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China can meet dairy needs domestically

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Various factors lead to questions about whether China can meet increased demand for milk products and other livestock commodities in the future. While some products will be sought from abroad, virtually all of the demand can be met by domestic production.

THE sheer size of China, its rapid economic growth, relatively low per capita consumption of milk products (currently 17 kg, Table 1) yet very high growth rate in the past half-decade all lead to questions about whether increased demand for milk products as well as other livestock commodities can be met in the future.

The answer is that while some specialized dairy products will continue to be sought from abroad, virtually all of the demand can be met by domestic production.

One reason is that China is competitive internationally due to its low production costs. For example, direct out-of-pocket expenses range from 11 cents to 19 cents/kg (\$5.00-8.64/cwt.) in eight major cities.

I found cost to be 16 cents/kg on a medium-size modern farm analyzed in Jilin Province, a major corn-growing area. In stark contrast, the cost on medium-size farms in the U.S. was found to be 24 cents/kg.

Costs are low, but how about the future as demand for dairy products expands due to a rapid rise in income, changes in urban lifestyles, government promotion of the dairy industry and improved marketing channels?

Analysts disagree on the extent to which growth will continue, with some arguing that the exceptionally large increases have already taken place (Table 2), while others believe strong demand for milk products will continue. On the supply side, the big questions are the number of cows that will be needed and sources of feedstuffs for them.

Table 1 includes three different projections. The shortest length is by Iowa State University's Food & Agricultural Policy Research Institute (FAPRI), which projects that per capita consumption will increase from 17 kg in 2005 to 20 kg in 2010 and 23 kg by 2014.

M. Fangquan has made long-term projections of 24 kg in 2020 and 35 kg in 2030. My projections are for 30 kg in 2020 and 40 kg in 2030. Compare that with 64 kg in Japan and 264 kg in the U.S. in 2005.

The projections are open to debate. However, for analytical purposes, assume that the rather high level of 40 kg is reasonable, which translates into a threefold growth in production, from 20 million tons of milk currently to 58 million tons in 25 more years.

There are four main types of cow milk production systems in China. The first, and most rudimentary, is part of grassland animal production systems in which milk is produced for suckling calves and herding families.

The second is a low-input, low-cost operation based on crossbred cows found in urbanized areas. This system, with most of the milk sold for nearby urban dwellers' consumption as fresh product, is based on grazing and cut-and-carry of feedstuffs by small size producers.

The third system consists of traditional medium- to large-scale operations that were originally state farms. They are in a period of flux regarding ownership, management and modernization.

The fourth system, and the type that will form the core of a modern dairy industry, is made up of operations owned by individuals,

partnerships and private or semi-public corporations. Most of these types of farms are characterized by a desire to improve management, size and economic efficiency. Experience in other countries indicates that this type system will become the dominant one in China.

Milk production per head of milk cows in inventory was about 1,700 kg in 2000, 2,800 kg in 2005 and is projected to be 3,300 kg in 2010. The projections utilized of 5,000 kg in 2020 and 6,500 kg in 2030 are very conservative (the U.S. average was 8,800 kg in 2005) considering that as China develops, there will be a commensurate shift to modern dairy farms. In addition, China will benefit from genetic and management advances worldwide, as well as from domestic research and propagation of results in national breeding programs.

The upshot is that while the number of milk cows has grown very rapidly from the base of 4.9 million head in 2000 (and 1.8 million head in 1985), that will only have to grow from 7.5 million head in 2010 to 8.6 million head in 2020 and 9.0 million head in 2030 to meet all of China's milk product requirements.

Dairy cattle are actually a small proportion of all animals in China, accounting for just 2.3% on an animal unit (AU) basis. The proportion they make up of all animal and fish protein (CP) requirements is relatively small and will only grow from 2.8% of the total in 2000 to 3.6% in 2030.

Dairy cattle accounted for 1.5% of all China's animal and fish metabolizable energy (ME) requirements, although their proportion is projected to increase to 3.5% of the total in 2030.

Extensive modeling on long-term projections of China's animal feedstuffs requirements and availabilities revealed that while imports of protein-based feedstuffs (such as soybeans) will continue to grow slowly, energy-based feedstuffs (such as corn) will continue to be adequate as China's human population growth will be relatively small, and animal and crop productivity will continue to improve dramatically due to adoption of improved technologies and crops, management, structural changes in agriculture and significant use of crop and processing byproducts.

(Detailed analyses and long-term projections of feedstuffs requirements and availabilities are available in *Feedstuffs* articles from Sept. 20, 2004, and Sept. 29, 2003).

Feedstuffs in the populous southern areas will be more expensive than in the maize and oilseed growing areas of the northeast, and some feedstuffs will be imported due to transportation cost differentials. However, domestically produced feedstuffs availabilities will not be a limiting factor in dairy production for the foreseeable future.

