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The Emerging Dairy Economy in China: Production, Consumption and Trade Prospects ¹

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Abstract

Currently per capita consumption of dairy products in China is low. In view of China's strong economic growth and the resulting higher consumer income, whether this would represent a great market potential for dairy products has drawn much interest from the dairy industry both within and outside China. This paper overviews China's dairy market with up-to-date information and highlights important factors affecting its development. The study shows that the growth of demand for dairy products in China is promising. However, despite the fact that China's accession to the WTO will result in reductions in trade barriers, a substantial increase in exports of dairy products to the Chinese market is unlikely in the near future. This is due to a number of reasons including taste differences between the Chinese and the consumers of those major dairy exporters. Increased understanding of the Chinese dairy markets and increased attention to modifying their products to suit the tastes of the Chinese are essential for dairy exporters to succeed in the Chinese market.

Key Words: Dairy market, China, WTO, Agribusiness

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The Emerging Dairy Economy in China: Production, Consumption and Trade Prospects

1. Introduction

Due to traditional dietary preferences and tastes, the consumption of dairy products by the majority of the Chinese has been very minimal. However, as a result of the rapid increase in consumers' income and the exposure to western culture in the recent two decades, many have predicted that the consumption of dairy products by the Chinese is to be on the increase (Wang and Fan 1999; CIAT 2000). Indeed, in the past years, the consumption of dairy products by the Chinese has been increasing, especially in the urban areas. Nationally, per capita milk output has increased quickly from less than 1 kg in 1970 to more than 7 kg in 2000. To meet the increased demand, the Chinese dairy industry has also expanded. Total milk production has increased from less than 0.6 million tonnes in the early 1970s to more than 9 million tonnes in 2000. Realising the health benefits of consuming dairy products, the Chinese government has also in recent years started to emphasise the importance of dairy consumption and the need to expand China's dairy industry (China Dairy Net 2001).

Despite its recent development, the Chinese dairy industry today is still characterised by its very small size, domination by numerous small-scale producers, and its less advanced processing and marketing techniques. China's domestic supply of dairy products cannot meet the demand and imports have to be resorted. Given that China is now a member of the WTO, China is obliged to reduce its tariff rates for dairy imports and imports will become easier. Then, can foreign dairy companies expect to substantially increase their exports to the Chinese market in the near future? Will the market potential soon become business opportunity for foreign dairy exporters? An understanding of the current status of the Chinese dairy market – the characteristics of dairy production, consumption, processing, marketing and trade – will help to answer these questions.

Viewed as an emerging market with enormous potential, efforts from both overseas and within China have been made to studying China's dairy market. Rabobank conducted a survey in four major cities in 1997 to look into dairy consumption behaviour of urban residents. The survey focused on three types of products, namely, liquid milk, milk powder and ice cream (Wei and Venry, 1998). EU commissioned the Centre for International Agricultural Trade (CIAT) of the Chinese Academy of Agricultural Sciences and the Research Centre for Rural Development (RCRD) of the Ministry of Agriculture to examine various issues related to China's dairy market development (CIAT 2000; RCRD, 2001). Some Chinese researches also studied some specific milk issues (e.g., Wang and Fan 1999; Tuo 1999; Li 2000; and Yuan 2001).

This study adds to the understanding of China's dairy market by highlighting the characteristics of China's dairy production, consumption, processing, marketing and trade.

We then provide our assessment on the likely changes that may take place in the Chinese dairy market following its joining the WTO. We will also address the likely factors that will impact on future development of the Chinese dairy market. Finally, we offer our views on how to approach the Chinese dairy market in order to tap any business opportunities.

2. Dairy Production and Consumption

2.1 Milk Production: Dominated by Small-scale Producers

2.1.1 Milk production: the past

In the past five decades, China's milk production experienced two broad stages: very low production (prior to 1979) and rapid milk production expansion (from 1979). Prior to 1979, priority was given to grain production and very limited resources could be devoted to milk production. Consequently milk output was low and was only marginally over one million tonnes till 1979 (see Table 1). There were some medium and large-scale milk-producing firms in suburban areas of larger cities, where they had the location advantage to supply the urban consumers. However, milk production was largely confined to some pasture regions with a subsistence nature. Private animal raising was restricted after rural collectivisation. State or collective-owned dairy farms were the key milk suppliers. With limited supply of raw milk, dairy product processing was undeveloped. Liquid milk and milk powder were almost the only products available and the government supplied milk under rationing to infants, aged and sick people mainly at the state-set prices in urban markets.

[Table 1 here]

In 1979 rural economic reforms started. Animal husbandry was one of the few sectors that were first reformed and deregulated. Private cow raising began to emerge in the early 1980s. State and collective dairy farms also responded to increased demand for dairy products and expanded their production. The government also took a wide range of measures to promote dairy production, including the provision of concessional loans for investment, feed subsidy, supply of improved breeds, and the provision of technical assistance to producers. Many city governments supported dairy production and processing to ensure local supply. Subsequently, milk output started to increase rapidly (Table 1).

The injection of foreign capital and introduction of advanced technologies also promoted China's milk production. As early as in the mid 1980s, some international organisations and foreign governments began to provide technical assistance in developing China's dairy industry. The UNDP sponsored a project for developing dairy production in six major cities during 1984-90. The EU implemented an even bigger project in 20 cities during 1990-94. With a total funding of US\$156 million, these projects made a significant contribution to the increase in China's milk production (RTDDI 1997, P61; Tuo 1999, P46). During the early 1990s, milk output continued to increase rapidly. By 1995, it reached almost 7 million tonnes (Table1).

2.1.2 Milk production: the present

Despite the rapid expansion in the past two decades, China's dairy industry is still very small compared to many other agricultural industries. Examining dairy production in China, three characteristics stand out: small scale, low yield, and high on-farm consumption. According to China's first agricultural census, there were 3.3 million head of dairy cows by the end of 1996. Seventy seven per cent of these cows were owned by 820000 households, with each having three animals on average. On the other hand, there are only 5271 larger non-household firms, with each having 145 animals on average (Table 2). The yield per cow is low. Statistics from the Chinese Cow Association show that on average an adult cow produces about 3520 kg of milk each year in 1998, about two thirds of the world average of 5500 kg (www.brightdairy.com). A substantial share, over 30 per cent, of the milk output is used on farm. Nonetheless the market sale share had increased from less than 30 per cent in the early 1980s to over 60 per cent by the late 1990s (Figure 1).

