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CHINA'S RURAL DEVELOPMENT MIRACLE

WITH INTERNATIONAL COMPARISONS

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CHINA'S GRAIN PRODUCTION TOWARD 2000

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A large population, scarce arable land, a backward economy, inefficiency, and the low income of the people—these are the basic points to be considered in studying any problems regarding China's agricultural development. Feeding the one billion people is of primary importance. It is a hard task for China to support 20% of the world's total population with only 7% of the total arable land on the Earth. As the economy develops and the people's income rises, the demand for grain will grow. China's per capita grain availability by the end of the century, however, cannot increase by a big margin, grain supplies will remain tight, the pressure of the grain problem will continue to exist. We cannot expect that China will become a world industrial power, which means China's grain supply will have to depend on domestic production rather than imports because China will have only a limited buying capacity in world markets. It is imperative for us to give priority to the grain problem when considering the nation's economic development.

In fact, the grain problem is a long-standing and difficult one in China. It has been repeatedly discussed nationwide. I would like first to analyze the historical background and current situation, and then give a brief picture about the future. This paper is based on the data and results of a research group within the Chinese Academy of Agricultural Sciences.

A HISTORICAL REVIEW

The grain problem has always been of greatest importance in China. The feudal system of land ownership was abolished after the people's revolution. The principle of 'land to the tiller' was realized. Then the socialist transformation of agriculture was carried out, and the agricultural economy was rebuilt on the collective-owned cooperatives or state-owned farms. All these have provided basic preconditions for agricultural development and one solution to the grain problem. An arduous struggle was waged for increasing grain output in the years after the founding of the People's Republic. There were many zigzags and setbacks as well as great successes in the past 38 years.

Generally speaking, enormous achievements have been attained in China's grain production. Total grain output scored a 2.46-fold increase between 1949

and 1986 (or an average annual growth rate of 2.5%) raising the per capita grain production by 76.6%, though the population doubled in the same period.

The development in this period was noted for the following major characteristics: (1) The proportion of cropland sown to grain declined continuously. That proportion was 87.8% in 1952, whereas it dropped to 75.8% in 1985. (2) The per unit area grain yield grew in a U-shaped pattern, i.e. the growth rate was high in the 1950s and late 1970s and early 1980s, but slowed down in the 1960s and early 1970s. (3) The average annual increase of total grain output would be much larger in some sub-periods than others if we divide the last four decades into 5 or 10 year intervals. The annual growth rates varied greatly between these sub-periods. (4) The per capita grain availability rose slightly, but never reached the average level of the world. We should point out that grain production and supplies in the past 38 years differed from time to time.

Period I (1949–1957) was characterized by a quick recovery and booming of agriculture and grain production. The reasons for this were correct policies, self-reliance, and adoption of measures suited to local conditions. In short, the guidelines were in line with actual conditions in the country. The nation's grain output in 1957 totalled 195.05 million tons compared to 113.18 million tons in 1949, or a 72.3% increase. The average growth rate was 6% a year and per capita grain production rose from 209 kg to 306 kg, a 46.4% increase. Although the production level was low and supplies were tight, it satisfied the demand and fitted the purchasing power of the people as the per capita income was also very low. The society as well as food prices were stable.

Period II (1958–1977) witnessed a sharp decline and fluctuations. The 'left' deviation caused incredible and lasting setbacks in agricultural development. The movement for creation of people's communes was launched in 1958, and the so-called 'great leap forward' was pursued, which led to a 3-year period of difficulties (1960–1962) in China. Grain production plummeted to 214 kg per capita. Severe shortage of grain made the people's life extremely difficult. Economic development slowed down and the national income per capita fell to 139 yuan. During the laborious readjustment period between 1963 and 1965, the state increased appropriation of funds for agricultural capital construction, which resulted in the rehabilitation of grain output, but this was only a temporary measure and could not eradicate the causes of the fluctuations. This 3-year readjustment was followed by a 10-year turmoil of 'cultural revolution'. While the slogan 'take grain production as the key link' was stressed endlessly, total grain output in 1977 reached only 282.75 million tons. This represented an increase of one third in 20 years (i.e. only up 1% per year). Furthermore, this period was accompanied by a rapid growth in the population. The per capita grain availability by the end of this period only just surpassed 300 kg. The rigid rationing system which had applied for more than two decades remained unchanged.

