



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# Problems in the Development of China's Dairy Cow Breeding and the Countermeasures

CHEN Zhi-ying\*, GE Rui, HAN Qing, ZHANG Yu-feng, LI Ting

College of Economics and Management, Northeast Agricultural University, Harbin 150030, China

**Abstract** This article offers an overview of the development of dairy cow breeding in China, and analyzes the problems in the development of dairy cow breeding in China as follows: the breeding scale is small; the pasture grass production cannot meet demand; the proportion of fine breed is not high and the dairy cow yield per unit is low; it lacks epidemic prevention and quarantine mechanism; economic benefits of large-scale breeding are not high. These problems have become bottleneck in the development of the dairy cow breeding. Finally countermeasures are put forward for the development of dairy cow breeding in China as follows: developing large-scale breeding, and increasing subsidies; supporting the development of grass industry, and ensuring the supply of good feed; strengthening cultivation and promotion of fine breed, and promoting the quality of fresh milk; improving the accountability system of dairy products, and giving play to supervisory role of the news media.

**Key words** Dairy cow breeding, Large-scale breeding, Problems, Countermeasures

With the development of China's national economy and improvement in people's living standards, people have growing demand for dairy products, posing increasingly high quality requirements. At present, China's dairy industry has already been in a high-speed development period, which is the industry growing fastest in the animal husbandry. The development of the dairy industry is the development of a complete industrial chain. This industrial chain includes cultivation of fine breed, production of raw materials, feed production, feed management, acquisition of raw milk, cold-chain storage and transportation, marketing and trade, market consumption and other aspects<sup>[1]</sup>. The dairy industry can not only enhance economic growth, but also have great significance to resolving the issues concerning agriculture, farmers and countryside, promoting comprehensive and sustainable social development. The breeding of dairy cow, as an important part of the dairy industry development, largely restricts the development of dairy industry.

## 1 Overview of the development of dairy cow breeding in China

Since the reform and opening up, the dairy cow breeding in China has made great progress. Compared to 1978, the amount of dairy cow on hand in 2007 experienced an 24.7-fold increase, from 475 000 to 12 189 000, an average annual rate of 11.8%; the milk yield experienced an 36.4-fold increase, from 911 000 t to 36 330 000 t, an average annual rate of

13.3%; the adult female cattle yield per unit increased from 3000 kg to 4800 kg, an increase of 60%; the per capita milk experienced an 1.7-fold increase, from 10.1 kg to 27.5 kg<sup>[2]</sup>. However, there is a series of questions along with the rapid development. *National Dairy Development Plan* (2009 – 2013) pointed out that outmoded breeding pattern is one of the main contradictions and problems in China's dairy industry; small-scale free-range breeding households are still the main body of fresh milk production; it lacks special forage; the feeding mode is extensive; the proportion of high-producing dairy cow; the level of yield per unit of China lags far behind that of the developed foreign countries<sup>[3]</sup>.

## 2 The problems in the development of dairy cow breeding in China

**2.1 The breeding scale is small** The breeding scale of dairy cow in China is small, and the breeding pattern of dairy cow is centered on individual dairy farmers. Small-scale free-range dairy cow breeding households are scattered in China, so it is difficult to form economies of scale, seriously restricting the development of China's dairy industry. According to international experience, the appropriate breeding scale of dairy farmers is about 50. In 2009, there were 2.37 million cow breeding households in China, among which, there were 1.79 million households breeding 1 – 4 head of cow, accounting for 75% of cow breeding households; there were 0.5 million households breeding 5 – 19 head of cow, accounting for 21% of cow breeding households; the households breeding 20 head of cow and above, account for 4% of cow breeding households<sup>[4]</sup>. Detailed information is presented in Table 1.

**2.2 The pasture grass production cannot meet demand** The pasture grass is an important source of nutrition for dairy cow. At present, the major feed for dairy cow in China is grain, crop byproducts, straw stalk and a small amount of pasture grass. Alfalfa is a kind of high-quality vegetable protein, which

Received: February 14, 2012 Accepted: April 26, 2012  
Supported by Key Technologies R&D Program of Heilongjiang Province (GC10D206); Cooperation Project of Northeast Agricultural University and Inner Mongolia Mengniu Dairy (Group) Co., Ltd.; The PhD Start-up Fund of Northeast Agricultural University (2009-RCW05); National Soft Science Research Plan Project (2010GXQ-5D330).

