

The Chinese Economy after 30 Years of Reform: Perspectives from the Agricultural Sector

ROBERT ASH

Abstract

The contours of China's rural economy and society have changed dramatically during the last 30 years. Urbanization and migration have made China less of a rural society than it was in 1978, while agriculture is no longer the principal driver of rural, let alone national, economic growth. Nevertheless, the registered rural population still numbers well over 700 million, and the dominant role of agriculture as a source of employment persists to this day. In its efforts to promote sustainable economic and social development, the Chinese government faces some of its most pressing challenges in the countryside. Its ability to fulfil major goals – those relating to employment, food security, poverty reduction, welfare enhancement and environmental sustainability – therefore depends critically on the effectiveness of its *rural* policies. Rapid growth and marked changes in the structure of farm production since 1978 have been underpinned by major improvements in both land and labour productivity. In particular, the response of farmers to changes in levels and patterns of food consumption associated with growing affluence has been quite impressive. Despite short-term fluctuations, trend growth of domestic grain above all, cereal output has been positive, as a result of which China has succeeded in fulfilling its target of maintaining 'basic' food self-sufficiency. The government's adherence to a strategy of food self-sufficiency that runs counter to the principle of comparative advantage has also minimized China's involvement in international cereal markets. Meanwhile, property rights remain a core issue in the farm sector. From this perspective, a recent initiative, designed to facilitate the emergence of new kinds of land transfers that would pave the way for a process of land consolidation, appears to represent a significant new development – albeit one that carries dangers as well as opportunities.

Key words: Rural economy, agriculture, productivity, structural change, diversification, GM technology

Introduction

The contours of China's rural economy and society have changed dramatically during the last 30 years. In 1978, on the eve of the reforms, 82 percent of the total population was registered as 'rural' (National Bureau of Statistics [NBS] 2008a: 39);¹ 30 years later, the rural share of population had fallen to just over 54 percent (NBS 2009a).² The rural economy has meanwhile become much more diversified. Between 1979 and 2005, the share of farmers 'proper'³ in the rural workforce fell from 94 to 59 percent, although during the same period the number of farm labourers showed no *absolute* decline (Ministry of Agriculture 1995, 2008).⁴

Under the impact of post-1978 economic reforms, the agricultural sector's output contribution has also contracted quite sharply. Its share of national GDP has, for example, dropped from 28.2 percent to 11.3 percent. Although data are not available to show the corresponding decline relative to *rural* GDP, a comparison of rates of growth of output in agriculture and township and village enterprises (TVEs) highlights the extent to which rural economic expansion has become increasingly dependent on non-farm activities in the countryside. Thus, between 1978 and 2007, agricultural GDP grew, on average, by 12.1 percent annually, while the gross output value (GVO) of TVEs rose by 24 percent per year. In 2007, TVEs accounted for 82 percent of the combined GVO of agriculture and TVEs, compared with little more than a quarter in 1978 (NBS 2008b: 448; Ministry of Agriculture 1995:187). Comprehensive time series data are unfortunately not available, but the remarkable pace of rural non-farm output growth is well captured in the finding that between 1978 and 1994 the contribution of non-farming activities to rural social value output more than doubled from 31.4 to 74.3 percent (*ibid*).

The bald evidence of such numbers highlights the major changes that have taken place during the last three decades. China today is much less a rural society than it was in 1978 and agriculture can no longer be regarded as a driver of economic growth. So much is clear.

But there are qualifications. One is that the number of people officially tied to the rural sector is still staggeringly large: at the end of 2008 China's rural population totalled 721.35 million – well over twice the size of the *total* population of the United States and the equivalent of 11 percent of the entire world's population (Population Reference Bureau 2008). It is true that many of those officially registered in China as rural citizens (certainly well over 100 million of them) (Wang and Cai 2007; Chan 2008) have migrated from the countryside to cities. But recent research is at

pains to emphasize the resilience of the household registration (*hukou*) system: a person's *hukou* designation remains fundamentally important and China's rural migrants are still prevented by the registration system from achieving permanent urban residency rights, except under conditions that are likely to be fulfilled in exceptional circumstances (Chan and Buckingham 2008: 582-606).

Another qualification is captured in the role of agriculture as a source of jobs. For if the farm sector's output contribution has declined sharply since 1978, it continues to dominate in terms of employment. In 2007, for example, the farm workforce totalled some 277 million (NBS 2008b: 109).⁵ This was greater than the number of people employed in both the service sector and rural TVEs (249.2 million and 150.9 million respectively), and far exceeded the number of people working in urban state-owned enterprises and private enterprises (64.2 and 45.8 million) (NBS 2008b: 109-10). The fact that farming generates barely 11 percent of national GDP but accounts for more than a third of total employment is indicative of its low productivity relative to that of other sectors of the economy. The same juxtaposition of statistics suggests the continuing challenge of large-scale agricultural underemployment.

The geographical complexion of changes is another salutary reminder of the care that is needed in making inferences about economic and social change from national indicators. It is a truism that the benefits of China's economic reforms have accrued disproportionately to the populations of increasingly urbanized coastal provinces. By contrast, in central and western regions of the country the extent and scale of urbanization and economic modernization have been less marked. The demographic profile of interior provinces displays, for example, a stronger rural orientation than elsewhere. In 2007 the rural share of total population in China's ten eastern provinces averaged 45 percent, whereas in the six central and 12 western provinces the corresponding figure was between 61 and 63 percent (NBS 2008b: 89; NBS 2007).⁶

In addition, the economic role of agriculture remains more pronounced in China's interior than in other parts of the country. Thus, whereas in 2006 agriculture accounted for 7 percent of GDP in eastern China, in central and western regions the corresponding figure was 15-16 percent (NBS 2007: 3, 5, 7).⁷ Similarly, the agricultural share of total employment ranged from just one-third in coastal provinces to more than one-half in their central (51 percent) and western (55 percent) counterparts (NBS 2007: 33).⁸ Concealed in these figures is the further finding that the growth of rural *non-farm* activities has been faster along

the coast than in the interior. In 2007, for example, eastern provinces contributed two-thirds of TVEs' GDP (measured in value-added terms), compared with less than one-quarter from central China, 6 percent from the northeast and a mere 5 percent from western regions (Ministry of Agriculture 2008).⁹

These are important findings. They suggest that the proportion of the population tied to the rural economy increases as one moves west in China. Not only that, but within the *rural* population in the interior, fewer are engaged in more profitable rural, non-farm (industrial, construction and service) activities, while more are employed in agriculture (crop cultivation, forestry, fishing and animal husbandry).¹⁰ Moreover, within these interior provinces, except in a few regions where pastoral farming is well developed (for example, Inner Mongolia), a higher proportion of farmers is reliant on low-return crop cultivation, above all, on grain farming, which has traditionally generated the lowest returns of all.

These findings are also reflected in the tendency to increasing regional economic and social polarization, which has characterized China's development trajectory since the mid-1980s. A famous Chinese slogan, coined in the aftermath of the 'Great Famine' of 1959-61, proclaimed that 'agriculture is the foundation' of the economy. The importance of agriculture was something to which Deng Xiaoping drew attention throughout the last decades of his life.¹¹ After his death, the same theme was taken up by Jiang Zemin, who in 1993 emphasized that:

In setting up a socialist market economy system, we must continue to ... carry out the policy of taking agriculture as the foundation of the economy, and we must give agriculture top priority in our economic work (Howe, Kueh and Ash 2003: 244).

