain-producing regions (*China Daily* 2004). Both measures are aimed to increase farmers' income and represent a breakthrough, since the industrial bias in the government's economic policy has meant that historically the sector was net taxed, often with insufficient consideration for farmers' interests. The new emphasis on the

latter and increasing farmers' income marks the start of a transition in agriculture from being traditionally taxed to subsidized (Huang and Rozelle 2004).

In the post-WTO phase, a new wave of land reform was introduced in order to improve tenure security and boost the development of land lease markets. In 2003 a new land law, the Agricultural Lease Law, was passed to address some of the drawbacks of the HRS (Yao 2004), which had exhausted its benefits and its limitations had started to have an impact on performance. Agricultural growth decelerated considerably: a drop from 7.1 percent during adoption of the HRS (1978–84) to around 4 percent in subsequent stages (NBS 2003). The shortcomings of the system were in part related to the practice of land redistribution that aimed to give rural households equal access to the village land in the event of new births or deaths. Land reallocations led over time to fragmentation of holdings and reduced incentives to invest, due to farmers' concern about the periodic plot reallocations. The new law aims to restrict land reallocations by the village authority, thereby improving tenure security as well as boosting agricultural investments and productivity. The law is also a new step toward increased individualization of land rights, as it sanctions the right to inherit and sell leaseholds for 30 years for arable land, paving the way to the development of land lease markets (Chen, Wang, and Davis 1999).

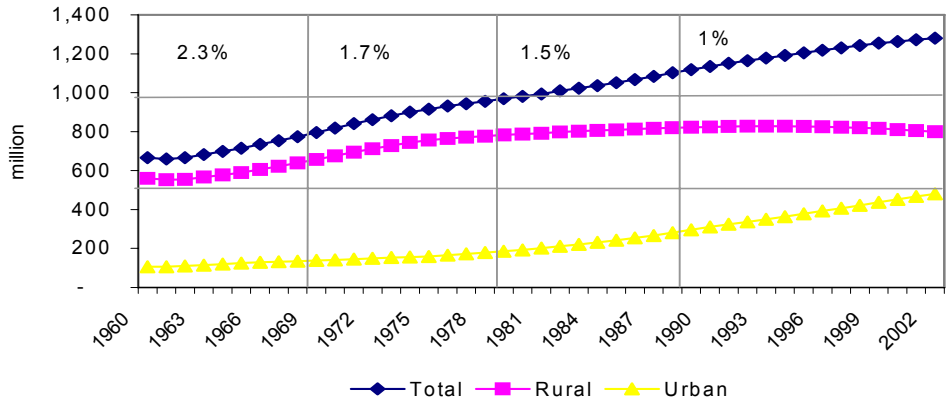
In the area of trade liberalization, the trend of declining trade protection is likely to continue. In fact, China committed itself to reducing the average agricultural tariff from 21 to 17 percent by 2004, which is expected to further increase the degree of openness of the primary sector and deepen its integration with world markets (Huang and Rozelle 2004). As was the case with the introduction of domestic marketing reforms over the last 20 years, the WTO commitments to further liberalize the economy are now regarded as the prime policy measures from which the government expects additional opportunities to deepen the reform process and achieve higher growth.

Finally, it is noteworthy that the policies of population control (viz., the "one-child policy") adopted throughout the reform period brought the growth of the population

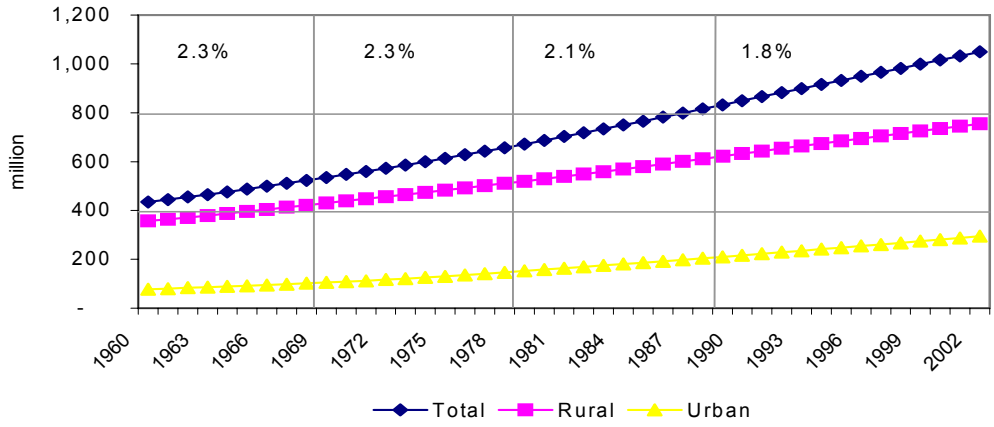
under control and contributed to the achievement of overall higher growth in income on a per capita basis (Figure 5).

Figure 5—Population growth

a) China



b) India



Source: WDI 2004.

2.2 TRADE AND DOMESTIC POLICY CHANGES IN INDIAN AGRICULTURE

The pre-reform period in India, from 1951 to 1990, was dominated by the Green Revolution, which played a crucial role in meeting the national food demand, reducing the rate of rural and urban poverty, and building the foundation for overall national economic growth.

The reforms unfolded in three different phases. The first (1991–94) involved changes to a broad set of policies outside agriculture, creating pressure to extend reforms to agricultural policies. The second phase (1994–98) brought the primary sector under the purview of reforms that aimed to gradually decontrol agricultural trade flows. As a result of a series of unilateral government initiatives and, to a lesser degree, in response to the signing of the URAA under the WTO in 1994, the sector underwent limited changes. The third stage (1998 to the present) extended reforms to domestic agricultural marketing but left the traditional support systems of input subsidies, food procurement at subsidized prices through the public distribution system (PDS), and the minimum support prices (MSPs) largely unaltered.

2.2.1 Pre-Reform Era, 1951–90

Pre–Green Revolution, 1951–65

Right after independence, the focus of agricultural policy was on land reforms and the strengthening of rural infrastructure (especially irrigation), as both were regarded as crucial for agricultural modernization. Overall, implementation of land reforms was only partially successful due to the conflicts of interests that crippled landlord-controlled state legislatures (Srivastava, Saxena, and Thorat 2004). But the truly successful intervention in this phase was investment in irrigation (Iyer and Raju 2004). The first five-year plan (1951–56) allocated 31 percent of the budget to the agricultural sector (Chandra, Mukherjee, and Mukherjee 2000), partly for the development of up to 2.5 million hectares of irrigated area (Indiastat 2004). Rural outlays, however, decreased thereafter to

20–25 percent as India formally adopted the socialist strategy of heavy industrialization during the second five-year plan (1956–61). Under this model, agricultural policy was conceived with an in-built pro-urban bias. To provide cheap food and cheap basic inputs for industrial development, farm prices were kept artificially low and agricultural exports were curtailed through quantitative restrictions and an overvalued exchange rate.

The new development strategy put pressure on agriculture, as the new investments in capital goods and industrial plants implied a long gestation period before they could translate into higher incomes. Between 1951 and 1966 grain production was rising at 2.8 percent per annum, a rate that was insufficient to keep up with population growth at more than 2 percent per annum (India, Ministry of Agriculture 2004). Thus, from the mid-1950s India began to rely on imports of foodgrains to feed its growing population. In 1956 India signed the agreement of Public Law 480 (PL 480) with the United States to receive food aid, mostly wheat.

A series of tragic political and natural circumstances increased foreign food dependency. Because of its involvement in two wars (with China in 1962 and Pakistan in 1965), India sacrificed rural investments to channel large quantities of resources toward meeting defense needs (Fan, Thorat, and Rao 2004). Two consecutive droughts in 1965 and 1966 plunged the country into an unprecedented food crisis, with foodgrain production and yield declining by 19 percent and 17 percent, respectively, in 1966 (India, Ministry of Agriculture 2004). The country's food security was so precarious that there were even forecasts that India and the rest of South Asia were inevitably headed for a famine that would claim 10–20 million lives by 1975 (Paddock 1967). To avoid massive starvation, foodgrain (mainly wheat) shipments brought into the country increased to 10 million tons, with internal wheat production hovering around 12 million tons in 1966–67 (Indiastat 2004).

Against the backdrop of the Cold War, food aid was used to arm-twist recipient countries into compliance, and India fell prey to this policy when on one occasion the U.S. shipments were abruptly stopped for 48 hours during the height of the drought

period (Gulati 2000).[15] Leaders realized then the high political risks inherent in relying on foreign sources for food security and thus resolved to achieve self-sufficiency in grain production, no matter what it cost. The goal of food self-sufficiency that would shape Indian agricultural policy for the next 40 years or so traces its roots back to this time and the harsh experience with food aid.

First Burst of the Green Revolution, 1966–72

To get out of the clutches of PL 480, India, under the leadership of then minister of agriculture C. Subramaniam, undertook a new agricultural strategy to spur grain production. He started by introducing a remunerative support price for farmers; in January 1965 the Agricultural Prices Commission was set up to recommend the MSP, and the Food Corporation of India (FCI) was set up to take charge of the logistics of procuring major agricultural commodities (Gulati 2003). That same year, India took a bold step by allowing the introduction of new high-yielding varieties (HYVs) of wheat from Mexico, which had been bred by CIMMYT, an international institute for research on maize and wheat.

The new seeds could yield more than double the existing levels and thus had the potential to dramatically raise wheat production and food supplies. At first there was extensive opposition to the import of large quantities of the HYVs, owing partly to the potential inequalities these varieties could create in agriculture and partly to their lower gluten content and less-than-optimal baking qualities. However, with the support of Prime Minister Shastri first and Indira Gandhi later, Subramaniam overcame public resistance, and in 1966 India ordered the import of 18,000 tons of HYV wheat seeds that were distributed in the highly irrigated areas of Punjab, Haryana, and western Uttar Pradesh, where the past investments in irrigation paid rich dividends. The outcome of the experiment was miraculous, leading to a veritable Green Revolution. In 1967–68, wheat production in Punjab boomed, increasing by nearly 30 percent, from 2.5 to 3.3 million

[15] The order to stop food shipments was caused by U.S. displeasure at India's stance on the Vietnam war and the closer ties with the Soviet Union following Indira Gandhi's visit to Moscow in 1966.

tons, while the all-India average was 16.5 million tons, nearly 5 million tons more than its best performance in 1964–65 (Indiastat 2004). [16] The total foodgrains harvested soared from 74 million tons in 1966–67 to 105 million tons in 1971–72 when India became self-sufficient, with grain imports declining to near zero (India, Ministry of Agriculture 2003).

These outcomes would not have been possible without the favorable pricing policy that provided farmers with adequate incentives, the dynamism of the national research system that proceeded to indigenize the new seeds to tackle their shortcomings (Gulati 2003), and the availability of inputs such as canal water, fertilizers, power, and credit. In view of the strategic importance of these inputs, it was the responsibility of the government to ensure affordable access to them by farmers. Subsidies thus started to become an instrument of agricultural policy beginning in the late 1960s, although they acquired effectively greater importance in the 1970s (Gulati and Narayanan 2002a). The role of credit began to gain attention after 1969, following the nationalization of banks.

Improved agricultural production resulting from modern inputs and technologies "trickled down" to the poor and led to a rise in farmers' income, while output growth and increased grain supplies caused a decline in real foodgrain prices, benefiting the poor. Thus, the percentage of rural poor declined significantly during this phase, from 64 percent of the rural population in 1967 to 56 percent in 1973 (Indiastat 2004). Several government antipoverty programs introduced during the fourth five-year plan in the early 1970s also played a role in poverty reduction (Parikh, Dev, and Shariff 2004).

Debacle and Second Phase of the Green Revolution, 1973–80

After the nationalization of the banks, then prime minister Indira Gandhi took other steps to extend the role of the state in key areas of economic management. In agriculture, private wholesale traders came under attack because their speculative motives were regarded as being responsible for fluctuations in foodgrain prices and supplies. Thus, in 1973–74 the government took over the wheat wholesale trade, but the

[16] It is even reported that due to this sudden burst of grain, schools in rural Punjab actually had to be closed so that classrooms could be used as storage space for the new harvest.

maneuver proved a disaster (Chopra 1981). Wheat procurement was hindered by limited supply resulting from droughts in several states in 1972–73, and the fledgling FCI could not prove itself up to the task.

