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COMMENT ON "WHO WILL FEED CHINA"

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ABSTRACT: With respect to population, cultivated land, yield potential per unit area, consumption standard and so on, this paper discusses and analyses the main ideas and conclusions of the article "Who will feed China", and puts forward advantageous proposals. The author thinks that this should arouse our urgent and crisis feelings of developing agriculture and make us take feasible measures. Only doing so can we feed ourselves and can our economy get sustainable and stable development.
KEY WORDS: population, land, yield potential per unit area, consumption standard

I. MR. BROWN'S MAIN OPINION

Mr. Lester Brown, president of the World Watch Institute in the U. S. A, published a long article titled as "Who will feed China" in 1994 (Brown, 1995), which aroused great responses from home and abroad and attracted much attention from all sides. The main ideas of the article include the following three points:

(1) It is estimated that the population of China will increase 490 million from 1990 to 2030, up to 1,600 million; the cultivated land of China is affected by the modernization of the economy, and is even disappearing; in addition, the potentiality in increasing the production per unit area of agriculture plants such as grain, wheat, etc. is limited. As a result, the grain production in 2030will be 20% lower than that in 1990, only up to 263 million tons. Only the growth in population is considered, China's demand for grain will increase to 479 million tons in 2030, which would leave a shortfall of 216 million tons. Further, more requirement for livestock products after the people becoming rich considered, the grain demand will be 641 million tons, if calculated by 400 kg per capita grain consumption (such a consumption level would be roughly the same as Taiwan today, or half the U. S. A.). Comparing with the actual production, there are 378 million tons of shortage.

(2)Even if taking 216 million tons as the amount of the grain shortages, the amount is already over the whole world grain exports in 1993 (200 million tons). Calculated by 378 million tons, the import grain will be 59% of the total grain consumption of China. Without respect to

the problem whether there is enough finance for importing grain, it is impossible for the world grain market supporting such great amount of grain. So the discussions about who will feed China arrive.

(3)The grain shortages will end the Chinese economy miracle prematurely.

II. DISCUSSION AND ANALYSIS ABOUT MR. BROWN'S OPINION

Mr. Brown's opinion is really considerable and alarming. As a bachelor, Mr. Brown indicted the probable crisis of China in the future, which can arouse our feelings of urgency and crisis for agriculture development and prevent us from falling into panic and being at a loss. So, discussing and analyzing Mr. Brown's conclusions can help us to strengthen agriculture efficiently, assure the stable rise in general farm products such as grain, cotton, vegetable oil and so on, and make the grain productivity come up to a new level.

1. Problems in Population

With a big population base, the absolute increase in population of China is still very great even if the growing speed slow down. According to the study of a research group on population in the research project named as "Study on the Land Resources Production Capability and Population-Supporting Capacity in China" (Chen, 1991) in which the author jointed as the president, using the population predicting model made by ESCAP of the United Nations, and taking different total birth rate and expected life-span as the main factors for the multi-planning prediction, we predicted that the population in 2025 will be 1,570 million under the condition of normal controlling effort. If the control is effortless, it will be 1,630 million. The prediction was relied on the base of the population in 1985. If the population at the end of 1994 used as the base, the predicted population will be 1,600 million in 2030 even if the growing rate per year of the population decreased to 0.8% (between 1949 and 1994 the rate was 1.78%). Therefore, it can be said that the growth in population which Mr. Brown indicated will be much probably appear and even more serious.

2. Problems in the Cultivated Land Reducing and Disappearing

Mr. Brown considered that the cultivated land of China is reducing continuously and even disappearing during the period of transition from agricultural society to industry society. It touched off a debate. Some criticisms indicated that the cultivated land of China would never disappear, and so on. Factually, saying "is disappearing" is strengthening the reducing extent of cultivated land, does not mean that it will "disappear totally" afterwards. The key to the question is to find out the real situation and the reason why the cultivated land is reducing for the purpose of putting forward proposals at last.

(1) It is undoubted that the cultivated land is reducing seriously at a dangerous speed. However, how much cultivated land in China exist and how much is remained after the reduction are still not clear. We don't know clearly, not to mention Mr. Brown.