[Table 2 and Figure 1 here]

In China, milk production is broadly categorised into three production systems: pastoral area production, cropping area production, and suburban area production.

Pastoral area production system. China's major pasture land is located in Inner Mongolia, Xinjiang, Tibet, Qinghai, Gansu and Heilongjiang, where the residents are mainly China's minorities. Animal husbandry is the major undertaking in the pastoral areas and is a way of life for the herdsman. Grazing is the traditional way to raise animals in these areas. These areas generally have harsh weather conditions and low population density. Due to the relative remoteness from China's inland major markets, market-oriented production activities in these areas were largely limited in the past. With respect to milk, a large proportion of output is used for self-consumption and nursing young animals, except in Heilongjiang (Table 3). Pasture land in China suffers from severe degradation caused by over-stocking and inappropriate management due to lack of clearly defined property rights. During the economic reforms in the past two decades, the pasture land production system underwent a transition from the traditional mode towards a more market-oriented system. Some dairy processing firms have begun to establish raw milk production bases in selected pasture regions where supply of feed is abundant and the environment is relatively unpolluted. Heilongjiang and Inner Mongolia lead this development and have become the largest raw milk producers and processors in China.

[Table 3 here]

Cropping area production system. The most remarkable change in China's livestock production pattern is that many cropping areas in inland China have become major production regions during the past two decades. This has become possible mainly because the new policies allow rural households to decide what they can best produce. Consequently, farmers in cropping areas are able to fully utilise complementarities between cropping and animal production and establish a multi-enterprise farming system. Animals are fed with all sorts of edible materials produced on their farms plus some purchased feed products. Manure is used to fertilise the land. The scale of animal raising in this kind of production system is

usually confined by the availability of feed resources on their farms or local markets. Although labour inputs are high under such a system, the use of auxiliary family labour or the spare time of main labour makes the opportunity cost relatively low. Thus, this production system has a feature of low labour and feed costs. Due to very limited land availability, farmers raise animals mainly in farmyards with simple sheds. Milk is sometimes by-product of calf production. Milk production scale is small but the production is primarily market-oriented as clearly shown in Tables 2 and 3 (for example, in Jiangsu, Jiangxi and Guangdong).

Suburban area production system. Demand for milk products is concentrated primarily in large urban areas. Consumers have a strong preference for fresh milk over reconstituted milk or other substitutes (e.g., soybean milk). This demand has encouraged the development of milk production in suburban areas of many large cities (geographical proximity helps to overcome the lack of specialised cooling transport facilities). Production in these areas has the following features: relatively large scale using high-yield animals, intensive feeding, highly market-oriented and a high degree of vertical integration. Milk produced is mainly sold to the processors who supply the market with branded products, for example, in Beijing (Table 3). Development of dairy production in suburban areas has been promoted by the government and included in several government programs, such as the “Vegetable Basket Project” and the “School Milk Program”. Milk production in suburban areas was traditionally carried out by state and collective farms. In the 1990s, however, to expand their business operation, many processing firms started to procure fresh milk from individual farmers. This is done by entering into contracts with household producers in the nearby rural areas. This practice has induced a rapid increase in cow raising by individual farms.

The above three production systems have evolved under different natural and market conditions. Currently, the level of mechanisation in China’s milk production is low. The use of milking machines and cooling equipment is still not extensive in all the three systems.² For commercial production, closeness to markets is essential for quality control. Thus, milk production is largely confined to areas with appropriate market infrastructure and processing facilities, and is therefore mainly based in suburban areas. However, since land has become increasingly scarce and labour cost tends to rise in near suburban areas, there is a tendency for milk production to gradually move further away from near suburban areas to cropping areas.

2.2 Consumption: Limited by Consumer Preferences, Income and Availability

In China’s pasture areas, milk and some other dairy products (i.e., cheese, butter, milk wine) have been consumed for thousands of years. However, dairy product consumption in other areas, especially in rural areas, was minimal before the economic reforms. The low consumption of dairy products was primarily due to the taste preferences by China’s majority

² In 2001, the government issued a draft plan for the food processing industry, “Development Plan for Food Processing Industry during the 10th Five-year Plan”. In this plan, the dairy industry is expected to have 50% of cow milking done by machine during 2001-2005. In the same plan, the dairy industry is also directed to produce proportionally more fresh milk but less milk powder.

Han people (91.6 per cent of the total population). Traditionally, dairy products are not part of the Han people's diet. Many do not like the smell and taste of dairy products. Many treat milk as a supplement for mothers' milk for infants, and as special nutritious food for sick and aged people. Other reasons for low consumption of dairy products were the limited supply and low consumer income.

With increased food supply and consumer income in recent years, there has been a shift towards high quality and healthy food products, such as dairy products, particularly in urban areas. Table 4 indicates that when consumers' income increases, their consumption of milk products increases.

[Table 4 here]

At present, consumption of fresh milk and other dairy products is largely concentrated in urban areas. According to SSB (2001) urban household surveys, purchase of dairy products accounted for 1.4 % of total family expenditure in 2000 while the same share was 0.9% in 1995. Consumption of milk products slightly reduced during 1995-96 due largely to sharp price increases. Recently, the consumption of yoghurt (or "sour milk" as often called in China) tends to increase strongly (Figure 2).

[Figure 2 here]

Consumption of dairy products by rural residents has also been surveyed by SSB. However, no systematic data are available. The available information indicates that rural consumption level is much lower than their urban counterparts (see Table 3). Compared with their urban counterparts, rural residents consume about one-half the amount of milk powder, one-fifth the amount of yoghurt and one-fifteenth the amount of fresh milk. Apart from income difference, limited access to dairy products in rural areas is an important limiting factor. Supply of milk products to rural areas is significantly constrained by lack of distribution facilities. In the vast rural areas where there is no milk production, dairy products are usually only available in towns.