Procurement dropped to 4.5 million tons from more than 5 million tons in the preceding years, and the cereal price index (base 1961–62=100) jumped from 236 to 278 during 1973 (Chopra 1981). The inflationary pressures worsened when the 1973 international oil crisis fueled fertilizer prices. Following two consecutive droughts in 1972–73, foodgrain production decreased by 7.7 percent (India, Ministry of Agriculture 2003) and India fell back into the trap of foodgrain imports, importing an average of 4 million tons a year from the United States in the period 1973–76 (FAOSTAT 2004).

After the oil shock the government increased fertilizer subsidies to prevent a drop in consumption following rises in fertilizer prices (Schumacher and Sathaye 1999). In 1977 the retention price scheme (RPS) was introduced for urea, the predominant fertilizer in Indian agriculture. During the 1970s, other input subsidies grew in importance within the state budget (Fan, Thorat, and Rao 2004), and the subsidy bill (excluding fertilizers) grew from Rs. 10 billion at 1993–94 constant prices to Rs. 33.2 billion, or from 0.5 percent to 4 percent of agricultural GDP between 1973 and 1980 (Gulati and Narayanan 2002a). Irrigation subsidy was related to a major rebound of investments in projects during the fifth plan period from 1974 to 1979 (Iyer and Raju 2004). Further, groundwater irrigation increased in importance, with its composition share rising from 0.55 percent in 1960 to 19.5 percent in 1975 (Indiastat 2004) on account of private investment in tubewells by farmers who reinvested the income from the earlier burst in foodgrain production. As a result, power subsidies for water pumping grew dramatically, reaching 44 percent of total input subsidies at the start of the 1980s (Gulati and Narayanan 2002a).

The extension of HYV technology from wheat to rice, favored by the growth of tubewells, spread the Green Revolution to new areas, marking a new phase in the expansion of domestic production. From 1972–73 to 1979–80, production as well as yields of foodgrains showed remarkable growth, at 3.1 and 2.5 percent, respectively, and

the percentage of rural poor declined from roughly 56 to 50 percent of the rural population (India, Ministry of Agriculture 2004).

Third Phase of the Green Revolution, 1981–90

In the 1980s, India consolidated its status as a food self-sufficient country. Rice production soared to 63.8 million tons in 1986, up from 37 million tons in 1964. Wheat output had grown from 12 million tons in 1964 to 47 million tons in 1986, a year in which for the first time India could secure 25.4 million tons of grain buffer stocks (India, Ministry of Agriculture 2004). When in 1987 the "worst drought of the century" struck, the country's food needs could be easily met without any loss of lives (Gulati 2003).

During this phase the HYV technology spread eastward to states such as West Bengal and Bihar, which experienced rice surpluses, with rice output growing at 5 and 3.7 percent, respectively, over the 1980s. However, in the rest of the country the Green Revolution ran out of steam by 1985, once the new seed varieties had been widely adopted in the main producing regions. Yields for rice and wheat that had grown by 3.5 percent and 4.5 percent per annum, respectively, between 1967–68 and 1984–85 slowed to 2.3 and 2.4 percent per year between 1985–86 and 1999–2000 (Indiastat 2004). With the HYV technology exhausting its impact in the mid-1980s, input subsidies were steadily increased to continue sustaining foodgrain production growth. By 1991 input subsidies had grown to 7.2 percent of agricultural GDP from 4.4 percent in 1980, and to 2.0 percent of total GDP from 1.5 percent in 1980 (Gulati and Narayanan 2002a).

Throughout the Green Revolution, Indian agriculture labored under a closed and strictly regulated policy regime characterized by pervasive restrictions on production through licensing requirements and other barriers to entry, as well as controls on pricing, movement, and private trading of agricultural produce. On the external front too, the sector was burdened with various tariff and nontariff barriers on agricultural trade flows.

The high protection accorded to industry produced high industrial prices and adverse terms of trade (TOT) for agriculture, reducing the relative profitability of the

primary sector.[17] Agriculture, by contrast, was overall net taxed on account of the overvalued rupee,[18] which produced an anti-export environment for agriculture. The objectives of this framework were broadly dictated by the dominant strategy of the pre-reform era—that is, food self-sufficiency from domestic supplies aiming to (1) ensure cheap food for consumers, (2) protect farmer incomes from price fluctuations, and (3) keep the balance of payments in check.

However, the agricultural policy framework that had kept Indian agriculture isolated and rigorously regulated for three decades was about to change in a limited way.

2.2.2 Reform Period, 1991 to the Present

Macroeconomic and Nonagriculture Sector Reforms, 1991–94

Starting in 1991, India adopted a series of sweeping macroeconomic and structural reforms affecting industry, exchange rates, foreign trade, and investments (World Bank 2003b). Reform was required by the International Monetary Fund (IMF) and the World Bank, to which India had resorted for a loan to tackle one of the most severe macroeconomic crises in decades, ravaging the country's fiscal and BOP situations. By 1990–91 the external position had grown weak and the current account deficit, amounting to 3.1 percent of GDP in 1990, had pushed foreign reserves to historic lows of 1.5 billion dollars, only enough to finance a few weeks of imports (Desai 2003). Internally, government expenditures (and particularly nonplan expenditures financed through borrowing) had soared unchecked in the 1980s and by 1990–91 had become unsustainable. The central government and states' fiscal deficit together came to 9 percent of GDP, and the short-term debt had grown to an alarming 146.5 percent of foreign reserves (Srinivasan and Tendulkar 2003). The inflation rate reached double digits and the fear of an imminent devaluation led to flight of capital from the economy.

[17] Agricultural terms of trade, or the quotient of agricultural prices to manufacturing prices, were near 0.95 in 1990–91 (India, Ministry of Finance, cit. in Gulati, Pursell, and Mullen 2003).
[18] The overvalued rupee imposed a tax of roughly 20 percent on domestic agricultural production (Landes and Gulati 2003).

Against this backdrop, the government of Narasimha Rao, elected in July 1991, with then finance minister Manmohan Singh at the helm, managed to rapidly stabilize the fundamental macroeconomic factors. To redress the fiscal and current account deficits and meet IMF conditions, the government agreed to cut expenditures and imports and depreciate the nominal exchange rate. As a result, the combined fiscal deficit declined to 7 percent of GDP by 1992–93 and the BOP current account deficit dove from 3.2 percent of GDP in 1990 to 0.3 percent in 1991. Two consecutive devaluations of the rupee, by 22.8 percent and 17.3 percent in 1991–92, contributed to further improve the balance of payment situation by boosting exports (Srinivasan and Tendulkar 2003).

Macroeconomic stabilization was not believed to be sustainable in the long term without structural adjustments to revive economic growth and industrial competitiveness. In effect, pervasive regulations and distortions created by public policies, together with infrastructure shortcomings, had hindered the efficiency of the economy. Thus, in addition to macroeconomic stabilization plans India also adopted an extensive program of longer-term sectoral reforms to liberalize industrial policy and investment as well as trade and the exchange rate regime.

In the area of investment, the government relaxed restrictions on investments and raised the limit on equity participation by foreign capital in the case of foreign direct investments (Gulati and Mullen 2003). With regard to industry, regulations on licensing, barriers to entry, and restrictions on scale expansion were relaxed. The number of industries requiring government approval was drastically reduced for security and environmental reasons and the list of industries reserved for the public sector was trimmed to three: defense, nuclear energy, and railways. More recently the policy of reserving some products for small-scale industries in order to protect employment by fostering labor-intensive industries was partially reformed since it ended up limiting investment and technological innovation. In 2001–02 several products, including auto components, garments, and shoes, were excluded from the pool of reserved items (Ahluwalia 2002). In addition, the exchange rate regime was reformed in a fundamental way. After the devaluations, the rupee was made partially convertible on the current

account in 1993, and the administered system that pegged the rupee to a basket of currencies was replaced with a managed floating system, implying a greater role of the market in influencing the exchange rate. Finally, in the area of trade, there was a gradual and substantial reduction in import protection, which was one of the highest among developing countries. Quantitative restrictions (QRs) on imports were reduced from 93 to 66 percent of tradable GDP by 1995 (Srinivasan and Tendulkar 2003). The weighted average tariff dropped from 72.5 percent in 1991–92 to 24.6 percent in 1996–97 (Ahluwalia 2002). Tariffs on industrial goods declined from a high of 300 percent for some commodities to a simple average of 30 percent between 1991 and 2002 (Hoda and Sekhar 2004).

These policy changes led to higher economic growth, with GDP recording an impressive 6.5 percent per annum growth between 1991–92 and 1996–97, compared to 5.2 percent in the 1980s (Table 2). Overall, the reforms implied the shift from a closed to a more liberalized and open system, as can be detected in the change in indicators such as FDI inflows and the trade-to-GDP ratio. From 1990 to 1995, the former grew from 0.07 percent to 0.6 percent of GDP, while imports and exports as a share of GDP increased from 17.2 percent to 25.7 percent (WDI 2004). The foreign reserve situation improved as well, reaching $22.4 billion at the end of 1996 (India, Ministry of Finance, *Economic Survey 1997–98*), up from $1.5 billion at the height of the fiscal crisis in 1990.

Table 2—GDP and its growth by sector in India

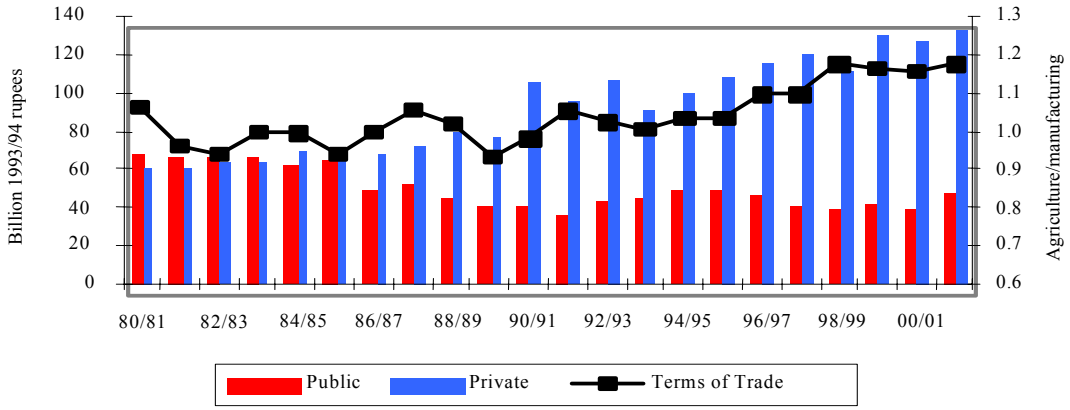
	GDP			
	Total	**Agriculture***	**Industry**	**Services**
	(billion rupees, 1993–94 constant prices, factor cost)			
1950–55	1,505	867	166	471
1956–60	1,802	982	223	595
1961–65	2,218	1,110	321	786
1966–70	2,560	1,162	405	993
1971–75	3,042	1,345	498	1,199
1976–80	3,671	1,514	640	1,509
1981–85	4,456	1,723	831	1,903
1986–90	5,757	1,961	1,182	2,614
1991–95	7,504	2,342	1,603	3,559
1996–2000	10,235	2,741	2,294	5,200
2001–04	13,023	2,991	2,839	7,193
	Annual Growth Rate (%)**			
Pre-reform Period				
1950–51 to 1959–60	3.62	2.68	5.81	4.43
1960–61 to 1969–70	3.23	1.50	5.03	4.81
1970–71 to 1979–80	3.39	1.72	4.95	4.33
1980–81 to 1989–90	5.24	2.91	7.26	6.26
1950–51 to 1990–91	*3.76*	*2.32*	*5.42*	*4.78*
Reform Period				
1991–92 to 1996–97	6.52	4.10	8.65	7.05
1997–98 to 2003–04	5.37	2.01	4.90	7.10
1991–92 to 2003–04	*5.91*	*2.67*	*6.09*	*7.52*

Sources: India, CSO 2004; India, RBI 2003.
Note: Values are simple averages for the time period indicated.
* Agricultural GDP includes farming and allied sectors (fishery and forestry).
** Growth rates are calculated by fitting a linear regression trend line to the logarithmic annual values.

