

The Development of the Dairy Industry in northern Vietnam -A case of the Mộc Châu area, Son La Province-

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Abstract

The objective of this study is to clarify the process by which dairy farming has developed in the Mộc Châu area of northern Vietnam and evaluated the current situation of dairy farmers. The author conducted six field surveys based on direct interviews from 2012 through 2015 to obtain information from 60 dairy farmers and about 20 personal interviews, covering the introduction of dairy farming in 1956 to its present expansion in Mộc Châu. Based on these interviews, the author identified three phases in the process of dairy farming development in Mộc Châu: the introduction period of dairy farming (1956-1985), the reform period of dairy farming (1986-2000), and the development period of dairy farming (2001-present). In addition, the survey showed that the development of fresh milk production in cooperation with the Dairy Farming Public Corporation established in 2005 led to an expanded scale of dairy farming, with voluntary bottom-up production at the farmhouse level, in response to top-down orders of the government.

Discipline: Agricultural economics

Additional key words: dairy farming, state farm, Doi Moi policy, public corporation

Introduction

Dairy farming is not a traditional industry in Vietnam. In tropical areas, rice production is easy,

whereas it is difficult to keep dairy cattle. However, milk consumption has recently been increasing in Vietnam, along with economic growth there. Fig. 1. shows the increases in the number of dairy cattle and in milk

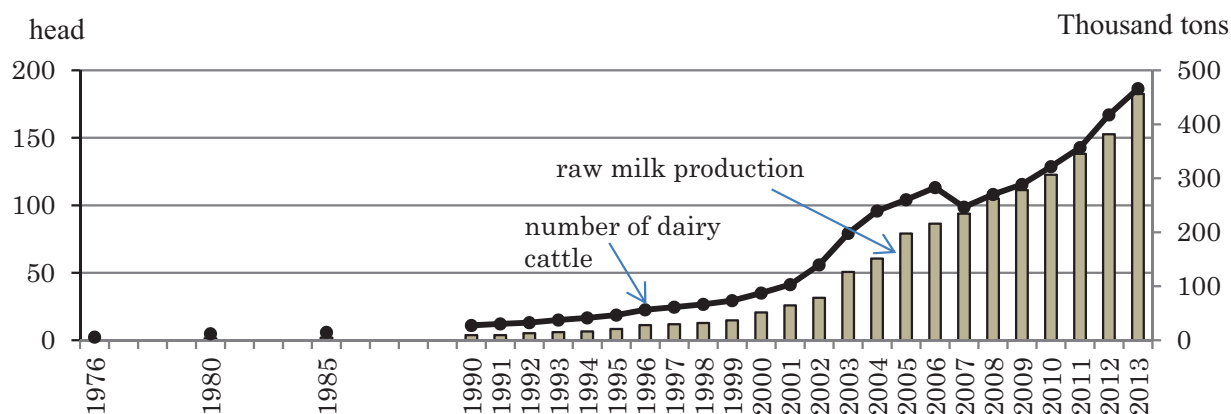


Fig. 1. Changes in the number of dairy cattle and in raw milk production

1) National Institute of Animal Husbandry (NIAH) statistical data for 1976, 1980, 1985, 1990-2000.

2) Ministry of Agriculture and Rural Development (MARD) statistics book for 2001-2010.

MARD, Livestock Industry Bureau, 2011-2013.

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production in Vietnam. The government of Vietnam has set a goal of increasing milk production to become self-sufficient and reduce the import of milk products.

The Mộc Châu area, Son La Province (hereinafter referred to as Mộc Châu) (Fig. 2) is situated on the slopes of a limestone plateau zone ranging in elevation from 850 to 1,050 m above sea level and located about 200 km northwest of Hanoi, the capital. The area has an average temperature 18 degrees Celsius (-1°C to 35°C), with average humidity of 86%. And there is little precipitation, at about 1,000 to 1,300 mm / a year.

Dairy farming began in Mộc Châu with the establishment of collective farms in 1960. After the Vietnamese–American war ended, collective farms were expanded to the southern Vietnam.

Vietnam's Doi Moi (Reform) policy was introduced in 1986. In Mộc Châu, five dairy cattle farmers were established under the Land Law in 1989. Consequently, the number of dairy herds gradually began increasing. The number of dairy cattle farmers increased from 170 to 338 during 1995-2000.

The number of cattle increased rapidly after 2001 and a Dairy Farming Public Corporation was established in 2005. At present, there are nearly 22,000 head of dairy cattle in over 550 tons that produce approximately 10%

of the milk in Vietnam. The Mộc Châu Milk Company produces fresh milk and milk products and sells these goods in the major cities of Vietnam. This study examined the history and status of dairy cattle production in Mộc Châu and evaluated the current status of the dairy farming industry in the area.

