

# Chapter 5

## Dairy farming, a clash of production models

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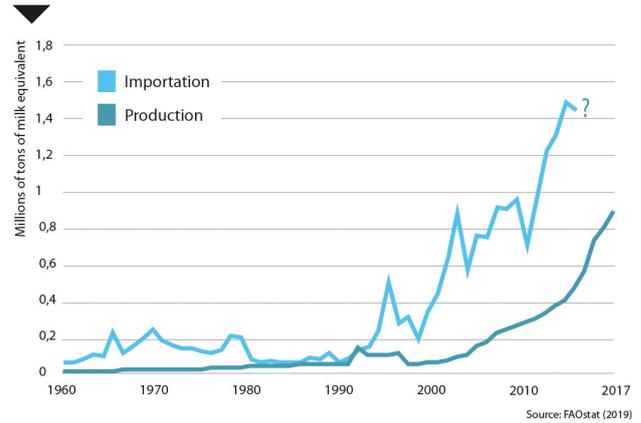
*Model farm at the Ba Vi research center*

# The emergence of localized milk-sheds

## Milk imports continue to dominate

The consumption of dairy products in Vietnam is expanding rapidly. Since 1990, the emergence of new eating habits and the increased standard of living of households have led to a rise in per capita consumption. Between 1990 and 2011, the amount of milk consumed annually per inhabitant increased from 1.4 kg to 16 kg. Up until the early 2000s, this growing demand was satisfied by a massive reliance on imports. While imports were under 100,000 tons of milk equivalent in the 1980s, they reached 1.4 million tons in 2011. It was not until 2002 that domestic milk production began to increase significantly thanks to the launch of a national dairy development program based on support for small farms. The reliance on imports came under intense scrutiny beginning in October 2008 when Vietnam was hit by a food crisis involving milk powder produced in China. This crisis led industrialists to take a renewed interest in collecting local milk.