Period III (1978–1984) showed the highest advance of agricultural production. The Central Committee of the Chinese Communist Party (CCP) held its Third Plenary Session at the Eleventh National Congress of the CCP in December, 1978. Both positive and negative experiences in the past years were summed up, the 'left' deviationist lines were eliminated, a series of new policies and measures were adopted to strengthen agriculture and promote economic reforms. First, the system of people's communes was replaced by the contract

responsibility system. The farmers gained more power to decide what to produce. Second, the purchase price for agricultural products was raised. The price indexes¹ of 18 farm products, including grain, went up by 22.1% in 1979. The farmers got a large benefit amounting to 40–50 billion yuan. Third, about 40 million tons of grain were imported during 1979–1981 so that the state purchases from farmers declined by about 20 million tons in the same period. The farmers were given greater leeway to reallocate their resources. Fourth, physical inputs were increased. Total supplies of chemical fertilizers (in terms of effective elements) rose from 10.86 million tons in 1979 to 17.73 million tons in 1984, a 63.26% increase; farm machinery increased from 182 million hp to 265 million hp, up by 45.6%; agricultural electricity was up from 28.27 billion kw to 46.2 billion kw, or a 63.4% increase. The correct policies and various support measures not only provided great incentives to farmers, but also brought into full play all the farmland facilities which had been built in the past 20 years. As a result, despite the grain acreage being reduced by 6.4%, total grain output rose at an unprecedented rate. Grain output attained a significant mark in 1982, reaching 354.5 million tons, 50 million tons above the 1978 level, and another mark in 1984, amounting to 407.31 million tons, 52.81 million tons more than the 1982 figure. In other words, in the six years between 1979 and 1984, China's grain production increased by one third, or on average, 5% per year. This growth rate was more than double that in the pre-reform period (2.4%). The per capita grain production increased from 319 kg in 1978 to 396 kg in 1984, or a 24% increase. For the first time China approached the world average in respect to grain consumption. This success was a major breakthrough in China's effort to get rid of the long-standing tense situation caused by grain shortages.

Period IV began in 1985. Another agricultural adjustment has taken place in recent years with a decline in grain production once again hinting at a fluctuating situation. Grain output in 1985 dropped to 379.11 million tons, a 7% decrease compared with the preceding year. Grain production rebounded in 1986, totalling 391.09 million tons, but this was still 4% lower than 1984. The grain production plan for 1987 is unlikely to be fulfilled. Even if the autumn harvest can record an increase of 7.5–10 million tons of grain, the total grain output will not reach the 1984 level, and per capita production will also be lower than in 1984 (4–5% less). The population grew by 30 million or more in the past 3 years. Animal production has been developing rapidly and requires more feedgrain. Grain sales went up and exceeded the normal amount by 50 million tons. All these factors explain the current stiff supply-demand balance. The grain problem once again has become one of the greatest concerns throughout the country.

Why is grain production facing a stagnant situation or even a decline after the previous six good harvests? The causes are numerous. 1984 was a good crop year in most countries in the world, especially China where grain production for the first time surpassed 400 million tons. Some people were dizzy with success. They overestimated the ability of the agricultural sector to develop on its own. They also showed over-optimism about the degree of farmers' wealth. Therefore, they did not adopt a sensible approach to analyzing the transient situation in which the farmers found it hard to sell their grain.