Methods and materials

The author had worked at the National Institute of Animal Husbandry (NIAH) and lived in Hanoi from 2006 through 2008, and visited Mộc Châu every month. The author conducted six surveys in Mộc Châu from 2012 to 2015 on the current situation of dairy farmers, as well as the activities of the Dairy Farming Public Corporation along with a researcher from the National Institute of Animal Husbandry.

Sixty dairy farmers and 20 personnel of the armed forces farm^(note 1), a state farm^(note 2) and Dairy Farming Public Corporation in Mộc Châu were interviewed. The dairy farmers were randomly selected from 540 dairy farmers in 10 communes by the Dairy Farming Public Corporation. In May 2015, the author interviewed 20 personnel about their past missions and jobs, the situation at the state farm, their lifestyle, memories of Mộc Châu,

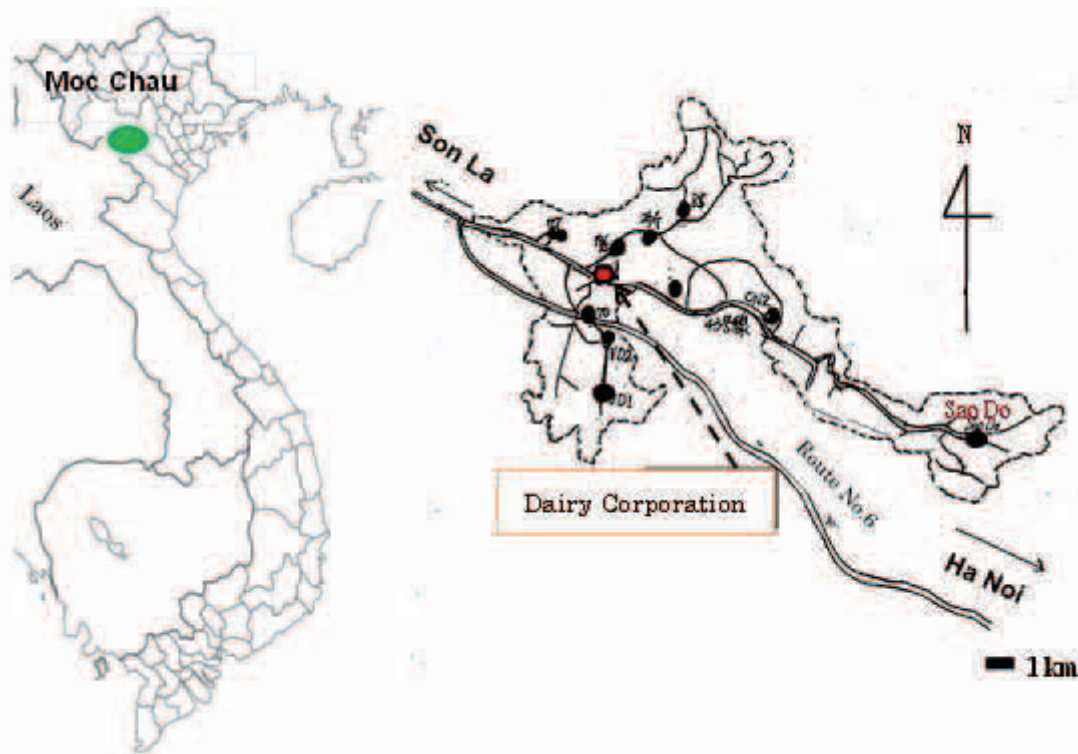


Fig. 2. Mộc Châu area in Son La Province and the survey site
Data: Illustrated by the author.

and other topics.

Available literature on milk production in Mộc Châu was also reviewed, together with technical and economic literature. Mộc Châu is located near the Laotian border and was occupied by France in colonial times from 1868 to 1954. Anh et al. (2009) described the reclamation process used in 1956 to construct the armed forces farm in Mộc Châu, and reported the production of fresh milk and tea on the state farm to commemorate 50 years in the history of Mộc Châu. Dairy farming and tea plantations were promoted due to the relatively cool climate in the area. Nga (2013) showed that improving cattle and the quality of milk by monitoring farming and management in Mộc Châu during 2010-12 could increase farming income. While there have been detailed reports of the situation of the southern French colony (Takada, 2014), few studies have examined the expansion of dairy farming in Mộc Châu.

Results: Interview analysis

Development of dairy farming in Mộc Châu

(1) Phase I: Introduction period of dairy farming (1956-1985)

During Phase I, the armed forces built a collective farm as ordered by the party, and then shifted dairy farming activity to the state farm on orders “from the top.” Beginning in 1956, the armed forces, which were active in Laos at the time, reclaimed Mộc Châu to increase food production in the undeveloped highland area. The armed forces farm was built in 1958 and later it became a state farm in 1960. China and Cuba exported dairy cattle to the state farm to produce milk products. China and Cuba also provided technological assistance with dairy farming.