The current fourth generation of leaders, too, are at pains to highlight the continuing challenge posed by the relative backwardness of China's farm sector, even if these days the problems of agriculture are viewed as part of a triptych of issues – the so-called *san nong*¹² – embracing farmers and the rural sector, as well as agriculture 'proper'. In his speech to the most recent (October 2007) National Party Congress, for example, Hu Jintao cited the failure to achieve adequate farm output and income growth as two key problems facing the government (Ash 2008: 215). Indeed, it was precisely to address such issues that (in the same speech) he called for an intensification of efforts to build a 'new socialist countryside'.

Notwithstanding China's shift towards a more urbanized society and a higher value-added economy, the government's preoccupation

with farmers, agriculture and the rural sector is not the paradox it may seem. Rather, it reflects an awareness by Beijing that in its efforts to promote sustainable social and economic development, it faces some of the most serious challenges to its authority in the countryside.¹³ Its ability to fulfil major goals – for example, those relating to employment, food security, poverty-reduction, welfare enhancement, environmental sustainability – depends critically on the effectiveness of its *rural* policies. More than perhaps any other constituency, farmers have faced the less benign consequences of reform, and their limits of social tolerance have been increasingly tested in recent years. This is something that Party and government view with great concern. Not least, the investment burden to provide for the basic welfare needs of a rural population, many of whom face serious difficulties, is huge. One of the ironies of rural reforms is that their success owes much to decentralizing, diversifying and autonomy-enhancing trends, which, however, have left a vacuum in social welfare provision. Neither central nor local government has filled this vacuum and levels of social welfare spending by the public sector in the countryside have increasingly fallen behind those in cities.

The complex forces bearing on China's future rural development are, in many ways, mutually antagonistic. Poverty is at the heart of widespread rural social anomie and a faltering agricultural economy. Continued migration, the shift towards higher-return agricultural activities and the expansion of agribusiness, agro-industry and non-farm rural economic activities, all have the potential to improve conditions for the rural population. But there are also attendant difficulties: migration may make urban resource and infrastructural pressures even more unsustainable; the shift towards higher-return farming may raise incomes, but at the expense of food security; and rural industrialization threatens to exacerbate damage to the environmental fabric.

In the end, all that is certain is that the challenges posed by complex and difficult conditions in the countryside will have to be addressed. Failure to do so would pose a significant threat to the sustainability of China's broad development prospects, including social and political transformation.

The remainder of this paper comprises three main sections. The first provides an overview of structural changes and the record of growth in the agricultural sector. The focus of the second section is narrower and seeks to address what is perhaps still the core challenge for China's farmers and the major agricultural policy issue facing the central government, that is, the performance of the grain sector and its ability to fulfil

the target of basic food self-sufficiency. The third section offers some preliminary comment on what may prove to be a landmark policy initiative in the countryside, namely, the government's apparent willingness to relax its rules on land leasing arrangements (a decision some have viewed as the precursor of the emergence of a genuine land market in rural China). The paper ends with a few concluding comments.

Structural Change and Growth in Agriculture

As Table 1 shows, the pace of structural change in agriculture under the impact of post-1978 reform has been marked. This is in stark contrast to the absence of such change during the Mao Era, when the fixation on a 'grain first' strategy ensured that crop cultivation dominated farm activities.

Between the end of China's First Five-Year Plan (1953-57) and the eve of reform, there was hardly any change in the structure of farming output. The shares of forestry and fisheries had stagnated, the minor contraction in the contribution of crop cultivation being offset by a small increase in that of livestock.¹⁴

By contrast, changes in the structure of farming output since 1978 have been quite dramatic. The principal beneficiaries of the change in output share of crop farming (from 80 percent to less than 50 percent) have been animal husbandry and fisheries. Such changes are not coincidental; rather, they reflect steady increases in per capita income, which have dictated major changes in food consumption demand and given rise to diets embodying less direct consumption of grain and vegetables and higher intakes of meat, fish, fruit and dairy produce.¹⁵ For farmers, the economic impact of these changes has been positive, generating income gains associated with the shift from low-value cereal cultivation to higher-value activities, such as fishing, livestock husbandry, poultry rearing and fruit and vegetable farming.¹⁶

Concealed in Table 1 is the important finding that output growth has accelerated under the impact of reform, albeit at differing rates within the agricultural sector.

The comparison between the years before and after 1978 is the most telling. During the Mao Era, agricultural output growth—2.8 percent per year—exceeded population growth (2 percent) by a fairly small margin, one that would have been even narrower, had it not been for the demographic catastrophe following the collapse of the Great Leap Forward. After 1978, the rate of farm output growth more than doubled

TABLE 1: The changing structure of agricultural production

	Share of each sector in agricultural gross value output (%)			
	Crop farming	Forestry	Animal husbandry	Fishing
Mao Era				
1952	85.9	1.5	11.2	1.3
1957	82.7	3.4	12.1	1.9
1965	82.1	2.6	13.4	1.8
1975	81.0	3.1	14.1	1.7
1978	80.0	3.4	15.0	1.6
Reform Era				
1980	75.6	4.2	18.4	1.7
1985	69.2	4.2	22.1	3.5
1990	64.7	4.3	25.7	5.4
1995	58.4	3.5	29.7	8.4
2000	55.7	3.8	29.7	10.9
2005	49.7	3.6	33.7	10.2
2008	48.4	3.7	35.5	9.0

Source: NBS 2009b: 10. China Statistical Abstract 2009: 124

in real terms, while population growth slowed markedly. As a result, China's ability to fulfil agriculture's most fundamental development burden, namely, to generate an increasing surplus of food and raw materials, was significantly enhanced.

Critical to any assessment of agriculture's performance is the extent to which output growth has or has not been carried by improvements in productivity. Available evidence suggests that both labour and land productivity have increased significantly since 1978.

Table 3 seeks to illustrate improvements in land productivity through estimates in average yields of important crops.

Even allowing for the dangers in comparing single years, these figures attest to an impressive yield performance: in most cases, yield growth since 1978 has outstripped that of the preceding quarter of a century – and by a significant margin. The disappointing post-1978 yield performance of grain, compared with that of the Mao Era, reflects a more faltering record since the mid-1990s: between 1978 and 1996, yields recorded an average annual growth of 3.2 percent – considerably better than in pre-1978 years. Subsequently, however, yields declined and further significant rises in output per hectare have only taken place since 2004.¹⁷

Given the increasing land constraint faced by China, rises in yields offer the firmest foundation for continued output growth in the agri-

TABLE 2: The growth performance of agriculture

	Average rate of output growth (% per annum)				
	All agri-culture	Crop cul-tivation	Forestry	Animal husbandry	Fishing
1952-2007	4.5	3.7	6.8	6.2	10.2
1952-1978	2.8	2.5	8.8	3.6	10.1
1978-2007	6.1	4.7	5.1	8.6	10.2
1978-1984	7.7	7.3	9.1	9.6	7.7
1984-1995	5.8	3.8	3.9	10.0	15.1
1995-2007	5.5	4.3	4.3	6.8	7.2