Beginning in 1985, a series of policies and measures were adopted which unfavourably affected the farmers' enthusiasm. First, the state investment in agricultural capital construction was reduced. The share of agricultural invest-

ment in the total investment of the national economy declined to 3.4% in 1985, the lowest in post-Liberation history. Second, the grain price set by the state plan was too low, usually 50% below that on the free market. Assuming the purchased amount was 50 million tons a year, the actual losses the farmers bore accounted for nearly 10 billion yuan. Third, the prices of many agricultural inputs rose and the gap between the prices of industrial and agricultural products once again widened. The difference between these prices approached that of the pre-reform period. According to a survey in Shandong Province, the difference caused by unequal exchanges was 6,507 million yuan, 4,131 million yuan more than in 1978, or burden of 61.9 yuan per agricultural resident. Fourth, the availability of physical inputs did not increase and some were even cut back. For example, fertilizer supply and irrigated area were curtailed and diesel oil use stood still. This reduced the capacity of farmers to resist natural disasters. Fifth, the comparative advantages of grain production were eroded. While agricultural production in general was in an unfavourable condition, grain producers suffered most. The returns from Chinese rural economic sectors in 1985 varied significantly. The annual output value per labourer in primary industries was 1,178 yuan. If this value is taken as 100, then that of the secondary and tertiary industries were 433 and 533, respectively; among which, manufacturing was 533, commerce 449, transportation 386, construction 353. According to a survey of 67 households in Jiangling County, Hubei Province, the annual income per grain producer was 1,661 yuan, while that for a worker in construction, transportation, and commerce was 2,307 yuan, 3,202 yuan, and 3,840 yuan, respectively. Moreover, within the agricultural sector, grain producers' incomes were one third to one half lower than the incomes of growers of cash crops.

The population continues to increase, arable land area continues to diminish, and the growth rate of grain production has begun to slow down. It is difficult to fulfil the state contracted purchase plan. There are still poverty-stricken areas covering 100 million people all over the country, the food and clothing problems of about 40 million people are yet to be solved. This is a serious challenge to the Chinese Government. A variety of measures have been taken to support grain production. If these measures are effective, grain production will increase steadily in the future. The past experience shows that the longer grain production stagnates, the more difficult the grain problem becomes.

DEMAND FOR GRAIN

If China realizes its goal of economic growth by the end of the century and increases the national income by a big margin, the country certainly faces a larger demand for grain consumption. The people's diet will be improved remarkably. According to the projections made by the Chinese Academy of Agricultural Science, the total population will rise to 1.25 billion in the year 2000, and the people's living standard will be upgraded to a comparatively well-off level (i.e. from the level of underdeveloped countries to a level typical of the medium-income countries). If the demand for grain is then 400–425 kg/person as estimated, the nation's total requirement will be 500–531 million tons (Table 1). The 400 kg/person level should be understood as the minimum requirement if we consider the future expected changes in the people's food consumption.

First of all, the 400 kg/person level can only meet the people's basic needs rather than leave a surplus. This amount can be compared with the world average figure in 1985 of 436 kg/person and that of China in 1984 (396 kg/person). Of these 400 kg, foodgrain is expected to account for 54%, animal feed 30%, and seeds, industrial and other purposes 16% (Table 1).

Second, the minimal level of 400 kg/person by the end of the century is supported by nutrition surveys. According to the second national nutrition survey conducted in 1982, the national average food intake was: 2,485 calories, 66.5 grams of protein, and 49.3 grams of oils and fats. The calorie intake was typical of the medium-income countries in the world today, which is enough to meet human requirements. Protein consumption was inadequate, like other low-income countries. The current Chinese diet is characterized by the dominance of vegetable food with a high proportion of grain, which provides 92% of calories and 80% of protein. Hence, the chief target for improving the people's food quality is to increase the share of animal protein from the present 12% to 22%. The requirements for major varieties of food by the year 2000 will be as shown in Table 2.

Table 1
China's Requirement for Grain in 2000

Item	Proportion of total	Total output at the 400 kg/capita level		Total output at the 425 kg/capita level	
		Per capita consumption	Total requirement	Per capita consumption	Total requirement
	(%)	(kg)	(m.tons)	(kg)	(m.tons)
Food	54	216	270	229.5	286.9
Animal feed	30	120	150	127.5	159.4
Seeds, industrial uses, etc.	16	64	80	68	85
Total	100	400	500	425	531.3