\* Corresponding author. E-mail: chenzy1997@yahoo.com.cn

is considered the basis for supporting the development of dairy industry. China's dairy cows lack high-quality feed, especially high-quality alfalfa and pasture grass, which is a major factor restricting the milk production of China's dairy cows. In some developed countries, alfalfa has played an indelible role in the development of dairy industry. In the United States, alfalfa, as the third biggest crop, has made outstanding contributions to the development of dairy industry; in Japan and Korea, in order to ensure the dairy quality, they spare no expense to import alfalfa hay from the United States and Canada. However, in China, the dairy cow can eat high-quality roughage only in some large domestic pastures. The majority of decentralized raisers' dairy cows usually feed on mixed feed, including low-quality straw roughage, having a serious impact on milk production of dairy cow, resulting in higher prevalence of cow metabolic disease.

**Table 1 Breeding scale of dairy cow in 2009**

Breeding scale	Number of breeding households
1 – 4	1796 061
5 – 19	506 449
20 – 99	62 840
100 – 199	4 324
200 – 499	3 341
500 – 999	1 773
1 000 and above	706

Note: Data are from *China Dairy Industry Yearbook* in 2010.

Alfalfa industry in China has failed to meet the needs of the dairy cow breeding, which becomes an important factor seriously hampering the healthy development of China's dairy industry. China's current alfalfa yield can far from meet the needs of dairy cow breeding. Imported alfalfa has high quality and good prices, making the domestic alfalfa industry face enormous challenges. The price of domestic alfalfa is 1 900 – 2 200 yuan/t, while the price of alfalfa imported is 2 250 – 2 400 yuan/t. The nutritional value of 1 kg of alfalfa imported is equivalent to that of 1.5 – 2 kg of domestic alfalfa<sup>[5]</sup>. China's alfalfa import from different countries in 2008 and 2009 can be shown in Table 2. Table 2 shows that in 2009, China imported 74 184.93 t of alfalfa from the United States, an increase of 321.20% compared to 17 612.55 t in 2008; in 2009, the alfalfa imported from Mongolia increased by 131.97% as against 2008. It can be seen that China's alfalfa consumption is more and more dependent on import. It is estimated that in the next 10 years, the annual demand for alfalfa in China will reach 1 million tons. Be that as it may, we cannot solve the long-term problems in the development of dairy cow breeding merely by dependence on import.

**Table 2 China's alfalfa import from different countries in 2008 and 2009** t

Year	United States	Australia	Mongolia
2008	17 612.55	1 545.80	418.89
2009	74 184.93	1 448.45	971.70

Note: Data are from *China Dairy Industry Yearbook* in 2010.

**2.3 The proportion of fine breed is not high and the dairy cow yield per unit is low** The highbred dairy cow in China

includes Holstein dairy cow, Sanhe cattle in Xinjiang and Inner Mongolia, brown cattle in Xinjiang, Chinese Simmental cattle, etc. According to the statistics of the China Dairy Association, in 2009, there were 12.18 million adult dairy cow on hand in China, an average yield per unit of 4814 kg, equivalent to only 53% of the yield per unit of adult dairy cow in the United States. At present, the coverage rate of highbred dairy cow in China is less than 50%, lagging far behind the coverage rate of 100% in the developed countries. National imports of the dairy cow for improving breed and frozen semen of dairy cow in 2008 and 2009 can be shown in Table 3. Table 3 shows that in 2009, the import volume of the dairy cow for improving breed and frozen semen of dairy cow in China were greatly increased, an increase of 169.31% and 16.29%, respectively, compared with that in 2008. However, this can not solve the problem completely.

**Table 3 National imports of the dairy cow for improving breed and frozen semen of dairy cow in 2008 and 2009**

Year	Number of the dairy cow for improving breed	Frozen semen of dairy cow//kg
2008	15 075.55	1811
2009	40 599.00	2106

Note: Data are from *China Dairy Industry Yearbook* in 2010.

