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Economic Growth and Sustainability: Rural China in the Reform Era

Anthony Chisholm and Sisira Jayasuriya

La Trobe University

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Introduction

Rural China is currently undergoing a dramatic and profound transformation. The traditional dominance of the agricultural sector in the rural economy is being challenged by the spread of rural industrial enterprises and the growth of a vibrant services sector. These sectors account for an increasingly large share of output and employment in the rural sector. There are also major changes in the relationships between the urban and rural sectors. In particular, there are growing pressures for rural to urban labour migration; administrative measures, which in the past permitted China to avoid the massive city-oriented population shifts experienced by other rapidly developing Asian economies, appear to be increasingly less effective in the face of widening urban-rural wage differentials and reduced scope for agricultural labour absorption.

These changes are part of the wider changes going on in the Chinese economy, which since the initiation of market oriented policy changes in 1978, has been one of the fastest growing economies in the world. Indeed, given that China is home to more than a fifth of the world's population and has only 7 per cent of its arable area, its sustained growth performance, averaging over 10 per cent per year for most of the past decade — effectively doubling the size of the economy (GDP) every eight years — is truly astonishing.[1] However, the pace and sweep of change is posing new policy issues and challenges. These are nowhere more sharply expressed than in relation to agriculture and the rural sector. Long term sustainable growth requires policies that can maintain the productive capacity of the natural resource base and the environment, while ensuring social and political stability. In relation to the magnitude of this task, the aim of this paper is modest: we seek to make a small contribution to the discussions on formulation of agricultural and rural sector policies in China by drawing on the analytical

approaches and policy experiences with which the authors are familiar.

Agricultural Policy and Performance: 1949 to the late 1970s[2]

The victory of the Chinese revolution in 1949 laid the basis for fundamental changes in the rural sector. Comprehensive land reform was implemented and many tenant farmers became owners of their farms. Moves towards collectivisation were initially confined to encouragement of relatively small scale collectives on a voluntary basis; up to 1955 the predominant type of cooperative farm was the 'mutual aid team' in which 4-5 neighbouring households pooled their farming equipment and labour. Large scale 'advanced cooperatives', which brought together all households in a village where all resources including land were collectively operated and returns were based on individual contributions of work effort, numbered only about 500 in the entire country. However, this situation changed during the mid-1950s when the political authorities adopted a policy of accelerated large scale collectivisation. By 1957, the advanced cooperatives had increased to 753,000 with 119 million households.

The advanced cooperatives recorded some early successes and led to the next stage of collectivisation which saw the merger of advanced cooperatives into 'People's Communes' which brought together about 30 cooperatives each having some 150 households. By 1958 24,000 communes, each having about 5,000 households and 10,000 hectares of land, covered almost all rural households. The results of forced collectivisation were the opposite of those expected by the government. Agricultural output fell dramatically in 1959 (by 14 per cent at 1952 prices) and in 1960 (by 12 per cent). Grain output declined even more sharply (by 15 per cent and 16 per cent in the two years). The resulting famine is estimated to have resulted in over 30 million deaths. In 1962, there was a change in policy and 'production teams' comprising 20-30 neighbouring farms were formed as the basic operating unit.

In essence this was a reversion to the former advanced cooperatives, though the commune remained as a broad administrative unit. Despite several changes in the payment arrangements for work, these production teams remained as the basic unit in agriculture until

the late 1970s. The strategy for increasing agricultural output shifted to the construction of rural infrastructure, particularly irrigation systems and through the mobilisation of rural labour and the progressive improvement of agricultural technology, including improved seeds and both traditional and modern inputs, such as organic and inorganic fertilizer and agricultural machinery. While the slump in output was arrested, agricultural performance continued to be poor right up to the late 1970s. From a net grain exporter during the 1950s, China turned into a net grain importer in 1961. Though food self sufficiency has been a central plank of economic strategy, China has remained a net grain importer, except for a brief period during the mid 1980s.

