

Development and Constraints of Food Industries in China

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Abstract

China is a large food-producing and consumer country. The issue of food for its people has always been of major importance. China's grain, meat, aquatic products and fruits have reached or exceeded the world's average in per capita output. The food industry has become one of the most important industries in China, and ranks first for the total output value among all industries, accounting for 10% of GNP. However, China's food industry is still less developed on the whole. The ratio of food industry to agriculture in total output value is only 0.43 : 1, and the structure of the food industries is not particularly efficient. Most of the current food-processing methods are still the old traditional ones. Owing to the limited capacity of storage and processing, the magnitude of postharvest losses in fresh fruits and vegetables is estimated at 20-50%, depending on the commodities. There are some technical problems, such as large consumption of raw materials and energy, low utilization rate of materials, and shortage of special-purpose varieties for processing, etc.

Now, China's food industry is being faced with major challenges, as well as plentiful opportunities. The Chinese government should pay close attention to the food industry's development and promote the intensive processing of grain and all types of farm, livestock and fish products. This can be achieved by increasing the food industry's input and improving the conditions for food production, optimizing industries and products structures, applying high technology and industrializing material processing.

Introduction

Diet level is an important index of civilization and the people's life quality of a nation. The food quality and supply situation are directly related to the health and physical condition of all people, as well as the political stability and social progress of a country. The developed countries pay great attention to the development of the food industry.

China is a large developing country, whose basic national policy is to constantly improve the people's standard of living. China has scored remarkable achievements in actively expanding food and agricultural production. China has supported 22% of the world's population on only 7% arable land, thus making an important contribution to the world food program.

Review of development of China food industry

China's grain, meat, aquatic products and fruits have reached or exceeded the world's

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average per capita output (Table 1). The sustained and rapid development of food and agricultural production has further improved the standard of living of the Chinese people and laid a foundation for the overall national economic growth and social stability.

Table 1 Yield of major agricultural products in 1997

Item	Yield (10,000tons)	Average output per capita (Kg)	1987-1997 average increase rate (%)
Grain	49,000	396.8	1.97
Meat	6,200	50.2	10.8
Eggs	2,100	17.0	13.5
Milk	810	6.6	7.9
Aquatic products	3,600	29.1	12.4
Vegetables	31,300	253.0	7.2
Fruits	5,000	40.5	11.6

Significant changes have taken place in the food structure. The proportion of animal food increased dramatically and the nutrition level has markedly increased. The food industry is one of the largest industries in China. During the period 1950-1980, the food industry was primarily focused on the rough processing of food : cereals, oil, meat as well as production of basic raw materials such as sugar and salt. Since the 1980s, food manufacturing, particularly intensive processing of food has markedly expanded and an integrated food industry system has been developed. By 1996, food industry enterprises in China had amounted to 60,406, employing 4.71 million people, and with a gross industrial output value of RMB 470 billion, a net value of fixed assets of RMB 276.8 billion, and a total pre-tax profits of RMB 102.57 billion (China Statistical Yearbook, 1997). The food industry ranks first for gross output value among all the industries in the national economy. The food industry gross output value has remained at over 10% of GNP for a long period of time, becoming a key industry in the national economy (Shao, 1992).

Since the 1980s, the average annual increase rate of the food industry has been maintained at more than 10%, although this percentage is still 50% lower than the national industry increase rate during the same period. According to experts' predictions, China food industry will continue to expand in future. It is expected that the gross output value of the food industry in 2000 will reach more than RMB 700 billion, with an average annual increase rate of 11% (Tables 2, 3).

As the food industry increasingly developed, there was a rapid growth of output of major foods, which played a significant role in keeping markets brisk, ensuring supply, and improving the people's standard of living (Table 4).

The expenditures for food items account for 50% of the total living expenditures for consumption. In short, the food industry has reached a moderate scale and played an important role in the national economy. However, many problems should be addressed in taking account of the development of the national economy and the improvement of the standard of living of the people.