There exist notable regional differences in dairy consumption (see Table 3). As shown by provincial averages, the pasture regions and municipalities have higher consumption of dairy products. Pasture regions have a large proportion of population who traditionally consume dairy products. Those municipalities (Beijing, Tianjin, and Shanghai) have better established supply chains for dairy products.

It seems dairy products are getting accepted more by urban residents than rural ones. According to a survey conducted by Wang and Fan (1999), about one-half of the urban respondents answered that they did not like the taste of milk while this proportion rose to three-fourths for the rural residents. Taste is ranked as the number one reason for people disliking milk (above 90% in both cases). It is also interesting to note that while urban people expressed a relatively higher satisfaction from dairy product consumption, they have no intention to buy more even if there is an improvement in the quality of the product. This is most likely due to consumers' fear of fake and poor-quality products which flooded the market in recent years.

Some studies found that the demand for liquid milk was not highly income elastic. For example, Yuan (2001) estimated urban and rural demand systems for livestock products

using household survey data. As can be seen from Figure 3, the income elasticities for milk products are below 1. These results are somewhat surprising as these elasticities would have been expected to be higher. However, Zhou (2001) also obtained very similar estimates, using urban consumption data by income group in the period of 1992-99. The income elasticity by Zhou is about 0.96 at mean income, being only marginally higher than Yuan's. Zhou (2001) also reveals that the income elasticity tends to decline when income rises. Further research is needed to verify income elasticities of demand for dairy products.

[Figure 3 here]

Dairy products are relatively expensive in China. For example, in Beijing, a 240ml pack of bagged milk cost 0.8 to 0.9 yuan and this is enough to buy three eggs or 0.5kg bean curd (tofu). The price of UHT milk is much more expensive than bagged milk (around 10 times higher). Using the price of 0.8 yuan to calculate, one year daily consumption of 240 ml milk requires an expense of 292 yuan per person. Even in higher-income regions like Beijing, this cost is equivalent to about 6% of the total living expenditure or 15% of food expenditure in 2000. Given this, it may be unrealistic to expect any drastic increase in dairy consumption by the Chinese, even in the urban areas.

3. Dairy Processing, Marketing and International Trade

3.1 Processing and Marketing: Constrained by Market Proximity

In the early 1980s when milk production began to grow rapidly, many small factories were established to process locally produced milk. Dairy powder was the main product due to a high demand and its storability. However, market demand started to change when consumers' income increased. Ordinary milk powder products (usually with a lot of sugar added) became less preferred in the urban sector where fresh milk and imported brand milk powder products became readily available. Many factories fell into great difficulty and eventually closed down. Some firms were successful in changing their business strategy by introducing new products that are in demand, such as yoghurt, ice cream and UHT milk. The winners are able to increase their production capacity and market share by making new investment, acquiring losing firms and have gradually become industrial leaders. For example, Bright Dairy & Food Co. in Shanghai and Yili Industry Co. in Inner Mongolia have established their reputation nation-wide.

Location of milk production and distance to major markets are important factors determining types of products produced by processing firms. For instance, Heilongjiang, with its abundant feed resources, has become the largest milk producer in China. However, it is far away from major consumer markets. Consequently, milk powder has been the major product for many years from this province. In recent years, processing firms have begun to establish capacity to produce UHT milk. On the other hand, pasteurised liquid milk is the major product produced by firms in city areas. However, with the improved availability of cooling transport facilities, distance between sources and destination markets seems to have become less important in determining the source of milk. For instance, in 1998 Bright Dairy in

Shanghai established two joint-venture milk source bases in Inner Mongolia and Heilongjiang (www.brightdairy.com). Raw milk is processed into some high-value dairy products that are then shipped for sale to other regions.

Pasteurised milk and milk powders are two dominant products. In 2000, the output of liquid milk (including pasteurised, UHT milk, yoghurt) was 1.43 million tonnes. Milk powder output was 0.58 million tonnes. Output of higher value products, such as yoghurt and ice cream, tends to increase more rapidly in recent years. The increase in UHT milk has somewhat slowed down. The increase in milk powder output has also slowed down but the varieties of milk powders have increased.

Fresh milk is the predominant dairy product sold on the urban market. The major channel of milk delivery is through designated distributors directly to regular consumers. This channel may be part of a processing firm or on a contract basis. Milk product is also sold in food stores, supermarkets and vendors' stands. However, in many small cities, fresh milk is supplied directly to consumers by cow-raising households without treatment. Ice cream and yoghurt products are sold mainly through food stores, supermarket and vendors' stands. UHT milk and milk powders often are distributed first through wholesalers and then enter food stores and supermarkets. In recent years, a wide range of differentiated products have become available for consumers to choose.

The production of quality milk is the basis for dairy product processing. Processors often try to establish their own milk production base and conduct fully controlled milk production. This option is often limited due to the difficulty in acquiring the needed land under the current land tenure system. To obtain enough milk, processors often need to enter contractual production with farm households within areas of reasonable distance. While each household has a small output, the total output from these areas is often sufficient to meet processing demand. The processors sometimes may provide some technical services to the households and the households take care of animals and manage production. Milk is sent to or collected by agents for processing firms. The agents are responsible for inspecting milk quality. Prices are determined on the basis of quality and may fluctuate with market conditions.

One major difficulty in contract production is quality control. With each household producing only a small amount of milk, quality testing becomes a costly operation. In reality, the agents usually use simple equipment to check milk and all milk that passes the test is pooled together into big jars. Thus, failure to identify poor quality milk may lead to the deterioration of the milk in the whole jar and the agents have no way to find out which producer is responsible for the poor quality milk. Some farmers may intentionally add other materials to the milk to increase its weight.³ On the other hand, household producers are often in a weak position when negotiating contracts or when disputes arise with the contracting firm since a processing firm often acts as a monopsony in a local market, leaving small producers to compete with each other. This is especially important for small dairy producers

³ Recently, some regions have been experimenting on the following method: cows are still looked after by individual farms but all cows from different farms are then brought to the same spot for milking under the surveillance of personnel of processing firms. While this may overcome some problems, it increases the danger of animal cross infection.

since they have no capacity to store the milk for long. When the demand for dairy products has fallen, processors have been known to reduce the price for milk sharply to shift the burden to farmers or have even stopped collecting milk from producers.