If these estimations are realistic, daily per capita food consumption levels will be 2,600 calories, 78 grams of protein, 50 grams of oils and fats. In most cases, vegetable sources will still provide 80% of calories and 76% of protein. The modest per capita increase in animal products is mainly from converted feedgrain because 95% of the meat supplies flow from farming (i.e. grain-producing regions) while the vast pastoral regions can offer only 4–5% of the total, or 300–400 thousand tons per year. Although China has 220 million ha of pasture or grassland, this extensive area is less productive, with an annual output of no more than 4.5 kg of meat per ha. Even if the present productivity of grassland can be doubled or tripled, only 0.8–1.2 million tons of meat could be produced. On a per capita basis (0.64–0.96 kg), that amount would have a negligible effect on the current consumption levels. This situation will not undergo any dramatic change by 2000.

Table 2
Estimated Food Requirements in China by 2000

Item	Per capita requirement	Total requirement
	(kg)	(m.tons)
Foodgrain	216–230	270–287
Meat	22–25	27.5–31.25
Eggs	10–12.5	12.5–15.63
Milk	20	25
Aquatic products	14	18
Marine fish	6–9	7.5–11.25
Vegetable oils	6–6.5	7.5–8.13
Sugar	6–6.5	7.5–8.13
Fruits	19–25	23.75–31.25
Vegetables	120–130	150–160

The estimate that China will require, as a minimum, 400 kg of grain per capita by the turn of the century is based on careful multidisciplinary research and takes the following facts into account:

1. The estimate assumes a population of 1.25 billion by the year 2000. Every 1% increase in the population leads to a 0.83% increase in daily grain consumption, or 4 million tons per year of unprocessed grain. It will be necessary to control the population growth rate below 9 per thousand to restrain the total population within 1.25 billion. As surveys indicate, the grain consumption in 46 Chinese cities exceeded 400 kg/person in 1982; in 1983, five provinces (Jiangsu, Zhejiang, Hunan, Jilin and Heilongjiang) exceeded 415 kg per capita, while three municipalities (Beijing, Shanghai and Tianjin) topped around 450 kg, 34% of which was for feed use. It would be remarkable progress indeed to raise the whole nation's average grain consumption level in the next 13 years to the 400 kg level now achieved in the top 46 cities.
2. The people's food consumption is bound to grow and the demand for grain will be increased as their purchasing power rises. The per capita national income is expected to reach 1,200 yuan (in 1980 constant prices) in 2000, of which disposable personal income will be 804 yuan. Assume that the Engel coefficient falls from 0.53 in 1985 to 0.49 by the end of the century, then, on average, the money spent on food will be 390 yuan per person. This is the basis on which the forecasts of food requirements in 2000 have been made. It may be necessary to prevent the people's food purchasing power from exceeding this level because higher demand will create even greater pressures on grain production.
3. Future increases in grain production will mainly go to animal feed. When the majority of the population have enough grain to eat, they tend to buy more animal products of higher quality as the demand for foodgrain is price inelastic. Development of animal husbandry implies more grain will be fed to livestock. At present, about 85 million tons or 21.7% of the total

grain output is used for stock feed. The feed use is expected to increase to 150–160 million tons by 2000, or nearly 30% of the total grain requirement. Meanwhile, the industrial uses (e.g. brewing, cake making) will also rise to about 43.1 million tons, averaging 34.5 kg per person. The pattern of grain use in our country will experience a considerable change by the year 2000. The ratio between food, feed and other purposes (including seeds, reserves, industrial uses, etc.) will be 5:3:2 compared to 7:2:1 in 1980. This is the general trend in China's future demand for grain.

4. Even if the abovementioned target is achieved, China will still stand in the transitional dietary stage between 'to have enough to eat' and 'pay attention to nutrients'. The dietary improvement should be in accordance with Chinese conditions. We should consider the people's traditional food preferences, nutritional requirements, and disposable income and retain the beneficial aspects of the oriental diet. It would be unreasonable to set arbitrarily excessive targets for meat, eggs and milk consumption without considering the actual conditions in China and our productivity. Such a course could generate social unrest and other severe consequences. There is no lack of such cases in the world. Briefly, the rate of increase of animal products should not be too fast, and their share in food composition not too large.
5. Economic development has been very unbalanced between regions in China. The people's consumption level and purchasing power vary greatly. By 2000, the gap in requirements for grain between regions is likely to be enlarged. The differences between the regions in terms of the various sources of animal protein will also increase so that, by 2000, the best region will be consuming about 40% above the national minimum while the poorest will be taking only about half the national minimum (Table 3).