Although the reforms were implemented in nonagricultural sectors, they affected agriculture in at least two important ways (Landes and Gulati 2003). First, higher economic growth and the consequent rise in per capita incomes resulting from the 1991–93 reforms had a significant impact on food demand. Higher per capita incomes growing at 4.5 percent per annum in this phase, as opposed to 3.6 percent in the 1980s (WDI 2004), led to the diversification of food demand toward more nonfoodgrain crops such as fruits and vegetables, as well as meat (mainly poultry) and dairy products (Joshi and Gulati 2004). Second, the lowering of industrial protection significantly improved the

incentive framework for the sector, through improvement in the domestic TOT between agricultural and industrial prices, which rose from 0.9 to 1.2 between 1991 and 2000, as shown in Figure 6.

Figure 6—Terms of trade and gross agricultural capital formation in India



Source: Gulati and Bathla 2002.

Improved TOT for agriculture in turn resulted in an increase in the profitability of the primary sector relative to industry and led to a rise in private investments, which are now double the public investment in agriculture (Figure 6). These investments were increasingly directed to the production of horticulture, poultry, fish, milk, and eggs in response to booming consumer demand for these high-value agricultural produce. These commodities experienced a remarkable growth in output during the 1990s relative to the previous decade (Joshi and Gulati 2004).

As a result of these developments, agricultural GDP rose from 3 percent in the 1980s to 4.1 percent in the aftermath of the reforms conducted between 1991 and 1996. However, the higher growth rates did not initially correlate to any significant decline in the percentage of rural poor, which actually increased during 1991–92, reaching a peak of near 43.5 percent of the population in 1992 (Indiastat 2004). It declined thereafter, fluctuating at the pre-reform level of 35–39 percent by the mid-1990s. Factors

contributing to the lack of poverty reduction included the fiscal contraction imposed by macroeconomic stabilization and concentration of growth in the nonfarm sector, especially in services (Waldman 2003). The partial liberalization of financial and investment policies in the early 1990s meant that poorer areas with lower levels of human development and infrastructure were less able to switch from farm to rural nonfarm activities and thus could not benefit as much from the reform-induced growth. The differential capacity of the nonfarm sector to create employment in richer and poorer areas also implied an increase in both urban and rural inequality, with the Gini coefficient measuring 0.38 in 1997 (World Bank 2003a).[19]

Agricultural Reforms at the Border, 1994 to the Present

While the 1991 reforms had been restricted to nonagricultural sectors, the signing of the URAA under the WTO in 1994 officially extended the reform wave to agriculture, albeit limited to the area of agricultural trade. The changes were at first contained, since there were few disciplinary prescriptions for India under the URAA. In effect, of the three areas of domestic support, export subsidies, and market access, WTO commitments affected only the last category. India was exempted from reducing domestic support since its aggregate measure of support (AMS), accounting for the impact of trade policy distortions in favor of domestic prices, was below the prescribed minimum threshold of 10 percent of the value of production for developing countries. Input and food subsidies were categorized as support to resource-poor farmers and domestic food aid and as such not subject to reduction. As for export subsidies, India was exempt since there were none at that time (Gulati and Kelley 1999).

With regard to market access, India had been allowed by the WTO to maintain QRs on imports to manage problems in the country's BOP. However, after the launch of the 1991 trade reforms and the improvement in the BOP by the mid-1990s, the QRs lost their rationale (Hoda and Sekhar 2004). It bears mentioning that their abolition was very

[19] The Gini coefficient declined to 0.31 in the early 1990s but increased in the second half of the decade, reaching 0.38 in 1997 (the last year for which data from the World Bank are available).

slow for fear of a surge in imports and was only completed in April 2001.[20] On account of lingering concerns of import floods, the elimination of QRs was accompanied by the setting up of a special standing group of concerned ministries to monitor trade imports for 300 "sensitive" items, two-thirds of which were farm products (Gulati and Mullen 2003). There was also an accentuation of nontariff barriers (NTBs), as the 2001 budget put emphasis on enforcing sanitary, quality, and labeling requirements of existing legislation in these areas.

Anticipating the phasing out of import restrictions, India bound tariffs at high levels (100 percent for commodities, 150 percent for processed products, and 300 percent for edible oils) and also levied tariffs on products that were previously set at zero due to the existence of QRs, such as some cereals and dairy products. The tariff structure that emerged from the URAA was characterized by a wide gap between bound and applied tariffs, which were 115 percent (simple average) and 35 percent, respectively, as of April 2002 (Gulati and Mullen 2003).[21] There was a general reduction of applied average agricultural tariffs and the opening up of imports of some key commodities. In 1994, the government opened up imports in the edible oil sector, which had until then been highly protected, with domestic prices up to 60 percent higher than world prices (Gulati and Kelley 1999). Wheat imports were also opened up at zero import duty in 1996.[22] Other interventions on the import side included the gradual breakup of the agricultural import monopoly of the state trading agencies, which by 2002 was limited to a few commodities such as copra, coconut, and cereals.

On the export side, reforms included the elimination of minimum export prices (MEPs), an increase in credit lines for exports, the setting up of special agricultural export zones, the elimination of most export quotas, and a reduction in the number of

[20] The abolition of QRs in 2001 was forced on India by the ruling of the WTO dispute settlement body following complaints by trading partners (particularly the United States) for India's slow pace in improving market access.
[21] This gap between actual and bound rates was motivated by the fact that the reduction commitments under the URAA applied only to the latter.
[22] This policy change was meant to benefit roller flourmills in southern India, which had been complaining about the constraints they faced in procuring wheat from northern states (Gulati and Mullen 2003).

products canalized by state agencies (Gulati and Kelley 1999). In 1994–95, the government opened up exports for major foodgrains, first for rice and a year later for wheat, which led to dramatic growth in the exports of these two staples. Rice exports soared from less than 1 million tons to 5 million tons in 1995–96, making India the second largest rice exporter that year. Wheat exports grew from 87 thousand tons in 1994 to 1.1 million tons in 1996. However, the policy still remained under government control and kept changing from year to year. The Ministry of Commerce, for instance, claimed the authority to impose or withdraw export restrictions to ensure an "adequate" domestic supply of key products at "reasonable" prices (Gulati and Mullen 2003).

The path to agricultural trade liberalization was not smooth; this is evidenced by changes in the trade flows of India's primary commodities. The reform process was held back by circumstances related to the international market as well as the effect of reversals in domestic agricultural policies in response to the changing world market conditions (Gulati and Mullen 2003). The limited adjustments that the URAA required and the prevalence of high world prices in 1995–97 meant that despite the initial trade reforms, agricultural imports were not large enough to generate concern. However, following the Asian financial crisis in June 1997, which negatively affected import demand from Asia, there was a crash in the international price of major agricultural commodities[23] (IMF 2004), which caused an abrupt increase in agricultural imports, especially of edible oils and wheat, compelling the government to implement considerable reversals in the trade policies adopted a few years earlier. Pressured by domestic producers, the government reinstated tariffs, which were as high as 50 percent in the case of wheat in 1999 and up to 75 percent in the edible oil sector by 2002 (Gulati and Mullen 2003).

The export side too was not exempt from the negative consequences of the deteriorating world price conditions, as evidenced in particular by the changes in rice trade flows after 1998 (Gulati and Narayanan 2002b). The announced world rice price index dropped from 155 in 1997 to 135 in 1998, and further to 82 in 1999 (USDA 2001),

[23] As an indication of the drastic drop in international prices, the IMF index of market prices of food (1995=100) fell to 77.6 by 1999; it then recovered slightly, reaching 81.4 by 2002.

and thus after a peak of 5 million tons recorded in 1998, rice exports fell to 1.5–2.5 million tons in the subsequent years (Gulati and Mullen 2003). Some have proposed that the downward trend in the world rice price was strengthened by developed countries' domestic support policies, which made their farmers artificially competitive and diverted the burden of adjustment to low international prices to Asian rice exporters, including India (Gulati and Narayanan 2002b).

The support price and buffer stock policies on the domestic front also helped blunt the competitive edge of India's rice and wheat exports. These policies included raising the MSP paid to compensate farmers for the decreasing international prices in the second half of the 1990s, and the resulting buildup of huge public stocks to an all-time high of 60 million tons in 2001, against a norm of 24 million tons (Hoda and Gulati 2003). Raising the domestic MSP against the backdrop of falling world prices in the late 1990s made grain exports less competitive, and to boost exports and reduce cumbersome stocks, the government in 2000–01 introduced subsidies on freight and stock holding of foodgrains. This protective measure boosted exports of rice and wheat from 2.1 million tons in 2000–01 to 6.7 million tons by October 2002.[24] The domestic situation of growing stocks also justified the aforementioned measures, since it was paradoxical to have huge grain imports coming in while there was oversupply from domestic sources.

Stagnation in public investment in the sector during the 1990s (Thorat, Chand, and Bhalla 2004) and unfavorable international circumstances are regarded as factors contributing to the weakening of agricultural and overall economic performance after 1997. In fact, growth in agricultural GDP and total GDP declined to 2 percent and 5.4 percent per annum, respectively, between 1997 and 2003 (Table 2), as opposed to 4.1 percent and 6.5 percent during the early postreform phase (1991–96). It appears, therefore, that there are two distinct stages with regard to Indian agricultural and overall economic performance in the reform years: the first, between 1991 and 1996, which saw

[24] The new subsidy policy did not incur censorship under the URAA since the government availed itself of Article 9.4, which exempts developing countries from reduction commitments with regard to export marketing and freight costs.

higher growth rates of total and agricultural GDP, and the second, between 1997 and 2003, which saw a deceleration in the pace of growth. Despite this decrease, urban and rural poverty (according to official estimates) declined significantly, from 35 percent in 1993–94 to 26 percent in 1999–2000, although this figure is controversial.[25]

Domestic Reforms: Challenges Ahead

Compared to the external front, agricultural reforms in the domestic arena lagged behind. The old support framework, with its three main policy interventions of the MSP, input subsidies, and the PDS, remained largely unaffected by the changes in the 1990s, except for the PDS, which underwent some targeting modifications in 1997 (Parikh, Dev, and Shariff 2004).

Obstacles in the political economy held up efforts by the government to move forward with reforms domestically, as pressures from constituencies that were major beneficiaries of the old support system hindered attempts to contain the increasing MSPs and subsidies (Landes and Gulati 2003). By the late 1990s, these accounted for 2 percent of GDP, 10 percent of agricultural GDP, and one-third of the federal fiscal deficit (Gulati and Narayanan 2003). Lavish MSPs paid to producers encouraged excessive grain procurement and stocks, resulting in higher storage and transport costs. Increasing handling costs of the stockpiles in turn exercised an upward pressure on consumer prices through the PDS, which hit the poorer consumers (Vyas 2004; Parikh, Dev, and Shariff 2004). Rising subsidies for fertilizers, power, and water limited the scope for productive rural investments, while low user charges led to environmental externalities (e.g., soil degradation, water salinization, and groundwater depletion) to the extent that they encouraged wasteful use of resources.

[25] Some argue that poverty dropped more rapidly in the 1990s than in previous periods (Bhalla 2003), while others argue that poverty reduction was more sluggish in the 1990s (Ravallion 2003; Sen 1996; Jha 2000). Controversy on actual poverty trends is partly related to modifications in the methodology used for the 55th NSS round (National Sample Survey, 1999–2000). The 55th round used weekly, monthly, and yearly recalls of food consumption as opposed to exclusively monthly recalls as in the past surveys.

Starting in 1998, more than 10 high-level governmental committees were set up to address these concerns and extend reforms to the domestic arena (Gulati and Mullen 2003). Their reports emphasized the need to implement reforms particularly in the three "I" areas of institutions, investments, and incentives—basically calling for the rationalization of markets, agricultural prices, and input subsidies.

With regard to *incentives*, the government enacted some limited changes in agricultural marketing to reduce the scope of obsolete legislation and thereby improve the environment for private investment. Starting in 2002, the government lifted several restrictions under the 1955 Essential Commodities Act, originally meant to prevent fluctuations in prices and supplies that could result from the movement of agricultural produce from surplus to food shortage areas (Gulati and Mullen 2003). The act imposed controls on the storage, trading, and movement of farm products, leading to market fragmentation and limiting private investment in these activities. Reforms involved the temporary removal of these restrictions for major agricultural commodities, including wheat, rice, coarse grains, and edible oils (Landes and Gulati 2003). This intervention was expected to allow the development of a single large market for agricultural produce and give new impetus to private trade and investment, which were highly constrained by the parastatal monopoly in agricultural marketing operations (Vyas and Ke 2004

Licensing requirements and the much criticized plant scale restrictions were abolished for the main food processing activities, paving the way for the growth of agribusiness (Landes and Gulati 2003; Ahluwalia 2002). Against the backdrop of booming milk production, the "Milk and Milk Products Order" was reformed to allow large-scale investments in the expansion of processing capacity. Further, restrictions were removed from risk-management financial instruments such as futures trading on numerous commodities, including wheat, rice, pulses, and oil seeds.