Source: From data in NBS 2009b: 11

TABLE 3: Yields of important crops

	Average yield of each crop (kg/ha.)							
	Grain	Soya	Cotton	Oil crops	Sugar	Flue-cured tobacco	Vegeta-bles	Fruit
1952	1,322.1	815.1	233.9	733.8	34,839.4	1,193.5		
1957	1,459.6	788.0	284.0	605.3	27,917.8	721.1		
1965	1,626.1	714.0	419.3	701.6	29,454.0	1,144.6		
1975	2,350.2	1,034.4	480.5	799.9	23,175.5	1,523.9		
1978	2,527.3	1,059.0	445.3	838.6	27,083.1	1,716.9		
1980	2,734.3	1,098.8	550.1	970.0	31,566.5	1,806.4		
1985	3,483.0	1,360.5	806.7	1,337.7	39,644.1	1,926.5		
1990	3,932.8	1,455.1	806.7	1,479.9	42,965.4	1,683.1		
1995	4,239.7	1,661.4	879.4	1,717.6	43,629.5	1,583.5	27,039.0	28,826.8**
2000	4,261.2	1,587.7	1,093.1	1,918.7	50,426.3	1,763.4	29,521.4*	30,178.8*
2005	4,641.6	1,704.5	1,128.9	2,149.2	60,419.3	1,956.0	31,856.2	32,995.7
2007	4,748.3	1,453.7	1,286.4	2,270.0	67,648.4	2,043.5	32,577.3	33,826.2
Average growth (% per annum)								
1952-1978	2.5	1.0	2.5	0.5	-1.0	1.4		
1978-2007	2.2	1.1	3.7	3.5	3.2	0.6	1.6***	1.5****

* For 2001 (data for 2000 not available)

** For 1996 (data or 1995 not available)

*** 1995-2007

**** 1996-2007

Source: NBS 2009b: 21-24

cultural sector. From this perspective, it is encouraging that since 1978 yield growth has outstripped the rate of expansion of sown area for every one of the crops shown in Table 3 for which data are available.¹⁸ We may infer that China's efforts to generate more intensive farm output growth are bearing fruit.

TABLE 4: Average supply of farm products per employed labour unit in agriculture

	Supply of each farm product per employed farm labour unit (kg.)						
	Grain	Cotton	Oil crops	Sugar	Fruit	Meat	Fish
1978	1,071.4	7.6	18.3	83.7	23.1	-	16.4
1980	1,088.8	9.2	26.1	98.9	23.1	40.9	15.3
1985	1,222.2	13.4	50.9	194.9	37.5	62.1	22.7
1990	1,356.8	13.7	49.1	219.4	57.0	86.9	37.6
1995	1,435.2	13.2	60.3	222.8	106.1	136.5	65.0
2000	1,406.7	13.5	89.9	232.4	189.5	183.1	112.8
2005	1,598.2	18.9	101.6	312.1	291.7	229.1	145.9
2007	1,727.9	26.3	88.5	419.9	362.4	236.5	163.5
Average growth (% per annum) 1978-2007	1.7	4.4	5.6	5.7	10.0	6.7	8.3

Source: NBS 2009b: 35

What of *labour* productivity? The lack of reliable labour supply and employment data – not least, in a situation in which a substantial, even huge, reservoir of surplus farm labour persists¹⁹ – makes it difficult to estimate output per unit of labour with any confidence. However, a recent Chinese source offers interesting insights into changes in the average 'supply' (*tigong*) of various agricultural products per member of the employed farm workforce, which point to substantial improvements in farm labour productivity since 1978. See Table 4. These are impressive figures. The rate of increase in grain supplies per employed labour unit underlines the status of grain farming as the least remunerative of all farm activities and bears out the point made above, that in search of maximum revenue or profit, farmers have taken advantage of the opportunities for diversification by shifting towards higher value-added agricultural activities outside the grain sector.

Changes in Food Consumption and the Role of the Grain Sector in China

The estimates set out in this section are just a few that highlight both the scale of structural change within China's farm sector and the positive performance of agriculture during the post-1978 transition. The changes that have taken place in the farm sector during this period are without doubt the most significant that have occurred since the great institutional

upheavals of the second half of the 1950s, when collectivization and the subsequent creation of communes transformed the face of agriculture and gave it the collectivist ethos that it retained until the early 1980s. On balance, the three-tier framework within which farming was organized during the last two decades of the Mao Era was inimical to sustained agricultural output and productivity growth. From this perspective, it is not surprising that decollectivization and gradual – indeed, at times halting – market liberalization are the forces that subsequently have had the greatest impact on farming, facilitating the twin processes of accelerated farm output growth and diversification discussed in the previous section.

Such dramatic developments notwithstanding, in one fundamental respect China's agricultural sector has not changed. I refer here to the role of the grain sector and to the fact that grain still holds the key, as it has always done, to China's future agricultural development. Even in 2009, more farmers are tied to grain cultivation – incidentally, the least profitable of all farming activities – than to any other agricultural pursuit. And disregardful of its economic irrationality, the imperative of 'basic'²⁰ grain self-sufficiency remains a cornerstone – a shibboleth even – of agricultural and economic strategy. It is with the grain sector that this section is concerned.

Dietary change and its implications for grain

The grain sector is, as it has always been, at the heart of China's food security. Until the early 1980s, the central role of grain reflected the fact that the diet of most Chinese was dominated by its *direct* consumption. Subsequently, as incomes have risen, dietary aspirations have undergone profound changes, which Chinese farmers quite successfully accommodated through the rapid growth of animal husbandry and dairy products, fish, vegetable and fruit farming. As the following tables show, since the 1980s, rising per capita incomes have generated profound changes in the pattern of food consumption among both urban and rural populations.

Between 1985 and 2007, China's annual consumption of meat (including poultry) more than doubled, rising from 15.2 million tons to about 34 million tons; during the same period, its consumption of eggs almost tripled. This is the background against which, in 2006, China became the world's largest producer of meat and eggs. These dietary trends and changes in taste reflect the impact of growing affluence and increasing urbanization, both of which are likely to be maintained into

the foreseeable future. Indeed, predictions have been made that meat consumption could reach 110 million tons by 2030.²¹

Chinese fisheries have also expanded very strongly since the 1980s.²² The industry is largely in private hands, with 80-90 percent of fish farms privately owned, and prices are market determined. China produces 70 percent of the world's farmed fish and other aquaculture products and consumes 30 percent of the global commercial fish catch.²³ Projections indicate that domestic consumption of aquatic products will rise by a further 40 percent by 2020.²⁴

Even more spectacular than that of meat and fish has been the expansion of the dairy products industry. Milk and milk products have been China's fastest growing agricultural products in recent years. As Table 5a shows, between 1985 and 2007 per capita urban consumption of such products – mainly liquid and powdered milk, but also yogurt, ice cream, butter, cheese and other items – rose by almost 650 percent, compared with 200 and 100 percent for fish and poultry and a mere 18 per cent for meat. Between 1985 and 1995, milk consumption virtually