Policy Reforms and Impact on Agriculture

The fundamental change in Chinese economic policy direction which began during the late 1970s saw major changes in agricultural policies. These involved changes to agricultural prices, the production team system, and the restrictions and regulations inhibiting inter-regional trade in agricultural produce. Under the established system of marketing, agricultural producers sold their output to the state at regulated prices; they had to meet a specified quota for which there was a specified price, but were paid a somewhat higher price for above-quota sales. Price reforms implemented in 1979 raised these prices and greatly enhanced the price incentives for producers. Average procurement prices rose by 17 per cent, but more importantly, the above quota prices rose by 40 per cent. At the same time, at first unofficially and then with tacit approval leading to official approval in 1981, changes were introduced to the production team system which enabled households to operate as individual production units increasingly able to hire both labour and land. By the end of 1983, this new system - the Household Responsibility System (HRS) - had been accepted by almost all production teams. Further, broader market oriented price reforms - particularly those which removed regulations on cropping patterns based on regional self sufficiency goals - provided incentives for enhancement of inter-regional trade and the exploitation of regional comparative advantage.

The growth performance of Chinese agriculture since the start of these reforms has been dramatic. The growth rate of farm output during 1978-90 averaged over 6 per cent per year,

three times the rate of the previous two decades. Rural per capita income increased faster than anywhere else in the developing world, at 13 per cent per year, after twenty years of near stagnation (World Bank, 1992a).[3] However, it must be noted that the period averages mask a significant change that took place during the mid-1980s. Until 1985, the wide gap between urban and rural incomes narrowed, but by 1988 it increased again. Agricultural output growth slowed down perceptibly from 1984 onwards. After growing at 8 per cent per year it fell to 4 per cent for the period 1984-88. Total factor productivity growth decreased from 5.9 per cent per year to 3.0 per cent over the same period (Jefferson *et.al.*, 1992). Wu (1994) estimates that total factor productivity growth in Chinese agriculture steadily declined from 5.8 per cent in 1985 to 3.1 per cent in 1991. It is interesting to note that total factor productivity growth for agriculture in Yunnan Province grew from a little over 0.4 per cent in 1985 to 6.6 per cent in 1991, the reverse of the national trend.

The impressive change in the agricultural sector performance that took place with the implementation of reforms played an important economic as well as political role. The surge in food output enabled low consumer food prices to be maintained during a period of relatively high inflation[4], and helped restrain urban wage pressures and sustain overall political stability both in the cities and the countryside. Further, it served as a demonstration of the potential positive impact of market oriented reforms, as this improved agricultural performance was generally accepted as being mainly attributable to policy reforms (see, for example, Lin 1992b; McMillan, Whalley and Zhu, 1989). However, it appears that weather, too, was an important positive factor in China's agricultural production in the 1980s. Surprisingly, most studies that have examined agricultural output growth in China (Lin 1992b and McMillan *et al.* 1989) have ignored the role of weather. A notable exception is Zhang and Carter (1994). Their research shows that previous studies have over-estimated the effects of economic reforms on agricultural productivity growth in China. Zhang and Carter conclude that economic reform in the 1980s contributed about 25 per cent towards agricultural production growth in China, rather than 40-50 per cent, as reported by Lin (1992b) and McMillan *et al.* (1989). Carter and Zhang (1993) also argue that the slowdown in growth of agricultural production in the late 1980s was not due to production inefficiencies, but rather due to slower growth of inputs, particularly fertiliser.

The breakup of large collective blocks of land into many small individual farms, following the change to the Household Responsibility System, has probably resulted in diseconomies of scale for some farm operations such as ploughing and transporting thus contributing to slower productivity growth. There is likely to be scope for farmers to set up farmer groups and for local authorities to provide some type of co-operative framework to facilitate the carrying out of such operations in larger operational units, while preserving the appropriate individual farmers' incentives on the small farm units.

