China can solve the problem of feeding its population

by Peng Jiangliang

Peng Jiangliang is Chief of Division I, China State Farms Economic Reconstruction and Technical Development Center, of the Chinese Ministry of Agriculture.

China is a developing country with the largest population in the world. Its GDP in 1994 was about $500 billion, and its per capita GNP over $400 (at the 1994 exchange rate). On Feb. 15, 1995, the whole population of continental China topped 1.2 billion. In the next decades, there will be an increase of 400-500 million people, according to present growth rates. If more grain and food cannot be produced, not only will the problem of feeding Chinese be hard to solve, but this unfavorable situation will affect the whole world. In fact, in recent years, some scholars, both at home and abroad, have wondered whether China can solve the problem of feeding its population in the future. The book, *Who Will Feed China?* by Lester Brown, director of U.S. Worldwatch Institute, has exerted the greatest international influence. Brown thinks that China's grain supply capacity will decline by one-fifth the current level by 2030, because China's grain production is severely restricted by various factors. If annual per capita grain consumption amounts to 400 kilograms, there will be a shortfall of 378 million tons of grain. Then, although China has sufficient ability to pay for imported grain, the international market will not be able to supply that much grain. So, Brown concludes, nobody can feed China. Moreover, China's purchases will make the world hungry. Brown's views have produced certain effects within China.

The question is, can China actually solve the problem of feeding its population in the future?

Objectively analyzed, China's agriculture, especially grain production, faces serious restrictions.

First, the quantity and quality of the cultivated land area are continuously declining. In respect to quantity, in 1952, China's cultivated land area was 108 million hectares; but in 1994, only 95 million hectares; there was a reduction of 13 million hectares in 42 years. In just the 14 years between 1980 and 1994, there was a reduction of 5 million hectares. Per capita cultivated land area dropped 1.7 times, from 0.19 hectares in 1952 to 0.08 hectares in 1994. At present, in one-third of the provinces and municipalities of the whole country, per capita cultivated land area is less than 0.067 hectares (1 *mu*); in some developed coastal areas such as Shanghai, Guangdong, Fujian, and Zhejiang, per capita cultivated land is below 0.04 hectares. With high-speed economic development, especially with the acceleration of urbanization and a continuously increasing population, if the tendency to reduce the cultivated land area cannot be controlled effectively, or new land cannot be opened up for cultivation, China's total, and per capita, cultivated land may decline to 80 million hectares and 0.067 hectares, respectively, by the end of this century, and will decrease in the next century.

In respect to quality, China has 35 million hectares of high- and stable-yield farmland, and about 60 million hectares of mid- to low-yield farmland, but at present, average costs of transforming mid- to low-yield farmland increased by over 100%, compared to the 1980s. The massive and irrational use of chemical fertilizers, especially nitrogenous fertilizer, destroys the environment as well, causing the organic matter in the soil to decline, and topsoil to erode badly. According to calculations, in China, the nitrogen, phosphorous, and potassium in annually eroded soil amount to 40 million tons of standard chemical fertilizer, but China's present chemical fertilizer production capacity is just over 20 million tons.

Second, natural disasters are severe. From the 1950s to the 1980s, serious floods or drought occurred, on the average, once every three years. Every disaster reduced grain production by 15-20 million tons, and caused heavy losses of peasants' lives and property. Since 1990, disasters have happened more frequently, and economic losses always increased, never decreased. In 1991, direct economic losses from the floods in the Yangtze and Huihe river valleys amounted to over RMB 70 billion yuan, equal to the sum total of national water control capital construction investment in previous years (the RMB-dollar exchange rate is currently 8.31 to 1). In 1994, floods and drought reduced grain production by 12 million tons, which made the relationship between supply and demand for grain much more strained, and aggravated the pressure of inflation. This year, flooding in some areas of the Yangtze River valley, and drought in other places, constitute a latent threat to agricultural production. In fact, there has been some reduction of early rice output in some places. Water control facilities, out of repair for years,

seem helpless before serious floods and drought. Losses from agricultural disasters will be heavier, if the construction of control facilities cannot be strengthened, and irrigation and drainage facilities cannot be improved.