TABLE 5A: Changing levels and patterns of food consumption in urban China

	Average per capita consumption (kg. per annum)				
	1985	1995	2000	2005	2007
Grain	134.8	97.0	82.3	77.0	77.6
Vegetables	144.4	116.5	114.7	118.6	117.8
Edible oil	5.8	7.1	8.2	9.3	9.6
Meat	18.7	19.7	20.1	23.9	22.1
Poultry	3.2	4.0	5.4	9.0	9.7
Fresh eggs	6.8	9.7	11.2	10.4	10.3
Milk	2.4	4.6	9.9	18.6	17.8
Fish	7.1	9.2	11.7	17.9	14.2
Sugar	2.5	1.7	1.7	-	-
Fresh melons and fruit		45.0	57.5	56.7	59.5
Alcohol	7.8	9.9	10.0	8.9	9.1

doubled; even more remarkably, in the next decade it almost quadrupled again. Moreover, although consumption is strongly concentrated in large coastal cities (Beijing, Shanghai and Guangzhou account for about 15 percent of all revenue from urban dairy sales),²⁵ demand is beginning to rise rapidly in other areas, including the rural sector (see Table 5b).²⁶

Chinese farmers have responded impressively to the explosive increase in demand for milk and dairy produce. Since 1985 total milk production

TABLE 5B: Changing levels and patterns of food consumption in rural China

	Average per capita consumption (kg. per annum)				
	1985	1995	2000	2005	2007
Grain	257.5	256.1	250.2	208.9	199.5
Vegetables	208.8	104.6	106.7	102.3	99.0
Edible oil	4.0	5.8	7.1	6.0	6.0
Meat	11.0	11.6	10.5	17.1	16.7
Poultry	1.0	1.8	2.8	3.67	3.9
Fresh eggs	2.1	3.2	4.8	4.7	4.7
Milk and dairy produce	-	0.6	1.1	2.9	3.5
Fish	1.6	3.4	3.9	4.9	5.4
Sugar	1.5	1.3	1.3	1.1	1.1
Fruits (incl. processed)	-	13.0	18.3	17.2	19.4
Alcohol	4.4	6.5	7.0	9.6	1.0

Sources: NBS 2007: 351, 375, 2008: 323, 347

has grown, on average, by almost 13 percent per year, from 2.5 to 32.5 million tons (NBS 2009b: 598-599). Underlying this buoyant performance, both cow herds and milk yields have risen significantly. For example, between 1985 and 2005 there was an average rate of expansion in cow numbers of just over 7 percent annually. Alongside this rapid increase in herd numbers, the average milk yield per dairy cow also almost doubled, increasing from 1,541 to 2,824 kg. (an average rate of annual growth of 3.1 percent).²⁷ If yields projected for 2030 are fulfilled, the production capacity of Chinese dairy herds will be comfortably more than domestic consumption requirements, offering significant export opportunities (especially if perceived *qualitative* deficiencies can be obviated).

Far from these changes in food consumption patterns having reduced pressure on China's grain farmers, they have, to the contrary, *increased* demand by placing a premium on the need to provide more grain for indirect use – for processing and, above all, to feed livestock. The use of grain for animal feed has already more than doubled since the early 1980s; it is estimated that by 2020 such needs will account for around a third of China's total grain demand. The added pressure on the grain sector resulting from rising meat demand derives from the conversion ratios associated with efficient cattle, pork and poultry rearing.²⁸ There are also other pressures on the grain sector that have resulted from the dietary changes under way in China. The conversion of land from arable to non-arable purposes – for example, aquaculture, animal husbandry, duck rearing and fruit farming – has at times been the source of considerable loss of land previously used for the cultivation of grain,

although available evidence suggests that such losses have been mitigated in recent years (Ash 2009).²⁹ Critically important feed supplies from the maize sector also face potentially serious constraints as a result of increasing demand for biofuels (especially ethanol), as China seeks to improve its energy security.

The Performance of China's Grain Sector under the Impact of Reform

Annual fluctuations apart, the post-1978 reforms have generated significant rises in grain supplies. As Table 6 indicates, with the sown area of grain showing a trend decline, the burden of output growth has been carried by impressive improvements in yields. But concealed in the aggregate trends are differing records among individual cereals. These are captured in Table 6.

The inclusion of estimates for the years before 1978 is a salutary reminder that despite the vagaries of policy, and the inefficiencies and disincentive effects of collectivization, the growth performance of the agricultural sector during the Mao Era was by no means unimpressive, whether compared with that of pre-1949 China or of other post-war developing countries. Perhaps more unexpectedly, between the beginning of the First Five-Year Plan and 1978, output and yield growth also compare favourably with that of the three decades of post-1978 reform. Three qualifications are, however, in order. First, during 1978-2007 the growth of both output and yields slowed significantly over time. In particular, for every crop category shown in Table 6, data for 1978-84 – years characterized by the implementation of a radical policy package, embracing decollectivization, the delegation of decision-making over farm production and distribution and a major readjustment of the inter-sectoral price terms of trade in favour of agriculture – show output and yields to have grown at rates that were unprecedented in China's post-1949 experience (Huang, Otsuka and Rozelle 2008; 479, Table 13.3). Second, against the background of a more severe land constraint, the contribution of improvements in land productivity (yields per sown hectare) to output growth was more marked under reform than before 1978. Finally, it bears repeating that whereas farming remained obsessively orientated towards grain production during the Mao Era to the exclusion of other farm activities, since 1978 grain output and yield growth have taken place alongside a dramatic process of diversification of the agricultural economy.³⁰

Analysis of grain output growth in China since the early 1990s reveals two major findings (see Figures 1 and 2 below): first, that trend growth

TABLE 6: Rates of growth of total output, sown area and yields of grain

		Average growth (% per annum)	
		1952-78	1978-2007
All Grains	Total output	2.4	1.7
	Sown area	-0.1	-0.5
	Average yield	2.5	2.2
Cereals	Total output	3.4	2.1
	Sown area	0.9	-0.1
	Average yield	2.3.	2.2
Rice	Total output	2.7	1.1
	Sown area	0.8	-0.6
	Average yield	1.9	1.7
Wheat	Total output	4.3	2.5
	Sown area	0.6	-0.7
	Average yield	3.6	3.2
Maize	Total output	4.7	3.5
	Sown area	1.8	1.3
	Average yield	2.9	2.1

Source: NBS 2009b: 13, 14, 17, 18, 21, 22; NBS 2008b: 460, 464.

has been positive; second, that production has nevertheless been susceptible to marked short-term fluctuations in both total output and per capita output.