At present, the published area of the cultivated land in China is about 95 million ha on "Statistical Yearbook", at the same time it being noted that the number is some smaller and need to be further verified. It is the official published number and is generally thought some smaller than it really is. Then what is the definite number? After the general land use investigation, the formal published number is about 120 million ha. The author, being in charge of the research project "Study on the Land Resources Production Capability and Population-Supporting Capacity in China"(Chen, 1991), by means of measuring the area which depending on the scale of 1:1,000,000 land resource map of China and deducting the reduced number after mapping, think that in the middle 1980s the cultivated land of China was 133 million ha and 37% larger than statistical number of the same time. In view of these, there are three data series :95,120 and 134 million ha, the last two are some believable. It means that the real cultivated area is 40% more than the published area on the yearbook.

As to the extent of the reduced cultivated land, "Statistical Yearbook" expressed that the area of the national cultivated land was 98 million ha in 1949, in 1957 it increased to 112 million ha, thereafter, it began decrease. In 1978, it reduced to 99 million ha and its average decreasing rate was 0.593 million ha per year during 1957 – 1978. After that, the reduction in cultivated land became decrease for a time. At the end of 1983, it was 98 million ha. On an average, there was 0.206 million ha of reduction in cultivated land each year. From 1984, the reducing rate became rising again. The area dropped to about 95 million ha at the end of 1994. On an average, the reducing rate was 0.326 million ha per year. Comparing the area in 1994 with that in 1957, the net reduction in the cultivated land is 16.92 million ha and the average reducing rate is 0.498 million ha per year, which means the reducing extent is 15%. Since the National Land Management Bureau was established, many detailed classification investigations and statistics on the national land use have been made and the data were some reliable. According to the material from the bureau, the cultivated area occupied for other purposes is 4.813 million ha from 1987 to 1994, 0.602 million ha per year; meanwhile, some cultivated land was expanded through reclaiming wasteland, tapping coastal beach and recovering cultivated land. As a result, the net reduction is 1.767 million ha, with an average reducing rate of 0.221 million ha per year. Among the reduced cultivated land in the 8 years, three constructions (of nation, the collective, individual building in rural areas) occupied 21.2%, the adjustment on agricultural structure (changing the cultivated land into garden, fishing pool, nursery, forest land, pasture land) occupied 61.4% and the destroyed land by disaster occupied 17.4%. From above analysis we can see that the occupying proportion of agriculture structure adjustment is not only the highest but also remains at high for ever. In 1993 and 1994, the proportion was 67.7% and 63.4%, which were over the average proportion of the 8 years.

(2)As above description, we can draw the following two conclusions: 1) The real cultivat-

ed area in China is probably 40% more than the published number on statistic annual which Mr. Brown knows about. It means that approximate 40 million ha of cultivated land, which is equal to the sum of cultivated area of England and French, was not recorded. So we can say that there is still a room for maneuver for China. Relying on the research subject "Study on the Land Resources Production Capability and Population-Supporting Capacity in China" and using the real cultivated area, we can estimate that the cultivated land will reduce to 123 million ha and the sowed area will be 141 million ha in 2025. According to these, it can be said that China would hold above 120 million ha of cultivated land and above 140 million ha of grain sowing land in 2030.2) Up to now, overview from the whole country, the main factor that can exert the reduction is the usage change from cultivated land into other kinds, not the course which Mr. Brown supposed. He guessed that, during the economic developing period, 100 million agricultural laborers will shift to industry departments. If one factory contains one hundred persons, one million factories and many storehouses and roads as accessory need to be built, which will occupy a large amount of cultivated land. As to the agricultural structure adjustment, two sides should be considered. Before 1992, it was necessary and should be continued to return the non-arable land to woodland or pasture in farming and stock breeding interlace zone and farming and forest transition area. Another consideration is, generally speaking, that agricultural adjustment lost its reasonableness gradually after 1992. For example, the east and the region along the coast, with some advanced economy, have changed much cultivated land, even including good farm land which has high and stable productivity into orchard, fishing pool or nursery. It has already weakened the cultivation as the agricultural foundation and not only affected the grain production but also has broken the reasonable agricultural inner proportion. We should pay enough attention to it.

3. Problems in the Potential Yield per Unit Area

Mr. Brown thought that the yield per unit area of rice in China has approached that in Japan and the increasing rate begins drop, either of the wheat. Then he reached a conclusion that it was limited to increase the potential yield per unit area of crops further.