At present there are proposals to reform regulations introduced by the Agricultural Produce Marketing Committee (APMC)—including reform of the requirement that agricultural sales occur only in regulated markets—that hinder private investment and development of a modern vertically integrated marketing chain between

producers, traders, and consumers. Other reforms under consideration include necessary changes in the land laws to facilitate land leasing, encourage market integration in contract farming, and align food safety laws with international standards to spur exports (Landes and Gulati 2003).

With regard to input subsidies, some reforms in the area of fertilizers have been attempted since the late 1990s. Changes were limited in scope, however, because of the resistance to any price increase by both farmers and the domestic fertilizer industry, which together make up a broad constituency opposing reforms. In 1989–90, immediately before the launch of reforms, the subsidy bill for fertilizers reached a peak of 1.11 percent of GDP, up from 0.26 percent in 1981–82. By 1999–2000 the fertilizer bill had increased to nearly Rs. 132 billion, a tenfold increase over the last 20 years (in constant 1981–82 prices). Only very recently were steps taken to reform urea pricing, but imports still remain restricted and channeled through state trading agencies. Based on the recommendations of the 2000 Expenditure Reforms Commission, there are plans to gradually increase urea prices with the phasing out of the retention price scheme over six years (Gulati and Narayanan 2003).

In the area of *investment*, the committees' policy proposals highlighted the importance of stepping up public spending in rural areas in order to ensure a long-term impact on growth. Despite increases in private investment in the 1990s, total investment in agriculture was low, at 1.6 percent of GDP, at the end of the decade, primarily because of stagnation in the public investment component (Gulati and Bathla 2002). Increased spending on input subsidies and other domestic support policies (MSPs and the PDS) had the effect of crowding out rural public investment,[26] an effect that has been related by some to the stagnation of public gross capital formation and total factor productivity during the 1990s relative to the 1980s (Thorat, Chand, and Bhalla 2004). Given the role of public investments and public goods in improving the investment climate through their

[26]During 1980–90 the share of factor subsidies in total revenue expenditure expanded from 44 to 83 percent, with a parallel decrease over time in the share of expenditures for long-term capital investments (Smith and Urey 2002; Fan, Thorat, and Rao 2004).

potential to induce private investment, some of the committees recommended stepping up government spending on irrigation, rural electrification, and rural roads to foster incentives for the private sector to invest more in agriculture, particularly in the areas of agricultural diversification, marketing infrastructure (storage and processing), input supply, extension, and power.

Lastly, *institutional* reforms were recommended in three areas: (1) providing safety nets, (2) enforcing regulation and food standards, and (3) ensuring transparency and efficiency of government operations, with particular reference to parastatals (e.g., the FCI) and nontradable inputs such as power and irrigation (Gulati, Pursell, and Mullen 2003). The power sector, plagued by operational inefficiencies and deficient revenue collection, is in a particularly critical situation. The quality of services provided by power suppliers such as the state electricity boards (SEBs) has deteriorated over time due to widespread power losses and undercharging of consumption, to the point that not even operating costs were are covered. Compared to the power sector, where much-needed reforms are still lacking, some institutional reforms were undertaken in the water sector to improve water-use efficiency during the 1990s. A community-based approach led to the introduction of watershed development programs, water users' associations (WUAs), and participatory irrigation management (PIM) programs (Iyer and Raju 2004).

A large unfinished agenda remains in the domestic arena. The lack of reforms in the areas of infrastructure, domestic marketing, and investments has been seen as one of the main reasons for the slowing of growth in both agricultural and total GDP after 1997. It is clear that the policy environment in which Indian agriculture has prospered so far has begun to undergo an overhaul since 1991. By 2003 the two major constraints of the pre-reform period—foodgrain shortages and low levels of foreign exchange—have been removed and the country is in a comfortable position on both these counts. Up to this point, the impact of reforms outside agriculture has been more prominent, but in the future, changes in domestic agricultural policy in the three interrelated areas of incentives, investment, and institutions will be increasingly important (Srinivasan 2003).

3. LESSONS AND CHALLENGES

This section first discusses the lessons that can be drawn from the foregoing overview and from studies currently being prepared for publication by IFPRI (see Appendix 2 for a list of the studies). This discussion is followed by a review of the challenges that lie ahead on the path to efficient, equitable, and sustainable rural growth.

3.1 LESSONS

The main lessons that can be gleaned from the Chinese and Indian experiences are discussed within the context of the major reform areas in the two countries.

3.1.1 Agriculture-led Reforms

The growth rates of agriculture and the incidence of poverty in the pre- and postreform periods show that in China it was primarily the acceleration in agricultural growth from 1978 to 2002 (4.6 percent per year, as opposed to 2.5 percent per year from 1966 to 1977) that led to the reduction in poverty from 33 percent of the population in 1978 to 3 percent in 2001. The most substantial decline occurred in the first phase of reform, from 1978 to 1984, when agricultural GDP jumped to 7.1 percent per annum and the percentage of rural poor dropped from 33 to 11 percent of the population (China, NBS 2002). However, it is clear that in India slower growth in agriculture was the major reason behind the laggardly performance in poverty reduction, even though overall economic growth was high. From 1980 to 1990, agricultural GDP grew at 2.9 percent per annum as opposed to 2.7 percent per annum between 1991 and 2003 (India, CSO 2004). It can be argued that there was an acceleration in agricultural growth immediately after the start of reforms between 1991 and 1997, when agricultural GDP grew at 4.1 percent per annum before decreasing to 2 percent per annum after 1997. This acceleration was accompanied by a reduction in rural poverty, with the percentage of rural poor dropping from 37.4 percent of the population in 1990–91 (46th NSS Round, July 1990–June 1991,

Indiastat 2004) to 35.7 percent in 1997 (53rd NSS Round, January–December 1997, Indiastat 2004).

It is clear that by starting the market-oriented reforms in agriculture, China was able to ensure the widespread distribution of gains and thus build consensus for the continuation of reforms. Besides, prosperity in agriculture favored the development of rural nonfarm activities, which in turn benefited rural areas through a virtuous cycle. The rise of the RNF sector is regarded as one of the main factors behind rapid poverty reduction in China, as it provided additional sources of income beyond farming (Fan, Zhang, and Zhang 2002). The rapid development of the RNF sector subsequently encouraged the government to expand the scope of policy changes and put pressure on the urban economy to reform, since nonfarm enterprises in rural areas had become more competitive than the SOEs. Reforms of the SOEs in turn triggered macroeconomic reforms, opening up the economy further.

In India, reforms followed an opposite path, starting with macroeconomic and nonagricultural reforms since they were prompted by macro imbalances. The reforms led to impressive rates of economic growth in the 1990s, but, being limited to the nonagricultural sectors, they did not have any significant impact on poverty reduction. Policy changes related to agriculture occurred only at later stages, and even then were only partial. Therefore, the evidence suggests that successful agriculture-led reforms reduce poverty faster.

3.1.2 A Gradual Approach

China's experience indicates that at the outset policymakers withdrew central planning and reduced the scope of procurement while expanding the role of private trade and markets in the allocation of resources. Thus they first created the incentives and institutions required by the market economy and in a subsequent stage, in the mid-1980s, they began to open up markets. Studies show that the growth impact of the incentive reforms of land use rights, agricultural production management through the HRS, and

rises in procurement prices from 1978 to 1984 was larger than the impact of market liberalization reforms after 1984 (de Brauw, Huang, and Rozelle 2004; Lin 1990; Fan, Zhang, and Zhang 2004). For de Brauw, Huang, and Rozelle (2004) this was because incentive reforms in China were instrumental in the gradual emergence of markets, which prevented the sudden collapse of the central planning system in the absence of market-based allocative mechanisms, as experienced by other countries in transition (Rozelle and Swinnen 2003).

It is not so much that the Chinese policymakers had planned this sequence in detail; rather, it came together from a trial-and-error approach in the implementation of reforms. The adoption of new measures through experimentation rather than following a predetermined blueprint increased the likelihood of the success of reforms, since it implied a "learning by doing" approach, or, in the words of Deng Xiaoping, "crossing the river while feeling the rocks" (Chow 2002). This was peculiar to the Chinese reform process in which the government made sure that each new policy was field-tested at length and was successful in selected experimental districts prior to applying the policy nationwide and proceeding with the introduction of the next measure (Chen, Wang, and Davis 1999). It would, therefore, seem that a gradual approach to reforms, beginning with the strengthening of market institutions and incentives and moving toward the opening up of markets leads to more substantial rates of growth and poverty reduction.

The case of India also supports this assertion, although from a diametrically opposite experience. Agricultural trade reforms were a point of departure rather than arrival of reform in Indian agricultural policy. It can be argued that this approach was a natural choice for India since it had a much larger scope for the role of markets than China. Nonetheless, the discussion in this paper shows that the incentive structure of Indian agriculture was highly distorted at the outset of reforms, as the sector was, and still is, burdened with excessive regulations on private trading and most market activities. The liberalization of agricultural trade policies preceding incentive and market reforms in the domestic arena created a series of imbalances. Lowered protection against a backdrop of low international prices increased imports, although in the case of wheat there was

already excessive supply from domestic production induced by a high MSP. Broad-based economic and trade reforms resulted in the new export orientation of the sector and improved the incentive framework of agriculture, although they also left the sector more exposed to international competition because of persisting constraints to productivity improvement on the domestic front.

3.1.3 Initial Conditions

In 1970 the likelihood of an Indian child dying before his or her fifth birthday was two times that of the child's Chinese counterpart. Life expectancy was 49 years in India against China's 62 years, and illiteracy affected nearly 70 percent of the Indian rural population as opposed to 49 percent in rural China (WDI 2003). These differences may be accounted for by the fact that under the collective system in China, the government provided free basic health care and education to the rural population. Rural electrification made strides in the pre-reform years, as rural electricity consumption grew at a rate of 27 percent per year from 1953 to 1980 as opposed to 10 percent per year from 1980 to 1990, and government investment in power grew at 27 percent per year from 1953 to 1978 (Fan, Zhang, and Zhang 2002). Moreover, the egalitarian access to land ensured by the land distribution and tenure system performed a crucial welfare function, providing the bulk of the rural population with access to a basic means of subsistence and limiting the number of landless.

The same cannot be said for India, where land reforms to make the agrarian structure more equitable after independence were not as successful and left a relatively larger number of landless agricultural laborers exposed to the negative consequences of unemployment and underemployment. Further, rural infrastructure did not receive as much attention in India as in China, particularly in the rural power sector, and thus rural electrification and the establishment of telecommunications connections proceeded more slowly in the Indian villages.

Both countries recorded a slowdown in the advancement of their goals in the health and education domains after the start of reforms (Prabhu, Kathel and Dev 2004). In India this was primarily due to the fiscal discipline imposed by the macroeconomic crisis, while in China market-oriented reforms introduced the logic of profit in the management of social services. This implied progressive privatization of supply agencies, a decline in government subsidies, and an increase in education and health costs, leading to an increase in school dropouts and in the health vulnerability of the population (Zhu 2004). In devising mechanisms to address the risks involved in the increased privatization of social services, China could learn from India's long experience with a vast array of government safety nets and welfare programs targeting the rural population. With regard to land, both countries have high population-to-land ratios but distribution is less skewed and landlessness is virtually absent in China. As with education and health care, equal access to land was a product of the egalitarianism inherent in the collective era that played a vital role in minimizing risks and ensuring the availability of the bare minimum means of subsistence to the bulk of the population. In India, replication of the conditions of the Chinese agrarian system is not politically feasible; therefore, marginal and landless farmers will require a strong social protection system ensured by well-targeted social security and employment policies (Srivastava and Yao 2004). Effective social protection measures will also be required in China, where land distribution is likely to become more skewed following the adoption of the new agricultural lease law that enables farmers to transfer lease rights and thus allows for the possibility of a higher concentration of land.