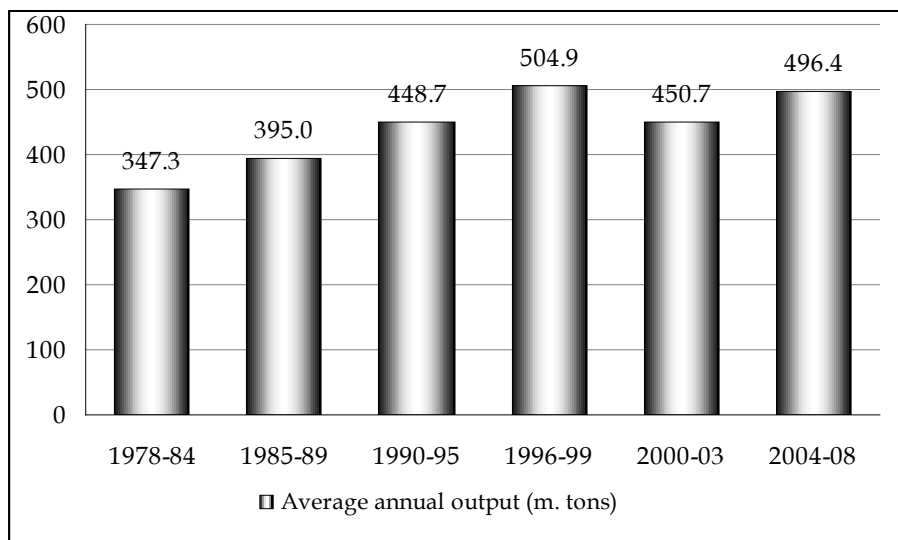
Figures 1 and 2 show that steady output growth was maintained – in both total and per capita terms – through the first half of the 1990s.³¹ But from the late-1990s until the present day, fluctuations have been much more pronounced, especially in terms of per capita production. Put another way, the estimates suggest that thanks especially to a series of record grain harvests between 1996 and 1999, by the end of that decade China enjoyed an extremely comfortable level of food security. But thereafter, a sharp downturn in production gave rise to a substantial supply deficit; indeed, between 2000 and 2003 China suffered a cumulative shortfall of some 245 million tons of grain – sufficient to meet the needs of more than 600 million people, at prevailing levels of consumption. It was against this background that, in 2004, the central government introduced a new policy package, designed simultaneously to stimulate grain production and raise the incomes of grain farmers.

This pro-farm policy package included the extension, for the first time in the PRC's history, of direct subsidies to grain farmers, as well as the

strengthening of measures to control arable land use and reduce illegal land requisitions. The steady recovery of grain output in recent years reflects the success of such policies, which have also helped increase farm incomes.³² The government also pledged 562.5 billion yuan (about US\$80 billion) in support of farmers in 2008.

The impact of these measures has been positive, although full recovery was achieved as recently as 2008, when the grain harvest overtook the previous peak level of 1998 to reach a new record output of 528.7 million tons. However, population has continued to grow, albeit slowly, and in 2008 per capita production remained 3.4 percent below its previous peak (attained in 1996). On the basis of a per capita requirement of 400 kg. – a crude benchmark considered sufficient to meet the feed and seed requirements of farmers, as well as the needs of the Chinese population (given current food consumption patterns) – total production in 2008

FIGURE 1: Fluctuations in total grain output, 1978-2008

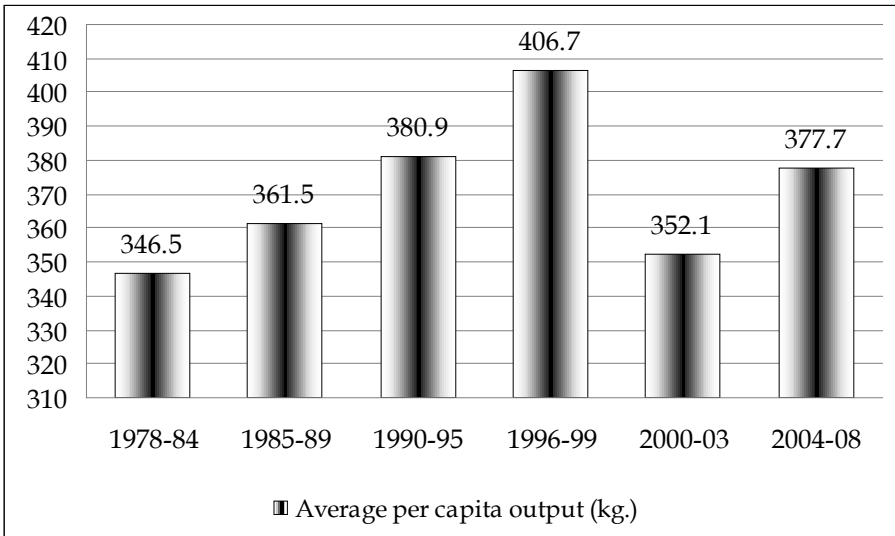


Source: NBS 2009b.

was just about sufficient to meet total demand.³³ It was still, however, almost 20 million tons below the level required to equal the previous (1996) peak level of per capita output. Such calculations underline the important point that recent harvest increases are, for the time being, best viewed as recovery, not net growth.

Disregard of the principle of comparative advantage for geo-strategic reasons has enabled China consistently to meet at least 93 percent – and often a much higher proportion – of its grain requirements from domes-

FIGURE 2: Fluctuations in per capita grain output, 1978-2008



Source: NBS 2009b.

tic sources throughout the entire period since 1978. Even between 2000 and 2003, when domestic output was falling sharply, China remained a net grain exporter. This paradoxical outcome was only made possible by massively running down its grain reserves. The depletion of stocks was, however, unsustainable, and in 2004 China was forced to turn to substantial imports to supplement domestic supplies.

China is so huge that even small changes in its involvement in international grain trade can have a global significance. So it was in 2004, when China's entry into world markets made it at a stroke the world's largest wheat importer, with gross purchases of 7.2 million tons (6.45 million tons in net terms) (Nie Zhenbang 2008: 164-65). In the same year, there were major declines in overseas rice and, especially, maize sales, although China remained a net exporter of both.³⁴ Nevertheless, overall, its trade in cereals shifted from a surplus of 19.9 million tons to a deficit 5 million tons. Its deficit position was, however, short-lived; by 2005, it had returned to the status of a net cereal exporter (which it has subsequently retained). Even so, the experience of 2004 is a reminder of the potential impact that longer-lasting changes in China's domestic farm conditions could have on the rest of the world.³⁵

Land Reform

In autumn 2008, Hu Jintao visited Anhui Province, where China's rural reforms started 30 years ago. During his visit, he was quoted as saying that the current system of land contracts, whereby Chinese farmers enjoy long-term *use*, but not ownership rights to their land, would remain unchanged. More interestingly, however, he also indicated that small-scale farmers would in the future be allowed to transfer their land lease rights.³⁶ This was subsequently endorsed in a Chinese Communist Party Central Committee (CCPCC) document, which similarly referred to farmers being allowed to 'transfer the right to operate on contracted land in the form of sub-contracting, leasing out, swap, transfer, shareholder cooperation, etc.' (CCPCC 2008 in Ash 2009: 260-82).

This initiative appeared to sanction the right of farmers to rent out their land to others, including companies, thereby offering new investment opportunities in agriculture of a kind that had been impossible within the existing framework of small-scale, household-based farming. The terminology used in the Party document seemed to envisage the emergence of a new kind of relationship, whereby enterprises outside the immediate village economy would be permitted to contract with individual households. In effect, instead of households farming their land as owner-operators, they would have the option of renting their land to outside 'companies', for which they could (if they so chose) continue to work as wage labourers.