Mr. G participated in the foundation of the farm. “I became Secretary-General of the party in Mộc Châu in 1956. About 5,000 North Vietnamese soldiers arrived and began construction of the farm. The armed forces farm was completed in 1958 and 4,000 of the soldiers returned to military service.” In 1959, ten dairy cattle were imported to Mộc Châu from China.

The armed forces farm became a state farm under the Ministry of Farms in 1960. Mrs. D, who enlarged the cultivated area by cutting trees and wild grass, said that they were not paid for six years. Mr. L, who was a high-level technical expert in those days, said “I was dispatched to Mộc Châu on orders from the party in 1960 and learned artificial insemination technology from Chinese experts in 1961.” China introduced artificial insemination technology in the 1960s, while Cuba exported many dairy cows and built a cattle artificial insemination center in 1972. According to Anh et al. (2008), Beijing

provided 24 head of dairy cattle (China Beijing Black and White cattle) in 1960^(note 3). In 1972, there were 400 head of Holstein Friesians that produced about 400 tons of milk, or roughly 1,200 kg fresh milk per cycle per cow on average. This low level of milk production was attributed to the lower quality of milk cow and feed shortages in cold winter. During the Vietnamese-American War (1960-1975), the state farm produced canned sweetened condensed milk for the North Vietnamese Army. After the war, rice production decreased in the 1970s. The state farm sent cows to southern Vietnam, but could not find a solution for food shortages and agricultural production. Dr. S, who studied milk cow breeding for increased milk yield, said “I transferred 1,020 milk cows to Da Lat in the Central Highlands after obtaining the results of a local adaptation study in 1978-82.”

During this period, Vietnam was isolated internationally and very poor due to the war in Cambodia. Nevertheless, engineers were dispatched to Mộc Châu. Mr. Ta M, an agricultural machinery engineer, said “I came to the milk cow breeding center in 1980, and healthy, younger individuals were dispatched from each province.” Mrs. M, who was a nurse, said “There were few necessities, and it was very cold; there were also many diseases.” Many cattle died in winter due to the cold and feed shortages. In addition, Dr. H, a veterinarian, said, “I came in 1980, and treated the domestic animals single-handedly.”

During this period, there was a severe nationwide shortage of food, so the number of milk cows were reduced and such foods as potatoes and bean were produced (Vien Chan Nuoi 2009).

(2) Phase II: Reform period of dairy farming (1986-2000)

During Phase II, dairy farming was converted to a bottom-up process based on individual farms with milk cows and cultivated areas to take advantage of market economization under the Vietnam’s Doi Moi (Reform) policy. At the party convention held in December 1986, the government adopted this policy to overcome food shortages and also adopted a policy of market economization and an openness to foreign investment.

In August 1986, FAO/UNDP launched ‘The milk production and milk processing project’ where the FAO experts worked in cooperation with the Mộc Châu state farm until 1993, and reported some problems in soil quality, feed shortages in winter, and poor milk plant facilities in Mộc Châu.

The cultivated land belonging to the collective farm of the state farm was distributed to individual farmers under the Land Law of 1988.

Other state farms were reorganized and Agriculture Public Corporations were established. As a result, rapid

agricultural development began for rice, pork meat, and industrial agricultural products such as coffee.

Mr. L stated, “At first, the corporation gave milk cows to five people at the end of 1989. Consequently, the Agriculture Public Corporation distributed land and milk cows to individuals knowledgeable about dairy farming as a trial. However, few people wanted to continue keeping dairy cows, and most turned to tea production. In Mộc Châu, the distribution of land in 1990 was based on the number of milk cows, with farmers being allocated land based on a rate of 5,000 m² per cow. I was also ordered to become a dairy farmer, so I was given some milk cows and land from the state farm in 1990.” According to Mrs. D.M., a staff member of the state farm and the Agriculture Public Corporation from 1980 through 2004, “In 1990, 17 people, about 10% of the state farm personnel in charge of the dairy cattle sector, were selected, and started a trial of large-scale dairy farming.”

The dairy cows were fed in a large brick cow house with mortar walls to protect the cattle from the cold. However, there was a shortage of feed in the cold winter and about 800 milk cows were slaughtered, thus reducing the number of cattle to 1,300 head.

Among the state farm staff, 147 people became independent dairy farmers. Several engineers kept 70-80 milk cows each, while others had as few as three cows each. The staff of the Agriculture Public Corporation asked their relatives to transmigrate to become dairy farmers in Mộc Châu. As a result, there were about 300 dairy farmers and 1,943 tea farmers in 1991-1992 (Anh et al. 2009). Although the dairy production areas were limited until 2000 to 11 provinces and cities, including Mộc Châu, milk consumption slowly increased based on the demand from the urban areas. Along with economic growth and population growth in Vietnam, the consumption of milk and dairy products increased 0.47 kg per capita in 1990 to 8.09 kg per capita in 2000 (FAOSTAT data-base). In 2000, 354 farmers in Mộc Châu owned 1,453 milk cows (an average of 4.1 head per farm).