Both countries are characterized by the predominance of small farms (less than 2 hectares), but these are more prevalent in China; this has significant implications for the employment of the rural labor force. It is clear from China's case that small farms support the more intensive use of family labor resources, while in India owners of holdings larger than 2 hectares, who account for less than 20 percent of total landholdings but control over 60 percent of the cultivated area, often lack the incentive to practice labor-intensive cultivation (Srivastava and Yao 2004). Therefore, reforms are still required to optimize land use and eliminate distortions in land markets. Land leasing is restricted to varying

degrees, limiting private investment as well as the scope for consolidation into larger and more efficient operational holdings (Landes and Gulati 2003). However, given the high population-to-land ratio, the approach to deregulation must be cautious, allowing for a minimum set of safeguards to prevent absentee landlordism and an increase in landlessness (Srivastava, Saxena, and Thorat 2004; Haque and Sirohi 1986).

3.1.4 Investments, Technology, and Irrigation

In China, the correlation between the initial conditions and achievements in poverty reduction and in growth after reforms makes the case for stepping up government investments in rural infrastructure and social services. In India, the decline in rural public investment—associated with fiscal profligacy; rising agricultural subsidies on fertilizers, power, and water; and price support—is regarded as one of the causes of deceleration in agricultural growth after 1997.

Significant increases in public investments seem unlikely because of the continuous pressure to reduce spending. Therefore, greater emphasis is needed on more efficient use of available resources. Returns on public investments vary drastically across different types of investments and regions, even within the same country. This implies great potential for more growth and poverty reduction even with the same amount of investment if, based on reliable information on the marginal returns of different types of government spending, public resources can be allocated optimally. Various studies have found that agricultural research, education, and rural roads are the three spending areas that hold the greatest potential to promote agricultural growth and poverty reduction in both countries (Fan, Zhang, and Zhang 2004; Fan, Hazell, and Thorat 1999).

In the context of limited possibility to expand cultivable land and water resources, farm growth based on yield rather than area will become even more important, thereby increasing the need for agricultural research and technology development. In a bid to increase research funding, China promoted the development of the public business sector through commercialization of technologies by public research institutes (Qian, Koo, and

Pardey 2004). However, this often led to the duplication of research and overlapping of efforts with state-owned traditional research institutes. The Chinese experience can provide valuable lessons in this sector for other countries in transition.

The improved intellectual property rights (IPR) regime under the WTO influence stimulated private research and patenting activity in both countries (Qian, Koo, and Pardey 2004; Pal 2004). However, weak implementation of IPR in both countries and the high costs of maintaining patents in China are obstacles to the entry of new private players. The Chinese experience also shows that protection of plant varieties can help improve resource generation by the poorer public research institutes, as the number of IPR applications filed was effectively higher for resource-poor institutions than for better-funded national institutes. India's case indicates that to increase the scope for private research, the improved IPR regime is more effective if it is complemented by favorable policies in the areas of tax, investment, and input imports (Pal 2004).

Private agricultural R&D provides both opportunities and challenges. Significant opportunities can arise for public-private partnerships in the areas of funding, improving efficiency, and extension. However, policymakers need to be aware that the private sector tends to favor higher-value crops and concentrate in areas where agriculture is already advanced (Pal 2004). Given the potential of agricultural research for poverty reduction in marginal regions, public research spending should focus on addressing the needs of poorer farmers in less-favored environments such as India's semiarid tropics and rainfed areas and China's poor western regions.

In the water sector, government spending in irrigation played an important role in promoting agricultural growth and poverty reduction, but today this type of spending has smaller marginal returns, in terms of both growth and poverty reduction (Fan, Zhang, and Zhang 2004). In both countries there is vast scope for improvement in water use efficiency through institutional and management reforms of existing water systems. India's experience with WUAs, participatory watershed schemes, and community-based rain harvesting can provide useful examples to learn from (Iyer and Raju 2004; Rao 2002). The transfer of management to user groups was more successful in India, although

the coverage of irrigated areas by these user associations remains low in India compared to other Southeast Asian countries. Insufficient administrative and political will to devolve management powers to WUAs at the local level and inadequate infrastructure for capacity building have been two major factors that inhibited the involvement of farmers in India (Rao 2000).

The Chinese case, in contrast, shows that reforms aimed at providing irrigation system managers with incentives to improve user efficiency had a positive effect on crop yields, the groundwater table, and cereal production (Wang et al. 2003). The question is whether the strategy of transforming water bureaucrats into managers is possible in India.

Providing the right incentives to farmers is crucial to promote water saving. Low water prices and profligate subsidies on power for operating tubewells encouraged wasteful use of water and depletion of groundwater resources. Ambiguous water use rights following decollectivization in China, and laws linking water rights to land ownership in India, also led to inefficiencies. These included the emergence of unfair water markets over time, in which rich landholders who can afford modern water extraction technology profit by selling water to poorer cultivators (Iyer and Raju 2004).

Increases in water use charges may not be feasible in the short to medium term without changes in the institutional environment. In India, irrigation is affected by politicization, as free electricity for pumping water is offered as political rent seeking. In both countries, given the booming numbers of private tubewell owners,[27] the impact of reforms such as withdrawal permit systems and volumetric charging will be limited by the weak institutional and infrastructural contexts that make monitoring and enforcement of water withdrawals and revenue collection difficult (Shah, Scott, and Buechler 2004; Wang, Huang, and Rozelle 2003).

In addition to better water productivity, a more efficient use of scarce water resources in agriculture can also come from improved crop yields. To this end, there is a need for deployment of inputs other than water, such as credit and agricultural research

[27] There were nearly 20 million private tubewell owners in India in 2003 and 3.5 million in China in 1997.

on water-saving and yield-improving technologies. This is particularly true for India, where both irrigated and rainfed crop yields are lower than those in China (Cai and Rosegrant 2004). In both countries, this may also call for trade and price policies that are favorable to high-value, less-water-intensive crops. In India, given the political and institutional constraints, technological innovations to improve yields seem more feasible in the short and medium term than management reforms to improve water use efficiency (Rao 2002).

In the context of raising crop productivity and improving water use efficiency, a specific strategy is required for rainfed areas: studies have shown high marginal returns on investments in terms of both agricultural growth and poverty reduction in rainfed areas of both countries (Fan, Hazell, and Thorat 1999; Fan, Zhang, and Zhang 2002). Although irrigated agriculture is and will remain crucial in both countries, increased rainfed production can have a significant impact on future agricultural production and poverty alleviation (Cai and Rosegrant 2004). To boost rainfed production, a Green Revolution type of strategy involving the application of inputs such as credit, fertilizers, machinery, and technology to improve crop productivity combined with policies favorable to high-value agricultural commodities is needed. However, lack of control over water in rainfed agriculture raises the risk of adopting HYV technologies and calls for the introduction of risk (crop) insurance schemes in rainfed areas (Rao 2000).

Special mention must be made of the fact that remarkable development and growth, in both China and India, were achieved even as aid as a percentage of GDP (Appendix 1) in the two countries remained at a low level. This is in direct contrast to most other developing countries and regions, where aid is much higher but commensurate development and poverty reduction outcomes have not been realized. This fact bears an important lesson for developing and developed countries, multilateral agencies, and local nongovernmental organizations (NGOs) and groups. It questions the very basis of current policy prescriptions that accompany aid packages, not only raising issues related to the efficiency and effectiveness of external aid but also, conversely, revealing the

extraordinary and often underestimated capacity of national initiatives and policy actions to turn—and in fact halt—the tide of poverty.

3.1.5 Marketing and Trade Reforms

China's experience with marketing reforms can be valuable for other economies transitioning from a centrally planned to a market system; policymakers embarking on the reform path should first increase incentives for production and build the institutions needed to operate efficiently in a market economy before rushing to open up markets (de Brauw, Huang, and Rozelle 2004).

In a situation of food oversupply and liberalization of agricultural trade, farm support policies geared toward self-sufficiency lose their original rationale. In India, MSPs and input subsidies, initially intended to encourage the adoption of new technologies and fuel agricultural growth, increasingly turned from incentives into inefficient and costly income-support interventions. It is clear that once the support measures have completed their function, they need to be abolished, otherwise they lead over time to inefficiencies and the crystallization of vested interests, resulting in the slowing of growth and poverty reduction.

China could learn from the experience of India and seek to encourage agricultural growth in the future while at the same time avoiding the large inefficient subsidies provided to its agricultural sector. This issue is of increasing relevance given the recent introduction of the direct transfer program to farmers and the emphasis placed by many scholars and government officials on increasing government support to agriculture and rural areas.

Despite limited reforms in the area of agricultural marketing activities in India, the impact of policy changes was reduced because state governments were reluctant to implement them. In addition, a host of outdated domestic regulations, such as the APMC acts, regulation of the agricultural produce market, restrictive land laws, and licensing requirements on food processing units continue to weaken the environment for

agribusiness and private sector involvement in agricultural marketing, which could boost employment and efficiency (Landes and Gulati 2003). Against the backdrop of increasing and diversifying food demand and opening up agricultural trade, reform of these regulations is increasingly critical, as it has a direct impact on the capacity of the sector to adjust to the changing context.

Given that smallholder agriculture is predominant in both countries, farmers could be excessively penalized because they do not possess sufficient capital and information to manage the risks inherent in agricultural activities (Vyas 2004). While the current forms of agricultural and input subsidies are being reconsidered, well-targeted and innovative, cost-effective crop insurance policies should be put in place to protect vulnerable farmers from drastic supply and price shocks. This need is even more compelling given the likelihood of further liberalization of trade policies, which will expose the economy to increased competition from abroad. In India, the abolition of restrictions on trading on the futures markets for major agricultural commodities is a promising step.

One other important area is the strengthening of the network of support services for small farmers related to information, credit, and extension (Vyas 2004). India is ahead of China in these areas, particularly with regard to the institutional infrastructure of rural credit and marketing. The Indian experience shows that smallholder agriculture needs strong institutional support in these areas to grow and prosper (Vyas and Ke 2004).

In terms of trade liberalization, both countries made progress in reducing protection levels but the weighted average tariff in India, at 29 percent, is almost double China's 16 percent. India has been able to sustain its current growth rate with lower FDI inflows and a relatively lesser export orientation than China. If India is to attain the target of 8 percent growth in GDP (Ahluwalia 2002), it must follow through with FDI reforms in view of their potential to transfer know-how, managerial skills, and new technologies. China can offer valuable lessons in this area.

In agriculture, the two countries still need to assess the short-term adverse effects of the inevitable restructuring and adjustments involved in opening up trade flows of

agricultural commodities. Domestic producers of crops for which the country lacks a comparative advantage (for example, edible oils in the case of India and wheat and maize for China) are likely to suffer increasingly from falling prices induced by an increase in imports (Huang and Rozelle 2004). They will also be negatively affected when governments are pressured to reduce support for inefficient national production. In addition, urban-rural inequality is expected to worsen as a result of broad-based structural adjustments in the economy that may depress rural incomes and increase opportunities in the manufacturing and service sectors, primarily located in urban areas. These intersectoral adjustments are likely to result in a reduction in the size of the primary sector, which will release additional unskilled labor into the labor markets.

The rural population will gain if it is able to shift to more profitable off-farm occupations (Zhang, Rozelle, Huang, and de Brauw 2004). Investment in rural education will be crucial in increasing farmers' ability to move out of farming. It will also be important to increase investments in rural R&D and infrastructure in order to enhance productivity. These investments fall under the WTO "green box" and therefore are exempt from reduction commitments, although their positive impact will be realized only over the longer term. The key question is what measures should and could be taken to mitigate the potential short-term impact of readjustments related to trade liberalization.

On the positive side, WTO membership can provide additional external pressure to improve efficiency and implement reforms, particularly for tradable inputs such as seeds, fertilizers, farm machinery, and pesticides, where markets are regarded as inefficient due either to government intervention or lack of infrastructure. The WTO can also help enhance the facilitating role of the government in the provision of services related to information, marketing facilities, technical assistance, and law and regulations related to standards and quality control. Lastly, the WTO offers an opportunity to join hands and create a third force of countries besides the EU and the United States in negotiations within the framework of the URAA.

3.1.6 Rural Diversification and Vertical Integration

A major shift in farm production toward nonfoodgrain products such as livestock, fish, and horticulture has been well under way in India and China since the 1980s. The experience of China shows that achievement of food self-sufficiency and the extraordinary growth in basic grain production experienced by the late 1970s was a necessary precondition for diversification, since the availability of food surpluses provided the government with enough leeway to feed the increasing population and relax controls over the foodgrain sector (Vyas and Ke 2004). A lesson can be derived in this regard for other developing countries affected by chronic food shortages. Once food self-sufficiency was achieved, China gradually abandoned the policies biased in favor of rice and wheat (such as the food rationing system for urban areas and the mandatory levy quotas), encouraging farmers to diversify production. In India, rising MSPs artificially boosted production of major cereals, discouraging diversification of production toward nongrain commodities (Zhong and Joshi 2004).