Table 2 Increase of gross industrial output value of food industry
(100 million yuam)

Year	1978	1986	1987	1988	1989	1990
Output value	813.5	1629.2	1814.3	2088.5	2157.0	2285.0
Year	1991	1992	1993	1994	1995	1996
Output value	2529.5	2828.83	3253.8	3834.2	4268.38	5741.4

Source: 1) Article by Qi, L., China Food Industry 1998, 5 (1) : 6.

2) Book by the Ministry of Light Industry, China Food Industry Yearbook 1997, pp. 63-203.

Table 3 Increase of gross industrial output value of food industry and industry
(%)

Year	1991	1992	1993	1994	1995	1996	91-96
Food industry	10.70	11.83	15.02	17.84	11.36	11.08	11.04
Industry	17.92	21.17	37.52	36.82	27.68	17.66	23.78

Sources: 1) Book by the Ministry of Light Industry, China Food Industry Yearbook 1997, pp. 63-203.

2) Book by the China National Statistical Bureau, China Statistical Yearbook 1997, pp. 42-427.

Table 4 Output of major foods
(10,000 tons)

Year	1980	1990	1996	1980-1996 Annual average increase rate (%)
Edible vegetable oil	222.00	544.00	946.54	9.5
Sugar	257.00	582.00	640.20	5.9
Salt	1728.00	2023.00	2903.57	3.3
Canned food	57.16	157.10	282.61	10.5
Beer	68.80	692.00	1681.91	22.1
Dairy products	6.30	31.36	50.41	13.9

Source: Book by the China National Statistical Bureau, China Statistical Yearbook 1997, pp. 42-427.

Problems of food industry and strategies

1 Food industry and agricultural development

Food industry is closely linked with agriculture, since the food industry is a processing industry of agricultural produce, and a continuation of agriculture. In the developed countries, the food industry output value is usually one to four times greater than the agricultural output value. On the contrary, this ratio in China is 0.43 : 1, while the ratio in the developed countries is 1.5-4 : 1 (Zhang, 1992), for example, 3.7 : 1 in UK, 2.7 : 1 in Japan, 2.6 : 1 in France, 2.0 : 1 in USA. In the developed countries, almost all the original farm, livestock and aquatic products

have to be processed before being allowed to appear in the market. This is why the food industry output value is generally two to three times as high as the agricultural output value. In the developed countries, the proportion of processed foods in food consumption increases gradually, being approximately 80%, or even 90%, while the proportion in China is only 30-40%, and the other foods are all original agricultural products. In recent years, China's agriculture has developed rapidly, and due to good harvests, special problems have occurred, including "difficulties in selling grain", "difficulties in selling pigs", and "difficulties in selling fruits", etc. A rather large part of agricultural produce has rotted causing a heavy loss due to the lack of processing on time. The food industry, therefore, is still less developed compared with agriculture, indicating the large potential of the food industry for development. The concept of Chinese food in the 21st century will not be based on the consumption of non-processed food anymore, and processed food will assume a leading position in food consumption. In the middle of the 21st century, per capita GNP will attain the level of intermediately developed countries, and three meals a day in the household will be composed of processed food, accounting for 80-90% of the foods (Zhang, 1992).

2 Structure of industries and products

1) Structure of industries

Based on the inner structure of the China food industry, there is a distortion characterized by "two big ends and a small middle part". In 1989, processed products of grain, oil, slaughtered animals, sugar and salt accounted for 40.75% of the food industry gross output value, of which grain accounted for 17.54%, oil for 6.55%, slaughtered animals for 8.26%, sugar for 5.77%, salt for 2.66%; the other large part was represented by favorite products-cigarettes and wine and spirits, accounting for 31.9% of the total output value, of which cigarettes, and wine and spirits reached a value of 21.2% and 10.77%, respectively. The sum of these two parts (ends) accounted for 72.68% of the food industry gross output value, while the foods consumed as meals in the household accounted for a small proportion, only 27.32% (Zhang, 1992). In the economically developed countries the roughly processed foods in the food manufacturing industry account generally for only 20% to 30% of the total output value. Therefore, further development of the food industry should be based on a change of the industry structure in which roughly processed and favorite products weigh too much, by actively promoting the food manufacturing industry, such as drinks, dairy products, canned foods and seasoning industries.