Reforms and improved performance, however, were not confined to the agricultural sector during this period. Indeed, in order to fully understand the nature of the changes in the rural sector during this period, it is important to place the changes in the agricultural sector in the broader context of the institutional, structural and the general policy changes of the wider economy since the late 1970s.

Policy Reforms and Structural Changes in the Wider Economy

The agricultural policy changes since the late 1970s were a reflection of the broader change in Chinese economic policy which marked a sharp break with past development strategies. The new policies were directed towards permitting a greater role for market forces in domestic economic activities accompanied by an outward orientation involving a greater role for foreign trade and investment. Though the emphasis of policy has shifted from time to time, often reflecting pragmatic adjustments to both economic and political circumstances, its general direction has not altered. While state interventions remain important in many areas of economic activity, the share of the state sector in the economy has gradually shrunk. Indeed, state ownership of productive enterprises is now confined mainly to the large industrial enterprise sector (for recent overviews of these policy reforms, see Garnaut and Guoguang, 1992; Lau, 1994; Perkins, 1994; Yusuf,1994; Watson, 1994).

The impact of policy reforms on the wider Chinese economy can be seen in Table 1 which provides data on key macroeconomic indicators. Table 1 shows that for nearly all economic indicators the performance of China in the reform period was better by a wide

margin. The rate of growth of real GDP almost doubled; the rate of growth of the gross value of agricultural production doubled; and the rate of real personal consumption more than doubled. Using an econometric model of the Chinese economy, Lau (1994) obtains projections of the economic indicators to the year 2020 which are also shown in Table 1. The rates of growth of selected economic indicators in the projection period are fairly similar to those in the reform period. The most notable exceptions are, first that the rates of growth of exports and imports decline considerably but are still high and second, heavy industry grows at a more rapid rate than light industry. In 2020 it is projected that Chinese real GDP will approximate the same level as the current United States real GNP.

The present level of per capita income and the size of the Chinese economy is widely considered to be underestimated by conventional GDP figures. Estimates based on consumption patterns suggest that actual figures may be 2-3 times higher (Garnaut and Ma, 1993). Purchasing power parity based comparisons suggest the actual levels may be even higher, and that the Chinese economy is already the world's third largest economy after the US and Japan and is close to 45 per cent of the US economy (IMF, 1993).

As earlier mentioned, the surge in growth following reforms was not confined to the agricultural sector; in fact industry and services have grown even faster than agriculture, particularly from the mid-1980s onwards. During 1980-91, industry and services grew annually at 11 per cent and 11.2 per cent compared to agricultural growth of 5.7 per cent (World Bank, 1993), and the relative share of agriculture in the economy fell to 27 per cent of GDP in 1991.

The Chinese economy in 1994, as a result of the economic reform, is a fast-growing and rapidly industrialising one, in which the non-state sectors and the market continue to expand rapidly. Lau *op.cit.* claims that "China (the Big Dragon) has three major advantages over the four "Little Dragons" (Hong Kong, Singapore, South Korea and Taiwan) and perhaps even Japan: a relative abundance of natural resources, a potentially huge domestic market and an almost unlimited supply of surplus labour" (p.11). The current high rate of national saving, together with foreign investment inflows, will ensure that capital accumulation is adequate for

continued rapid growth of the Chinese economy. Another source of increased output would be improvements in the efficiency of use of new technologies. The substantial rates of technological progress in all major sectors reflects the impact of China's reform efforts, including its success in importing modern technology from developed countries. However, present levels of technical efficiency appear to be low with only 50-60 per cent of potential output being achieved (Wu, 1994). The co-existence of a high rate of technological progress and a low rate of technical efficiency probably reflects China's lack of appropriate institutional arrangements to facilitate efficient absorption of modern (foreign) technologies, despite its successes in obtaining such technology. In this respect, it is noteworthy that total factor productivity growth rates in Yunnan province have been substantially higher than the national average in all sectors.