3.2 International Trade: Relatively Small Volume

The volume of China's dairy product imports and exports is relatively small. China is a net importer of dairy products (Table 5). The value of imports tends to increase over time. China exports liquid milk to the two special administrative areas of Hong Kong and Macau. Milk powder is another important export item, which goes to various destinations.

[Table 5 here]

Examining Table 5, it is clear that milk powder and whey are the two major products China imports. Whey is used mainly for feed, pharmaceutical and bakery industries. Milk powder is primarily for ice cream and yoghurt production and reconstitution of liquid milk. Imports of cheese, butter and yoghurt are relatively small, according to official statistics. However, there have been reports that some foreign dairy products get smuggled into the Chinese market and have affected domestic firms (Wei and Viney 1999).

4. Likely Scenarios in Dairy Production and Trade after Joining the WTO

The discussion in the previous sections clearly shows that China's dairy market is characterised with many small-scale producers, less advanced processing techniques and marketing facilities, and low per capita dairy consumption. Then, after the market opening up, what will happen to the Chinese dairy market? This has become an important question which interests many. In this section, we provide our assessment on the likely changes that may take place in the Chinese dairy market given that China is now a member of the WTO.

Trade policy changes will make it easier for foreign firms to operate and compete in the Chinese market.

After becoming a member of the WTO, changes in various trade policies by the Chinese government are inevitable. In respect to dairy imports, China has committed to reducing import tariffs and the reductions are substantial, especially for several import items (see Table 6). Indeed, China has been, in the past years, voluntarily reducing its dairy import tariff rates, as shown in Table 6, to prepare for the entry into the WTO.

[Table 6 here]

Considering the fact that international trade of dairy products is still heavily distorted by high tariffs, wide use of tariff rate quotas (TRQs) and massive domestic support in a number of developed countries (WTO 2000; WTO 2001a), China's reduction in its dairy import tariff rates is even more substantial. The reduction in China's tariff rates will make foreign products relatively cheaper and will increase their competitiveness in the Chinese market.

Easier access will not immediately translate into large imports of foreign dairy products

With easier access for foreign products to enter the Chinese market, dairy imports are expected to increase. However, there will be unlikely immediate surge in the amount of imports. Even in some distant future, it is unlikely there will be any significant increase in dairy imports. Three major factors have an important bearing on China's dairy imports in the near future. One is that China's dairy market opening up will not be an overnight event but a gradual process. China will have three to four years in which to implement fully its commitment to market opening up. This will ensure that any increase in imports will be gradual. The other two factors are that any increase in Chinese people's demand for dairy products will also be a gradual and slow process and that China's own dairy industry will also respond to market changes if there is increased demand for dairy products.

Chinese people's acceptance of dairy products will be a slow process

The discussion in early sections has shown that demand for dairy products, chiefly milk products, has increased in China, even though such foods are not traditionally a part of the diet for majority of the Chinese people. This increase in demand in China's urban areas is especially apparent where the residents have higher disposable income. The experience in Taiwan also shows an increased milk consumption as a result of the increase in consumers' disposable income (Xiao 1992). Despite the increase in demand for dairy products by the Chinese consumers in the past years, any rapid increase in dairy consumption by the Chinese is unlikely, even in urban areas, as elaborated in Section 2.2. Chinese people's tastes and preference for dairy products cannot be changed overnight: they will not suddenly want to eat more dairy products just because China has become a member of the WTO.

Another factor that will not lead to drastic increase in demand for dairy products by the Chinese consumers is their relatively low income. Dairy products are not necessities and are expensive to the Chinese. The majority of urban people, let alone rural people, cannot afford to consume dairy products on a frequent and regular basis.

China's own dairy industry will respond to changes in the market

The accession to the WTO will expose domestic dairy firms to tense competition in the home market with foreign firms, especially in those high-income markets such as those in municipalities and coastal regions. However, Chinese firms have already experienced the market system for some two decades and have learnt to survive in the harsh competitive market environment. In spite of tense competition from foreign firms, Chinese firms are likely to respond to market changes in a positive way so long as they expect the profitability of dairy businesses to be promising. Hence, if there is increased demand for dairy products, it can be expected that Chinese firms will try their best to meet the demand and secure their share in this competitive market. The Chinese dairy industry is likely to increase the varieties

of products, improve the quality of their products, and where possible, increase the output of their products to meet the increased demand.

There is potential for China to increase its dairy products. This potential will partly result from further structural adjustments of agriculture which are expected to take place following China's joining the WTO. While such structural adjustments present some challenges to the dairy industry, it may offer more opportunities as well. For example, with the relaxation of grain procurement quotas, farmers will have greater freedom than ever before to decide what to produce. In the long term, this will result in greater specialisation at both household and regional levels. Besides, increased imports of cereals and soybean may lead to lower feed prices. All such changes will be conducive to the development of dairy production. The major increase in dairy production is likely to be concentrated in central China, due to the availability of feed and labour resources. The Northeast, with its abundant feed resources, is likely to be another major producing region .

The likely dairy import composition: limited liquid milk but more milk powder and whey

No matter how hard the Chinese dairy industry may try, it is unlikely that China can meet the demand for dairy products completely with domestic resources. Hence some imports are unavoidable. However, China's imports are likely to be selective. The import composition (see Table 5) in the past years is likely to continue. That is, in the near future, China will continue, or even may increase, the import of milk powder and whey products. The import of cheese and butter will remain minimal unless there is substantial change in consumers' taste. Milk is a perishable good and also heavy in weight. Hence, the import of liquid milk is unlikely to increase and the increased demand for liquid milk will be mainly met by domestic production.

5. Factors Affecting Future Development of China's Dairy Market

It has been anticipated that China's demand for dairy products will increase in the future. The trends of dairy consumption in China's large urban centres tend to support this. With the promising market potential, suppliers from both within China and overseas are keen to seize their market share. Some foreign dairy firms have already set their sights on the Chinese market for some time and such companies are mainly from Switzerland, France, USA, and Italy. Nestle of Switzerland is the earliest to explore the Chinese market. By 1996, it had already set 11 plants in China through both sole ownership and joint venture strategies. By now, more than a dozen of the world's top 23 dairy companies have set their plants in China. However, how the Chinese dairy market will evolve and what dairy suppliers can expect to gain from this emerging market will be affected by a number of factors. Some of major factors are elaborated below in this section.