2) Structure of products

(1) Special foods

Although food variety has increased compared with the past, there is still much room for changes in the product structure. Most of the present foods are oriented to ordinary people and lack consideration for the age or special needs of other consumer groups. For example, the output of foods for babies and for elderly people is relatively small against a large market. China is the most populous country in the world, with 23-24 million newborn babies every year, 95 million children under 3, 310 million children under 14, 122 million pupils, and 100 million people over 60. Foods suitable for people of different ages should be developed in accordance with the physiological characteristics of the people. Special foods for particular occupations, common diseases, and pregnant women, etc. should also be considered and developed. China is

just starting to be engaged in this area which has a bright future.

(2) Instant foods

Instant foods have registered a rapid growth in the developed countries. In 1994, on the average, each household spent about 20 minutes for preparing a dinner in European countries and USA. At present, instant foods account for 20% of the food market in USA and can be cooked within 10 minutes (Shen, 1997). With the increasing pace of the life style and increase in earnings in China, there is an urgent need for the development of convenient staple foods and non-staple foods, which will lessen housework. However, instant foods presently cannot meet the consumers' needs both in terms of varieties and quantity, because there is a shortage of serial and diversified variety of instant staple foods and other foods in the market apart from instant noodles and fast frozen Chinese dumplings. With the initiation of a staple food project (kitchen project), the sales volume of instant foods is going up. Nevertheless, the instant food industry in China is relatively less developed. Up to 1996, processed meat products in China amounted to only a little more than one million tons, accounting for 2% of the total meat production. Considering that processed meat products accounted for 40% to 70% of meat production in the developed countries, China has a large potential market for processed meat products (Chong, 1998).

(3) Functional foods

With the economic development and improvement in the standard of living of the people, foods should become diversified, leading to the development of functional foods. Some industrially developed countries, such as Japan and USA, have invested a large amount of money and manpower to conduct research on Chinese medical diets and various traditional functional foods based on modern science and technology. China's research and development in the field of functional foods are just beginning, and currently Chinese functional foods still represent the first or second generation of products, while Japan has already produced the third generation of functional foods. Therefore, it is necessary to use modern technologies such as separation, extraction, recombinant technology, etc. to develop various types of combined functional foods so as to satisfy the needs of different consumers. These functional foods include food for elderly people, recovery food, medical food, baby food with immune function, etc.

(4) Dairy products

Many Chinese people do not usually consume milk and dairy products, and per capita consumption of fresh milk was 6.6 kg in 1997. There is a considerable difference between China and the developed countries in terms of dairy product consumption and production level. Hence, it is important to expand milk production and the dairy product processing industry, to increase people's intake of milk and dairy products, and to improve the people's physical condition.

The structure of industries and products in the food industry is not particularly efficient and needs to be adjusted. It would be impossible to develop a food structure in which meat, dairy products predominate in the people's diets. It is possible, however, to emphasize agricultural produce, and meanwhile, to actively develop other edible resources.

3 Utilization and development of food resources

Farmers in China account for 70% of the total population. Commodity rate of agricultural

produce is low and a large amount of food resources is directly consumed in the household without industrial processing. In the past years, grain processed using modern industrial technology accounted for only 35% of the total grain output, the oil crops processed with modern extraction techniques for only 20% of the total output (Lu,1987). In the developed countries, edible resources have been fully utilized. For example, the utilization rate of corn in the developed countries reaches 99% by using the modern wet processing method, while over 90% of corn in China is used as ordinary food and feed.

The agricultural produce used as raw materials in the food industry is highly perishable. Currently, the postharvest processing capacity for the agricultural produce in China is less than 20% of the total output, while the postharvest processing capacity in the developed countries accounts for more than 60% of the total output. In China, the grain loss rate during storage is 9%, amounting to about 22 billion kg, and the postharvest loss in fruits and vegetables is as high as 25%, amounting to about 68 billion kg, while the postharvest loss in fruits and vegetables in the developed countries is lower than 5%. In 1997, China's fruit yield reached 50 million tons, being two and half times higher than in 1990. Owing to the limited export and domestic sales volume, fruits used for processing as canned fruits, fruit juice and other products amounted to only about 8 million tons, less than 20% of the total yield. Thus the problem of "difficulties in selling fruits" occurred, leading to serious losses by rotting. In the developed countries, 50-60% of fruit yield is used for processing (Kong, 1998). Therefore, efforts should be made to promote preservation, storage and processing of grain and all types of farm, livestock, and aquatic products so as to enable these products to enter the market in the form of finished products or semi-finished products, which would be more convenient for the consumers and would reduce losses and waste.