The growth of the industrial and manufacturing sectors are of particular interest as they are at the centre of China's efforts to develop into a modern industrial economy. It is in the industrial sector that some of the most important changes of recent times are most sharply expressed.[5] Table 2 provides an overview of the changes in the industrial sector during 1980-92. Note that non-state enterprises have grown far more rapidly than state enterprises so that the share of the state sector has fallen from 76 per cent in 1980 to 48.4 per cent in 1992. The Township and Village Enterprises (TVEs) have expanded their share from 9.9 per cent in 1980 to nearly 29 per cent in 1992.

These TVEs, while not private firms in the ordinary sense in that they are collectives typically with close links to local administrative and state structures, evolved as a specific institutional response to the opportunities created by the reforms for market and profit oriented, dynamic entrepreneurial organisations.[6] TVEs, compared to the large state industrial enterprises, are typically smaller, more labour intensive and are not subject to centralised state control. They are also not heavily subsidised by the state or the banking system, and thus faced 'hard budget constraints' in that loss making enterprises have little prospect of being kept open by continuing flows of subsidies (Findlay, Xiaohe and Watson, 1992). They respond to market opportunities both at home and overseas and in turn, are disciplined by competitive pressures.

Thus it is not surprising that their productivity growth has been higher than that of state enterprises by a factor of two to three, despite the fact that state enterprises themselves have been pushed by recent reforms to improve performance; in fact, they have developed national and international linkages which would ensure continuing access to technological innovations and other forms of productivity enhancing developments (Jefferson and Rawski, 1994). The development of these industrial enterprises and their impact on output and employment has been dramatic: by 1990 they, together with other rural non-state enterprises, already accounted for a quarter of national output and employed nearly 100 million workers. The labour intensive nature of much of rural industries (and their exports) accords with China's comparative advantage and provides a welcome source of employment to the growing labour force. In turn this industrial growth has stimulated continuing rapid growth in the services sector.

Rural Industries and Agriculture

The growth of the TVEs and other non-state enterprises collectively described as 'Rural Industry' has fundamental implications for agriculture. Rural industry now dominates rural sector output contributing over 60 per cent, well ahead of agriculture, with the share being markedly higher in the coastal provinces with relatively scarce land, better infrastructure and greater potential for linkages to existing industries. Between 1978 and 1983 the number of rural people with nonagricultural jobs grew from 31.5 million to 86.1 million. The creation of these jobs by local people was a response to the removal of most restrictions on economic activities (Johnson 1994). The restrictions on labour movements to the large urban centres (in the context of rapid growth of the rural labour force which far exceeded agriculture's capacity for labour absorption), the inability of the underdeveloped financial and capital markets to mobilise effectively rural savings, the deterioration of agriculture's domestic terms of trade from the mid-1980s (Kueh and Ash, 1993)[7] were all factors which provided supply side encouragement to the establishment and development of rural industry. However, as Jefferson and Rawski (1994) point out, rural industry "benefited from the success of China's agricultural reforms, which greatly expanded the supply of rural savings, freed millions of workers to seek non-farm employment, and boosted rural demand for consumer goods"(p.59). Thus the

reforms in agriculture and those in the wider economy, jointly, have provided the basis for integrated rural development based on mutually reinforcing agriculture-industry linkages.

However, this process of rural transformation poses a set of new issues and challenges if growth and rural prosperity is to be sustained over the longer run. The *relative* decline of agriculture that is taking place now in China (despite its productivity improvements) is precisely what economic theory and the experience of other East Asian economies lead one to expect, given China's rapid economic growth and low per capita endowment of farm land. All the indicators point to the agricultural competitiveness of China being on a downward long-run trend, with the boost to agricultural production in the early to mid-1980s associated with the rural reforms providing only a temporary respite (Anderson, 1990). Chinese agriculture cannot avoid facing pressures for structural adjustments. Huang (1993) argues that after 1984, farmers preferred to invest their resources in rural industry. Perkins (1994) also claims that farmers were constrained from making major capital improvements to their land, such as irrigation systems, because they did not feel they had secure property rights under the 15-year land lease system. At a policy conference in Beijing in December 1993, it was recommended that the land use-rights be increased from 15 to 30 years, thus providing farmers with more secure property rights.

