

# Operation and Development Models of Dairy Industry in Inner Mongolia of China

## From Retail Dairy Farmer to Milk Industry Artel

Xingwang Wang and Xiulan Chen

College of Agriculture and Rural Development  
Renmin University of China  
Beijing, China  
xwang@csufresno.edu

Daming Zhang

Department of Industrial Technology  
California State University, Fresno  
Fresno, CA, USA  
dazhang@csufresno.edu

**Abstract**—Milk Industry Artel is a new development model driving the dairy industry. Retail farmers receive compensation for devolving dairy cattle ownership to Artel. This paper describes retail dairy farmers' circumstances and analyzes the first demonstration pasture of one of the Artels, Company A. But Milk Industry Artel can only ensure a profit for the dairy farmer over a short period against the background of the mode of dairy industry transfer to socialization, centralization, and specialization.

**Keywords**—retail dairy farmer; Milk Industry Artel; management mode of the dairy industry

### I. CURRENT STATUS OF THE INNER MONGOLIA DAIRY INDUSTRY

The dairy industry has developed dramatically throughout Inner Mongolia. Raw milk output has steadily increased. Compared to 1978, raw milk output throughout the country has increased about 40 times (Figure 1). As shown in Figure 2, the Inner Mongolia Autonomous Region is the largest province in terms of its dairy industry in China. It has the highest raw milk output than any region in the whole country. Inner Mongolia is at the top of any list of raw milk production in China. The dairy industry has achieved outstanding accomplishments in Inner Mongolia. In this prosperous industry, this region presented advantages of resources and position in developing dairy industry. The dairy industry has become an important driving force of the local economy and an engine for increasing the income of farmers and herders. However, with the occurrence of the "melamine contamination incident" in China, some profound problems plaguing the dairy industry were exposed. Dairy farmers were threatened by the high risk of breeding cattle, and the market risk of dairy industry transferring to other regions.

In recent years, the dairy industry gradually became a target of investment and received unprecedented attention. Advertisement of the nutrition value of milk and its role in strengthening peoples' physical health in the whole nation was enhanced. Several leading enterprises were established through competition. The model of breeding in dairy industry began diversification. Cattle stock and milk output increased greatly.

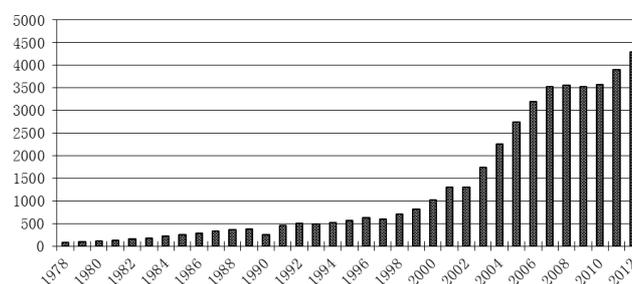


FIGURE 1. NATIONAL RAW MILK OUTPUT OF CHINA (10,000 TONS)

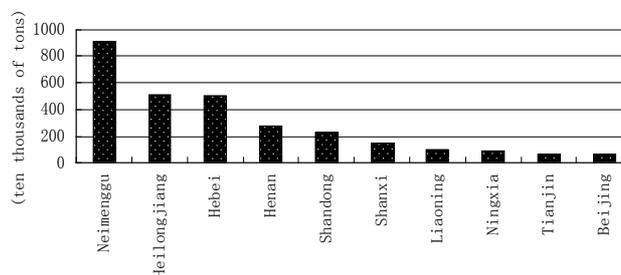


FIGURE 2. TOP 10 PROVINCES OF RAW MILK OUTPUT (2012)

The number of cattle in Inner Mongolian increased rapidly during 2003–2005. Figure 3 portrays the change of the cattle stock and raw milk output in Inner Mongolia during 2003–2012. To the end of 2012, the cattle stock within the whole area reached 3,054,000 heads, which is 4.3 times that of the prior decade and which constitutes 22% of the total cattle stock in the whole country. The raw milk output was 9,082,000 tons, or 10.1 times that of the prior decade, which is 25% of the national output. The two targets developed rapidly and are national leaders[1].