Table 3
Estimated Total Consumption of Meat, Eggs, and Fish in Six Agricultural Regions by 2000

Region	kg/capita	As percentage of the national minimum ^a
South	72.5	139.4
Middle and lower reaches of the Yangtze River	65.5	126.0
North-east	50.0	96.2
South-west	34.0	65.4
North	33.5	64.4
North-west	27.5	52.9

^a The national minimum is assumed to be 52 kg/capita in 2000

Our projections indicate that the growth rate of purchasing power will be higher in the middle to lower reaches of the Yangtze River, the South and the

North-east and 30% above that in the North, South-west and North-west. Consumption of rice and wheat in the three northern regions will be only about a half of that of the three southern regions, implying that coarse grain will still make up a noticeable portion in the daily diet in these regions. Consumption of foodgrain and animal products will depend largely upon local supplies with only supplementary exchanges between regions because of unbalanced economic development and limited transport facilities.

AN OUTLOOK ON FUTURE GRAIN PRODUCTION

There are three scenarios concerning China's future grain production by 2000 based on the past 38 years' development of grain production as well as on considerations of the required target. According to the lowest, medium and highest scenarios, the total grain output of China will be 500 million tons, 530 million tons, and 550 million tons, respectively. In order to reach a basic balance between the total grain demand and total supply, it is necessary to do our utmost at least to realize 500 million tons which, as argued above, is the barest minimum. Even the medium production target can merely assure per capita availability at the 425 kg level (the population is assumed to be 1.25 billion), which corresponds to the world average in 1985. We must endeavour to make the 530 million tons scenario a reality.

According to the medium projection, China should increase grain production by 138.91 million tons in 2000 in comparison with 1986. It may well be asked: is it realistic for China to attain the medium goal? I think the answer is positive. As described before, the average annual increase of grain output in the past 37 years was 2.5%. Much higher growth rates were observed during that period: 6% between 1949 and 1957 and 5% between 1979 and 1984. If we are able to maintain a 2% increase annually in the remaining 13 years, the medium target can be guaranteed.

The most important way to raise grain output is to enhance the productivity of land. If the production conditions can be improved and adequate quantities of inputs be ensured, the per mu grain yield can be lifted to 315 kg by the year 2000, or an annual increase of 5 kg. That will not be very difficult. In the period between 1949 and 1984, the per mu yield increase was 4.8 kg a year, while in the 1978-1984 period it was 12 kg a year. In order to increase the per mu grain yield from 180 kg to 300 kg or more, the southern provinces of Jiangsu, Zhejiang, Hunan as well as Shanghai municipality took roughly 10 years. Similar progress was reported in more than 20 counties of the northern provinces of Hebei, Henan, Shandong and Liaoning. Thus, the key point to attaining a continuous growth of grain production in the 13 years to come, is to create production conditions similar to that which exist in the high-yielding localities of the leading grain-producing areas of the country.

The area of newly reclaimed wasteland is likely to be enough to offset only the areas devoted to non-agricultural uses in the future. Intensified management will remain the major source of growth in grain output. It is important to adopt interplanting and intercropping, to regain the multicropping index level of 1.55, and to maintain a total sown area of 2.3 billion mu. In this case, the grain area can be kept at 1.67 billion mu (111.33 million ha). Total grain output can be

increased only by using adequate acreage for grain growing and by making the other necessary physical inputs available.