Byproducts, non-conventional feeds, crop residues such as treated and untreated maize stalks, straw, other fodders and forages will continue to constitute a substantial portion of feedstuffs for ruminants in much of China over the next decade, especially in the less-populated areas. In brief, China technically can largely meet its energy-based animal feed requirements without additional imports.

It can be concluded that while drinking milk requirements can easily be met and, from a technical standpoint, China could produce all of its milk products, it will likely continue to be an importer of some processed products.

For example, it has been the biggest U.S. whey market by volume due to reduced tariffs from joining the World Trade Organization. Some pundits have forecasted that China might become the world's largest importer of whole milk powder, but that is contrary to FAPRI projections.

It is also questionable as consumers change their preferences to fresh milk and because processing infrastructure will improve and grow with "re-entry" of multinational corporations.

That has indeed happened for, by early December 2005, New Zealand dairy exporter Fonterra announced that it bought 43% of China's Shijiazhuang Sanlu Group dairy company. That is the largest investment ever by a foreign dairy company in China. It is particularly significant because Fonterra, the biggest marketer of dairy ingredients in the world, is also the largest exporter of dairy products to China.

It is relatively easy to be carried away by news reports and short-term changes in production, infrastructure and demand.

This article instead focused on the fundamentals of production and longer-term prospects to avoid that potential pitfall as they are the keys to determine the extent to which China can and will be able to compete internationally in dairy products.

Those fundamentals are particularly critical to determining how China views its position on resolving conflicts regarding milk and other trade issues and how it feels about its food security over the longer term.

1. Comparison of studies and data sources on milk consumption and production in China, 1984-86 to 2005, and projections to 2030

Item	1985	1990	1995	2000	2004	2005	2010	2014	2020	2030
Consumption per capita, kg ¹										
FAO	2.4	3.8	5.0	7.0	14.3	--	--	--	--	--
Fangquan	--	--	--	8.0	--	--	16.0	--	24.0	35.0
FAPRI	--	--	7.0	9.0	--	17.0	20.0	23.0	--	--
Simpson	2.4	3.8	5.0	7.0	--	--	18.0	--	30.0	40.0
Total production, mil. Tons										
FAO	2.6	3.8	5.0	8.9	18.9	--	--	--	--	--
Fangquan	--	--	--	10.0	--	--	22.0	--	36.0	56.0
FAPRI	--	--	6.1	8.6	--	20.0	25.0	29.1	--	--
Simpson	2.6	4.4	6.1	8.9	--	--	24.7	--	43.1	58.4
Yield per dairy cow, kg										
FAO	1,541	1,568	1,533	1,749	2,680	--	--	--	--	--
FAPRI	--	--	1,533	1,749	--	2,824	3,282	3,647	--	--
Simpson	1,541	1,562	1,545	1,807	2,543	--	3,300	--	5,000	6,500
Number of dairy cows, mil.										
FAO	1.8	2.8	3.9	4.9	7.0	--	--	--	--	--
FAPRI	--	--	4.0	5.0	--	7.1	7.6	8.0	--	--
Simpson	1.7	2.8	3.9	4.9	--	--	7.5	--	8.6	9.0

Sources: FAO, from FAOSTAT Database collections (faostat.fao.org); Mei Fangquan (1998); FAPRI, November 2005 (www.fapri.org/outlook2005/tables/15_Dairy.xls); J.R. Simpson, December 2005 (projections are unpublished data).

See Simpson and Ou Li (2004) and Simpson (2003) for a description of the model.

¹ Includes milk products on a milk equivalent basis.

2. Milk consumption in China and the U.S., 1995-2014

Item	1995	2000	2005	2010	2014
Fluid milk consumption, 1,000 mt					
China	1,967	4,401	10,445	13,449	15,475
U.S.	26,677	26,890	26,764	26,869	27,105
Manufacturing and other uses, 1,000 mt					
China	7,080	7,444	12,641	14,426	16,438
U.S.	43,762	49,038	52,355	56,164	58,507
Total milk consumption ¹ , 1,000 mt					
China	9,047	11,844	23,086	27,875	31,913
U.S.	70,439	75,928	79,119	83,033	85,612
Total population ²					
China (mil.)	1,226	1,282	1,330	1,373	1,411
U.S. (1,000)	269,945	285,003	300,038	314,921	239,650
Consumption per capita, kg					
China	7	9	17	20	23
U.S.	261	266	264	264	357

¹ Includes milk products on a milk equivalent basis.

² From FAOSTAT Database collections (faostat.org).

Note: 2014 interpolated.

Source: www.fapri.org/outlook2005/tables/15_Dairy.xls.