This arrangement promised to confer three benefits:

- the return to farmers from rent payment and wages would offer a higher and more secure income than their income as owner-operators;
- the emergence of the new contractual relationships would facilitate a process of land consolidation and the creation of larger-scale farms,³⁷ with all the benefits (for example, in terms of enhanced investment, technological upgrading and higher productivity) that might result from this;³⁸
- the ability to transfer leases also opens up the possibility of farmers cashing in their land use rights and using the proceeds to pursue new entrepreneurial careers outside farming, whether in the rural non-agricultural sector or in cities.³⁹

The CCPCC document was at pains to sanction the use of land 'transfers' (*liuzhuan*), not land sales, and it reiterated the firm undertaking made by Hu Jintao during his tour of Anhui that farmers' existing

contractual rights over land would be protected (as would controls over transfers of arable land to non-agricultural uses). Thus,

Circulation of the right to operate on contracted land cannot change the collective ownership nature of land, it cannot change the usage of land, and it must not harm farmers' rights and interests regarding the contracting of land.⁴⁰ (CCPCC 2008.)

Such statements notwithstanding, the response of one Hong Kong source to the CCPCC's resolution was that it effectively marked the beginning of the process of land privatization.⁴¹ A source of concern among conservative elements in the Party is no doubt that the new policy could prove to be a catalyst for land privatization. As such, there are no doubt fears that the initiative will be used as an underhand way of extending private property, rather than primarily to raise farm incomes.

Arguments that the new policy deserves support on the grounds that it promises to be a means of empowering farmers and protecting them from indiscriminate, uncompensated and illegal land seizures – a common phenomenon in recent years – are also perhaps a little disingenuous. It remains to be seen to what extent farmers are able to negotiate the transfer of their land leases on equitable terms in the face of strong and entrenched local political power and entrepreneurial capital. One wonders, too, whether the framework of existing legislation will prove sufficient to protect farmers' interests as the new policies unfold and take effect.

A key concern must also be the employment implications of the policy initiative. The point has been made often enough that land consolidation in China is bound to result in the displacement of large numbers of farmers from the land – this in a context in which there still exists a large reservoir of surplus labour. The emergence of larger farms may be accompanied by the adoption of increasingly capital-intensive methods of production that push increasing numbers of farmers off the land and into poverty.

Finally, the transfer of land use rights threatens to deprive farmers of what has commonly been regarded as their ultimate form of social security. The vision of farmers cashing in their land use rights in the hope of establishing themselves as entrepreneurs in nearby towns or distant cities is wholly commendable. But for many of them, it may prove to be illusory. For most migrants who find jobs in cities, the work that they perform is in the informal sector and of a menial, often unpleasant nature – sometimes described as the 'three Ds' ('dirty, dangerous and demanding'). Indeed, a major contribution of migrants has been their willingness to undertake work that registered members of

the urban labour force have rejected as unsuitable and/or inappropriate to their status. But the failure rate among migrants from the rural sector is also high, and for those who find employment, job security is by no means guaranteed. Recent developments in parts of coastal China, where deteriorating economic conditions have forced the closure of many enterprises, highlight the problem. If laid-off or failed rural migrants retain the right to contracted land, they can at least return to their villages and eke out some kind of a living. Without it, they are left dangerously exposed.

Conclusion - Threats to China's Future Food Security and Grain Self-sufficiency

In considering the factors on the domestic supply side that might precipitate greater dependence on grain imports in the future, two scenarios deserve consideration: 1) a change in government policy, and 2) the emergence of unsustainable constraints of domestic output.

The first scenario would reflect a deliberate policy choice by the government, namely, its adoption of a lower grain self-sufficiency target. This might, for example, involve a change in the criterion of 'basic' self-sufficiency from 95 percent (as it is currently defined) to one of 90 percent of domestic requirements. Such a shift would confer major benefits, as it would push China towards a pattern of farm production that more closely accorded with the principle of comparative advantage. Bearing in mind the priority goal of redressing rural poverty and raising farm incomes, this would enable more farmers to move out of low-return, land-intensive grain farming to more profitable, higher value-added, labour-intensive farm activities. In addition, bearing in mind that grain imports are overwhelmingly destined for coastal provinces, recourse to higher imports would also relieve pressure on China's over-worked transport system.

The second scenario⁴² reflects acknowledgement of increasingly serious constraints on future yield and output growth. One such constraint, arguably the most serious, is that of *water*. Water shortages pose the most serious threat to farming in *northern* regions, where about half of China's grain, including almost all its wheat and maize, is produced, but with access to only a quarter of its water resources. On the North China Plain, for example, water tables are falling by between one and three metres a year, and it is thought that by 2020 groundwater may have disappeared entirely during the winter (a period when little rain

falls).⁴³ If it is successfully implemented, the South-North Water Diversion Project – a gigantic engineering project – will help allay such shortages, but this is not expected to be completed until 2050.

The problem is made worse by inefficient water use, which causes huge losses as a result of extraordinarily high leakage rates. This situation, in turn, is exacerbated by offering highly subsidized water prices to farmers, who consume more than 60 percent of all China's water. One way of addressing this problem would be to replace volumetric pricing at the village level with a pricing system targeted at individual households. But to do so would be to incur heavy transactions costs and would also threaten to impede another key government objective, that of raising the living standards of impoverished farmers, by adding to their costs.

The physical loss of arable land, already mentioned in this essay, has been a problem that has faced China for many years. Reclamation helps offset land loss, but does not wholly compensate for it, either in quantitative or qualitative terms. Between 1996 and 2007, well over eight million hectares of arable land were lost – about 6 percent of the total land base.⁴⁴ Various factors have caused this contraction: urbanization, industrialization, infrastructural construction, natural disasters and environmental policies (e.g., conversion of arable land to forest and pasture under China's 'grain-for-green' programme).

Arable land loss can be offset by increasing the multiple cropping index (MCI). In this regard, China has been quite successful: between 1996 and 2007, the MCI rose from 117.2 percent to 126.1 percent (Ministry of Agriculture 2008: 133-34). Meanwhile, the only viable way of expanding the *grain* acreage is to increase its share of total sown area. But, in fact, the opposite has been happening: the grain area is contracting, as farmers convert their land to non-grain crops to accommodate rising demand for fruit, vegetables, meat and dairy products by the more affluent population.

The policy inference of these developments is that grain output growth is becoming even more critically dependent on raising yields. By world standards, Chinese rice, wheat and maize yields are high. But maintaining yield growth will not be easy in the face of continuing water shortages and in the absence of technical advances. One of these is the need to shift from current heavily subsidized nitrogenous fertilizers – whose over-application is exhausting land fertility and causing serious environmental damage – to phosphate- and potassium-based products. Prices of compound fertilizers are, however, up to three times

higher than those based on nitrates. Low-income farmers will be reluctant to buy these products, unless the government extends subsidies to embrace better-quality fertilizers.

The commercial adoption of genetically-modified (GM) grains is another area that deserves to be explored. At present, indigenously designed hybrid *non-GM* varieties account for over 60 percent of total rice acreage in China, and it is expected that the gradual commercialization of 'super-hybrid' strains will raise yields by a further 15-30 percent. But despite the technology being available, GM rice, wheat and maize are not yet in use. On balance, it is unlikely that the government will give regulatory approval in the near future for the widespread use of GM grains out of concern that contamination of non-GM plants will affect farm exports to GM-averse countries (for example, the EU and Japan), as well as worries that commercialization may lead to dependence on foreign seed manufacturers.