About 150 million tons of grain will go to animal feed, implying 500 million mu are needed to support animal husbandry. In order to supply enough grain for food and animal feed², it is desirable to make the following readjustments to the national cropping patterns: (a) converting 30 million mu of rice fields in southern regions into corn production with soybean as the intercrop, so that animal feed can be provided nearby; the use of rice for animal feed is uneconomical. In turn, 30 million mu in the northern regions can be reallocated to rice production where water supply is adequate so that the people's diet can be improved; (b) a part of the acreage under corn for grain in the northern regions is to be changed gradually to corn for silage use; (c) a portion of the corn and sorghum growing area can be intercropped with leguminous plants, which can be cut as animal protein fodder; (d) 30 million mu under sweet potato can be used to plant high-yielding forage crops; (e) cultivation of green manure crops is to be resumed and popularized; a part of them can be first used as forage, thereby increasing barnyard manure to benefit cropland fertility. China's traditional double-component cropping structure (foodgrain-cash crops) will gradually proceed to a triple-component one (foodgrain-animal feed-cash crops).

It is widely accepted that enhancement of yield per unit area is the decisive way to increase total grain output, but there have been many debates about the priority to be placed on raising crop yields. Some authors reported that the greatest potential lies in the medium to high yielding arable land with irrigation facilities. This category of land is followed by the dry farming area characterized by medium or low yields. These two categories can be the major sources of increased grain production. The regional development strategy for grain production should be aimed at consolidation in the South and the North, development of the intermediate zone, and protection of the North-west and South-west. The South (i.e. the middle and lower reaches of the Yangtze River) characterized by abundant water, warm climate, fertile land and a developed economy, has been the leading grain producing belt. The North refers to the Songjiang-Nenjiang Plain in the North-east, which has also been China's breadbasket and has a great potential yet to be tapped. By the intermediate zone we mean the Huanghe-Huaihe-Haihe River Plain (including Hebei, Henan, Shandong, and northern parts of Anhui and Jiangsu) and Fenhe River Valley and Weihe River Valley (in Shanxi and Shaanxi provinces). Climate is temperate in this zone. Geographically, it is connected with the rest of China by numerous roads and economic ties. A great number of water conservation works have been completed since the 1950s, and tremendous socioeconomic changes have taken place in the last 6 to 7 years. This vast area can be built up as an important grain and oilseed production base. In short, our efforts should be directed to the South, North and the intermediate zone. The central government should cooperate closely with relevant provinces and work out feasible plans to consolidate the old and build new commercial grain bases. The scarce funds available should not be dissipated on the regions which are beyond our capacity for the time being.

Specifically, the measures which need to be taken if we want to realize the grain production target in 2000 are as follows:

1. There must be increasing amounts of material inputs made available and their efficiency must be raised. For example, 48 million tons of fertilizers (in terms of plant nutrients) are needed to reach the desired level of grain production by 2000 of which chemical fertilizers and organic manure would be 50/50. That is, the former should go up from 17.76 million tons in 1985 to 24 million tons. Meanwhile, the current ratio of nitrogen, phosphorus and potassium (10:3:0.5) will be gradually changed to a relatively more rational level of 10:6:2. Demand for agricultural chemicals, highly effective with least toxicity to human beings and with low residue, will rise to 210,000 tons; the ratio of pesticides, fungicides and herbicides being 6:2:2. Output of plastic film for farm use will come to 700,000 tons. The irrigated area will be enlarged to 800 million mu, with emphasis on completion of conveyance systems to make full use of existing water conservation projects and to adopt water-saving irrigation techniques. Farm machinery services need to be strengthened and renewed; machines should be complemented with the necessary auxiliary instruments. The engine power of irrigation machinery will account for more than one quarter of the total power used in agriculture. While increasing the physical inputs, we should devote major efforts to popularizing adequate techniques to improve traditional methods in fertilization, irrigation, tillage and field operations. In such a way, we will upgrade the efficiency of physical inputs. If the efficiency of fertilizers applied rises from the present 30% to 40%, this method alone means increase the use of fertilizer by one third. Likewise, if the utilization ratio of irrigation water is raised from 35% to 45%, that will result in nearly a 30% enlargement of the benefited area.
2. Efforts are to be made on scientific-technological progress and popularization of a set of suitable yield-increasing measures. It is necessary to use the existing achievements in agricultural research and transfer them into real production. This not only increases output, but also saves investment. There are at least 10 measures that can be used in grain production: (a) a set of cultivation techniques suitable to different regions for high and stable yields; (b) a number of fine quality seeds and hybrid combinations of grain crops; (c) recommendations for high-yielding fertilizer application measures; (d) water-saving irrigation techniques; (e) moisture-retaining techniques in grain field tillage under dry farming systems; (f) integrated control systems for pests, diseases, weeds and rodents; (g) ameliorative techniques for low-yielding cropland; (h) high-yielding cultivation techniques for protective ground; (i) energy-saving mechanized tillage techniques; and (j) cultivation techniques for a variety of multiple cropping systems. All these techniques are easy and highly effective, and if used appropriately according to local conditions, they will result in sizeable returns.
3. A reasonable proportion of public funds should be invested in agricultural capital construction. Past experience has shown that agricultural investment by the state was an influential factor in grain production. It has been