Evolution of milk production and imports in Vietnam since 1960



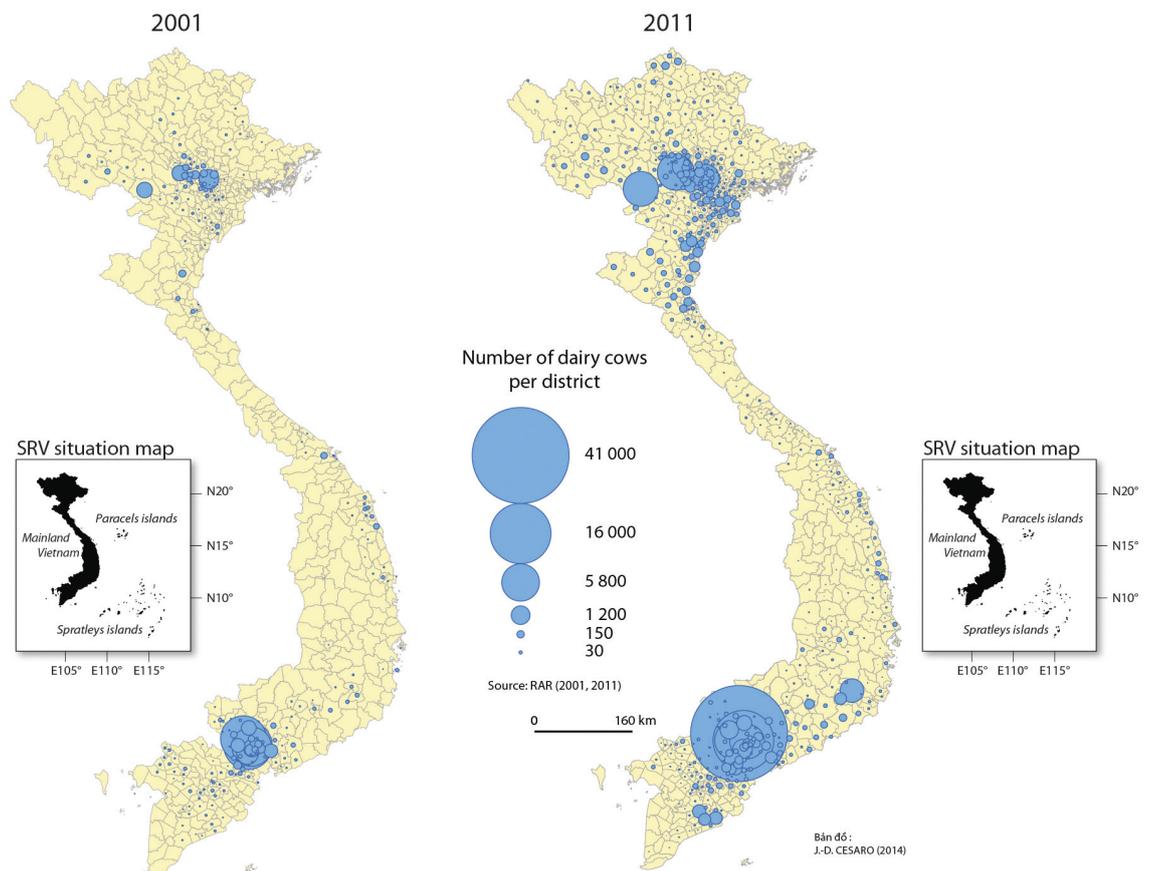
## Emerging output

In the early 1990s, the country had less than 10,000 dairy cows distributed across a dozen state farms. In 2000, Vietnam had 44,000 dairy cows on 10,000 farms. By 2011, the country had slightly more than 130,000 heads spread over 37,000 farms. Over this entire period, the growth in production was supported by a strong demand for dairy products and joint investments from the government, business, agricultural households and development projects. These investments were focused on small farms in a limited number of districts that became milk-sheds where family farming dominates.

A dairy farm in Ba Vi



Comparison of numbers of dairy cows by district in 2001 and 2011



### Traditional production areas

In the regions of Mộc Châu, Ba Vì, Đà Lạt and Củ Chi, the small family farm model was developed with real political will on the part of the government. Farms are generally small, with 3 to 4 dairy cows, except for Củ Chi, where farms have on average more than 10 dairy cows. These milk-sheds are often linked to the previous existence of an old state farm from the collectivist era. An effort was made to provide small producers access to land.