A comparison of government expenditures on agricultural R&D in various subsectors to the pace of growth in output of the respective subsectors indicates that despite their high growth levels, some high-value products (such as livestock and horticulture) are underfunded relative to traditional food crops (Pal 2004). Policymakers must step up investment in research on these crops to boost yields and expand their cultivation, given their export potential, positive impact on smallholders, and growing domestic demand.

The rise in income per capita induced by reforms is increasingly influencing food consumption patterns, leading to rising consumer demand for these nonfoodgrain products, which is a major driving force for diversification. However, without vertical integration between production, processing, and marketing—that is, between "plate and plough"—the potential for growth inherent in the diversification process is likely to remain underexploited (Joshi and Gulati 2004). The innovative institutional arrangements that have emerged in both countries to promote the development of new products must be

strengthened. India's successful experience with contract farming in reducing risks, promoting the production and export of high-value foods, and increasing the income and employment of smallholders could be valuable for China, while the experience of growth in the retail food chains and supermarkets in China in recent years could benefit India, where FDI restrictions and infrastructure bottlenecks are limiting development in these areas (Zhong and Joshi 2004).

Diversification in the context of smallholder-dominated agriculture, in many cases carried out at subsistence level, has important implications for poverty reduction in both countries. The labor-intensive nature of the production of high-value products suits the small farm economy well, while at the same time there is also great potential for employment creation in agroprocessing and the retail chains associated with these products. In this context, strengthening vertical integration through institutional arrangements without tackling the other major obstacles faced by the small farmers would hardly be effective in realizing the poverty reduction potential of diversification. In effect, India's case shows how institutional deficiencies such as weak enforcement of contracts and the high transaction costs faced by small cultivators often lead agro-firms to prefer dealing with large farmers (Srivastava and Yao 2003). Acceleration of diversification in favor of small farmers is hindered by the lack of access to markets and information, poor rural infrastructure, and inadequate marketing facilities. Future reforms must address these issues through increased investments in basic rural infrastructure and marketing facilities such as cold storage chains. Lastly, small cultivators often lack sufficient marketable surplus, and their ability to increase production is related to their lack of access to technology and financial services. Therefore, well-targeted government support services are needed in credit markets and extension services designed specifically for smallholders.

In addition to the crop sector, another dimension of rural diversification is provided by the evolution of a vibrant RNF sector. China's experience can be a point of reference in this area. The rapid growth of rural enterprises in China is regarded as a critical factor in the different results of reforms in the two countries, especially in relation

to poverty reduction, as TVEs provided increasing job opportunities outside agriculture, thereby diversifying and expanding the sources of household income. Agricultural growth and favorable demand conditions were critical to RNF development in China, where the post-1978 reforms stimulated a surge in demand for products of TVEs from prospering rural areas. In contrast, farm output growth rates decelerated in India, dampening demand and therefore farm and nonfarm employment in rural areas. In addition, TVEs benefited from the close connection with urban markets that had been established since the early stages of their development (Bhalla, Chadha, and Zhang 2004). The connection with urban markets brought TVEs into competition with SOEs and thus stimulated them to increase productivity and unit scale (ILO 1998). This link explains in part the different nature of RNF activities in India.

India's nonfarm economy primarily produces for the rural population and markets, and is dominated by tiny own-account family-operated units in low-profit services of the informal sector. These are characterized by low productivity on account of a poor technological base and policies aimed to protect rural employment by reserving certain activities for small-scale units. Limited growth of RNF job opportunities in India is also related to the lack of knowledge and skills on the part of the poorly educated rural labor force (Chadha 2004). This lack of skills is a challenge that will increasingly confront both countries as they adjust to greater market and trade liberalization, leading to economic restructuring and the disappearance of traditional and low-productivity jobs. These jobs are progressively being replaced by new and more productive occupations, which often require more educated laborers.[28] Thus, spending on rural education is most crucial to enable the rural labor force to shift to off-farm activities.

The role of nonfarm employment is expected to become increasingly significant in the context of smallholder agriculture as the average farm size gets smaller. Small farms may be efficient in terms of land productivity but not labor productivity, which is more closely linked to farmers' income. Greater off-farm opportunities and migration to

[28] Considerations by Peter Hazell of IFPRI.

urban areas is required to increase average farm size as well as labor productivity and farmers' income.

3.1.7 Antipoverty Programs and Safety Nets

The role of safety nets in poverty alleviation came into focus during the 1990s, as the negative effects of liberalizing policies on income distribution needed to be addressed with the start of reforms in India and the intensification of liberalization policies in China related to WTO accession (Parikh, Dev, and Shariff 2004). The need for fiscal stabilization in India meant a reduction in transfers to the states and capital expenditures on rural infrastructure. To counteract the possible negative impact of these policies on the poor, the government stepped up funding on several antipoverty programs in rural areas and also created new programs (Jha 2000). In China the government was strongly committed to addressing the country's poverty problem, and government initiatives, as announced in official plans and government conferences starting in the mid-1990s, were revived (Zhang, Rozelle, and Huang 2004).

Despite their documented shortfalls and inefficiency in terms of targeting and cost-effectiveness, poverty funds and programs have contributed significantly to limiting the severity as well as the extent of poverty (Parikh, Dev, and Shariff 2004). There are still more than 300 million rural poor in India and China, based on the international standard of one dollar a day (more than 100 million in China and more than 200 million in India). In China the bulk of the rural poor are located primarily in the western provinces of the country, which are remote and mountainous, or areas poor in natural resources (Fan 2004). In India, rural poverty is concentrated in the states of Bihar, Orissa, and West Bengal in the east, Madhya Pradesh in the center, and Uttar Pradesh in the north, where, as of 1999–2000, the incidence of rural poverty is higher than the all-India average of 24 percent (Indiastat 2004).

Radical redistributive measures such as land reforms are relatively impractical due to their potential for social conflict, while public investments involve long time lags

before they can translate into employment and economic growth. Thus, antipoverty programs (APPs) provide a relatively more agile instrument to tackle poverty in the short run and to reach out to remaining clusters of poor people. However, there is need to improve and address the shortcomings of APPs, given the limited budget resources and the fiscal discipline imposed by macroeconomic stabilization reforms.[29] To improve targeting, one lesson that China may draw from the experience of India is the use of a greater variety of targeted programs directed to specific sections of the poor, as opposed to the broader income- or area-based approaches traditionally implemented in China.

To strengthen the impact of APPs, decentralized and participatory approaches are more effective than top-down strategies and involve a greater variety of agents (NGOs, civil society, and international aid) in the fight against poverty besides the government. India is a good point of reference in this respect, since the extensive participation of *panchayats* and civil society at various stages of the formulation and implementation of the programs ensures the tailoring of programs to local needs, thereby improving the impact and effectiveness of the antipoverty schemes.

3.1.8 Political Systems, Institutions, and Regulations

In both countries there was political will to carry out reforms, but in practice outcomes were shaped by the different patterns of governance. India is a "debating society", in which political differences are expressed freely, policymaking is exposed to pressure by various interest groups, and there are thus long debates before decisions are taken (Rao, 2003). Subsequently, implementation is slowed by the lengthy procedures of the bureaucracy, which was set up to ensure checks and balances. This exercise, while compatible with the needs of a free and dynamic polity, considerably slows the pace of economic reforms. China, in contrast, is a "mobilizing society" in which decisions are taken faster and state power is backed by mass mobilization. As a result, implementation of decisions is more effective, although the lack of extensive debate in China on major

[29] Jha (2001) provides a comprehensive analysis of the financial, regulatory, and political means to improve the effectiveness of poverty reduction programs.

changes and reforms can also lead to disastrous courses of action, such as the Great Leap Forward in 1958 and the Cultural Revolution from 1966 to 1976. However, as the economic system opens up further and prosperity increases, it will become harder and harder to reconcile the centralized political setup with the more liberal economic system, and this is indeed one of the most important challenges that China faces today (Prabhu, Kathel, and Dev 2004).

While the importance of investments in rural infrastructure and other key public services for achieving growth and reducing poverty in rural areas cannot be over-emphasized, it is also equally critical to develop suitable institutional arrangements for their delivery. In both countries the government continues to be the major supplier of infrastructure services, but there are major failures in the public provision (Herath and Gulati 2003). Input suppliers such as the SEBs in India and SOEs (including grain bureaus) in China do not function efficiently due to the lack of transparency and accountability. In the case of power and water, underpricing of user fees does not allow the providers even to meet costs of operation and maintenance, and this leads to a deterioration in the quality of water and power services to farmers. Strengthening the public institutions that provide public goods and services can lead to both fiscal sustainability (through significant cost reductions) and long-term growth (by improving the quality of services provided). These goals can be achieved in different ways, including privatization, unbundling, decentralization, and contracting (Herath and Gulati 2003). Effective public institutions also require an adequate supply of trained and motivated personnel, as well as investments in training to help increase the supply.

Reforms were also slowed at the implementation level by the regulatory environment and the enforcement bureaucracy. In India, many inefficiencies remain in place, although reforms, including de-licensing, have been introduced to streamline the regulatory apparatus. Some private investment decisions still require government approval, entailing long bureaucratic procedures affected by corruption and delays.

During the reform years China relaxed regulations on mobility between rural and urban areas, which gave impetus to the development of the nonfarm sector and increased

migration for economic purposes. In recent years the Chinese government has also started to relax the complex system of regulations affecting broad-based personal mobility, which is easing the grip of state control on the private domain and is thus creating a gradually more mobile and open social environment in tune with the increasingly freer economic setting (*The Economist* 2003).[30] These changes have led, for instance, to more expeditious procedures in the issuance of passports and visas.

Finally, with regard to the political systems, a key to effective implementation of reforms in China was the ability of the leadership to set both clear objectives and timeframes for the transition to the reformed regime. The high level of centralization of decision making, which minimizes dissent, facilitated this. In the context of a highly pluralist society such as India, consent is more difficult to achieve, allowing neither the setting of clear objectives nor timeframes for transition (for the phasing out of subsidies, tariff reductions, price increases, etc.). These aspects slow the pace of change. Furthermore, the populist nature of Indian policymaking adds to the stalemate, as evidenced by the case of subsidies, which although inefficient and iniquitous, are highly popular and thus hard to reconsider (Ahluwalia 2002).

3.2 CHALLENGES

Due to the sizeable share of the population still living in poverty, the two countries are confronted with the challenge of sustaining the high growth rates achieved in the past and raising an increasing number of people out of poverty. To this end, India and China face four major challenges, specifically: accelerating growth, improving efficiency, and at the same time ensuring that this growth is both equitable and sustainable. These challenges are reviewed below, with particular reference to the agricultural sector and rural areas.

[30] In recent years some cities, including Beijing, were allowed to relax the *danwei* system of permits, a government-controlled work unit to which urban citizens had to apply for permission to obtain housing, wedding licenses, passports, and so on. The decline of the *danwei* system is a consequence of the restructuring of the SOEs during the reform years.

3.2.1 Accelerating Rural Growth

Continued rural growth is vital for both countries in order to provide employment as well as markets for industrial products. More importantly, it is a must if national poverty is to be alleviated and, ultimately, eradicated.

Three main sources of rural growth are identifiable that can push the two countries' production frontier outward in the future. First is agricultural research and technology, which can increase crop yields and quality. Although China has yields that are on average double those of India, there is still potential to increase them in the poorer western provinces (Cai and Rosegrant 2004). Similarly, there is scope for narrowing the gap in productivity among regions within India, where the highly irrigated areas of Punjab and Haryana show yields of 5–6 tons per hectare as opposed to 2 tons per hectare on average in the eastern states. Agricultural growth will rely heavily on yield improvement because of increasing population pressure on land and the limited possibility to expand land for cultivation in the future.

The research focus must be reoriented toward rainfed regions because of their higher returns relative to irrigated areas. New breakthroughs in biotechnology (such as genetically modified organisms, or GMOs) are essential, but equally important is the establishment of regulatory bodies to create and enforce biosafety standards and regulations for the new technology. These are critical preconditions for effective R&D spending in this sector.