Since 2004, agriculture has become a major beneficiary of large-scale government subsidies, introduced in conjunction with other stimulatory measures, such as the abolition of agricultural taxes, the accelerated development of rural public services, increased investment in rural infrastructure and the provision of small loans to farm households. From an economic perspective, the key question is whether subsidies will increase output. On balance, the answer is that they will help to do so. At the same time, if output constraints are to be effectively overcome, subsidy measures will need to be supplemented with other initiatives, including a more proactive policy towards GM crops, promotion at affordable prices of compound fertilizers and the adoption of more rational water prices.

The record of agricultural reform and extrapolations from that record leave room for both optimism and pessimism. For the time being, however, any feelings of optimism should be tempered by the undoubted scale of the problems that face the government in China's agricultural sector. These are well captured in the Central Committee's Resolution of October 2008:

The rural economic system is not yet perfect. The degree to which agricultural production operations are conducted by organisations is low. The system of markets for agricultural products, the system of socialised services to agriculture, and the system of national support and protection of agriculture are not entirely sound. The construction of integrated systems and mechanisms for urban and rural economic and social development is urgently required. The agricultural development pattern remains extensive. Agricultural infrastructure, technology, and equipment lag behind. The

quantity of arable land has been greatly reduced. Population, resource, and environmental constraints have grown stronger. The effects of climate change have intensified. Natural disasters occur frequently. Contradictions in the food supply internationally are quite significant. Ensuring the nation's food security and balancing supply and demand for principal agricultural products is under increased pressure. The level of social undertakings and public services in rural areas is rather low. The disparity in development between different regions and in the incomes of urban and rural residents is widening. The mission of changing the backward face of the countryside is arduous (CCPCC: 2008).

The list is a litany of the formidable challenges that face the Chinese government in the farm sector. It offers convincing evidence that into the second decade of the twenty-first century, the perception will remain that agriculture continues to constitute 'the foundation of the economy'.

Robert Ash is Professor at the Departments of Economics and Financial and Management Studies, School of Oriental and African Studies, University of London, UK. (r.ash274@btinternet.com)

NOTES

- ¹ *Xiangcun renkou.*
- ² In absolute terms, the rural population continued to increase after 1978, peaking at 859.47 million in 1995, but thereafter falling to 721.35 million in 2008.
- ³ That is, those engaged in crop cultivation, forestry, fisheries and animal husbandry.
- ⁴ In 1979 the farm workforce numbered 284.6 million; in 2005 the corresponding figure was 299.8 million.
- ⁵ This is the balance after deducting those employed in rural TVEs, private enterprises and self-employed individuals from total rural employment.
- ⁶ The breakdown of provinces used here follows NBS usage and is as follows: East - Beijing, Tianjin, Hebei, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong and Hainan; Centre - Shanxi, Henan, Hubei, Hunan, Anhui and Jiangxi; West - Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. In the three remaining Northeastern provinces (Liaoning, Jilin and Heilongjiang), the rural share of total population was 44.2%.
- ⁷ The agricultural share of GDP was 12%.
- ⁸ The figure for the northeast was 43%.
- ⁹ The disparities in regional contributions to TVEs' industrial value-added were even greater, with coastal provinces accounting for almost 70% of the total.
- ¹⁰ For those who are interested, relevant data can be found in NBS, *Zhongguo nongcun tongji nianjian* (China Rural Statistical Yearbook) (Beijing: China Statistical Publishing House), published annually.
- ¹¹ Thus, '[i]f we don't agriculture right, there is no hope for industry, nor will it be possible to solve the problems of food, clothing and articles for daily use' (Deng in 1962); 'the modernisation of agriculture is the key to realising the four modernisa-

tions' (Deng in the mid-1970s); 'the prime strategic focus [of the national economy] is agriculture' (Deng in the early 1980s); '[w]e must address the problems of agriculture. It is easy for rural areas to become rich, but it also easy for them to remain poor. The land only has to be farmed badly and agriculture will be finished' (Deng in 1990). (Sun, Li 1997 in Howe et al. (eds) 2003: 241-53)

¹² *Viz., nongmin, nongye and nongcun.*

¹³ In any case, in China, accelerated urbanization, industrialization and globalization should not be interpreted as inferring the marginalization of the rural sector. On the contrary, each of these processes has an important *rural* dimension. Urbanization embraces the creation of towns and small cities deliberately sited in the countryside (between 1985 and 2007, the number of 'villages' (*xiang*) in China fell from 62,851 to 15,468, whereas the number of rural 'towns' (*zhen*) rose from 9,302 to 18,584 (see NBS 2009b: 3); one of the most telling indicators of the extent to which industrialization incorporates the expansion of rural industrial enterprises; even the integration of China's economy into the global order has a rural facet (e.g., in 2007 the value of TVE exports was 3,124.3 billion yuan – a third of the value of China's total exports) (data from Ministry of Agriculture 2008: 140).

¹⁴ During the Mao Era, the pattern of food consumption also remained largely unchanged and was dominated by the direct intake of grains (including non-cereals, such as potatoes). Official data show that between 1957 and 1978 the rural Engel coefficient rose from 65.7 percent to 67.7 percent (NBS 2005b: 34).

¹⁵ In the urban sector, average per capita direct consumption of grain fell from 135 kg. to 78 kg. (1985-2007); direct grain consumption has also peaked in the countryside, although it is still significantly higher than in cities (it was 174 kg. of flour and rice in 2008). The change in diet is dramatically captured in surveys that indicate that between 1985 and 2000 the prevalence of overweight and obesity among Chinese school children (aged 7-18) increased 28 times (Yang 2006: 362).

¹⁶ Farmers have also benefited from increased demand for edible oil and other economic crops.

¹⁷ The performance of the grain sector is considered in more detail in the next section.

¹⁸ The following are the annual rates of sown area growth for 1978-2007: grain, 0.07%; soya, 0.7%; cotton, 0.7%; oil crops, 2.1%; sugar, 2.5%; and tobacco, 3.4%.

¹⁹ Measuring the scale of China's farm labour surplus is notoriously hazardous, and the difficulties are exemplified in the widely differing estimates that have been made during the post-1978 reform years. A careful study undertaken in 2008 (Fung Kwan, 'Labour efficiency and the incidence of surplus labour: experience from Chinese agriculture during reform' [unpublished paper, April 2008]) concluded that the surplus labour force in crop farming numbered about 56 million, but that when all branches of agriculture (including livestock husbandry, fisheries and forestry) are taken into account, this number rose to 116 million. This figure is almost exactly the same as the estimated surplus of around 120 million, obtained from subtracting China's farm labour requirements – 180 million – from agricultural labour supply (300 million in 2006). I am grateful to Dr. Kwan for making his paper available to me.

²⁰ In Chinese parlance, 'basic' means the provision of at least 95 percent of China's basic food (i.e. grain) needs from domestic sources.