China has long had the national goal of self sufficiency in staple grains, though it has proved to be an elusive goal. This goal has been justified not merely on economic grounds but on political and strategic grounds. The current changes in the rural sector appear to make this goal even more difficult without a major technological leap in rice and wheat production (which appears unlikely). China's comparative advantage, at this point in time, certainly lies in labour, rather than land, intensive products and the costs of substantially increasing grain output may prove prohibitive. Note that China's population is increasing by about 17 million every year while cultivated land area is actually shrinking due to conversion of land to residential and industrial uses. Almost certainly, economic growth will lead to an increasing demand for food imports and especially livestock feed imports over the next decade. One way of reducing the growth in coarse grains and soybean imports to feed livestock, would be to make better use of

available pasture. However, the scope for greater livestock production from pastures may be limited because of the potentially serious environmental consequences of more intensive grazing. The fragile lands along the north and northwest borders of China are already heavily grazed by sheep and increasing stocking rates could do irreversible damage to the ecology and to the future grazing potential (Anderson, *op.cit.*).

. . .

Rising incomes in China will increase demand for a range of more income elastic, high value food items ranging from fruits and vegetables to livestock products. The income elasticity of demand for grain is now estimated to be negative. A shift of emphasis from grain production for human consumption towards such goods, particularly those in which perishability and high transport costs offer a substantial degree of natural protection, is economically attractive. By the early 1990s, farmers were already placing much more emphasis on producing higher valued cash crops and spending more time on off-farm activities. There is a potential for further reforms aimed at allowing resources to shift more freely from grain and cotton production to other cash crops and from agriculture to industry and services.

The growth and structural changes taking place in the Chinese economy have implications for income distribution and inequality. Overall income inequality in China declined in the early 1980s, but subsequently increased (Perkins, 1994). The Engel coefficient for food purchases as a percentage of total expenditures has trended steadily downward, but the Atkinson index of interprovincial inequality increased significantly after 1982 for both per capita income and consumption expenditures of Chinese peasants (Kueh and Ash, 1993). Over the whole period, 1978 to 1992, official estimates show that per capita urban consumption increased from 2.9 to 3.1 times rural per capita consumption.

Over the period 1988-93, real urban incomes increased by 44 per cent while rural incomes increased by only 12 per cent. The major factor explaining the relatively slow growth rate of rural incomes since 1988 is the slowdown in creating rural nonfarm jobs. Over the period 1984-88, 8-12 million new nonfarm rural jobs were created annually, while since 1988 no more than 3 million of these jobs have been created annually. The rural labour force grows at approximately 10 million annually, a growth rate well above the rate at which new rural jobs

are being created (Johnson, 1994).

Sustainable Resource Use and Environmental Issues

There are a range of important issues that arise in relation to the sustainable use of the natural resource base — land and water — in China's rural regions. In essence, these have to do with public goods and externalities (spillover effects) and the types of economic signals given to land and water users.

The sustainable and unsustainable use of natural resources is directly linked to the types of economic signals natural resource managers receive through the pricing system. Environmental goals are unlikely to be met when (i) underpricing of natural resource inputs, such as coal, gas and irrigation water, lead to wasteful utilisation; (ii) imperfect information, or divergences between "on-site" private and social costs, such as the discount rate used by farmers to evaluate investment in soil conservation measures, lead to excessive short-run exploitation of farmland at the expense of its long-run productivity; and (iii) a lack of appropriate incentives leads to socially excessive "off-site" spillover effects, such as sedimentation or pollution of dams and waterways due to farmland soil erosion and run-off of fertilizers and pesticides (Chisholm, 1993).