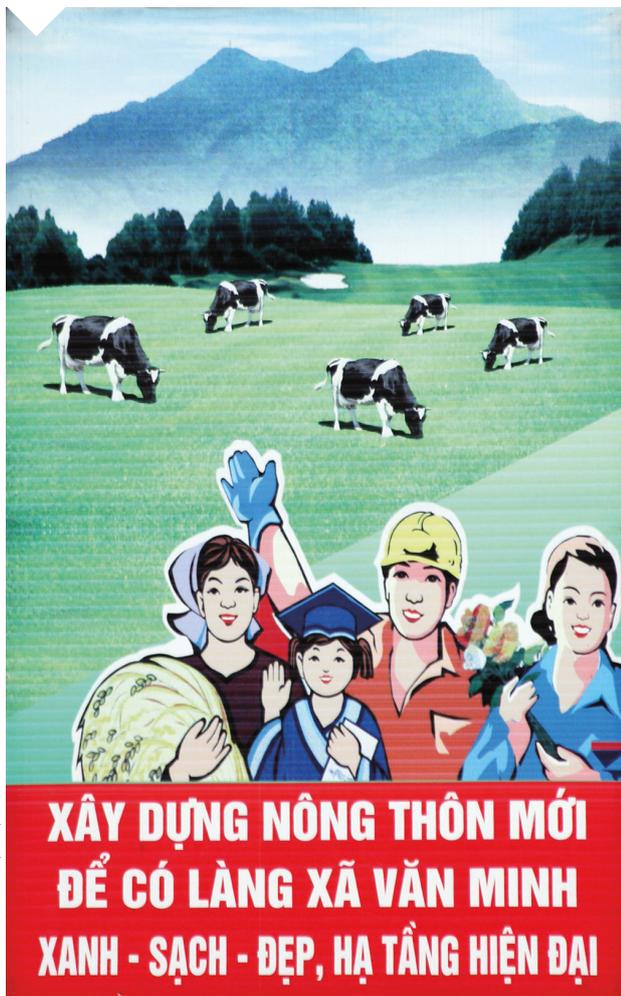
### Space and market problems

However, these production basins are constrained by land, as agricultural land is in short supply. To increase the quantities of milk collected, dairy companies must either increase the number of dairy farmers supplying them, or promote an increase in the number of cows per hectare and per farm. The first option involves the diversification of farms to dairy farming, which was the driving force for dairy development during the 2000s. The second solution involves intensifying fodder production and turning to regional markets for green and dry fodder, which increases production costs.

### Towards mega-farm models

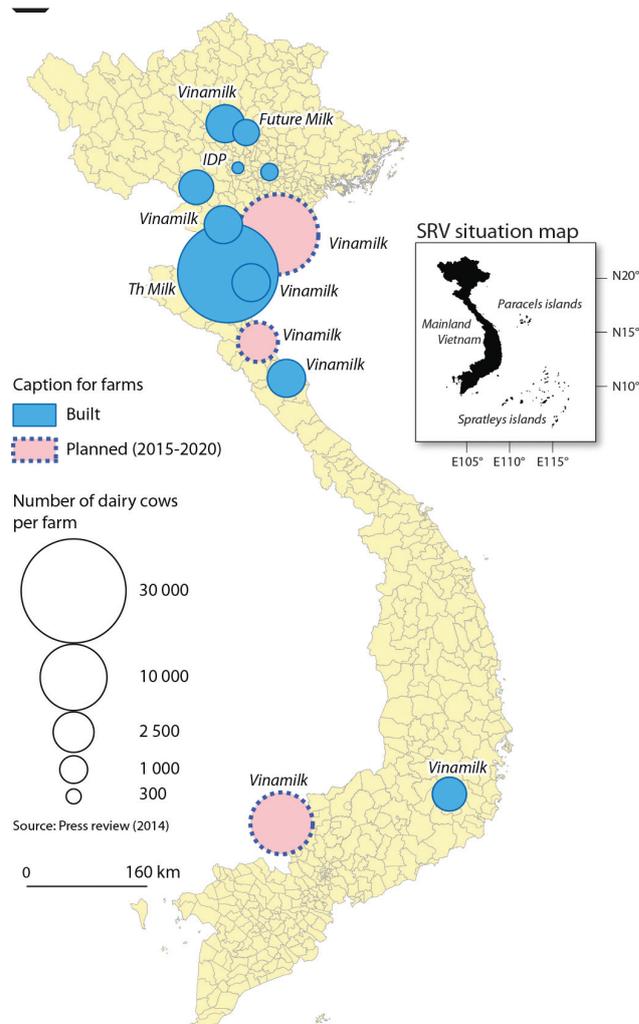
Since the early 2010s, the emergence of very large industrial dairy farms has shaken up dairy production in Vietnam. Between 2011 and 2015, the dairy cow herd doubled, from 120,000 heads to 250,000. Yet the mega-farm model of 500+ cows is not something new. Vietnam indeed experimented with the establishment of very large state farms during the collectivist period.

Poster of dairy production Mont Ba Vi



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Large dairy farms operating in 2014 and projected by 2020



### Mega-farms on the remnants of collectivization

These farms have several hundred dairy cows. Moreover, most recently established mega-farms were set up on the land of former state farms. This is the case of the IDP experimental farm in Ba Vì and the TH Milk mega-farm, which had 44,000 dairy cows in 2015. In 2014, we drew up a list of all the intensive farms officially present in the country. We counted eight farms with over 1,000 cows, of which one had a total official herd of 40,000 dairy cows. Dairy companies such as VinaMilk, TH Milk, and FrieslandCampina currently hold 25% of the national herd on these “mega-farms”.