Government's dairy production and consumption policies

Starting from the mid 1980s, the Chinese government implemented a series of programs to promote dairy production and consumption with an attempt to improve the health of the Chinese people. The government set a target for milk production in its development plans and provided the producers and processors with financial and technical assistance. Nevertheless, milk is the only product that failed to reach the planned production target set for 2000 (Zhou et al. 2001, p. 6). In recent years, development of dairy industry again received greater attention. In October 2000, the government issued “Guidelines for Encouraged Industries, Products and Technologies”. Dairy industry has been listed as one of the industries whose development will be encouraged by the government (CFQN 2001). How the dairy industry will get encouraged has not yet been clear. If it receives favourable policy support measures, its output level may increase and will affect China’s domestic supply of dairy products.

On the consumption side, the Chinese government initiated a “School Milk Program” and intends to provide fresh milk to primary school pupils at affordable prices. It is designed to improve health of pupils through nutritional improvements. The program was put into trial in 1999 in 5 large cities (Beijing, Tianjin, Shanghai, Guangzhou and Shenyang). It has now been implemented nationwide since 15 November 2000 (Ministry of Agriculture 2000). In 2000, there were over 135 million primary school students, of whom some 45 million were in cities or rural towns. If this program turns out to be successful, the demand for fresh milk will be enormous.

In the newly promulgated “Development Guidelines for China’s Food and Nutrition – 2001-2010” by the central government, the target for milk output was set to be 26 million tonnes in 2010, from the present around 9 million tonnes. By 2010, per capita dairy consumption was set to reach 32 kg in urban areas and 7 kg in rural areas.

Structural adjustment of agriculture

China’s accession to WTO will result in substantial industrial structural changes, especially for the agricultural sector (CEM 1999). Agricultural structural adjustments are likely to spare more resources for milk production. For example, under the grain-dominant policy, many regions without adequate natural conditions had to produce cereals. The relaxation of the strict grain procurement quota policy will enable farmers to devote resources that are not suitable for grain production to feed production. In Heilongjiang province, land is relatively abundant but it has a longer cold time period. Long-growth-period varieties had to be used in conjunction with plastic mulching technology in order to increase corn production. It is believed that if the focus of production is shifted from grain kernels to feed nutrients (green corn or grasses), the overall farm return can be increased (RTDDI, 1997). In those dry land areas in the northwest, where limited rainfalls significantly constrain grain crop production, structural adjustments may also result in increased production of non-grain crops that will increase the supply of feed. Similar adjustments are also possible in some other regions. Therefore, agricultural structural adjustments may lead to increased supply of milk.

Income growth and urbanisation

The Japanese and Korean experiences show that with increased disposable income and western influences, consumers in Oriental countries may increase their consumption of dairy products (Song and Sumner 1999). In China, consumers, especially those in urban areas, are increasingly accepting dairy products in recent years. Clearly, while changes in tastes and preferences are important, disposable income increase is most critical to the increase in dairy product consumption. Many have envisaged that the Chinese economy is likely to grow at the present high rate (around 7-8%) in the next decade or so. If this is the case, then it can be expected that there will be a steady increase in consumers' income and subsequently demand for dairy products.

Urbanisation will generally lead to several important changes to those who move to the urban areas. These may include the change in their culture, the change in their income level, and their better access to dairy products – many rural residents still have very limited access to dairy products. Hence the speed of urbanisation can also have an important influence on the demand for dairy products.

Consumers' tastes and preferences

Currently, dairy consumption level of the Chinese people is very low compared with other countries. According to FAO statistics (FAO 2001), per capital supply of milk in 1999 was 47.5 kg in India, 43.5 kg in Japan, 16.8 kg in South Korea, 17.3 kg in Malaysia but only 7.1 kg in China. One of the major reasons for the low level consumption of dairy products, as noted in earlier sections, is consumers' taste and preference differences. However, taste preference can be changed. In recent years, foreign cultures have become increasingly present in China, which has had a strong influence to stimulate the Chinese to try different things from other cultures such as cheese and butter, especially the younger generation. There have been also increased government efforts that attempt to promote the benefits of consuming dairy products. Therefore, Chinese people's tastes are likely to change and various dairy products will become acceptable to them, though this may be a slow and gradual process.

Product quality and marketing infrastructure development

Currently, the quality of dairy products manufactured by many Chinese firms is often not consistent. Lack of quality consciousness from both small milk producers and manufacturers and less-advanced processing equipment are largely responsible for the inconsistent quality. Lack of proper marketing facilities also contribute to the quality inconsistency. Inconsistent quality sometimes discourages the consumers' intention to buy dairy products.

In the presence of increased competition, particularly the competition from foreign companies following China's joining the WTO, Chinese firms are likely to improve their product quality in order to survive. The availability of more consistent quality of products

will increase consumers' confidence and will give them a peace of mind to consume more dairy products.

The development and availability of adequate transportation and marketing facilities for dairy products also have an important bearing on the future development of the dairy market in China. Such facilities are essential to extend product life and maintain product quality. They are even more important for distributing dairy products and making them accessible by rural residents in outskirts of large urban centres and economically developed regions where market potential exists if properly tapped.

6. Summary and Concluding Comments

In this paper, we highlighted the characteristics of China's dairy production, consumption, processing, marketing and trade. We examined the likely changes that might take place in the Chinese dairy market following its joining the WTO. We also addressed the likely factors that would impact on future development of the Chinese dairy market.

China's dairy production is dominated by small-scale producers. Based on our analysis, we believe this industry has strong ability to respond to market changes, thanks to China's joining the WTO, which makes further agricultural adjustments possible. Dairy consumption is still largely limited by consumer preference and income and the limited access to dairy products by many consumers. However, dairy consumption is increasing, particularly in major urban centres. Generally, dairy processing and marketing facilities are less advanced and more technological inputs are needed. Although increasing in the past years, the volume of China's dairy international trade is very small. Whey and milk powder are two major items that China imports.