Predicting the potential yield per unit area is a complex problem. Many scientists has carried on calculation and analysis on theory. Also, Food and Agriculture Organization of the United Nations (FAO) has uphold many research projects to inquire into it. The current research report on prospecting on the world grain situation in 2000 put forward: 1) In China, a country with the most rice production, although its rice planted area is probably reducing, the yield per unit area will increase fast. 2)The foreseeing increase rate per year of the world wheat production can approach 1.7%. Among this, the rate in developing country is 2.6%, in advanced country it is 1.5%, and about 96% of the increase will come from the augmentation of yield per unit area. The above research conclusion from agriculture specialist has certainly more authority than Mr. Brown's opinion. In the research project "Study on the Land Resources Pro-

duction Capability and Population-Supporting Capacity in China", we calculated exactly the potential grain productivity with agri-ecological zone method which FAO used (the factor about productive forces was adjusted according to Chinese situation) and came to a conclusion that the present grain production has only approached about 50% of the maximum possibility of the productivity(not the theoretical highest limitation, but the level that can be approached), so the potentiality is still great. In regular political and economic circumstances, the grain production of China can keep the increase rate of 1.3% per year between 2000 and 2025 with most possibility.

4. Problems in Consumption Level

Mr. Brown thought that millions of new richer in China might increase the consumption of livestock products therefore the average consumption of grain would increase. The tendency is clear. After Chinese people becoming rich, their diet becomes variety. They used to take the starchy grain as the main diet, but now it is meat, milk and eggs. At the beginning of the economic reform, only 7% of grain used as fodder, but now the rate has increased to above 20% and most of these is used for pork production. However, under the definite level of the agricultural productivity and the population situation, it must be pointed out that consumption should be led reasonably and reflected to the procession of production in order to make the production components satisfy the nutrition need. If the developing country, being at the stage that economy is not fully-developed enough, tending prematurely toward the high consumption level at high economic advanced stage, i.e., the consumption surpassing the current producing stage, will be very disadvantageous for the national economic development and the improvement on people's living condition. Therefore, this kind of consuming, which is not mature enough, could not be taken as judgment standard. Mr. Brown also mentioned it after he published the article "Who will feed China" and pointed out that the averaged consumption standard he used should be lowered. According to the new standard, he estimated again the amount of grain that China need import.

5. Problems in Comparing with Japan, Republic of Korea and Taiwan Province of China

Mr. Brown introduced the examples from Japan, Republic of Korea and Taiwan Province as comparison and lessons. He showed the altercation of Japan, Republic of Korea and Taiwan Province, which have large population, after the industrialization, during which the cultivated land changed into nonagricultural usage continuously. The cultivated land in Japan reduced by 52%,42% in Republic of Korea and 35% in Taiwan Province; along with this, the grain production reduced continuously too. From the highest production, it reduced by 33% in Japan, 31% in Republic of Korea and 19% in Taiwan Province; further, with the growth in population and more grain requirement for good living, till 1993, Japan has imported 77% of grain,

Republic of Korea 64% and Taiwan Province 67%. Mr. Brown thought that China would follow with them and would import 59% of grain in 2030.

How to use the experience of Japan, Republic of Korea and Taiwan Province during the industrialization for reference is also a complex problem, which can not be said clearly in this article. However, it can be affirmed that the process of industrialization in China don't necessarily follow with Japan and Republic of Korea and we ought and also have the possibility to avoid the problem in agricultural production, just as the author analysis.

However, we can't ignore that some cases appearing in some area with advanced economy just is similar with that in Japan and Republic of Korea. For example, in a special economic zone, the cultivated area has reduced by 70%. In consequence, when the grain provision become intense the provision system by means of bill has to be resumed. At the same time, we should pay attention to that the industrialization of the countryside has been on the way of diverse development from the beginning. Among the town and township enterprises of the whole country, 1% is situated in county town, 7% in administrative town, and among the other 92% of these, small in market town, most in village and below. The overdue dispersion made the land use scale larger by one third and the problems which may weaken the grain productivity appeared, such as wasting land, enclosing large amount of farm land. We should learn the lesson from all above analogizing with Japan and Republic of Korea.

In addition, the reason why Japan and Republic of Korea increase the grain import with great range is not only the cultivated area reducing, but also the need of importing the grain and agricultural products as exchange of exporting large industrial products. An important reason for the conflicting of trade between Japan and America is that America impose Japan to open its grain market further.