### Clashing production models

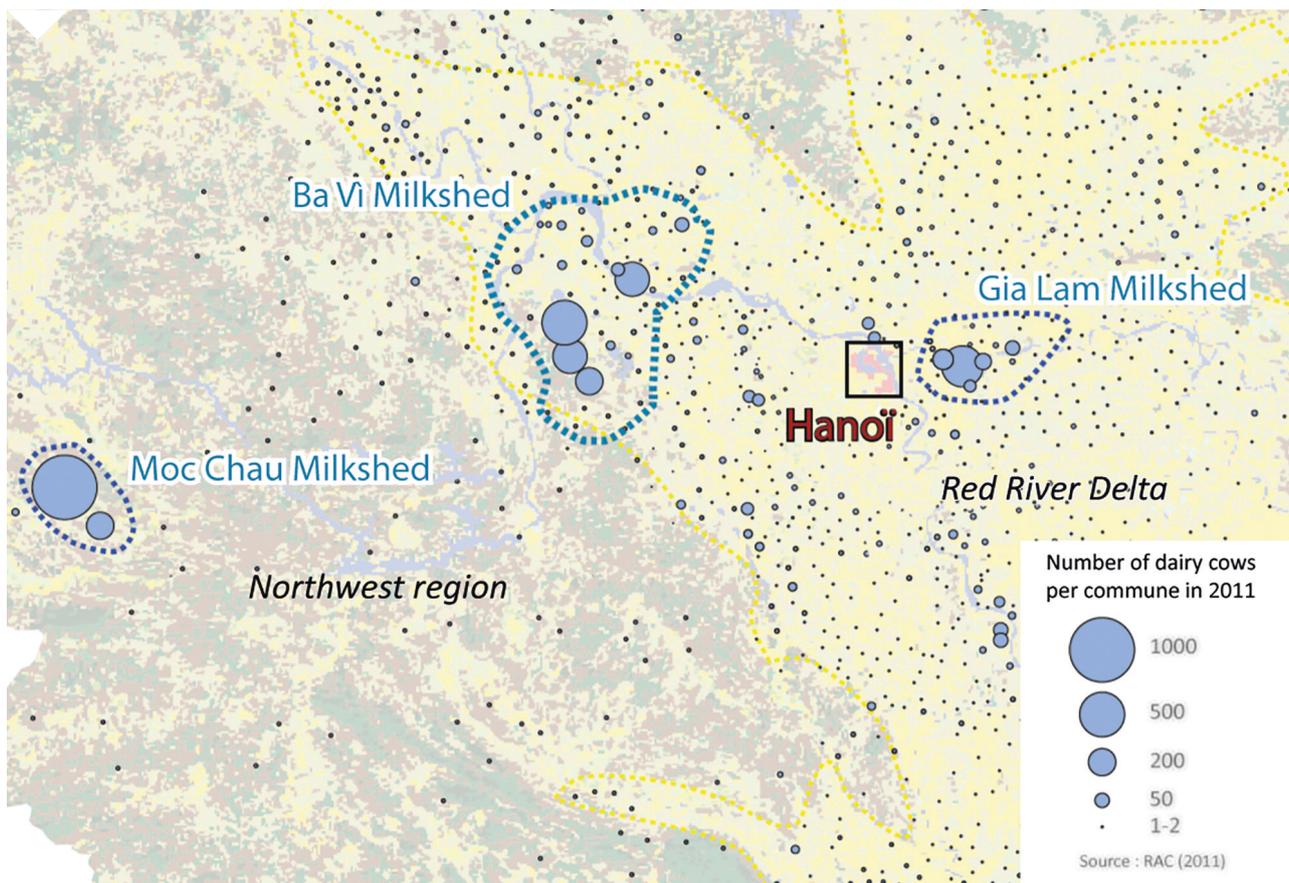
Are these new livestock production models peacefully existing alongside family farms? Or is there a clash between the models? The question seems to be clear for the TH Milk company, which announced that it wants to alone produce 50% of the milk consumed in the country. In 2015, the company already produced 17% of the national output. Moreover, the current orientation of public policies indicate that the government seems to support these gigantic models.