Consumption of dairy products is encouraged by the Chinese government and nutritional experts. The recently introduced "School Milk Program" is likely to boost the demand for milk product even if it will be only fractionally successful. Given the likely strong increase in demand for dairy products, no matter how the Chinese dairy industry tries, it will not be able to produce the needed amount to meet the demand. The supply-demand gap is expected to grow in the longer term.

According to our assessment, following China's accession to the WTO, dairy imports to China will be easier due to the reduction of trade barriers and dairy imports will be increasing. However, a substantial increase in dairy imports is unlikely in the near future for the following reasons. (1) China's dairy market opening up will be a gradual process over the next several years. (2) There will be no drastic increase in demand for dairy products in the near future due to various constraints such as consumers' taste preferences, lack of income, and lack of specialised dairy marketing facilities to get the products to the many consumers not residing in major cities. (3) China's own dairy industry will also respond to capitalise on the increased demand for dairy products.

The longer-term potential of the Chinese dairy market should not be overlooked, however. Australian dairy industry needs to prepare itself for this market sooner. Below are some of

our views on how to approach the Chinese dairy market in order to tap any business opportunities.

- (1) Make an effort to understand the Chinese culture and cultural changes. Understanding the Chinese culture and the taste preferences of the consumers will allow one to decide what product to supply to the market and how to modify the product to better suit the tastes of the Chinese consumers (e.g., varieties, packaging). An ability to follow cultural changes in China will enable one to rapidly capitalise on the changes in market demand. For example, cheese and butter are generally not favoured by majority of the Chinese. However, with the wide spread of western fast food outlets (e.g., McDonalds, Pizza Hut), cheese is finding its way to the Chinese consumers. If one is prepared to modify the taste of their cheese, e.g., making it a bit sweet and less smelly, one may find that the Chinese consumers may accept such a product.
- (2) Joint production with Chinese firms will empower one to operate in the Chinese market. This will help to understand the Chinese market, making use of the expertise of the local partners. It enables one to have some control over the supply of raw milk for the production of fresh milk and other products (i.e., yoghurt, icecream, UHT milk). Chinese firms are also enthusiastic to form joint ventures with foreign companies and this has already taken place between several Chinese and foreign companies. Given the huge size of demand for fresh milk, this alone offers enormous potential, let alone the potential to also supply other processed dairy products. Therefore, if successfully managed, such joint production arrangement can be very rewarding.
- (3) Technological export is possible. Australia has advanced dairy processing and marketing techniques and cow raising expertise that is in need by Chinese firms. If one does not want to engage in joint production, exporting technology or management expertise is an option. Given that China is a member of the WTO, TRIMS and TRIPS can be used to protect the expertise of Australian companies.
- (4) Consumption promotion will increase future demand for dairy products. Increased exposure to the knowledge and merits of consuming dairy products will encourage the Chinese consumers to try dairy products. Admittedly, such activities tend to generate “public goods”. However, if such promotion is closed linked to the image of Australia, the products of Australia will become more recognisable in the longer term. Promotion may be targeted at younger generation. Younger people are more acceptable to new products and when they are used to dairy products, their children will generally accept such products.
- (5) Pay attention to the development of the “School Milk Program”. This will be a major driving force for increase in demand for dairy products in the future. Currently, there are over 135 million primary school students. Some 45 million are living in cities or rural towns. Following the implementation of the Program, around 10% of students in large urban centres such as Beijing are participating in this Program. Hence, it is in its very early stage. Some involvement by the Australian dairy industry in this Program is likely very beneficial. In particular, this will increase young people’s recognition of

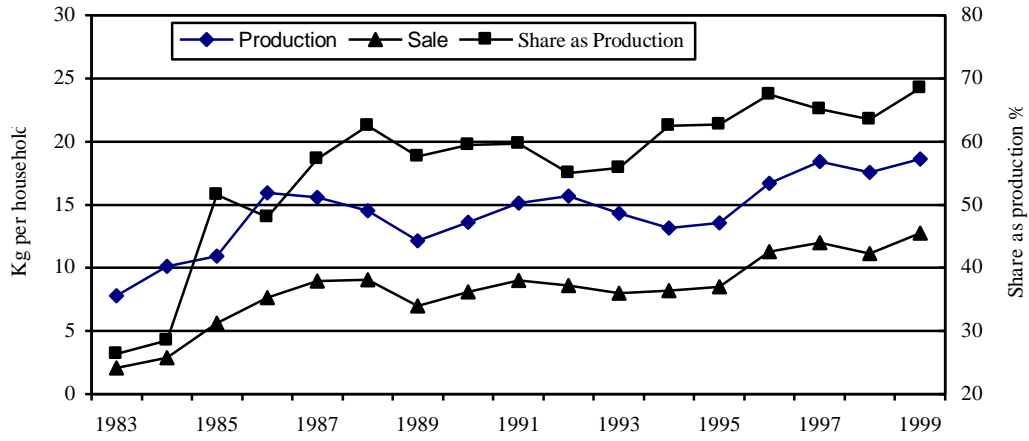
Australia and its products. It has been found that quite often “word of mouth” among children have strong influence on what other children may demand.

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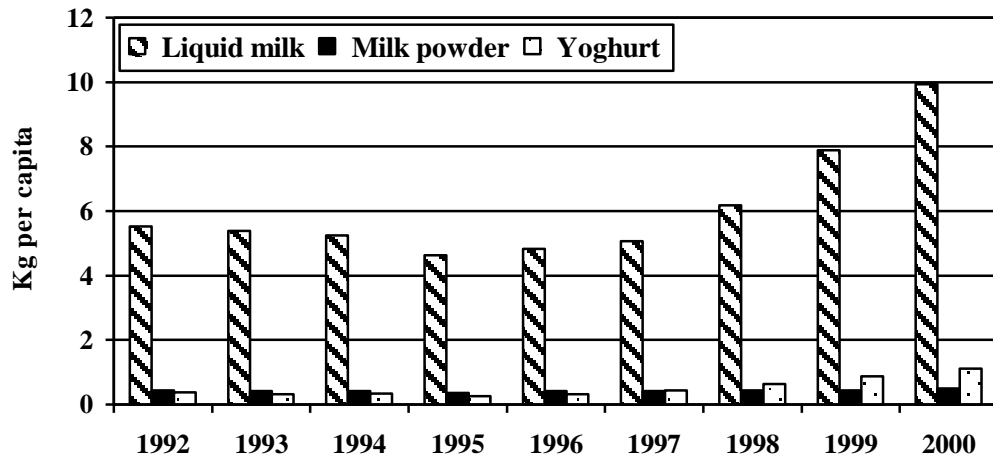
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Figure 1. Average Production and Sale of Raw Milk by Rural Households