III. INSPIRATION FROM ABOVE DISCUSSIONS AND ANALYSIS

(1) Since it is inevitable that the increasing peak of the population in China will come up to 1,600 million or even more, the urgent problem is how to postpone the coming of the population apex and keep it at 1,600 million around. Therefore, from now to the 2030s is the key period for controlling the population. Controlling force and public opinion must be strengthened further by increasing the social pressure and making public opinion on fertility to make the people lower the desire for more children, and to relax or even reduce the disapproving feelings and conflicting action to the national population policy. In addition, in this period, the burden on population of labor force of our country is the least and the population of labor force occupies the most part in total population. Under the similar predominance in population, Japan realized its economic flightiness. So, we can say that it is also a precious opportunity for our country's economic development. A good population quality must be prepared for improving the process of economic development. Particularly, wiping out illiteracy in rural areas is the prerequisite. We must improve the laborer's skill in production and strengthen the training on various practical

technique to make the farmer attain secondary school education level in the first part of the next century.

(2) Recently, the consumption for food (including meat, poultry, eggs, milk and alcoholic beverages) increases faster than the production. It is also an important reason for the intensive situation on grain supply. Therefore, according to the national situation we should control the need for grain consuming and make up a scientific objective model of our country's diet component to lead the consumption and advocate moderate consumption. These measures should be placed at the same important station as controlling the population. The people must be told frankly and sincerely that we have no conditions to balance with advanced countries such as America, neither with Taiwan, Hongkong and Macao. This choice is not alternative and is the only wise one which can make our nationality abstain from high eagerness on consuming and balance intention.

(3)Market economy is controlled by both the need and the provision. On the relationship between the need and the provision, the provision of land is thought as the dominant, because great amount of grain will be required for feeding the people up to 1,600 million and the room for providing is small. The nation must monopolize the whole provision of land. Only when the people's "grain bags, vegetable baskets" is pledged, can the land for construction be provided. And the side which require the land should be led to use land sparingly and improve the land use efficiency in taking up various constructions. The construction of the cities and towns and developing region must enliven the store land instead of enclosing the cultivated land continuously, centralize to use instead of using separately.

The main ways to delay the reduce of cultivated land are fundamental farm land protection,crop land recovery and wasteland reclamation. The State Council published "the Routine for Fundamental Farm Land Protection" in July 1994, thereafter, divided several fundamental protected regions all around the country. By now, seventeen provinces have already completed the planning for fundamental farm land protection and about 70% of the total cultivated land has been efficiently protected . The facts show that the protection policy has played a great role in protecting the cultivated land efficiently. We should perfect the policy continuously and strengthen the force in land supervising when enforcing the law. As to land reclaiming, the National Land Management Bureau claimed in "The Ninth Five Year Planning Outline on the Whole National Land Recovering", which was formulated recently, that six major regions would be chosen from the country for carrying out the land reclaiming program, and up to 1996, 133 thousand ha of discarded land should be recovered to make the amount of land reclaimed within a year equalize the land discarded in the same area. During the ninth five-year plan period, we will reclaim and control 0.7 million ha of various discarded land and strive to make the reclaiming rate increase to 30% (at present, it is about 4%). From a long point of view, there is about 13 million ha of wasteland in our country, among which 70% to 80% can be cultivated and 10 million ha of cultivated land will be added. At present, we has about 10 million ha of wasteland can be exploited into arable land. In the near future, some little con-

fined wasteland can be chosen to be reclaimed into arable land; in medium future, middle confined wasteland can be considered. The net arable land will add up to 7. 5 million ha^2. Although it is very difficult to recover the land and reclaim the wasteland under the condition of current fast economic development. Only in this way can we feed ourselves and develop our economy sustainably and stably.

(4) Increasing the yield per unit area will become the key factor for ensuring the increasing of total grain output under the condition that the amount of cultivated land will reduce inevitably from now on. Just as above description, the yield per unit area of cultivated land of our country is far from the due productivity. So, besides quickening the process in breeding new varieties and spreading the hybrid rice we should strengthen the infrastructure reconstruction of farm land, improve the quality of the cultivated land and transform medium and low productivity land into higher degree. The raised productivity from these steps will have great important effect on sustainable and stable grain production.

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