### Mirrored in geography

These farms are mostly located in the north, where state farms are the most numerous, but also where family farm dairy production is the lowest. These mega-farms have rapidly enabled the country to sharply reduce its dependency on imports. So the question may be: is there competition or synergy?

## In the north: from state farms to family farms

Dairy production around Hanoi in 2011



### The milk-sheds of northern Vietnam

In the north of the country, the agricultural census of 2011 reported 25,000 dairy cows. They were mainly distributed in three large milk-sheds: Mộc Châu, Ba Vi and Gia Lâm. The province of Nam Định also has seen its herd increase in recent years. The location of these livestock is not accidental. It is related to the location of old dairy farms. Gia Lâm is a former concession established by a rich Vietnamese back in the 1940s, while Ba Vi is related to a colonial concession held by a Frenchman who made a fortune growing coffee. After independence, these two farms were occupied by the army, then were nationalized and turned into state farms. Mộc Châu has a slightly different profile because this farm has no colonial history, and was built entirely by the collectivist regime. Proud of its communist management, the Mộc Châu dairy farm (named “Red Star” in the beginning) was then gradually privatized.

### Lowlands and highlands: different trajectories

During the 1990s, the government wished to develop small family dairy farms. Communes in the Red River Delta were chosen to host this new production. The large milk-sheds were politically and financially supported, but small production units emerged locally in the plains. In contrast, production in the mountains remains limited to the area around Mộc Châu farm.

Harvesting elephant grass in Ba Vi



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## Family farms and mixed farming systems

Dairy farms have on average 0.4 hectares (or about 10 *sào*). All of the farms devote 720 to 1000 m<sup>2</sup> of forage land per dairy cow. This represents a density of 10 to 14 dairy cows per hectare. These farms also use about 0.4 kg of industrial feed concentrates per litre of milk. The study of the diversity of dairy systems shows that these are above all diversified farming systems. Farmers grow elephant grass for the dairy unit, as well as rice, maize, tea, and fruit, they may even raise pigs and chickens, and in some cases also engage in an aquaculture activity. All on less than half a hectare on average.

## Gradual specialization

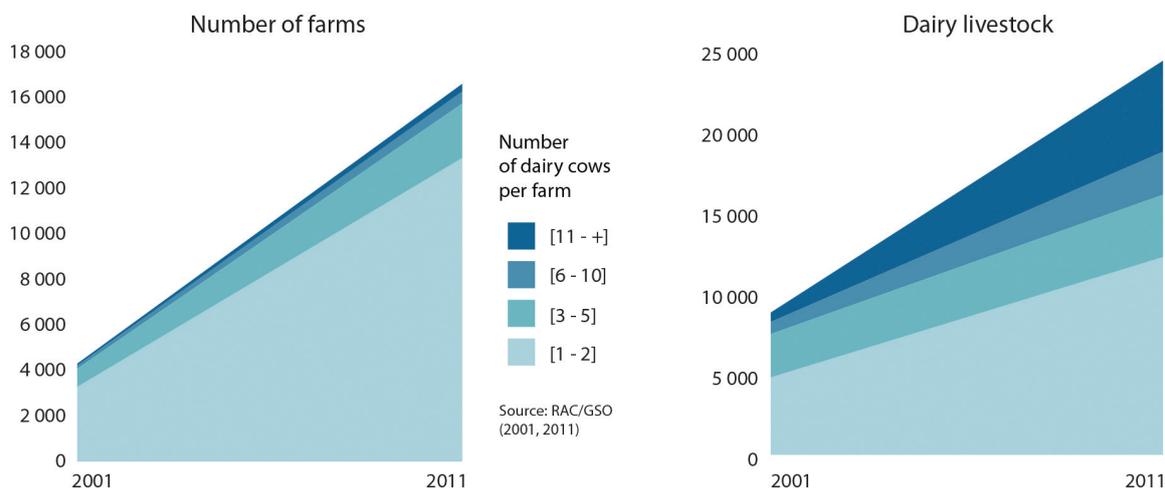
In the main production basins, larger farms are emerging. They are specializing in dairy production by restructuring land use towards the production of elephant grass, maize between seasons, and sometimes legumes for the nitrogen input. These farms are confronting a problem of space because it is difficult to find land to rent or purchase. They therefore buy fodder on local markets. Their size varies between 10 to 50 cows per farm.