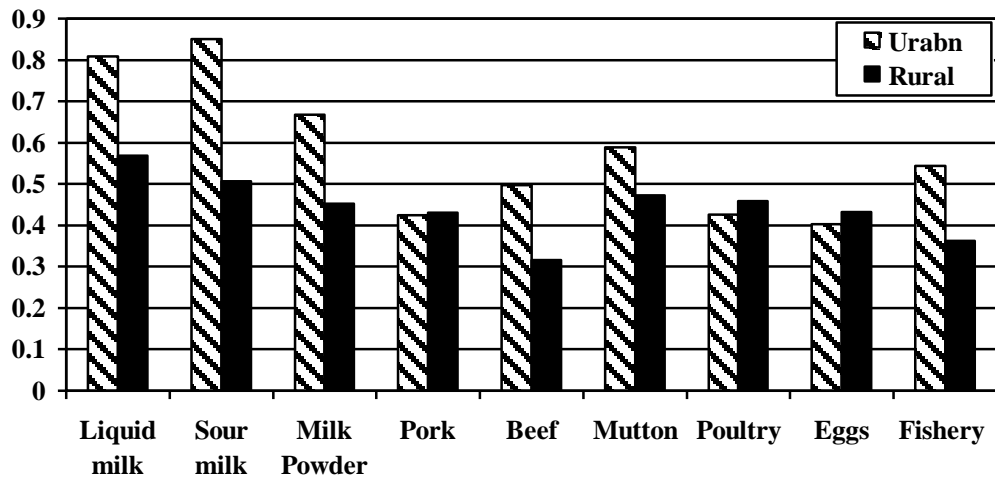
Source: SSB (2001).

I. Figure 2. Changes in Composition of Dairy Products Consumed by Urban Residents



Source: SSB (2001).

II. Figure 3. Estimates of Income Elasticities of Demand for Animal Products



Source: Yuan (2001).

Table 1. China's Milk Production

Year	Output of Milk (1000 tonnes)		Number of Dairy Cows (1000 heads)
	Total	Cow milk	
1972	n.a.	571	n.a.
1973	n.a.	807	389
1974	n.a.	866	344
1975	n.a.	889	448
1976	n.a.	885	425
1977	n.a.	877	447
1978	n.a.	883	475
1979	n.a.	1065	557
1980	1367	1141	641
1981	1549	1291	698
1982	1960	1618	818
1983	2219	1845	951
1984	2596	2186	1336
1985	2894	2499	1627
1986	3329	2899	1846
1987	3788	3301	2164
1988	4189	3660	2222
1989	4358	3813	2526
1990	4751	4157	2691
1991	5243	4644	2946
1992	5639	5031	2942
1993	5637	4986	3451
1994	6089	5288	3843
1995	6728	5764	4174
1996	7358	6294	4470
1997	7748(6811)	6638(6011)	n.a.
1998	(7445)	(6621)	n.a.
1999	(8069)	(7176)	n.a.
2000	(9191)	(8274)	

Note: Figures in parentheses are new data series after adjustment according to China's first national agricultural census.

Sources: SSB (1999, 2001).

Table 2. Regional Milk Production Patterns in China

	2000 Output (1000 tonnes)		Number of Dairy Cows (1000 heads) ^a	Percentage of Cows Owned by Farm Families (%) ^a	Average Number of Dairy Cows Owned ^a	
	Total Milk	Cow Milk			Farm Families	Larger-scale Milk Producing Firms
National	9191.2	8274.3	3328.5	77.0	3.1	145.5
Beijing	303.6	303.3	54.5	15.6	3.5	292.6
Tianjin	165.2	165.1	26.7	29.4	8.9	553.8
Hebei	962.1	842.0	96.9	78.6	2.7	159.9
Shanxi	359.1	335.3	75.2	83.9	2.6	141.0
Inner Mongolia	829.9	797.8	404.0	62.7	5.5	281.6
Liaoning	219.5	188.8	44.9	62.4	4.2	146.6
Jilin	150.0	142.5	19.8	75.7	3.8	92.8
Heilongjiang	1565.3	1543.0	654.6	71.6	3.0	83.7
Shanghai	259.5	259.5	55.0	12.3	6.1	267.7
Jiangsu	256.9	255.2	24.7	31.7	2.6	175.9
Zhejiang	111.7	111.7	27.0	52.4	2.5	204.3
Anhui	41.2	41.2	10.3	19.5	2.3	276.2
Fujian	99.1	96.0	13.0	85.3	2.7	34.6
Jiangxi	58.2	56.1	16.9	28.7	1.2	250.8
Shandong	704.7	457.3	56.4	75.5	2.6	84.3
Henan	202.1	161.0	14.5	76.8	2.6	60.1
Hubei	59.4	56.4	15.5	22.7	1.3	225.9
Hunan	10.6	10.6	3.9	44.6	1.4	154.1
Guangdong	95.2	91.9	24.4	21.6	2.7	336.2
Guangxi	16.9	16.8	4.8	47.4	2.2	133.3
Hainan	0.3	0.3	1.6	90.7	1.4	37.3
Chongqing	56.0	56.0	10.1	90.9	2.3	30.8
Sichuan	289.2	284.9	19.3	65.5	2.4	79.4
Guizhou	16.9	16.9	5.2	17.3	2.0	205.4
Yunnan	146.9	129.7	61.1	90.3	1.5	105.3
Tibet	204.0	162.0	1142.7	99.4	4.0	95.0
Shaanxi	638.8	392.5	62.6	80.2	1.4	147.2
Gansu	137.4	133.1	18.4	55.9	2.4	56.6
Qinghai	212.9	206.1	37.0	90.3	1.4	111.6
Ningxia	236.4	236.0	50.5	77.7	3.5	110.4
Xinjiang	782.3	725.4	277.2	64.8	1.9	204.3

^a Data from 1996 National Agricultural Census (SSB 1999).