estimated that 1,000 billion yuan needs to be invested in agriculture to realize the goal of grain production by the end of the century. Of this amount, 70% has to be raised by the farmers' own efforts, 20% will come from the rural industrial enterprises and grain credits, and the remaining 10% requires government financial appropriation. The latter will mainly go to large-scale agricultural engineering projects. For this reason, the state should ensure that 10% or more of the total investment in capital construction of the national economy goes to agriculture. This percentage was as high as 17.7% in the 1963–1965 period of readjustment. It is not an undue burden for the government to maintain a 10% investment in agriculture in the years to come. It is feasible but requires a significant increase relative to the 1986 level of state investment.

4. Grain purchasing and marketing policies must be managed to protect grain growers' interests. China's grain problem, in the final analysis, is one of providing marketable grain to the urban population at a price acceptable both to the state and to the farmers. This is a complex problem of universal concern as prices touch everybody's interests. It is impossible to abolish the planned contract purchase in a short period of time because of the large population, low agricultural productivity and limited government financial resources. The purchasing and marketing policies can be adjusted step by step, and the grain purchasing prices can be raised steadily. As an interim measure, a double-track price system may be desirable now. That is to say, the price of the government purchase (50 million tons of grain) is set at the state fixed level, supplemented with some preferential support payments; the rest is to be procured from the farmers at market prices. In recent years, the market prices for the major grains have been higher than the state purchase prices by 50–60%. This difference should be shared by the state and the urban consumers together. Then, step by step, the state purchase prices should be raised to approach the open market level. At the same time, it is important to control the prices of the means of production. The grain producers will keep their mind on grain production until the opportunity cost of grain production equals that of other possible activities. That is the basic reason for raising grain purchase prices and for regulating the interests of all sectors. On the other hand, the control over grain marketing should also be relaxed gradually in terms of the purposes and regions. The state monopoly over marketing of grain used in the food industry, brewing, 'food for work' projects, rewarding enterprises for overfulfilment of the state plans, animal feed, seeds, etc. should be lifted item by item and step by step. That could be done in one region at a time. It is possible to open grain markets first in the more developed grain producing provinces after conducting experiments at selected points.

CONCLUSION

To sum up, it is a quite complicated and peculiar problem to consider grain production in China by 2000. If we are able to reach our projected minimum target of grain output, the per capita availability will not change markedly. It is expected that supply-demand balance will be barely maintained; while in good

years China may gain a 5–10 million tons surplus, the same amount of deficit might appear in bad years. Grain exports or imports will be necessary to maintain the balance. In order to get rid of such a tight situation, we have to depend mainly upon our own efforts to increase domestic production and to build up food security reserves. It is impractical to import large quantities of grain over a long period of time. The grain problem is still the top priority issue in the development of the national economy. We must not, in the slightest degree, weaken our efforts, even in a bumper crop year.

NOTES

- 1 Calculated on basis of the state-set price, negotiation price, and above-quota price (which is higher).
- 2 It is estimated that 260–295 million tons of concentrates will come from feedgrain, husk, oilseed meal, feed crops and green manure crops; 700–950 million tons of fodder will be provided by forage grass and straw; and silage will account for 750–1000 million tons.