Dairy production around Ba Vi in 2011



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Evolution of the number of dairy farms and of the dairy herd between 2001 and 2011 in northern Vietnam



## The location of industrial actors

The geography of industrial actors in the north of the country is not at all haphazard. The Mộc Châu state farm became a private company in the 1990s, but the State remained a shareholder until 2017. No other company can collect within the perimeter of the former farm. In Ba Vi, the situation is slightly different. In 2012, district authorities signed a partnership agreement with the DP company for milk collection in the district. Small local processors are tolerated as the Bavi milk company is located next to the Ba Vi research center, a former state farm that has been reconverted into a forage research center. Lastly, the Gia Lâm zone is more open to competition between Vinamilk, IDP and other foreign companies such as Dutch Lady and Friendscampina.

## Towards medium-size commercial farms?

Due to the political difficulties of collecting milk from small farmers, companies are investing in intensive commercial farms. Although they remain limited in number, these medium-size farms are providing a reliable supply of milk to firms within an unsteady regulatory context. Milk production remains a State concern that is subject to political and economic uncertainty. Large farms are consequently a secure source of milk.

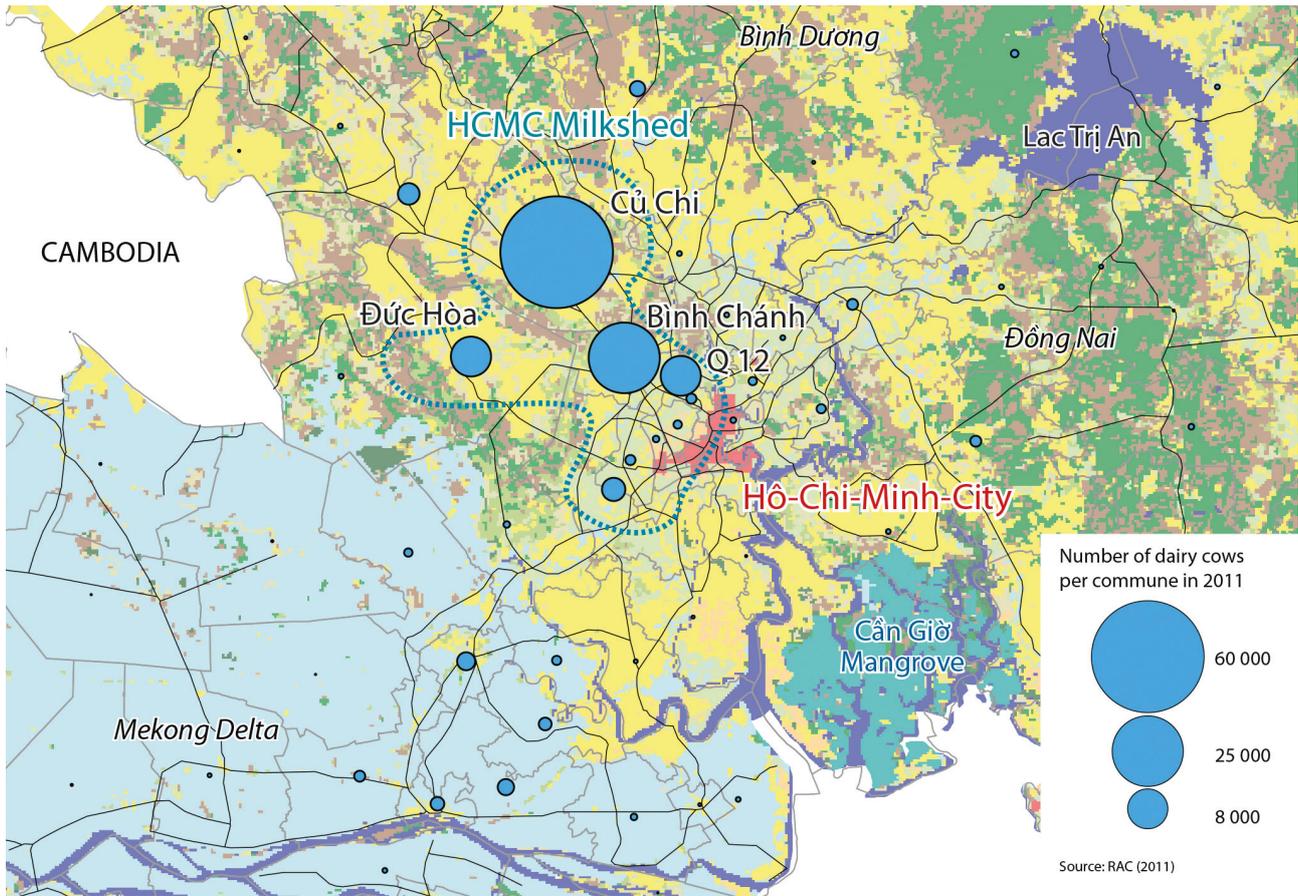
Dairy cows near Hanoi in 2011



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# In the south: from family farms to company farms

Dairy production around Ho Chi Minh City in 2011