(3) Phase III: Development period of dairy farming (2001-present)

In Phase III, the “top-down” government policy and “bottom-up” requests of dairy farmers were merged in a new Dairy Farming Public Corporation that was established in 2005.

To improve nutrition and reduce the import of dairy products, the government decided to increase domestic milk production. The “Dairy Development Program” was announced in 2001 in order to increase the income of farmers, enabling them to switch from rice production to raising livestock. Since 2001, farmers in 22 provinces and cities have newly engaged in dairy farming. The

government has imported over 10,000 head of dairy cattle and used over 800,000 straws of semen from 2002 to 2004 (Ministry of Agriculture and Rural Development 2008). New technology involving excellent quality milk cows, a new straw method of artificial insemination method, and improved grass and silage production were introduced to dairy farmers. The total number of dairy cattle increased in Vietnam to 104,000 head in 2005, three times the 35,000 head in 2001.

Mộc Châu Agriculture Public Cooperation also imported over 1,000 head of dairy cow breeding stock from the United States and Australia, and distributed the milk cows to farmers. In 2004, the construction of National Road No. 6, linking the capital of Hanoi to Mộc Châu, was completed, making the transport of dairy products very easy.

Son La Province devised a milk factory reconstruction plan and secured a budget of 200 billion VND (approximately 1.4 billion JPY) and financed the Agriculture Public Corporation. Consequently, the corporation was divided into a Dairy Farming Public Corporation and a Tea Farming Public Corporation. Mr. C, the president of Mộc Châu Dairy Farming Public Corporation stated, “In 2005, a new milk factory was completed in cooperation with Sweden and the Mộc Châu Milk Company was established.”

Although the government achieved the targeted number of dairy cattle (100,000 head) in 2005, many small-scale farmers went bankrupt in 2006-2007, especially in the northern part of Vietnam, due to a lack of dairy farming skills and technologies (e.g., feeding, cattle management, reproduction, and disease prevention). The Vietnamese government announced a “Dairy Development Strategy” in setting a target of 500,000 head of dairy cattle, one million tons of milk, and 40% self-sufficiency by 2020. The government hopes that the number of dairy cattle will be increased in traditional milk production areas, such as Mộc Châu, Ho Chi Minh City and Da Lat.

In Mộc Châu, the number of dairy cattle had increased to 3,474 head (an average of 6.9 head per farm) by 2008. The Mộc Châu Dairy Farming Public Corporation purchases milk cows and feed, sells the cows and feed to dairy farmers, and then purchases fresh milk under contract. The corporation has a technical section and its artificial inseminators and veterinarians check dairy cows regularly. The dairy farmers need to adapt to current conditions by changing the methods of care and nutritional balance used, as well as improving the breeding, mechanization, and training. Improved herd quality is directly related to improved income for the farmers. In addition, large ranches and feed factories

have recently been built to externalize the feed production labor needs faced by dairy farmers. The Mộc Châu Milk Company produces milk and dairy products, transports them to capital of Hanoi, and then sells the fresh milk. The self-sufficiency rate for domestic fresh milk and milk products has reached 24.7% in 2010 in Vietnam.

By 2014, the number of dairy farms in Mộc Châu had increased to 560 and the number of cows to 14,738 (an average of 26.3 head per farm). Milk production was 160 ± 5 tons/day or slightly less than 10% of the nationwide production (Giao 2015).

Discussion: Development of dairy farming

1. Three phases of dairy farming development in Mộc Châu

Based on these interviews, three phases of dairy farming development in Mộc Châu were identified. Those phases are called the introduction period of dairy farming (1956-1985), the reform period (1986-2000), and the development period (2001-present). Table 1 lists the development of dairy farming in Mộc Châu in chronological order.

Fig. 3 shows in the numbers of dairy farms and dairy cattle in Mộc Châu. The Dairy Farming Public Corporation imports purebred Holstein Friesian cattle, which are then kept at large-scale ranches (constructed in 2010), bred via artificial insemination, and sold to dairy farmers. The average milk yield is $> 5,700$ kg/head/305 days, far greater than the typical yield (3,800 kg) in Vietnam's lowland tropical zone (Thao 2014). The Mộc Châu Milk Company is the only Dairy Farming Public Corporation operation; there are no private milk companies in Mộc Châu. On the dairy farms, milking is done in the morning (beginning at about 5:00-6:00 a.m.) and again at about 4:00 p.m. The farmer washes the cow before milking in the morning and evening, and the cow is milked by hand or milking machine. The entire family then helps to transfer raw milk into containers and transports it to the milk collection depot by motorcycle. Farmers then cut and carry grass to the barn as fodder for the cattle. This grass will be consumed during the evening and following morning. Rice bran and beer residue are popular cattle feed in the tropical lowland zone, but Mộc Châu farms do not use such feed, preferring hay, which it has imported since 2009. Corn production has increased since 2008, and is stored as silage after harvest. In 2012, there was insufficient mixed silage and concentrate or total mixed ration (TMR) feed available; however, the Dairy Farming Public Corporation built a TMR feed factory in 2013, which provides TMR feed to farmhouses at low cost. From 2006 to 2011,