Second, broad-based government investments in rural areas are an important component of the strategy for accelerating rural growth. This applies particularly to investments in education and rural infrastructure such as roads, since these are two areas, in addition to agricultural research, in which both countries have shown the highest returns. Higher literacy rates as a result of increased spending on education can favor new technology adoption, improvement in agricultural productivity, and occupation in nonfarm sectors. Investment in rural infrastructure can boost productivity and foster both farm and nonfarm diversification by reducing transaction costs, favoring market

integration, and strengthening urban and rural linkages. An IFPRI study in China found that the marginal return on investment in lower-quality roads (mostly rural roads) is more than four times greater than that in high-quality roads (Fan and Chan-Kang 2005). In India, another sector in which public spending is expected to translate into higher growth is irrigation. The country's potential gross irrigated area is 140 million hectares, while the actual irrigated area is only around 90 million hectares. Undoubtedly, investments can allow the utilization of unexploited potential. However, the question that needs to be addressed is whether the scarce resources should be redirected toward improving the management of existing water systems through watershed development and user groups or toward the expansion of irrigation systems through new projects.

The power sector is another critical area of future reforms in India. It is estimated that states are now losing nearly 1 percent of GDP due to distribution losses, amounting to a whopping 35–50 percent of total revenue, as opposed to the expected 10–15 percent (Ahluwalia 2002). This inefficiency must be tackled if India is to sustain its current rate of growth and further accelerate to the target of 8 percent.

Third, high-value agriculture and vertical integration hold a great deal of promise as a source of future growth in both countries. Diversification from low-value foodgrains to high-value commodities must be encouraged, as horticulture, livestock, and fishery provide high returns and are labor-intensive in nature. Moreover, these specialties have the potential to generate employment in agroprocessing and retail chains. Vertical integration through innovative institutions (such as contract farming) is critical in reducing transaction costs and marketing risks. In both countries, although more so in India, the challenge lies in determining how to reorient the policy environment, which continues to be geared toward wheat and rice, toward high-value products that entail completely new institutions and marketing facilities on account of their perishable nature. Furthermore, diversification should not be restricted to farming alone, as rural income enhancement requires growth in nonfarm employment (Zhong and Zhu 2004). In India this calls for overcoming infrastructure bottlenecks, which severely affect the development of rural industries and services, and increasing human capital through the

provision of education for the poor. China is also confronted with specific challenges in the development of its RNF sector. The increased competitiveness due to economic globalization poses challenges to rural TVEs in terms of management and technical efficiency. The reform of macro policies aimed at enhancing access to credit and specialized firm services, which are less favorable to labor-intensive enterprises, represents an additional challenge.

3.2.2 Promoting Efficient Growth

Achieving an increase in total factor productivity in the agricultural sector is conducive to higher growth and is a goal in itself—with a series of challenges. First, inefficient agricultural subsidies must be phased out, which would have the added advantage of freeing funds for productive investments, particularly in India, where subsidies are about five to six times higher than investments in rural areas (Gulati and Narayanan 2003). The question is how to eliminate inefficient support without creating political instability.

Next, it is critical to create a conducive policy and institutional environment, as this is a necessary precondition for improving the efficiency of the provision of public investments and services and making them more pro-poor.

Third, an important source of efficiency improvement could be obtained from greater economic integration with world markets. The further opening of the two economies would involve a host of reforms on various fronts, including investment; access to foreign inputs, technology, and managerial skills; reduction in price distortions between domestic and international markets; and improvement in quality and safety standards.

Related challenges are those of stepping up both bilateral and multilateral trade. Trade relations between India and China, currently much below potential, especially in agricultural products, would benefit rural areas where the poor are concentrated (Agrawal and Sahoo 2003). Similarly, cooperation at the WTO can help change policies in

developed countries that affect producers in China and India and restrict access for their products (von Braun 2003). One reason for cooperation within the context of the WTO lies in the similar role of agriculture as the major single source of employment in both the Chinese and Indian economies. Another reason comes from the potential benefits of international trade. If the efforts of developing countries under the leadership of India and China, and perhaps Brazil, to improve trade liberalization are successful, the WTO can improve export and employment prospects in the labor-intensive production of horticulture, livestock, and fisheries, which are areas in which India and China have a comparative advantage (Lin 2003; Sharma 2003).[31] The WTO also offers the opportunity to accelerate the growth of employment in labor-intensive industries, facilitating the shift of the rural workforce out of agriculture, provided that there are educations and skill development opportunities (Lin 2003).

3.2.3 Ensuring Equitable Growth

The reform-induced growth has not benefited everybody equally in the two countries. Inequality in China, as measured by the Gini coefficient, jumped from 0.21 in 1978 to 0.46 in 2000. This was more than a twofold increase in the past 25 years, bringing the indicator into the range of highly unequal economies and creating a significant paradox for a society that used to be one of the most egalitarian in the world. Inequality worsened between rural and urban areas, as well as among regions and different age groups. The average rural income was 60 percent of its urban counterpart in 1984, but the percentage declined to 33 percent in 2002. The per capita GDP in Shanghai was 13 times higher than that in the southwestern province of Guizhou (Fan and Chan-Kang 2003). New graduates employed in joint ventures with foreign businesses and working in cutting-edge sectors of the new economy earn up to five times more than their

[31] Against this background, the visit of the Indian prime minister to China in June 2003 and the common stance adopted by the two countries, together with Brazil, on the occasion of the WTO negotiations in Cancun in November 2003 were positive developments showing the willingness of both countries to take steps to bring their position closer for their mutual benefit as well as in the interests of the developing world at large. The April 2005 visit to India by the Chinese premier is another big stride in this direction.

parents who have lower education levels or are employed in the SOEs (Fan and Heerink 2004). Regional inequality increased because of the preferential policies implemented in eastern China in the areas of infrastructure, TVEs, export-oriented enterprises, and foreign investment, all of which led to higher productivity growth. Institutional reforms aimed at dismantling the commune system increased urban-rural inequality, as they eliminated the mechanisms of egalitarian distribution of resources (e.g., food, land, education, and health services) embedded in the communes. The rural-urban gap was accentuated by the failure to completely eliminate the urban policy bias dating back to the pre-reform era. In several areas, including labor mobility, housing, the welfare system, inflation subsidies, and investment credits for the urban sector, policies continue to be more favorable to urban dwellers, thus perpetuating the rural-urban divide.

In India the reform process was accompanied by rising income inequality as well, although with the Gini coefficient at 0.33 as of 2000 (WDI 2004) it is less marked than in China. The milder impact of reforms on inequality is related to the fact that in India the approach to liberalization has been more cautious and reforms partial. Moreover, labor legislation still offers considerable guarantees to workers, shielding them from the adverse effects of reforms on employment. Inequality increased because economic growth was concentrated primarily in the service sector, and thus its benefits were limited to skilled workers and specialized factors of production and were not shared with the bulk of the workforce employed in agriculture. In addition, reforms in investments and industrial policies were conducive to greater earning opportunities for capital income rather than wage income (Jha 2000).

While the increasing inequality in the two countries could be to some extent viewed as an inevitable by-product of the growth process, addressing this issue is critical for the future, as it has the potential to significantly affect social stability, equity, and even growth. This calls for a mix of effective redistributive mechanisms such as targeted fiscal transfers, safety nets, and public investments to assist less advantaged groups and areas.

3.2.4 Promoting Sustainable Growth

The challenge of sustainable growth relates in particular to energy consumption, water resource use, environmental degradation, and financial sustainability.[32]

Because of economic and population growth, energy consumption in India and China has not only been increasing at one of the fastest rates in the world during the past two decades, but it is also expected to grow more rapidly in the future. This represents a considerable challenge to economic growth since it is questionable whether such rapid rates of growth in energy consumption are sustainable in view of their fiscal and environmental implications.

China's energy consumption accounts for approximately 53 percent of East Asia's total, excluding Japan. Energy consumption grew by 130 percent from 1980 to 2001, when China came second in the world behind the United States in both total energy consumption (9.8 percent of the world's total) and carbon emissions (12.7 percent of the total). In 2002, China was the third largest consumer of oil products, following the United States and Japan, with total demand of 5.26 million barrels per day and net imports of 1.87 million barrels per day. China's oil demand is projected to reach 10.9 million barrels per day by 2025, with net imports of 7.5 million, making the country a major factor in the world oil market. India's energy consumption grew by 208 percent between 1980 and 2001, and the country ranks fifth after Germany, Japan, China, and the United States. India's oil use was 2 million barrels a day in 2002, of which 1.2 million barrels a day are net imports.

Despite government efforts to mitigate pollution, both countries suffer from major energy-related environmental problems. Heavy reliance on coal (which meets more than 50 percent of the energy needs in both countries) has meant that carbon emissions are rising fast. A 1998 report by the World Health Organization (WHO) indicates that 7 of the 10 most polluted cities in the world are located in China, owing primarily to coal

[32] Energy-related data in this section are from the U.S. Energy Information Administration (EIA), 2004.

combustion. China accounts for 12.7 percent of the world's carbon emissions (with 831.7 million metric tons), and India for 3.8 percent of the total (251.3 million metric tons). Between 1990 and 2001, China's and India's carbon emissions increased by an astonishing 111 percent and 61 percent, respectively. Carbon emissions are expected to continue to increase throughout the decade, against the planned reduction in carbon and greenhouse gases (GHGs) under the Kyoto Protocol. Both China and India are "non–annex I countries" under the United Nations Framework Convention on Climate Change, meaning they are not obligated to comply with the Kyoto Protocol's requirements for the reduction of emissions of carbon GHGs. Although the two countries recognize the importance of reducing these harmful emissions, they also place a high priority on their economic development. In the case of China, the question is whether the current energy-intensive and trade-led growth pattern, especially in manufacturing, can be supported in the long run. This implies that future growth in the agricultural sector should be energy-efficient and that the agricultural sector in the near future needs to develop innovative ways to provide renewable energy for the manufacturing and service sectors.

Sustainable use of water resources is another major challenge from both the environmental and economic growth points of view. Water use in agriculture is highly inefficient in China and India (Cai and Rosegrant 2004) because of policy distortions arising from the treatment of water and power as welfare items (Meinzen-Dick, Raju, and Gulati 2000). Booming groundwater irrigation in China following the tubewell privatization wave in the 1990s and the underpriced or in some cases free power in India caused problems of groundwater depletion and lowering of water tables and thus need policy attention. Cheap water for irrigation and fertilizers in India will lead to further waste of scarce water resources and aggravate the problems of waterlogging and salinity if the issue is not addressed soon. In addition, as the development process progresses, domestic and industrial use will increase dramatically and compete for scarce water resources with the primary sector. Against this backdrop, China and India must reduce water use without affecting food production and farmers' incomes (Cai and Rosegrant 2004).

Although increasing water charges is expected to have a positive influence on water conservation and the environment without compromising food production, implementation of such a policy remains a great challenge in both China and India (Cai and Rosegrant 2004). Implementing an increase in prices without parallel improvement in the institutional shortcomings of supplying agencies will prove difficult. In China, an increase in water prices may be carried out administratively overnight, but in the absence of adequate safeguards the welfare effects on poorer farmers will be no less painful than in India.

The challenge of financial sustainability applies specifically to India, as China has so far managed to limit the fiscal deficit of the central government to 3–4 percent of GDP (NBS 2003). As a result of reforms, the problems of double-digit inflation and shortage of foreign exchange were brought under control in India (IMF 2004).[33] However, the budget deficit, which was one of the major triggers of macroeconomic reforms in 1991, remains alarmingly high. After declining to 7 percent of GDP right after the 1991–93 reforms, the consolidated budget deficit has climbed back to the pre-reform level of 9–10 percent. This is regarded as one of the prime reasons why economic growth slowed after 1996–97 and why overall Indian GDP growth during the postreform period was not much higher than in the 1980s. Meeting the growth target calls for cutting expenditures, particularly subsidies, and improving revenue collection by the tax authorities as well as by input suppliers such as SEBs and water canal authorities. This would increase the pool of resources available for productive public investment. In addition, to raise the growth rate from 6 percent to 8 percent, the rate of savings needs to increase from 23 percent of GDP to 29–30 percent (India, Ministry of Finance, *Economic Survey 2001–02*), bringing India closer to China, where the savings rate has hovered around 35–40 percent throughout the reform period (WDI 2004).