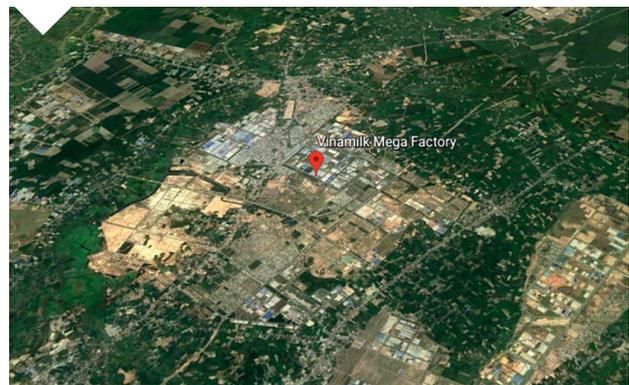
## An inherited milk-shed

The creation of the Ho Chi Minh City milk-shed has a long history. In the 19th century, Tamil, Pathan and Sikh communities already were producing milk on the outskirts of the city along the riverside in the Camp des Mares, between the city center and Chợ Lớn. In 1959, the Australian government set up a dairy farm in the military zone south of Bến Cát. This military zone was a former colonial rubber concession. Two hundred cows and 10 bulls were sent by boat in 1959 and by plane in 1972 under an agriculture cooperation agreement. The first family dairy farms in the region appeared in 1989. In the 2001 agricultural census, the authorities counted 7,000 farms with a total of 35,000 cows in the Ho Chi Minh City area, which represented 79% of the national herd. In 2011, the number of cattle exceeded 80,000 heads, or 58% of the national herd.

## Peri-urban livestock farming

In the 2000s, the dairy sector was growing rapidly. The number of livestock doubled in the space of 10 years. Growth was slower than in other regions of the country, but still represented the largest increase in the number of cows in the country. Reports by international experts mention a risk of development in a context of urban sprawl. Livestock farms in District 12 were clearly the first affected by the city's growth. However, in the district of Củ Chi (northwest of the city), the State controls a significant amount of land, limiting the development of the city without the consent of the provincial authorities. The pressure on land therefore is strong and limits the development of farms outside former state farms.