the small and medium-scale dairy farmer technology improvement project was carried out by the Japan International Cooperation Agency (JICA). JICA experts and staff of the National Institute of Animal Husbandry (NIAH) offered training to engineers, technicians, and farmers within the Dairy Farming Public Corporation (JICA 2011). Engineers are now able to provide technical guidance regularly at farmhouses. Mr. N, one of the dairy farmers, said, "I learned a lot about dairy farming issues and the meaning of technical points, which hadn't been known 10 years ago. Now I expanded the land used for grass and corn production and produced silage, and more than 20 head of cows that produced over 6,000 kg milk per a cow."

Table 2 lists the results of the 2012 survey of Mộc Châu farmhouses, categorized by farm size (cattle number). Most farmers were middle-aged and kept an average of 20.3 head per farm (range 7-45 head per farm). Cultivated land is divided into categories according to use: hayfield, cornfield, and grazing pasture. On average, 3.1 ha/farm is cultivated, an average of 2 ha/farm at the smallest scale (7-14 head), and 4 ha/farm at the largest scale (31-45 head). As the head count per farm increases, dairy farmers need a large grass land area for self-sufficient feed cultivation, from 49 a/farm at the smallest scale to 75 a, 135 a, and 238 a at larger scales (Table 2). However, the average cultivated area per dairy cow is only 13-18 a/head. As a result, as their dairy cattle holdings increase, most farmers purchase concentrated feed, with volume increasing to 31.2 tons per farm. Approximately 3-4 kg/head of concentrated feed is provided daily, and typically over three feedings.

Silo storage during the study period showed an increase since 2006, when Mộc Châu introduced bunker silos. In 2012, the rate of silo use reached 60% (37 silos) to prepare for winter feed shortages. However, most small-scale farmers (< 14 head) do not use silos. Alfalfa hay cubes are imported from the U.S., at an annual average of 5.93 tons per farm.

The introduction of milking machines (milkers) has improved efficiency over manual milking by hands, through increased speed and the collection of cleaner milk. At the time of 2012 survey, 55 households already owned 59 milkers, with the remaining 5 households planning to purchase milkers in the near future.

The average profit was approximately 6.15 billion VND per farm (range of 4.1-10.5 billion VND per farm). Deducting feed costs (the sole greatest expenditure), average income was approximately 2.57 billion VND (1.4-4.7 billion VND). According to Vietnamese statistics (Vietnam Living Standard Survey 2012), the national average household annual income is 24 million

VND/household in urban areas and 19 million VND/household in rural areas, while the income of dairy farmers is a hundred times higher than the latter amount. Raw milk prices have increased to 12,500 VND/kg in 2015 compared to 11,900 VND/kg in 2013. By 2015, dairy cattle ownership in the farmhouses surveyed had increased rapidly to 29.6 head per farm, the largest farm owning 60 head of cattle.

On average, the income needed to sell raw milk is 5.9 million VND per cow. The main expenditure cost is for concentrated feed during the milking period. The feed cost is about 2.4-3.6 million VND depending on milk production. The profit per cow is sufficient for dairy farmers. The farmers hope to increase the number of milk cows and the Dairy Farming Public Corporation will support them and promote further development.

Although 60 of the surveyed farms had a total of 42 compost manure sites without roofs located next to cattle sheds, 21 farmhouses discharge feces and urine directly outside, which sometimes flew into streams. This may create an environmental problem for Mộc Châu in the near future.