Compared with the previous reported 4.47 million heads (SSB 1997, p. 213), this figure was adjusted downward by about one-fourth. The adjustment of livestock statistics in 1997 by the Chinese government made some time series data incomparable.

Source: SSB (1999, 2001).

Table 3. Regional Milk Consumption Patterns in China (1999-2000)

	Rural Household				Urban Household ^b	
	Output per household (kg) ^a	Sales per household (kg) ^a	Sales as output (%) ^a	Per capita consumption (kg) ^b	Expenditure on dairy products (yuan per capita)	Share as total consumption Expenditure (%)
Beijing	13.3	13.3	100.0	5.72	178.3	2.1
Tianjin	n.a.	n.a.	n.a.	0.74	98.6	1.6
Hebei	16.2	14.8	91.3	0.22	63.3	1.5
Shanxi	5.4	4.8	88.6	0.63	63.0	1.6
Inner Mongolia	51.8	18.2	35.2	6.79	54.9	1.4
Liaoning	0.3	0.3	91.2	0.42	64.4	1.5
Jilin	0.4	0.3	86.8	0.15	47.2	1.2
Heilongjiang	47.7	46.6	97.8	0.34	57.6	1.5
Shanghai	n.a.	n.a.	n.a.	2.07	200.9	2.3
Jiangsu	5.2	5.1	99.4	0.42	79.7	1.5
Zhejiang	15.9	15.9	100.0	0.97	81.9	1.2
Anhui	n.a.	n.a.	n.a.	0.12	52.0	1.2
Fujian	1.0	1.0	95.0	0.55	104.5	1.9
Jiangxi	0.8	0.8	100.0	0.13	43.4	1.2
Shandong	12.7	12.7	99.5	0.75	84.3	1.7
Henan	3.9	3.9	99.0	0.14	43.3	1.1
Hubei	n.a.	n.a.	n.a.	0.04	43.4	0.9
Hunan	n.a.	n.a.	n.a.	0.07	40.3	0.8
Guangdong	1.6	1.6	98.7	0.08	65.2	0.8
Guangxi	n.a.	n.a.	n.a.	0.02	46.1	1.0
Hainan	n.a.	n.a.	n.a.	0.08	27.9	0.7
Chongqing	n.a.	n.a.	n.a.	0.06	111.4	2.0
Sichuan	0.8	0.1	17.3	1.31	70.7	1.5
Guizhou	0.0	0.0	0.0	0.03	47.9	1.1
Yunnan	30.5	29.5	96.7	0.09	45.8	0.9
Tibet	433.5	3.4	0.8	12.25	282.7	5.1
Shaanxi	46.3	42.5	91.6	1.02	50.9	1.2
Gansu	0.2	0.0	19.0	0.39	58.6	1.4
Qinghai	116.7	16.4	14.1	21.68	56.7	1.4
Ningxia	522.9	518.9	99.2	0.88	58.5	1.4
Xinjiang	34.9	12.8	36.5	2.78	60.0	1.4

a. 1999 data; b. 2000 data.

Source: Calculation based on data in SSB, *China Statistical Yearbook 2000* (pp. 320, 322, 397-398); *China Rural Household Survey Yearbook 2000* (p. 150), *China Statistical Yearbook 2001*.

Table 4. Urban Consumption of Dairy Products by Income Group (1999-2000)

	Household income level						
	First decile	Second decile	Second quintile	Third quintile	Fourth quintile	Ninth decile	Tenth decile
1999							
Disposable income (yuan)	2618	3492	4364	5512	6905	8632	12084
Living expenditure (yuan)	2523	3137	3694	4432	5347	6443	8262
Consumption of:							
Fresh milk (kg)	3.34	5.14	6.52	7.62	9.69	11.00	13.78
Milk powder (kg)	0.25	0.32	0.40	0.47	0.52	0.56	0.62
Yoghurt (kg)	0.39	0.52	0.65	0.80	1.14	1.32	1.47
2000							
Disposable income (yuan)	2653	3634	4624	5898	7487	9434	13311
Living expenditure (yuan)	2540	3725	3948	4795	5895	7102	9251
Consumption of:							
Fresh milk (kg)	4.59	6.04	8.27	9.83	11.95	14.07	17.52
Milk powder (kg)	0.26	0.36	0.43	0.52	0.56	0.67	0.70
Yoghurt (kg)	0.51	0.62	0.88	1.09	1.42	1.32	1.47

Source: SSB (2001).

Table 5. Composition of China's Dairy Imports and Exports in 2000

Product	Import		Export	
	Volume (tonnes)	Value (US\$1000)	Volume (tonnes)	Value (US\$1000)
Fresh milk and sparse butter	14910	8870	29417	20120
Milk powder	72769	115319	10162	20880
Condensed milk	647	360	7253	7046
Yoghurt	2554	1519	162	200
Whey powder	122903	79964	334	300
Butter	3088	4749	223	353
Cheese	1968	3916	407	1175
Total	218839	214697	47958	50074

Source: Secretariat of Chinese Dairy Products Industry Association, 2001.

Table 6. China's Dairy Import Tariffs (MFN rate, %)

Product (HS No.)	1997	1998	2001	WTO ^a	
				2002	Final
Fluid milk (0401)	30	25	23	19	15 ^b
Milk powder (04021)	30	25	25	13.8	10 ^c
Yoghurt (04031)	65	50	42	26	10 ^b
Butter milk(04039)	65	50	44	32	20 ^b
Whey and modified whey (04041)	7	6	6	6	
Whey, other(04049)	65	50	44	32	20 ^b
Butter / dairy spread(0405)	65	50	44	30	10 ^c
Cheese(0406, except 04064)	65	50	43	27.2	12 ^b
Lactose (17021)	60	35	30	20	10 ^b
Ice cream (2105)	70	45	40	29.4	19 ^b

^a Rates committed by the Chinese government under WTO Accession Protocol. ^b 2004; ^c 2005.

Sources: China Customs General Administration 2001 and WTO 2001b.