A sustainable agricultural system may be broadly defined as one which meets domestic demand for agricultural products (and, for exported products, international demand) at socially acceptable economic and environmental costs to current and future generations. A more specific measure of sustainability is the total factor productivity of a cropping or farming system.

With 23 per cent of the world's population (over one billion people) and only 7 per cent of the world's arable land it is not surprising that there is severe pressure on cultivatable land in China. Further, while China's population is increasing, the area of the country's cultivated farmland is shrinking. Moreover, mountains, hills and arid regions cover about 65 per cent of China's land area, but only 10 per cent of this land is suitable for farming.

Land degradation has been an 'old' problem in China and the dangers of deforestation were recognised early. China is one of the few countries in the world which has been successful in implementing an extensive program of afforestation; forest area has increased from 8.6 per cent of total land area in 1949 to over 13 per cent in 1991. However, land degradation continues to be a severe problem. About one sixth of the total land area in China is currently affected by soil erosion, and water loss and soil erosion threaten almost one-third of the nation's cultivated land. Moreover, desertification and salinisation are spreading rapidly. Over 15 per cent of total land area is affected by salinisation and alkalisation.

The area of irrigated land in China has more than doubled since 1952. Nearly half of the cultivated land is now irrigated. Indeed, the development of water resources for irrigation has been one of the major contributors to China's success in maintaining close to self-sufficiency in grain production. Irrigation, however, is itself a major contributor to over exploitation of groundwater and salinisation. Excessive use of groundwater and a resulting drop in the levels of watertables have caused problems of land subsidence as well as increased soil salinisation, particularly in coastal areas. As a result of pollution from all sources, it is estimated that one-fourth of the total fresh water in China is polluted and the problem of water quality is worsening. The collapse of some of the old mechanisms for mobilising the population for collective action to maintain public goods, such as resources and major irrigation system feeder canals, may create an institutional gap during the transitional period. This issue also arises in relation to water quality and other forms of pollution.

In contrast to the countries of Eastern Europe and the former USSR, however, the state and party structures in China appear to have succeeded in addressing some pressing environmental problems. Environmental protection policies were first introduced in the PRC's Sixth Five-Year Plan (1981-85). The resources allocated to environmental protection have been substantially increased in successive Five-Year Plans and environmental protection is now established as a high priority policy.[9] The overall policy goal is to arrest the upward trend of environmental degradation by the year 2000 and reverse the trend by the year 2030. The most important targets set for the protection of the natural environment are the control of soil erosion

and water loss, the establishment of ecologically sustainable agriculture systems, an increase in land productivity, the expansion of arable land,[10] and an expansion of forest coverage and of natural reserves.[11]

One of the most direct consequences of the rapid growth of rural industry is the spread of industrial pollution in rural areas. The nature of the production technologies, the lack of expertise and, more importantly, funds for pollution control, and the difficulties that have been encountered in implementing environmental laws have contributed to a serious and rapidly growing rural industrial pollution problem despite a government strategy of improving technology and pollution control equipment in the TVEs. Monitoring and enforcement of environmental regulations and standards for rural industry industry is difficult because TVEs are often small and widely dispersed. There is a need for strengthening and expanding rural and provincial Environmental Protection Boards possibly with the technical assistance of institutions such as the Asian Development Bank (Capannelli and Shrestha, 1993).[12]

Conclusions

The transformation of the Chinese economy into a rapidly growing market economy has changed the nature of rural China. While all sectors have grown in absolute terms, rural industry and services have grown faster than agricultulture. Rural industry, which has thrived in the market friendly policy environment, has followed the classic pattern of a labour intensive, export oriented growth path that characterised the industrialisation process of Japan and the Asian NICs. The policy challenge is to sustain this growth momentum over the long run, and raises the issues of both macroeconomic and political stability as well as the sustainability of the natural resource base.