Fig. 4 shows the changes in the number of number of dairy cattle per farm from 2006 to 2015. There was a general increase after 2008. The number of farms with 1-10 head decreased sharply from 457 (89% of the total) in 2006 to 102 (18%) in 2015, while the number with 11-20 head increased until 2012. In 2006, only eight farms had 21 or more cows (0.6%), but this had increased to 312 farms (55%) in 2015. The price of raw milk paid by the Dairy Farming Public Corporation increased with the increased along with higher demand for milk and

Table 1. Development of dairy farming in Mộc Châu

Phase, Policy	Development in Vietnam	Introduction of Technology to Vietnam	Dairy cattle/Farm Number/Milk production
Phase I 1956~1985 The Dairy farming introduction period	1958 Army Farm was constructed	1958~ Cross-bred dairy cattle were imported from China	10 heads (1958)
	1960 State Farm was constructed	1969~ Pure-bred Dairy cattle were imported from Cuba (129 heads)	
	1961~ Artificial Inseminator were trained	1972 Cattle Artificial Insemination Center was established, Perret type semen production technique was introduced by Cuba.	24 heads (1960)
	1966 Dairy cattle breeding center was established		1,814 heads (1976)
Phase II 1986~2000 The Dairy farming reform period Doi Moi (Reform) Policy (1986) Land Law (1988)	1986 Change from State Farm to Agriculture Public Corporation	1975~ 1976 887 Holstein-Friesian dairy cattle were imported from Cuba.	
	1989 Dairy cattle were distributed to 5 farms	1986~ 1992 Mộc Châu Dairy Farming Project by FAO/UNDP.	5 farms (1989)
	1990 Dairy cattle were distributed to 17 farms		About 300 farms (1991~1992)
Phase III 2001~ The Dairy farming development period Dairy Farming Improvement Program (2001) Dairy Farming Development Strategy (2008)	2005 Milk Plant was constructed, Mộc Châu Dairy Farming Public Corporation was established	2001~ Straw type frozen semen was introduced from Japan (JICA project) 2006~ Extension of Bunker Silo	2,553 heads, 4,006 tons (2001)
	2010 Mộc Châu milk Antenna shop was opened in Hanoi.	2007~ Training course for Technicians and Farmers started (JICA project)	516 farms, 3,540 heads, 5,456 tons (2006)
	2010 Large scale Ranch was constructed	2008~ Corn Production have been increased	6,313 heads, 22,630 tons (2010)
	2013 TMR Feed Factory was constructed		11,352 heads, 38,308 tons (2012)

Data: Obtained from surveys conducted in 2012 through 2015.

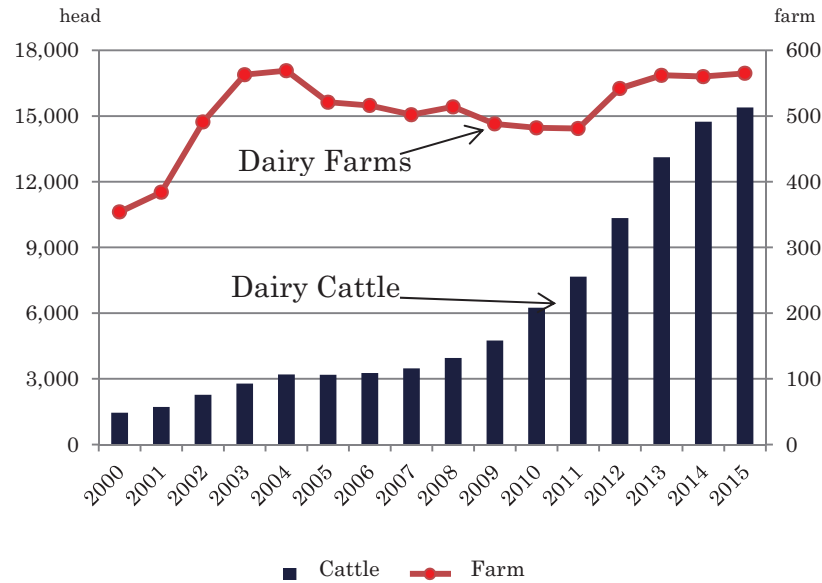


Fig. 3. Number of dairy cattle and dairy farms in Mộc Châu

Data: Illustrated by the data from surveys conducted in 2012 through 2015.

Table 2. Status of 60 dairy farmers surveyed in 2012

Item	Unit	7~14 head per farm	15~19	20~30	31~45	Total/Average
Household	house	13	23	16	8	60
Dairy farmer • Man	years old	43.6	41.2	43.8	48	43.3
Dairy farmer • Woman	years old	39.2	38.8	42	44.7	41.4
Dairy cattle	head	11.9	17.2	24.1	35.5	20.3
Adult Cow	head	5.9	9	12.2	17.9	10.4
Cultivating area	per farm	214	222	422	481	310.1
Grassland	per farm	49	75	135	238	114.6
Corn field	per farm	87	77	154	120	120.7
Cultivating area/head	a per head	17.9	12.9	17.5	13.5	15.3
Concentrate feed	tons per farm	18.6	26.9	40.1	50.5	31.2
Silo	Unit (%)	1 (8)	17 (74)	12 (75)	7 (88)	37 (62)
Milking machine	Unit (%)	10 (77)	24 (104)	15 (94)	10 (125)	59 (98)
Compost unit	Unit (%)	8 (62)	16 (70)	11 (69)	7 (88)	42 (70)
Average profit	10,000 VN dong/farm	39,588	51,923	61,233	105,762	61,784
Average profit/head	10,000 VN dong/farm	6,710	5,769	5,019	5,908	5,941
Average income	10,000 VN dong/farm	12,425	21,237	23,467	46,150	24,693
Average income/head	10,000 VN dong/farm	2,106	2,360	1,923	2,578	2,374

Data: Calculated from the survey conducted in 2012.

milk products. Most parents believe that milk and milk products help children to grow.