Although cattle breeding in Inner Mongolia developed through a trend of standardization, and industrialization, the providers of raw milk to many dairy product processing firms are retail dairy farmers. There are very few dairy product firms with self-sufficient raw milk production. For the distribution, more than 60 cities raise more than 10,000 cattle; 70 cities

produce more than 10,000 tons of milk. Hohhot, HulunBuir, Baotou, and Ulanchabu are still the main producing districts in Inner Mongolia.

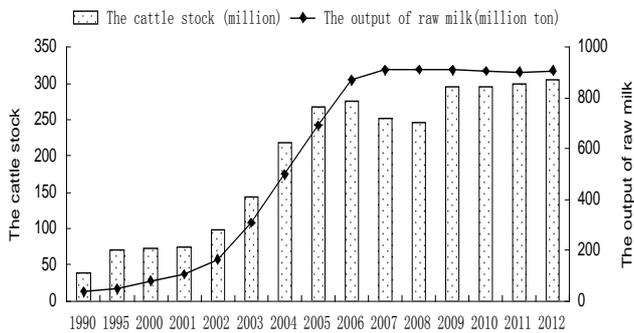


FIGURE 3. CATTLE STOCK AND RAW MILK OUTPUT IN THE INNER MONGOLIA AUTONOMOUS REGION.

In 2012, their dairy cattle stocks were 63.39% of those of the whole region. The milk output was 72.66% of the region's total [2]. However, breeding on an extremely large-scale is not done commonly by any producer. Therefore, cattle from retail dairy farmers constitute a large percentage of total production. The current situation of the Inner Mongolia milk source base is that large-scale farms make up only 22.19%, or 653,300 cattle. Those firms generally own more than 50 cattle through contracts with individual and self-sufficient farmers. The remaining 77.89% of cattle are raised by dairy farmers whose scale of breeding is small, with low output. The dramatic price increase of feed directly increases the costs of raising cattle [3].

## II. TRANSFORMATION OF THE MANAGEMENT MODEL OF THE DAIRY INDUSTRY

### A. From Retailers to Milk Industry Artel

Many Dairy Federations have come into being with the goal of accomplishing Dairy Industrialization, and with a focus on the total benefits of the Dairy Federations, which let small and scattered dairy farmers join the federation according to their own desires. Therefore, dairy farmers can be transformed into an organization functioning with a specialized, intensified, and scaled developmental model [4].

The author visited Bingzhouhai Agriculture Development area in Tuzuo city, which was the first demonstration pasture affiliated with Company A. It was established with 2,255 million Yuan of registered capital and an areal scale of 300 Mu in June, 2004. Company A had made use of foreign government loans (North Europe Investment Banking Firm) to set up first-grade raw milk buses, and begin the first cattle cultivation cooperative. In the early period of 2007, the first "demonstrative pasture" of Milk Industry Artel was established in the Bingzhouhai city agriculture development area of Hohhot city.

### B. Joining the Association and Means of Drawing Dividends

The Artel was an organization of the cattle raising cooperative enterprise which had adopted different forms of membership to absorb the milk retailers into Artel and ultimately to be rewarded. Company A, the Artel investigated in this paper, obtains technology, equipment, and capital from its father company.

By this model, dairy farmers join in the association according to their own free will, but not take part in the administration. Those farmers are guaranteed to receive stable rewards yearly. They will withdraw from Artel when the contract expires, and receive compensation for transferring cattle to Artel. Dairy farmers were expected to evaluate the cattle price; and the level of the evaluation was attested through tripartite confirmation of dairy farmers, Milk Industry Artel, and the Animal Husbandry bureau. The period of the contract was five-years. During the contract period, Artel assumed the risk of an epidemic affecting the cattle and death. After expiration of the contract, the cattle belong to Milk Industry Artel with any calves that were born within the contract period. Artel returned 20% of the association-join funds every year.

If a cow produced 4.5 tons of fresh milk priced at 55 thousand Yuan, and if the contract period was five years, then the association would pay 1.1 thousand Yuan (20%) to dairy farmers over the succeeding five years, which meant to the dairy farmers an amount of 5.5 thousand Yuan. Therefore, the gross income was 11 thousand Yuan by the end of the five-year-contract period.