**2.4 It lacks epidemic prevention and quarantine mechanism** Animal diseases have a significant impact on food safety, international trade, and economic growth. Cow epidemic is a serious threat to the sustainable development of dairy industry. Many dairy cow breeding farmers lack cattle breeding knowledge and experience, who do not know how to prevent the disease, and in the local areas, it is also devoid of appropriate veterinary services. In some places of China, bovine tuberculosis, brucellosis, and other diseases prevail. And some staff of the Animal Quarantine Station take quarantine as a behavior of sale and purchase, and as long as people pay money, it can be stamped, so that *Law on Animal Epidemic Prevention* can not be implemented effectively.

The quality of raw milk is related to health status of dairy cow, breeding environment, nutritional factors in milk, etc.<sup>[6]</sup>. The quality of raw milk of dairy cow directly affects the quality of dairy products. If we can not ensure the quality of raw milk from the source, all measures are empty talk. China lacks international raw milk quality standards, supporting detection technology, and especially independent third party testing organization. In China, this raw milk testing system dominated by the buyer lacks effective supervision.

**2.5 Economics benefits of large-scale breeding are not high** Large-scale breeding of dairy cow will be the future development direction of the livestock industry, which can better increase milk yield and quality as against the free-range breeding, but the overall economic benefit is not satisfactory. According to the data in the *China Statistical Yearbook*, the economic benefit of large-scale breeding is not higher than that of free-range breeding of dairy cow. The dairy cow yield per unit using free-range breeding is 5 400.08 kg, and the dairy cow yield per unit using large-scale breeding is slighter higher, at

5 686.22 kg.

From the total output value, the large-scale breeding is only slightly higher; from the point of view of total costs, the cost of large-scale breeding is higher than that of free-range breeding; from the perspective of the total cost of milk per kg, the large-scale breeding is 2.13 yuan/kg, while the free-range breeding is 1.88 yuan/kg, showing that the cost of the large-scale breeding is higher; from the total profit, the profit of the free-range breeding is slightly higher<sup>[5]</sup>. Raising cost-benefit comparison between free-range breeding and large-scale breeding of dairy cow in China in 2009 can be shown in Table 4.

Table 1 Raising cost-benefit comparison between free-range breeding and large-scale breeding of dairy cow in China in 2009

Item	Milk yield per dairy cow kg/milk production cycle	Yield value yuan/head	Total costs yuan/head	Total costs per kilogram of milk//yuan/head	Total profits per kilogram of milk//yuan
Free-range household breeding	5 400.08	14 736.60	11 113.00	1.88	0.61
Large-scale breeding	5 686.22	16 573.03	13 196.47	2.13	0.54

Note: Data are from *China Dairy Industry Yearbook* in 2010.

### 3 Countermeasures for the development of dairy cow breeding in China

**3.1 Developing large-scale breeding and increasing subsidies** At present, the development space for China's dairy industry is still very broad, and doing a good job in large-scale construction is a priority. We can carry out large-scale construction to promote industrial upgrading of dairy industry from two aspects. One is to improve dairy farmers' feeding scale and the pasture feeding scale. For those free-range breeding farmers, we can guide them to be stationed in "cattle nursery". The other is to enhance the scale and quality of the dairy enterprise. The state should promulgate related industrial policies, close down those small enterprises with weak ability to resist risk, increase the support for the leading enterprises, enabling them to give full play to their exemplary role.

The benefits of current dairy cow breeding farm are not high, and the driving force of social capital investment is not enough, so promoting large-scale breeding of dairy cow at present hinges in a large measure on government support. We should further intensify efforts to support large-scale breeding, provide appropriate low-interest loans for large-scale breeding. "Before the end of October 2011, the proportion of dairy cow in breeding farms, with the scale more than 100 head of cattle, should be increased from less than 20% at present to about 30%". It is a goal put forward by the state on dairy cow breeding. But the breeding scale of dairy cow should be determined based on the actual local conditions, such as the local feed supply, and environmental carrying capacity, and we can not blindly expand the scale.