2. Organization and roles of the Dairy Farming Public Corporation

The Dairy Farming Public Corporation issues bonds that dairy farmers invest in and can use to obtain excellent milk cows for increased milk production. The corporation has many roles, including purchasing and selling milk cows, feed production and sales, the collection of fresh milk, transportation, production, and sales.

The Dairy Farming Public Corporation has a president and two vice presidents, with nine staff in the production business management section, six in the personnel section, and nine in the accounts section, along with a technical section with 21 technicians and veterinarians. The corporation has a total of 1,807 workers, including more than 400 in the dairy products processing factory, a large-scale dairy cow ranch (more than 40 people), and a total mixed ration (TMR) feed factory (more than 40 people).

The production business management section drafts many plans with the president and vice president. The technical section includes artificial inseminators and veterinarians and provides artificial insemination, periodic breeding diagnosis, and such animal hygiene services vaccination, breeding management, or milking hygiene instructions. The provision of dairy farming

technology to small and medium-size farms leads to the stable of dairy farming management. It also introduces new artificial insemination methods to farmers and advanced-techniques dairy farming equipment, such as milking machines. The technical progress made is exhibited at the milk cow expo held every October. The champion cow yield of milk is more than 10,000 kg/head. These activities of the corporation intended to support dairy farmers have led to improved productivity, better management by dairy farmers, and higher income based on the number of milk cows.

In 2010, the Dairy Farming Public Corporation constructed a large ranch for breeding cows, and kept around 2,000 head of dairy cattle. The ranch has three barns and parlor-type automatic milking facilities, large bunker silos, an automatic manure removal machine, and an aeration type of manure disposal pond.

As the supply of feed for winter can be a problem, the corporation planted King grass^(note 4), which is an improved cross-bred type of grass that produces much more grass, and constructed bunker silos for silage production. In addition, a new feed factory was constructed in 2013 and it produces TMR feed and sells it at a price about 15% lower than that of concentrated feed; (i.e., 250,000 VND/40 kg). The corporation also supports the external securing feed and feed production labor.

The corporation purchases the fresh milk produced by the farmers and maintaining stable high prices for fresh milk. And it has continued raising the price of raw

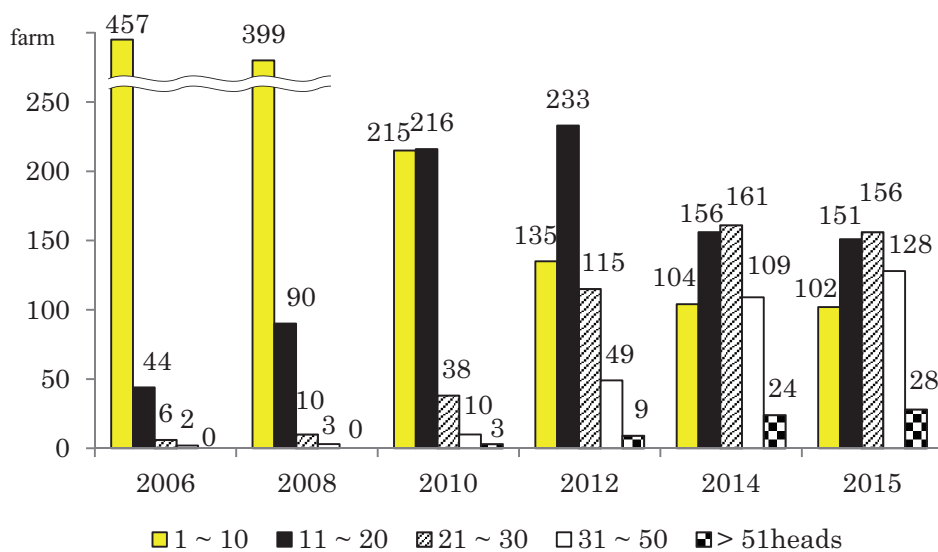


Fig. 4. Dairy farm count by scale in Mộc Châu
Data: Calculated from the surveys conducted in 2012 through 2015.

milk annually since 2006, when it was 2,900 VND/kg as compared to 12,000 VND/kg today.

There have been some recent problems including feed shortages and manure treatment in Mộc Châu. U.S. hay has been imported since 2009 because it is believed to increase the volume of milk. In fact, a total of 700 tons was imported in the second half of 2015. If they would continue to import grass much more, they might become a processing-type dairy farming.