[33] IMF 2004 and Srinivasan and Tendulkar 2003. In 1990–91, inflation was 11.6 percent and foreign exchange reserves were $1.5 billion. By 2000–01, inflation had been brought down to 3.8 percent and by October 2004 foreign reserves had jumped to $120 billion.

4. CONCLUSION

When India and China were reborn as new states in the middle of the last century, both economies were characterized by low income per capita and widespread poverty, with China faring worse than India in these respects. From the 1950s to the late 1970s, both countries implemented similar policies, inspired by the socialist model. They adopted economic planning, although under different models—that is, a mixed economy in India and a command economy in China. They implemented strategies of heavy industrialization and self-sufficiency in food production, and to this end they subjected agriculture to a panoply of controls. Industrialization was to be ensured through import substitution, which led to an autarkic and anti-export policy environment, giving the two countries an overall "antiforeign" economic outlook.

In 1978, both countries had the similar per capita GDP ($1,071 for China and $1,255 for India all measured in 2000 international price). With reforms, China covered considerable ground and more than caught up with India, which is somewhat surprising given that India had a better "capitalist infrastructure and commercial culture" at the outset of reforms. By 2003, China's per capita GDP has reached $4,726 measured in PPP, which is 73% higher than $2,732 of India's.

A number of factors help to explain the difference in growth during the pre-reform era. First, initial conditions matter. China's universal access to education and health care in both rural and urban areas laid the foundation for the economy to take off rapidly. Equal access to land is another important initial condition that not only guaranteed well-distributed benefits from agricultural price and market reforms, but was also an important factor in improving efficiency and productivity. Both contributed to a more rapid reduction in rural poverty in China as compared to India. In addition, equal access to land continues to play an important role as a safety net, even as the society is becoming increasingly unequal in the later stages of reform.

Second, agriculture-led reform contributed to overall poverty reduction on several fronts. Starting with agriculture ensured that the majority of the population benefited

from the initial reforms (for example, the increase in the procurement price), given the overwhelming dependence of the population on the primary sector. The large number of prospective beneficiaries also helped generate consensus and create political support for the subsequent stages of the reform process. The various incentive reforms—including the new land tenure laws, the rise in procurement prices, marketing reforms, and exchange rate interventions—led to an improvement in returns for farmers and in the efficiency of resource allocation in the economy. As a result, the domestic production base was strengthened and gradually made more competitive. Only then was the subsequent integration into the world market attempted through trade liberalizing measures. The success of the early agriculture-led reforms also increased the demand for nonagricultural goods and released a surplus of labor and capital into the rural nonfarm sector. As the rural nonfarm economy thrived, it provided farmers and rural areas with an additional investment source outside agriculture and its allied sectors, and it put pressure on the urban economy to reform as well, since nonfarm enterprises in rural areas became more competitive than state-owned enterprises. These successes in turn triggered macroeconomic reforms and also favored the opening up of the economy and the adoption of measures such as the special economic zones to increase foreign investment.

Third, the sequencing of reform polices is critical for all countries as they pursue their national development goals. Opening up the economy in the absence of adequate market institutions and incentives is detrimental to sustainable growth and poverty reduction. An ex post assessment of China's experience indicates that at the outset policymakers first created a strong incentive structure and the institutions needed for agricultural production to take place efficiently and for markets to operate smoothly. Only in the second stage, in the mid-1980s, did they begin to liberalize and open up markets. The growth impact of incentive reforms relating to land use rights and agricultural production management (through the household responsibility system) and rises in procurement prices from 1978 to 1984 was much larger than the impact of the market liberalization reforms after 1984. Gains would have been smaller if markets had been opened up before adequate incentives were in place. Incentive reforms were

instrumental in the gradual emergence of markets and prevented the negative consequences that were experienced in other transition countries when a sudden institutional void was caused by the abrupt collapse of the plan system's mechanisms for allocation.

Fourth, the political system, institutions, and regulatory environment are vital for long-term economic growth, poverty reduction, and the avoidance of man-made tragedies. A more authoritarian political regime such as the one in China can mobilize its population and resources swiftly to achieve its development goals. But due to the lack of checks and balances and the lack of voice and expression by those affected, inappropriate polices and development strategies are often not challenged, and this can lead to man-made disasters and tragedies. In contrast, in a democratic society such as India, it is hard to reach any consensus. Policies are often made based on the bargaining power of different interest groups that are not necessarily representative of the whole society. Therefore, the pace of reform is usually much slower than would be the case in an authoritarian society. However, a democratic society can prevent man-made tragedies due to the existence of opposition political forces. The key question, therefore, is how to reform the current political systems in both countries so that effective social mobilization as well as reliable systemic measures that prevent policy mistakes and catastrophic results can become part and parcel of both systems.

Both countries face tremendous challenges on the path to further prosperity. Continued growth is a must due to pressure from population growth and the need for employment. It is also a condition for a more stable society. Due to the high expectations of their citizens, the lack of growth or even slower growth could lead to unrest in both countries. A critical constraint to growth lies in the limited natural resource base. This means that future growth must be based on high efficiency. Investing in new technologies; optimizing the economic structure for allocative efficiency; and reforming fiscal, financial, and banking systems are some of the most critical needs of the day. The future economic growth of both countries increasingly depends on imports of energy, the future prospects of which are very unreliable. Both countries are also among those most

severely affected by water shortages. A more equitable growth pattern is also called for in both countries. This is not only a development objective in itself, but also a precondition for long-term growth in the future.

China and India can both gain tremendously by sharing and learning from each other, as both nations still face a long road ahead. The dragon has attained height and the elephant is starting to gather momentum, but both need to address their weaknesses and build on their strengths in order to achieve their national goals and fulfill the aspirations of their people. The lessons learned from the experiences of China and India are also of relevance to other developing countries and the fight against global hunger and poverty.

APPENDIX 1: SOME MAJOR FISCAL AND FINANCIAL INDICATORS

	Inflation rate[1]		Exchange rate[1]		Foreign reserves, USD billion		Food subsidy (% of GDP)		Budget deficit (% of GDP)		Aid (% of GNI[1])			
	India	China	India	China	India [2]	China [3]	India [4]	China [5*]	India [4]	China [5]	China	India	SSA	LDC
1970	1.59	-2.64	7.5	2.46	0.58	—	—	—		—	—	1.37	1.9	—
1971	5.32	0.66	7.49	2.46	0.66	—	—	—		—	—	1.54	2.17	—
1972	10.89	-0.02	7.59	2.25	0.63	—	—	—		—	—	0.88	2.04	—
1973	17.9	0.14	7.74	1.99	0.74	—	—	—		—	—	0.93	2	3.58
1974	16.7	0.23	8.1	1.96	0.78	—	—	—		—	—	1.27	2.17	4.42
1975	-1.55	-1.16	8.38	1.86	1.66	—	—	—		—	—	1.65	2.62	4.65
1976	5.96	-0.19	8.96	1.94	3.24	—	0.14	—		—	—	1.41	2.29	4.8
1977	5.58	1.09	8.74	1.86	5.31	2.35	0.13	—		—	—	0.84	2.44	5.19
1978	2.52	1.33	8.19	1.68	6.42	1.56	0.14	0.31		0.28	—	0.85	2.95	5.79
1979	15.79	3.56	8.13	1.55	6.32	2.15	0.16	1.36		4.23	0.01	0.92	3.2	6.59
1980	11.51	3.78	7.86	1.5	5.85	2.26	0.16	2.28		1.53	0.04	1.2	2.97	7.37
1981	10.26	2.31	8.66	1.7	3.58	4.78	0.16	4.09		0.52	0.25	1.05	2.96	6.96
1982	7.72	-0.19	9.46	1.89	4.28	11.14	0.16	2.95		0.55	0.26	0.85	3.31	7.31
1983	8.88	1.07	10.1	1.98	5.10	14.48	0.18	3.07		0.73	0.29	0.87	3.4	7.37
1984	7.42	4.89	11.36	2.32	5.48	16.71	0.22	2.81		0.62	0.31	0.81	4.11	7.4
1985	7.19	10.14	12.37	2.94	5.97	11.91	0.32	2.59		0.24	0.31	0.7	4.91	7.81
1986	6.77	4.6	12.61	3.45	5.92	10.51	0.37	2.07		0.69	0.37	0.82	5.39	8.64
1987	9.21	5.07	12.96	3.72	5.62	15.24	0.36	1.99		0.67	0.52	0.63	5.33	9.08
1988	8.29	12.12	13.92	3.72	4.23	17.55	0.36	1.64		0.53	0.63	0.68	5.78	9.46
1989	8.35	8.81	16.23	3.77	3.37	17.02	0.38	1.80		0.94	0.61	0.62	6.12	9.49
1990	10.55	5.68	17.5	4.78	2.24	28.59	0.35	1.67	6.6	0.79	0.57	0.45	6.38	10.62
1991	13.82	6.73	22.74	5.32	5.63	42.66	0.41	1.43	4.7	1.10	0.51	1.04	6.17	10.38
1992	8.85	7.9	25.92	5.51	6.43	19.44	0.38	0.99	4.8	0.97	0.72	1.01	6.6	11.81
1993	9.48	14.55	30.49	5.76	15.07	21.20	0.71	0.74	6.4	0.85	0.74	0.54	6.31	10.7
1994	9.68	19.9	31.37	8.62	20.81	51.62	0.61	0.49	4.7	1.17	0.58	0.73	7.2	12.77
1995	8.97	13.18	32.43	8.35	17.04	73.58	0.60	0.43	4.2	0.99	0.5	0.5	6.16	11.5
1996	7.24	5.92	35.43	8.31	22.37	105.03	0.63	0.50	4.1	0.78	0.33	0.5	5.13	8.33
1997	6.51	0.82	36.31	8.29	25.98	139.89	0.78	0.59	4.8	0.78	0.23	0.41	4.5	7.39
1998	7.89	-2.4	41.26	8.28	29.52	144.96	0.84	0.75	5.1	1.18	0.26	0.39	4.71	7.01
1999	3.85	-2.19	43.06	8.28	35.06	154.68	0.82	0.62	5.4	2.12	0.25	0.34	4.26	6.84
2000	3.79	0.94	44.94	8.28	39.55	165.57	1.01	0.87	5.7	2.78	0.16	0.33	4.33	6.77
2001	3.87	1.18	47.19	8.28	51.05	212.17	1.38	0.63	6.2	2.59	0.13	0.36	4.62	7.23
2002	3.46	-0.29	48.61	8.28	71.89	286.41	1.83	0.51	5.9	2.99	0.12	0.29	6.32	8.69
2003	—	—	—	—	107.45	403.25	1.80 †	0.47	4.6 †	2.50	—	—		
2004	—	—	—	—		609.93	—	—	4.6 †	—	—	—		

Sources: [1] WDI 2004; [2] Reserve Bank of India [India, RBI 2003]; accessed online on July 7, 2005; 3 IMF International Financial Statistics [IMF 2004]; accessed online on June 13, 2005.[4] India, Ministry of Finance, *Economic Survey, 2004–05*; [5] NBS, *China statistical yearbook*, various years.

Notes: * Food subsidies for China include edible oil, sugar, cotton, and meat; † Provisional data; — Data unavailable; SSA: Sub-Saharan Africa; LIC: Low Income Countries (according to 2003 GNI per capita, calculated using the World Bank Atlas method of $765 or less).

APPENDIX 2: LIST OF PAPERS PRESENTED AT NEW DELHI AND BEIJING WORKSHOPS

Bhalla, Sheila, G.K. Chadha, and Linxiu Zhang. 2004. The rural nonfarm sector in India and China: An overview.

Cai, Ximing, and Mark W. Rosegrant. 2004. Future prospects for water and food in China and India: A comparative assessment.

Chadha, G.K. 2003. Rural nonfarm sector in Indian economy: Growth, challenges, and future direction.

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Huang, Jikun, and Scott Rozelle. 2004. Trade reform and the likely impacts of China's WTO accession on its agriculture.

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Ke, Bingsheng. 2004. Agricultural marketing reform in China.

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Parikh, Kirit, S. Mahendra Dev, and Abusaleh Shariff. 2004. Antipoverty programs in India: Are they pro-poor?

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Srivastava, Ravi, N.C. Saxena, and S.K. Thorat. 2004. Land institutions, policy, and reforms in India.

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Zhong, Funing, and P.K. Joshi. 2004. Rural diversification in developing countries: Lessons from India and China.

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3. *Agricultural Market Reforms in Egypt: Initial Adjustments in Local Input Markets*, November 1994, by Francesco Goletti.

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