The food resources in China are relatively low. While making full use of the present food resources, China should actively develop new food resources, and comprehensively use agricultural produce, thus providing more processed foods.

4 Enterprise scale and technology level

China has 60 thousand food-processing enterprises, most of which operate on a small scale. Due to the small scale, low strength, antiquated equipment and technologies, and poor management, small and medium-sized food enterprises produce low quality products with high production costs and low utilization rate of raw materials, leading to low economic benefits. In the case of the dairy product industry for example, per capita annual output of milk powder in the developed countries is 20-30 tons, and each ton of milk powder requires 0.8-1 ton of standard coal, while in China per capita annual output of milk powder is only 2-3 tons, and each ton of milk powder requires 2-3 tons of standard coal. During the period 1977-1979 in the USA, a per capita output value of the food industry was US\$ 127, 830 (Lu, 1987), while in 1995, China's labor force production rate in the food industry was RMB 95.2 thousand per capita per year. China, therefore, should enhance its strength by combining enterprise groups or forming joint ventures to enlarge the production scale and importing advanced technologies and equipment. The application of advanced and new technologies has characterized the food industry technology development. Only by using high technology, can high-value added products be produced and enter the international markets for competition. The most advanced processing technologies

in the field of food industry include sterilization (ultra high temperature and ultra high pressure), membrane separation, biological technology, freezing technology, microencapsulation technology, aseptic production technology, recombinant structure technology, super critical fluid extraction technology, etc.

5 Development of packaging and food machinery industry

China's packaging and food machinery industry which was introduced in the 1970s, developed gradually in the 1980s and rapidly from the 1990s with an average annual increase rate of 30%. This industry achieved an output value of RMB 20 billion in 1996. Currently the packaging and food machinery industry is relatively less developed in terms of product varieties and manufacturing technology. Only 5-8% of the total equipment reached the international level of the early 1990s and most of it has remained at the international level of the late 1960s. The whole level of the packaging and food machinery in China lags behind that in the developed countries by more than 20 years. In the last decade, China imported many production lines, but for a variety of reasons these lines were not used fully. Since 1980, China has imported more than 50 concentrated fruit juice production lines (Hu, 1998) and over 100 Tetra Pak production lines. In 1990, about 20% of the imported fruit juice concentrating equipment was not used at all. Even if some of the equipment was used, the run rate was also very low (Liao, 1997). Nevertheless, China's packaging and food machinery industry is developing steadily and it is predicted that the total output value of the whole industry will reach RMB 40 billion in 2000.

6 Varieties of raw materials for processing and raw materials base

Raw materials are considered to be the first link in the food processing chain. Only from high quality raw materials can excellent products be obtained. Food enterprises in the developed countries usually have their own raw materials for production. The current situation in China is that food enterprises process whatever is sold in the market. Generally speaking, the surplus agricultural produce for fresh sale could be used for processing.

In fact, there are differences between the agricultural produce for fresh sale and that for processing in terms of variety and quality requirements. China lacks special-purpose varieties for industrial processing. The varieties used in fruit and vegetable processing are mixed varieties of uneven quality, unsuitable for machinery processing, which exerts a negative influence on product quality and economic benefits. Since the present wheat varieties are not suitable for processing special-purpose flour, large amounts of wheat with a high gluten content are imported from abroad every year. Growing structure and feeding structure in agriculture should suit the requirements of modern food processing, through the development of raw materials bases at the district level with varieties of good quality and promotion of steady development of agricultural produce, thus providing a sufficient and steady amount of high quality materials for the food industry.

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