**3.2 Supporting the development of grass industry and ensuring the supply of good feed** We should first change the traditional concept and build new culture of grass industry. In China, the traditional culture holds exclusion attitude towards the grass. We should cherish the grass, make the grass serve ecological construction, and give play to a variety of effects of the grass for the development of animal husbandry. Second, we should develop special grass industry development plan,

In summary, the economic benefit of the large-scale breeding is not higher than that of the free-range breeding in China. The main reason is that the cost of the large-scale breeding in China at present is too high. In addition, the new techniques of dairy cow breeding in large-scale breeding farms are seldom used, limiting the improvement of dairy cow yield per unit, eventually making the economic benefit of the large-scale breeding lower than that of the free-range breeding. But currently, the large-scale breeding of dairy cow is the development trend of the world dairy industry.

and make a clear development goal; change the dual structure of grain crops and cash crops to the ternary structure of grain crops, cash crops and feed crops; increase the acreage of alfalfa and feed grain. In addition, the relevant government departments should formulate some policies on grass industry, so that grass industry gets a healthy development environment; pay attention to grass industry, and give reasonable subsidies for fine pasture grass seed and the growing of pasture grass. Finally, we should intensity the efforts in the grass-related research and technology promotion, cultivate the grass industry talents and introduce fine varieties of pasture grass.

**3.3 Strengthening cultivation and promotion of fine breed and promoting the quality of fresh milk** Cultivating highbred dairy cow is the most important task in dairy production, and highbred dairy cow can significantly improve the level of yield per unit<sup>[7]</sup>. We should further improve the construction of cold improved breed station, introduce foreign highbred bulls and frozen semen, according to local circumstances, to speed up the pace of improving the breed; implement genetic improvement program of dairy cow, establish the core group of high producing dairy cows; effectively speed up the registration, marking management system of highbred dairy cow. China's agricultural extension work is very backward, and dairy industry technology promotion is no exception. In the vast rural areas, dairy farmers still rely on traditional breeding techniques. Through promoting scientific and technological cooperation mode in the breeding planning counties (cities), we should increase benefits for the extension workers, strengthen the training for the promotion team so that the extension work is effectively carried out, and effectively improve the breeding techniques for the majority of dairy farmers. We should also strengthen guidance on the work of breed improvement, promote artificial insemination, embryo transfer, and other breeding technologies, to continuously improve the level of yield per unit of dairy cow, and improve the quality of fresh milk.

**3.4 Improving the accountability system of dairy products and giving play to supervisory role of the news media**

The dairy company is the first responsible person of the final

product safety. However, the current regulatory departments are not strict in enforcing the law, so that some companies make a reckless move at the cost of the life safety of the consumers. The promulgation of *Food Act* on February 28, 2009, is only a small step in the construction of this system. In the process of implementing this act, all regions should pay close attention to the factors related to food safety at home and abroad, according to the actual situation, emulate the foreign countries to establish supporting punitive damage compensation system, to earnestly safeguard the interests of consumers. There must be laws to go by, the laws must be observed and strictly enforced, and lawbreakers must be prosecuted. The dairy departments should formulate the enforcement regulation, in accordance with *Food Act* in China. The two most important links are quality safety inspection of dairy cow feed and milk station management. Through the establishment of independent third-party feed testing organizations, the government should realize full control over the process of dairy cow breeding. In addition, in the process of breeding, we should carry out the experimental work of GAP, HACCP system certification; pay attention to the role of the media and public opinion. A good environment for dairy development is inseparable from

(From page 10)

accordance with market rules, and carry out pilot works and demonstration. The pilot and demonstration take the city or county as units. It is preferred to select better agricultural basic conditions, influential economic power, and leading team. Through establishing modern agricultural demonstration area and exploring course and experience to provide reference and experience for local government. Finally, in view of unbalance of agricultural productivity level in different regions, when implementing policies and guidance, it is required to uniformly bring into play superior advantages of local resources, respect farmers' desire and take construction of modern agriculture to guidance to different types of areas.