Meanwhile, with the accelerating process of "marketization" of the economy, the market system is obviously strengthening its role in allocations of resources, while the capacity of the central government for macro-control is reduced more than ever. Local governments and peasants are decreasing low-return agricultural production, under the "guidance of the market" and the drive to increase profits. In just four years, between 1991 and 1994, China's land area sown with grain—a low-return crop—was reduced by 4 million hectares, including over 3 million hectares in the mid to lower reaches of the Yangtze River and southeast coastal areas, which caused a big reduction of grain and great regional changes of national grain production. The traditional pattern of "grain sent from the south to the north" is changing into "grain sent from the north to the south." As the market economy increases, if the central government does not strengthen its protection of agriculture, it will be difficult to increase grain production in a stable manner, and, thus, solving the problem of feeding the population may be more difficult.

Enormous potentialities

Although China's grain production faces serious restrictions, the potential for increasing production is still enormous. China has vast territory, rich natural resources, and great potential in the depth and breadth of its agricultural development. According to materials provided by the Ministry of Agriculture, total potential grain production, calculated according to the light, climate, water, and soil resources China has, could reach 926 million tons, over twice the present actual output. In respect to increasing the extent of cultivated land, China has over 30 million hectares of wasteland suitable for agriculture; more than 13 million hectares of that can be developed as cultivated land; and land readily reclaimable in the coming years will amount to nearly 9 million hectares. Calculated according to the current per-unit-area yield, grain production can go up at least 40 million tons. In respect to developing the capacity of cultivated land, the current yield of mid- to low-yield farmlands, amounting to nearly 60 million tons, can increase to more than 100 million tons of grain, if investment in these areas is increased, and methods of cultivation improved. Besides, China's present multiple crop index of cultivated land is only 155%, but the theoretical value can amount to 198% (the practical value is over 218% in some areas), or 43 percentage points of potential. According to the research of the scholars concerned, raising the multiple crop index by 15 percentage points can yield an increase of 60-80 million tons of grain. Therefore, from the angle of resource potential, it is certainly possible that China will increase its grain self-sufficiently in the coming decades.

In respect of techniques, now nearly half the agricultural regions in China still depend on traditional techniques to increase production. However, while, all over China, rewards are given to farmers for 6,000 agricultural technological achievements each year, owing to various restrictions, the transformation rate is only about 30%, and fewer than 20% of these better techniques are put into widespread use. The rate of the contribution of scientific and technological progress to agricultural output, is only 35%, half that of developed countries. If traditional techniques can be improved, and advanced techniques can be widely used, there will be a big increase in the productivity of cultivated land and total agricultural output. This can be illustrated by a few examples:

1. **Improve the varieties of crops.** According to research, in the next 28 years, with a big increase in scientific investment, improvement of crop variety can raise per hectare yield of rice, wheat, and corn, respectively, by 5.2, 5.65, and 7.83 tons, equal to 92%, 176%, and 172% of the current level. In that case, grain yield will double, even with little or no change in the area sown to grain. In fact, there was a 240 million ton increase of paddy in a short time, after new varieties of hybrid rice, bred through research by Yuan Longping, China's "father" of hybrid rice, were widely distributed and used. In Hunan, Yuan's home province, per hectare rice yield of 0.6 million hectares of land topped 15 tons. Owing to the use of fine varieties of corn, per hectare corn yield topped 16.5 tons in some areas. Thus, there is enormous potential for increasing production through improving varieties of crops, and this can be turned into reality.

2. **Use straw from crops as fertilizer.** China's agriculture was world-famous for using organic fertilizer, but in the recent, nearly 20 years, the use of organic fertilizer has been reduced to a minimum. Five hundred million tons of straw from grain crops is produced yearly, which has rich nitrogen, phosphate, and potash nutrients, but this straw has been generally burned or wasted. According to calculations, the nutrients in 100 kilograms of fresh corn stalks is equal to 2.4 kg of nitrogenous fertilizer, 3.8 kg of phosphate fertilizer, and 3.4 kg of potash fertilizer, respectively. Other crops' straw is also rather nutrient-rich. The rate of output may increase 10-15%, if crop straw is crushed and used on the soil. This measure alone, according to the most conservative estimation, could provide a 30-40 million ton increase in grain output.

3. **Improve fertilizing techniques.** In China, the volume of application of nitrogenous fertilizer per unit area has reached a rather high level, but only 30% or so is absorbed by crops; most of it runs off or permeates the ground. Some experts determined that there could be an increase of over 10 million tons of grain, if the rate of utilization of nitrogenous fertilizer were raised 10%, equal to applying an additional 10 million tons of nitrogenous fertilizer, and this could increase

grain output by over 10 million tons. In fact, this is completely possible. The results of experiments with wheat and corn in the north China plain, show that 1 kg of fertilizer can increase output by 1 kg, by improving the techniques of using carbon, ammonium, and urea.