²¹ Some authoritative sources indicate that official Chinese estimates of meat consumption significantly under-state reality. E.g., FAO statistics show average per capita meat consumption in China having risen from about 20 to 50 kg. per year between 1985 and 2000. According to the 'Chinagro-project', undertaken by a group of Chinese and European research institutes, consumption could reach 85 kg. a year by 2030 – double the level of the late 1990s and higher even than in Japan and South

- Korea. See, Center of World Food Studies (SOW-VU), Amsterdam, SOW-VU Brief, 'China's rapidly growing meat demand: a domestic or an international challenge?', available at <http://www.sow.vu.nl/pdf/Brief%20Feed%20for%20China.pdf>. Despite such high projected rates of meat demand, the Chinagro-project finds that 'by and large, between now [2005] and 2030 China's agricultural sector will continue to be capable to meet the increased demand for meat, without excessive reliance on imported feeds.' The only check on further increases in meat consumption in China is likely to be the inexorable process of population ageing, since older people tend to eat more rice, fruit and vegetables, but less meat.
- ²² The information in this paragraph is based on an insightful analysis of China's fisheries sector under the title 'Net Returns', published by *Trusted Sources* (London, 10 Oct. 2007).
- ²³ A significant proportion of this catch is processed into feed for use by the domestic aquaculture industry (ibid.).
- ²⁴ Like other activities in the agricultural sector, China's fisheries industry offers potentially lucrative export opportunities, especially if environmental supervision can be tightened to allay suspicions of Chinese products on health grounds.
- ²⁵ With fresh milk consumption in Beijing, Shanghai and Guangzhou already close to the Asian average, further increases in purchases of dairy produce in these cities are likely to come from other related products, such as yogurt, milk beverages and cheese. In this respect, it is significant that in another, higher-income Chinese community - that of Taiwan - only a third of dairy consumption is absorbed by fresh milk, compared with 22 percent each for yogurt, and cheese, concentrated milk and related products, and a further 13 percent from milk beverages. As incomes continue to rise in the most affluent Chinese cities, their residents can be expected increasingly to emulate the Taiwanese pattern of dairy consumption. As second- and third-tier cities also reach saturation point in terms of milk consumption, they too will display a similar pattern of change. Thus, the *McKinsey* article predicts that between 2006 and 2010, 70 percent of net revenue growth in China's dairy industry will have come from such cities.
- ²⁶ There is a strong consensus that the rapid expansion of China's dairy industry will continue into the foreseeable future. A crude indication of the industry's future potential lies in the finding that China's average per capita milk consumption in 2005 was about 20 percent of the world average, barely a quarter of the average for Japan, and little more than 6 percent of the corresponding US figure. It would, however, be wrong to extrapolate too readily from such figures. For one thing, while the shift towards higher milk and dairy consumption counters the traditional orthodoxy that generic lactose deficiency prevents Chinese from consuming milk and milk products in significant quantities, it does not wholly negate the reality of metabolic resistance. In 2005, Wang Huaibao (Vice-Director of the China Association of the Dairy Products Industry) pointed out that lactose intolerance was a common problem among Chinese. One survey revealed that 60 percent of Beijing residents were unable to digest large amounts of lactose without suffering rashes, diarrhoea and other disorders.
- ²⁷ Data from Food and Agriculture Organisation and University of Iowa, Food and Agricultural Policy Research Institute.
- ²⁸ The amounts of grain required to produce 1 kg. of poultry, pork and beef are approximately 2 kg., 4 kg. and 7 kg.
- ²⁹ See Robert Ash 2009: 129. Chinese Ministry of Agriculture data show that between 2000 and 2004, annual losses of arable land resulting from intra-agricultural restructuring averaged about 320,000 ha.; during 2006-08, the corresponding figure had

- fallen to less than 20,000 ha. (Ministry of Agriculture 2008: 133).
- ³⁰ Also concealed in aggregate trends since 1978 are differing performances among individual cereals. For example, it is noteworthy that contractions in the sown areas under rice and wheat contrast with a significant expansion of the maize sown area (the fact that maize is a preeminent source of animal feed, as well as of biofuel, is no doubt not coincidental).
- ³¹ The figures also highlight the danger in choosing single years as a basis on which to assess growth trends. Perhaps most notable in this regard is the contrast between 1984 and 1989, which would suggest that no growth at all occurred during this period (indeed, that per capita production of grain *declined*). By contrast, a comparison of blocks of years - in this case, 1978-84 and 1985-89 - points to an increase in both total and per capita output.
- ³² Average per capita net income of crop farmers rose by 47 percent between 2003 and 2007, compared with an 11 percent decline during 1997-2002 (Ministry of Agriculture 2008: 149).
- ³³ That is, total output (528 m. tons) was a mere 0.47 percent below total demand (1,328.02 m. \times 0.4 = 531.2 m. tons).
- ³⁴ Between 2003 and 2004, overseas sales of husked rice fell from 2.6 to 0.9 m. tons, and of maize from 16.4 to 2.3 m. tons (a decline of 86 percent) (*ibid.*).
- ³⁵ There is one crop for which China has become heavily dependent on imports, namely, soyabeans. Until 1995, China was a net exporter of soya. Subsequently, under the impact of rapidly increasing demand for meat and dairy produce, overseas purchases of soyabeans - mostly used for animal feed - rose steadily to reach almost 31 m. ton in 2007 (about twice the level of domestic output), costing China US\$11.5 billion. The impact of such purchases is suggested in the finding that if, following traditional Chinese usage, soya were included as a grain, China's national grain self-sufficiency rate would be reduced to about 90 percent. The seriousness with which China's growing soya import dependence is viewed is captured in expressions of concern that a soyabean 'crisis' is beginning to affect China's overall food security.
- ³⁶ Hu reportedly gave an undertaking to the effect that farmers would be permitted to 'transfer land contracts and management rights through various means' (China, Xinhua News Agency [XHNA], 1 October 2008).
- ³⁷ Cf. the CCPCC Document's advocacy of the development of 'operations on a suitable scale ... such as specialised big family, family farm, and professional farmers' co-operatives' (*ibid.*).
- ³⁸ Farming on a larger-scale basis would facilitate significant infrastructural improvements, such as the installation of more efficient irrigation systems, and encourage mechanization. Larger farms would also confer stronger bargaining power vis-à-vis supplies of modern farm inputs (e.g., seeds and fertilizers).
- ³⁹ As an analyst at the Chinese Academy of Social Sciences put it, the initiative would 'speed up the country's urbanization by bringing more farmers to the cities with the big farm contractors promoting modern farming in rural areas' (quoted in *China Daily*, Oct. 8 2009).
- ⁴⁰ In Jan. 2007 Chen Xiwen (Director of the Rural Work Office under the State Council) was unequivocal in stating not only that land would not be privatized, but that the government had no power to do so ('this is not a policy issue that can be decided by the central government or by departments'), given that the principles of land ownership principles were enshrined in the Constitution (XHNA, 30 Jan. 2007).
- ⁴¹ See Hong Kong, *Ming Bao*, 2 Oct. 2008, which commented 'the shackles of land ownership have restricted the entry of the capital model, leaving a 'vacuum' in the

rural areas. The resolution of the Third Plenum is considered as the beginning of privatisation of land and another reform of ownership following the introduction of the 'Property Rights Law'.

⁴² The two scenarios are of course not mutually exclusive.

⁴³ For China as a whole, more than 12 percent of groundwater resources were lost between 2002 and 2007; between 2005 and 2007 per capita water availability fell by almost 11 percent (NBS 2008b: 393).

⁴⁴ Notice, however, that there has been a sharp decline in net arable land loss since 2003 (from 2.5 m. ha. to just 40,000 ha. in 2007). See Ministry of Agriculture, 2008, op.cit., p.133.

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