At the macroeconomic level, the major potential problems are, first, the possibility of high levels of inflation leading to boom-bust cycles of economic activity, and, second, a widening gap in the distribution of income, both within and across the urban and rural sectors and geographical regions, which may not easily be reversed. The large, inefficient urban based state enterprises are a huge fiscal drain on the central government and a source of inflationary

pressures which, in turn, raises costs for rural industry. There is considerable empirical evidence that increasing inequality is common during the early stages of rapid economic growth, and that inequality tends to go down subsequently. Nevertheless, it can be the source of political destabilisation which, in turn, can hamper sustained growth. The continuing growth of labour intensive rural industries, accompanied by labour intensive services, holds the best promise of raising rural incomes and reducing the rural-urban income gaps. Of course income differentials would also decline to the extent that any urban-bias in economy wide policies is reduced.

The widening of regional income inequalities is a consequence of the differences in factor endowments, including the availability of infrastructure such as transport and communication facilities; as market forces permit each province to exploit their comparative advantage, these endowment differences tend to be reflected in income levels. Again, there are several ways in which such emerging inter-regional inequalities can be addressed. Government transfers through the tax system whereby the richer regions are taxed to provide finances for the poorer regions is one, and such transfers may be effected through a national public investment policy to improve infrastructure in the poorer regions. However, in practice, such transfers may impose some efficiency costs on the economy as a whole, as the investments may not always be the most profitable from a national point of view. Factor mobility, particularly labour mobility has increased as administrative barriers to inter-regional migration have broken down. This would certainly tend to reduce the impact of regional income differences on labour incomes. But the benefits of greater labour mobility must be balanced against its costs in terms of greater urban congestion and associated negative externalities.

Within the rural sector, in addition, problems of resource degradation, particularly those of land and water, are being aggravated by some of the economic and institutional changes, despite positive action by government. The increasing role of market forces in the determination of the level and composition of agricultural output is changing cropping patterns and farming systems. Similarly, rural industry and services sectors are developing in a new institutional and policy environment. On the basis of the (admittedly limited) evidence available

to us, it appears that in the current transitional phase there is a lack of adequate institutional and/or market mechanisms to prevent excessive natural resource resource degradation and environmental pollution: while the old institutions and regulatory control systems have been destroyed or weakened, effective new mechanisms have not yet been developed yet.

It is important to stress the role of price signals in these circumstances. The establishment, monitoring and enforcement of appropriate environmental regulations is clearly neccessary but by themselves, they are likely to be inadequate. In an increasingly market oriented economy, appropriate market signals through the price mechanism should supplement such regulations, and the impact of economy wide policies on relative prices and thereby on the environment should be understood and recognised when evaluating particular policy changes. The need for such price signals appears to have particular urgency, for example, in the case of water use. Further, if the old methods of mobilising the population for collective action to maintain public goods such as major irrigation systems prove difficult in a market economy, the state may have to intervene to take direct responsibility for such activities and to use effective tax systems to obtain required finances. Overall, the emerging problems in the rural sector pose the need for combining the market oriented reforms with a redefinition of the role of the state.

Endnotes

1 Growth slowed down in the late 1980s after deflationary policies were adopted to combat rising inflation, but has recovered strongly since then. Estimates for 1994 are in the range of 9–10 per cent, again a relative slow down compared to nearly 13 per cent in 1992 and 1993.

2. The discussion on policy reforms and agricultural performance is based substantially on Lin (1992a) and Findlay, Martin and Watson (1993).

3 There are considerable problems involved in the use of published statistics, due to different methodological approaches to data reporting, comparability and estimation for some issues related to output and employment data (see Wu and Wu (1994)). Agricultural data problems relating to grain in particular are discussed by Johnson (1990) and Crook (1993).