### C. Production Situation

For use in pasture management systems, Milk Industry Artel adopted a monitoring and managing system using software named Delaval. This system had an all-weather monitoring function to help the pasture control costs. System coverage included records of breeding and calving, the herd arrangement of cows (cows with medium yields were labeled as high-yield cows if they had reached a standard, etc.), distinctive cards, output, days of lactation, dates of mating, pregnancy, date of gestation examination, and the estrus period. If something was wrong with these records, the system would notify workers. Each cow was equipped with an identifier conditioner used to estimate the distance travelled on foot by recording the number of steps taken. Production data such as the date of mating and therapy were logged automatically or manually into the Delaval Management System.

Regarding epidemic prevention and disinfection, Company A achieved a strict disinfection system. Workers are disinfected in a specialized disinfection room before entering the pasture. Different working regions used different disinfection procedures in Artel: 1. gate-keeper epidemic prevention and disinfection; 2. living-area epidemic and disinfection.

Therefore, the product of raw milk reached the national standard and even the international standard. Table 1 presents the lacto-protein, butter fat percentage, dry substance, and the total number of bacteria as examples. The first three reached the national standard; the last is the international standard. Raw

milk sale has a price of 3.5–3.7 Yuan/kg, which was 0.8–1.2 Yuan/kg higher than that of the milk from retailer farmers.

TABLE I. RAW MILK ASSESSMENT CRITERIA

Indicator	lacto-protein	butter-fat percentage	dry substances	Total bacterial count
Conformity level	>2.95%	>3.1%	>11.60%	<1000 thousand
Pasture	3.2%	3.9%	12.4%	<20 thousand

### III. EVALUATION OF THE ARTEL MODEL

#### D. Benefit Comparisons

According to the survey, most dairy farmers acceded to Artel membership at the end of 2006 or in 2007 when the raw milk purchase price had decreased to 1.7 Yuan/kg. The revenues of milk retailers became so low that they suffered deficits because of the persistent soaring costs as well as the notorious influence of melamine contamination in 2008. After joining the association, the rate of revenues of each cow was 20%. In other words, the cows earned the owner 20% of the joining-Artel funds, and the cows were divided into different groups according to evaluation levels from 4000 to 10000. The dividend of each cow was from 800 to 1000 Yuan every year during the five years. Meanwhile, the dairy farmers were able to become the employees of Artel, and other dairy farmers who planted silage and fodder were able to sell their product to Artel. Furthermore, the dairy farmers were thereby released from drudgery at work.

The service provided to participants by Artel was a stable reward, which is their fixed profit. However, we conclude that if the dairy farmers did not accede to Artel but continued breeding the cattle in their own ways, they would have been able to receive revenues of more than 10 thousand Yuan per year. Additionally, dairy farmers were able to get calves and income from the beef after lactation ceased. Consequently, for dairy farmers, joining Artel or not presented different merits.

#### E. Artel's Indemnification of Dairy Farm Profits

The current situation shows that the model of low-breeding presented no radical changes over subsequent years in Inner Mongolia. Although Artel had provided favorable policies to ensure the profits of the dairy farmers, the model of dividend payments had ignored inflationary factors. If it was the fifth year during the contract period, the dairy farmers should have gained a profit of 2000 Yuan according to the contract. Meanwhile, taking the current inflation rate into consideration, the 2000 Yuan gained in the fifth year was probably much less than that of five years prior. Therefore, the model of dividend payments might not protect the dairy farmers' profits well. According to visits and investigations of scattered dairy farmers who were residents of nearby areas, many dairy farmers remained unwilling to participate in Artel. They insisted that after joining Artel, cows and calves would not belong to them anymore (calves born during the contract

period). Moreover, the cattle were to be sold as beef when they stopped lactating. They were able to obtain profits in the first five years, but after the five-year contract, how were they supposed to be able to make a living without cattle? Therefore, many dairy farmers regarded the plan as a loss to themselves. Consequently, several situations demonstrated that the indemnifications from Artel for profits of dairy farmers were inadequate. The essence of Artel-joining was the fact that Artel buys cattle from dairy farmers using payments over five years. There was no doubt that it was a way to put risks on Artel in a short term. However, when considered in terms of long-term development, the scheme had deprived dairy farmers of their likely profits and their livelihood.

#### F. Milk Industry Artel is not a True Cooperative Organization

Dairy farming cooperative organizations should have been an organization that dairy farmers take part in for management to unite numerous retail dairy farmers and thereby form economies of scale, enforce competition, and withstand market risk. Furthermore, the dairy cattle should always be owned by the dairy farmers themselves. From this perspective, Milk Industry Artel is not a true cooperative organization. It is only an organized form of a commercial joint-stock company.