Conclusions

All analysis of the history and current-situation of dairy farming in Mộc Châu suggests three phases of dairy farming: Phase I is the Introduction period of dairy farming (1956-1985); Phase II is the Reform period of dairy farming (1986-2000); and Phase III is the development period of dairy farming (2001-present). The climate and soil in the Mộc Châu area are not suitable for cultivating paddy rice or the tropical crops that generally grow in the warm humid environment of the lowlands. However, the cool climate is suitable for keeping Holstein Friesian milk cows. Mộc Châu is the biggest milk production area in northern Vietnam. Most dairy farmers began dairy farming after the Vietnam's Doi Moi policy was introduced and paved the way for small-scale dairy farming. In 2001, the "Dairy Promotion Program" started and the number of dairy cattle increased sharply. The number of dairy cattle farmers increased until 2005, with the importation of dairy cattle and sire semen. The dairy cattle population in Mộc Châu increased to over 22,000 head in 2013, and the number of dairy cattle per farm also increased. The development of the dairy farming in the Mộc Châu area involves collaboration between the Mộc Châu Dairy Farming Public Corporation and dairy farmers. At the beginning of 2000, the quality of dairy herds in Mộc Châu was still low; however, the Mộc Châu Dairy Farming Public Corporation selected and imported good quality dairy cows for farmers. Dairy farmers were thus able to expand through cooperation with the Mộc Châu Dairy Farming Public Corporation by making use of technical support, training courses, health and reproductive care, feed supply, and high raw milk prices. However, dairy farmers also face some risks related to input material, especially fluctuations in feed prices and lower demand for national milk products. However, the demand for safe and delicious domestic milk will increase, so if the farmers keep high yield dairy cows in

the cool climate in Mộc Châu, milk production may be further increased.

- Notes -

- 1) Armed force farm: Farmland reclaimed by the armed forces for food production purposes increased in various place throughout North Vietnam from 1956. Livestock raising and tea cultivation were carried out in Mộc Châu.
- 2) State farm: Established by the North Vietnam's Ministry of Farms in 1960, and farms reclaimed by armed forces nationwide became state farms.
- 3) China Beijing Black and White cattle refer to a cross-bred between Chinese Yellow cattle and the Holstein Friesian breed.
- 4) King grass is a hybrid with Napiergrass (*Pennisetum purpureum* Schumach) and pearl millet (*Pennisetum typhoides*).

References

- Anh et al. (2009) "Nong Truong Mộc Châu- Sơn La, 50 năm Xây dựng và trưởng thành", Công ty Bò sữa Mộc Châu, Nông trường Mộc Châu, 9-11, 48, 55-56, 61, 71, 92-94. Mộc Châu, Sơn La, Vietnam.
- Bò Nong Nghiệp và Phát triển Nông Thôn (1998) Báo Cao Tong ke, VIE80/013. Công Ty Sữa Thảo Nguyên. 3,5. Hanoi, Vietnam.
- Giao, Hoan Kim (2015) Một số thông tin về chăn nuôi bò sữa trên thế giới và trong nước năm 2014.8. Hanoi, Vietnam.
- JICA (Japan International Cooperation Agency) (2011) "Gijyutsu Kyouryoku project jigyo kanryou Houkokusyo (Final report of JICA project on Small and Medium dairy farming production technology improvement project)" <https://www.jica.go.jp/project/vietnam/0601775/pdf/report.01.pdf>. JICA, Tokyo, Japan. [In Japanese].
- Nga, Bui Thi (2013) "Cost Monitoring in Dairy Farms to promote the Value Chain of Fresh Milk in North Vietnam", Liege University, Belgium, 14,104,172. Belgium.
- Takada Yoko, "Futsuryou Indochina no Kome yusyutsu, Mekong Delta ni okeru Kome zousan taisei no seiritsu, Kaihatsu no syatem to daitochi syoyusei (Rice export in French colony Indochina, Establishment of rice production increasing system in Mekong Delta, Development system and Latifundio(large land occupied system) ". Tokyo, Japan. 195-219. [In Japanese].
- Thao. L.V. (2014) Tài Liệu Hội Thảo Khoa Học Phát Triển Ngành Sản Xuất Sữa và Chăn Nuôi Bò Sữa ở Việt Nam. Trung Tâm Nghiên Cứu Bò và Dông Cổ Ba Vi. 127. Hanoi, Vietnam.
- Vien Chăn Nuôi, Ministry of Agriculture and Rural Development, 2009, "Trung tâm Nghiên cứu Bò và Dông cổ Ba Vi, 50 năm Xây dựng và Phát triển". 18-19, 21, 58, 68. Hanoi, Vietnam.