In China, there is an enormous potential for saving grain, from the heavy losses after harvest. According to investigations, in China, 100 million tons of grain is lost during the course of harvest, storage, transport, processing, sales, and consumption every year. If the conditions of these operations can be improved and management strengthened, a saving rate of even 20%, would be equal to increasing grain supply by 20 million tons.

Moreover, China has 220 million hectares of grassland available, over 60 million hectares of hills and mountains, over 3 million hectares of coastal beaches, and 2 million hectares of continental water. At present, the rate of utilization of these regions is rather low. However, by improving and sufficiently using these resources, there could be a big increase in husbandry and aquatic production.

To sum up, at future food structure and consumption levels, China can meet its demands with about 600 million tons of grain, even though the population of China amounts to 1.7 billion; judged by the potentials on all sides, there can be an increase of about 230 million tons of grain, and the whole volume of grain supply can reach 600 million tons during the period of maximum population. In this case, the balance of supply and demand can be more easily maintained with a small amount of imported grain.

Countermeasures to be sought

Whether or not China can solve the problem of feeding its population completely depends upon whether the central government has sufficient authority to unify willpower, arouse the enthusiasm of the peasants and local governments, and make up its mind to surmount the restrictions and thoroughly tap latent potential.

Gratifyingly, the Chinese government and people have a clear and complete understanding of the difficulties and the existing enormous potential for solving the problem of feeding the population, and are seeking solutions. Both in existing policies, and in the medium- to long-term program for agricultural and national economic development now being researched and drafted, great importance has been attached to some crucial problems, such as those below:

1. **Place priority, in economic work, upon strengthening agriculture.** With the aim of increasing the effective supply of agricultural products and raising peasants' income, the policy is to continuously promote the reform of agriculture and the rural economy, and the agricultural product distribution system; to further arouse the peasants' enthusiasm for production; to quicken the development of agricultural industry to provide sufficient production materials for agriculture; to implement the capital farmland protection law; to control the reduction of the quantity and quality of cultivated land; to perfect the system of the government's macro-control; to support and guarantee agriculture; to strengthen the production of agriculture; and so forth.

2. **Increase agricultural investment.** The basic Agriculture Law stipulates that the percentage of increase of annual investment in agriculture from the national budget, must be higher than that of running income of the national budget, while at the same time actively using foreign funds and guiding the peasants to increase agricultural investment. In fact, from this year on, the agricultural investment of the central government and all levels of local governments has obviously increased. The central government has planned to strengthen the harnessing of big rivers and construction of agricultural water control facilities, to quicken the pace of comprehensive development, and to raise the level of production across the board.

3. **Promote the progress of agricultural science and technology.** Mr. Deng Xiaoping, the qualified leader of China, has always indicated that agriculture must depend on science. Further, in May 1995, the Central Committee of the Communist Party of China put forward a strategy of "invigorating the country through science and education." This gave outstanding importance to promoting agriculture, through use of science and technology, and taking a series of concrete measures. These measures included increasing the funds for scientific research for agriculture, organizing the key scientific and technological tasks, emphasizing applied basic research, research on seed selection for new crops, comprehensive use of mid- to low-yield farmland, high-output and high-efficiency planning and breeding techniques, intensive production techniques, agricultural resource development and utilization, environmental coordination of development techniques, and so on. The Ministry of Agriculture has put forward and is planning to spread widely, application of ten advanced techniques, to increase agricultural output considerably in the near future.

In the central government's plan, by the end of this century, China's grain yield needs to increase by 50 million tons, and both meat and aquatic products by 10 million tons, which can basically meet the demand of 1.3 billion people. In the next century, with strengthened comprehensive national power, China will be strong enough to build agriculture production, tap further agricultural potential, and produce enough grain and other food to meet the demands of 1.6-1.7 people.

Jiang Zemin, the President of China, has repeatedly emphasized that a great country with a large population like China, must be self-sufficient in grain; the balance between supply and demand must be well maintained. This indicates that China is not only determined to, but is able to, solve the problem of feeding its population. It may be predicted that China will be able to solve the problem of feeding its population, and will not make the world hungry in the future.