4 The government increased retail prices of certain food items such as pork, eggs and fish, however, the prices of 'necessities' such as grain and edible oils were not increased. While the political imperatives driving government policy were understandable, the fiscal burden of such partial price reforms proved to be very heavy. The combination of increased procurement prices and output increases in this context increased the effective government subsidy on food consumption such that in 1984 it was nearly a quarter of the state budget (Lin, 1992a). The government was compelled subsequently to undertake some changes to the marketing arrangements to reduce this subsidy burden.

5 For detailed discussions, see Jefferson and Rawski (1994) and Naughton (1994).

6 For more details on the nature and functioning of TVEs, see Byrd and Lin (1990).

7 Real farm output prices have been declining since 1988, partly as a result of the elimination of most food price subsidies for urban consumers.

8 It was also recommended that land-use rights should no longer be subject to reallocation

as a result of demographic change within a village. A family's land allocation is currently increased when a child is born.

9 Controlling population growth through family planning is a fundamental state policy. Aggregate birth rates have fallen from 5.81 to 2.31 in 1990.

10 Particular environmental strategies in rural regions include a slowing of the conversion of agricultural land to industrial and residential use, the reclaimation of marginal land for cultivation, and a reduction of the adverse environmental impacts resulting from the application of fertilisers and pesticides.

11 Due to its wide range of geographical and climatic features, China has a very large range of animal and plant species that account for around 10 per cent of the total world's species. As in most developing countries, considerable loss of biodiversity has been occurring in China and threats to biodiversity are increasing. China is seeking to systematically improve its wildlife programs by developing plans and policies with assistance from international organisations such as the World Bank and World Wildlife Fund. For a study on loss of biodiversity in China, see Fan and Song (1993). For a recent study on biodiversity conservation with particular application to Yunnan, see Tisdell (1994).

12 While the pollution levy program is fairly successful for non-rural enterprises, the World Bank (1992) estimates that the pollution levies collected from the TVEs are less than 30 per cent of the amount due.

Table 1. Comparisons of the Average Annual Rates of Growth of Selected Economic Indicators

	1954-1979 Pre-Reform	1979-1992 Reform	1992-2020 Projected
Real GDP	5.9	8.9	8.6
Real GDP/Capita	3.8	7.4	7.5
Real Gross Value of:			
Agricultural Production	2.9	5.9	5.2
Light Industry	8.7	14.8	10.2
Heavy Industry	12.8	11.9	12.3
Real Personal Consumption	4.0	8.7	7.4
Real Consumption/Capita	2.0	7.2	6.3
Gross Fixed Investment	7.7	10.2	11.7
Capital Stock	5.3	8.7	9.2
Employment	2.6	2.9	2.3
GDP Deflator	0.4	5.2	7.3
Retail Price Index	0.7	6.0	7.1
Exports (in current US Dollars)	10.5	16.7	11.3
Imports (in current US Dollars)	9.9	15.4	11.7

Source: Adapted from Lau (1994)

Table 2: Shares of Various Type of Firms in Nominal Industrial Output, 1980-1992.

	Shares of Nominal Output (%)			Per cent Share of Incremental Output 1980-92	Average Annual Real Growth 1980-92 (Per cent)
	1980	1985	1992		
State	76.0	64.9	48.4	43.6	7.8
Collective					18.4
Urban	13.7	13.3	11.8	11.5	
Township-Village	9.9	18.8	26.2	28.8	
Private[a]	0.0	1.9	6.8	7.9	64.9
Other[b]	0.5	1.2	7.2	8.3	37.2
Total	100.0	100.0	100.0	100	13.1

Source: Adapted from Jefferson and Rawski (1994)

Note: Percentage totals may not check due to rounding errors.

a. Privately-owned firms employing less than 8 workers.

b. Includes private firms employing 8 or more workers, joint ventures, foreign-owned firms, and other ownership forms.

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