## References

- [1] CHEN QJ. Restricting factors and countermeasures for developing modern agriculture in China[J]. Xinjiang state Farms Economy, 2010(2): 52–58. (in Chinese).
- [2] ZHANG HY. System obstacles of modern agriculture development in China[N]. China Economic Times, 2008–10–27. (in Chinese).
- [3] WANG JM. Transformation of agricultural scientific and technological achievements strategic research[R]. 2011. (in Chinese).
- [4] SUN RL. The current situation, bottleneck and outlet explore of modern agriculture construction[J]. Agricultural Economy, 2008(8): 81–83. (in Chinese).
- [5] LIU ZY. The development of modern agriculture must innovate system of promotion of science and technology[J]. Agricultural Economy, 2007(4): 24–26. (in Chinese).
- [6] MIAO S. On China fresh water resource status and protection countermeasures[J]. Modern Business Trade Industry, 2010(17): 19–21. (in Chinese).

the support of the news media.

## References

- [1] RAN QG. The building of innovation system in Heilongjiang dairy clusters[J]. Journal of Harbin University of Commerce: Social Science Edition, 2007(6): 38–40. (in Chinese).
- [2] MAO WX, SU XL, ZHANG XW. Problems and countermeasures of dairy[J]. New Agriculture, 2011(6): 13–14. (in Chinese).
- [3] Dairy development planning in China during 2009–2013[J]. China Dairy Cattle, 2010(8): 1–5. (in Chinese).
- [4] LIU CG. China dairy yearbook[M]. Beijing: China Agriculture Press, 2010: 131. (in Chinese).
- [5] LI SL, YANG ZM, HUANG WM, *et al.* How the purple medic industry to meet the dairy industry development demand[J]. Chinese Journal of Animal Science, 2010(8): 43–46. (in Chinese).
- [6] FULLER FH, BEGHIN JC, HU DH, *et al.* China's dairy market: consumer demand survey and supply characteristics[C/OL]. Staff Report 04–SR 99, 2004, Center for Agricultural and Rural Development Iowa State University Ames, Iowa 50011–1070 www.card.iastate.edu.
- [7] MA J, GAN L, QIAN XH, *et al.* The present status of milk industry in our country and the countermeasure of sustained growth[J]. Journal of Agricultural Mechanization Research, 2006(1): 50–52. (in Chinese).
- [7] WANG HY, GAO XZ. Dry farming and water saving agriculture status, problems and development suggestions in China[J]. China Agricultural Technology Extension, 2010(9): 35–37. (in Chinese).
- [8] SHAN L, KANG SZ, WU PT. China water saving agriculture[M]. Beijing: China Agricultural Press, 2006. (in Chinese).
- [9] SUN JS, KANG SZ. Present situation of water resources usage and developing countermeasures of water-saving irrigation in China[J]. Transactions of the Chinese Society of Agricultural Engineering, 2007(2): 1–5. (in Chinese).
- [10] New Century Weekly. Industrial safety and dust control[J]. New Century Weekly, 2010(9): 55. (in Chinese).
- [11] GENG FY. Achievements, problems and ideas of China's modern agricultural construction[J]. Journal of Anhui Agricultural Sciences, 2010, 38(16): 8763–8765. (in Chinese).
- [12] ZHENG WK, LI Q. Build perfect agriculture socialization service system to promote the development of modern agriculture[J]. Newsletter about Work in Rural Areas, 2007(10): 8–10. (in Chinese).
- [13] MFPRC. The reply of MFPRC to the proposal of the eleventh CP-PCC National Committee fourth meeting No. 3337(agriculture and forestry 330). Finance Construction[2011] No. 116. [2]. 2011.
- [14] ZHOU HL. Adhere to the red line—visit farmland protection secretary YAN ZY[J]. National Land and Resources Information, 2011(2): 33–34. (in Chinese).
- [15] ZHANG BL. Problems and countermeasures for the development of modern agriculture in Henan Province, China[J]. Asian Agricultural Research, 2011, 3(2): 12–15.
- [16] GENG FY. Achievements, problems and ideas of China's modern agricultural construction[J]. Journal of Anhui Agricultural Sciences, 2010, 38(16): 8763–8765. (in Chinese).
- [17] SUN XW. A study on the countermeasures of modern agricultural development from a perspective of e-commerce[J]. Asian Agricultural Research, 2010, 2(7): 35–38.