In view of protecting the interests of dairy farmers, a better developed cooperative organization is the Dairy Cooperative Organization. Although the Dairy Cooperative Organization has sprung up only in recent years, it guarantees the interests of dairy farmers. It has become an important organization linking leading firms with dairy farmers in the industrial chain of dairy farming and improving the overall level of dairy industrialization. Facing an open and fiercely competitive market, dairy farmers are incapable of taking precautions against market risks, of breeding good strains, of preventing and curing epidemics, of selling centrally, or solving other difficult problems. The Cattle Cooperative Organization unifies retail dairy farmers. After the farmers join the organization, they gain material resources, means for prevention of epidemics, breeding plans, and sales channels. Additionally, they are more competitive in dialogues with dairy product firms. The capacity to withstand market risk and the status in the market exchange is strengthened. These facts prove that the establishment of a Cow Cooperative Organization improves the level of organization and specialization, and brings retail dairy farmers together to form economies of scale and to seek economic benefit.

### IV. SUGGESTIONS

#### G. Retail Dairy Farmers Should Make a Long-term Plan

At present, the contract period between Milk Industry Artel and dairy farmers lasts five years. Therefore, dairy farmers should make a long-term plan of how to ensure their income when the contract expires. During the duration of the contract, dairy farmers can receive stable payments as income. What should they do after five years? From the long-term interest perspective, dairy farmers should decide whether to join Milk Industry Artel based on realistic expectations. If they join Artel,

then they will have lost their cattle five years later. Therefore, they should explore new avenues of earning money before joining. If they want to seek work, they must consider whether they can gain equal cash flows to those from cattle raising. If they want to expand into other fields, they should incorporate management risk and assess whether they can receive the anticipated income or not. Therefore retail dairy farmers should establish a development path and seek to develop their long-term interests in accordance with their own conditions, desires, and risks they may face[5].

#### H. Improving Interior Operations of Milk Industry Artel

Dairy farmers can join Milk Industry Artel freely and leave it. Buying shares and sharing bonuses should be rational and equal. Interest distribution systems should be improved and the interests of dairy farmers should be protected. Bonuses should not be limited to the first five years and long-term interests of dairy farmers must be considered. In the meantime, for developing Milk Industry Artel itself, it should provide technological guidance for nearby dairy farmers who have not joined Artel to improve the integrated development of the local dairy industry.

Regarding Milk Industry Artel interior construction, standardized postural construction should be enhanced and managing facilities and services should be improved to ensure dairy product safety. Cooperation with university or scientific institutions on technology should be established. A professional team group on technology, operation and management should be established. Milk Industry Artel should not only be confined to special field breeding technology, but also be equipped with professional resources particularly addressing the path to increase profits by cutting costs and improving output and quality, thereby realizing specialized operations and management[6]. Scattered and multiple pastures should be managed by different departments of pasture operations and management in accordance with different regions and types. A pasture conservation department, farm associative development, a technology center, and a quantitative control center should also be established to realize professional service and support for every pasture.

#### I. Enforcement of Managerial Staff Training of Milk Industry Artel

As beneficial results of each scattered dairy farmer related to that of Artel, the managerial staff had played an important part in Artel. Artel managerial staff members are mainly local farmers who had worked in Artel, but competent managerial staff members are few. To improve Artel operations, managerial staff training and employment of professionals should be enforced.

#### J. Careful Government Protection of Dairy Farmer Profits

The dairy industry in the future has a development trend demanding that it be scaled, centralized, and industrialized: many dairy farmers must expect to lose their own cattle in the years to come. Consequently, they must change their original lifestyles and seek other works to make a living. Dairy farmers must start afresh to master new techniques and to seek work to extend their means of making a living. Therefore, there might be many installations. Incomes of dairy farmers might have decreased when compared with those in the past. To some degree, the decreased incomes of dairy farmers might destabilize society. Therefore, when government transforms the mode of dairy industry, the adopted policies should follow the principle of gradual improvement instead of emphasizing haste. The government should adopt a mode of diversified development to develop some large-scale reared farmers to guarantee dairy farmer profits. And the government should provide employment opportunities to dairy farmers who have lost their cattle, or provide capital supplements and technical support to ensure their profits[7].

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