Vinamilk factory in Mỹ Phước, Bến Cát, Bình Dương



A milk tank in front of a collection point in Củ Chi



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Dairy production around Ho Chi Minh City in 2011

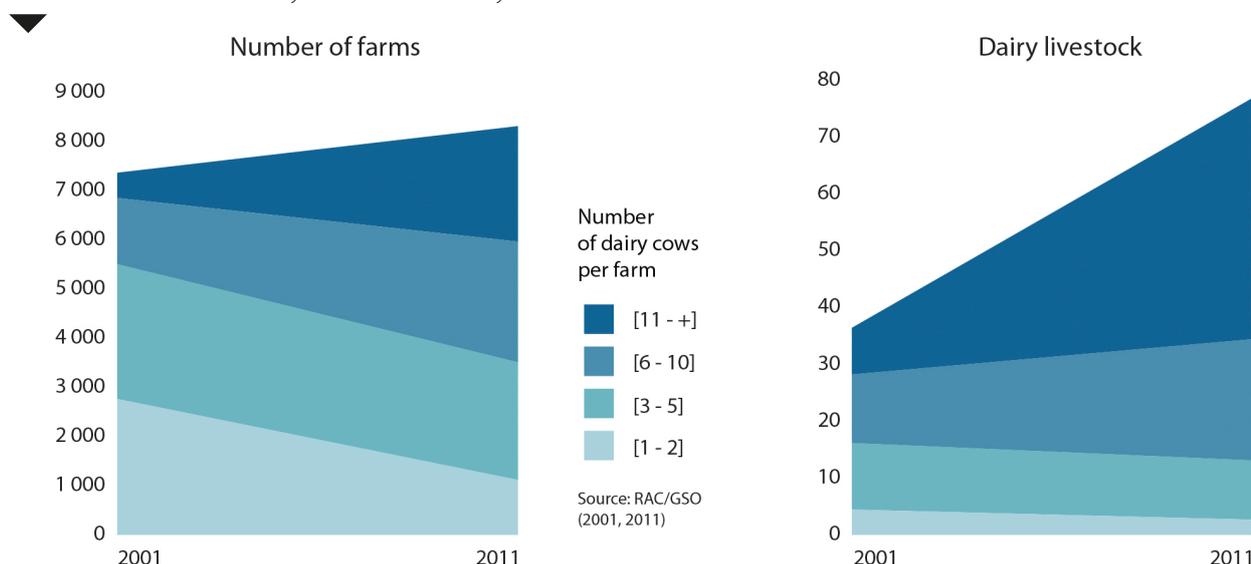


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### The district of Củ Chi at the center of the system

In 2015, Củ Chi had nearly 60,000 dairy cows. Farms with more than 200 dairy cows have multiplied since 2010. Around 16,000 families are directly involved in dairy cattle farming. According to official estimates of the National Institute of Animal Sciences (NIAS), a farm with 10 dairy cows can generate a turnover of US\$30,000, or US\$7,500 per hectare. This turnover is five times higher than a rice crop. The district decided to transform 18,000 hectares of rice paddies into fields of elephant grass to supply dairy farms in the surrounding area. In total, the productivity of Củ Chi dairy cows exceeds on average 15 litres per day over one cycle. In 2000, the average productivity was 8 litres per day over one cycle. Productivity has therefore clearly increased in this region. The modernization of farms and the professionalization of farmers are contributing greatly to this improved efficiency. Furthermore, the restructuring of the herd in this part of Vietnam is the most advanced.

Evolution of the number of dairy farms and of the dairy herd between 2001 and 2011 in southern Vietnam



### Restructuring production

While across the country, farms have an average of 4 dairy cows, Củ Chi farms have an average of 8 cows. Half of the farms have more than 6 cows. Restructuring is currently on an upswing as the number of farms continues to increase. These farms represent 80% of the herd in the district. Production is therefore concentrated on a limited number of farms, which is more interesting for dairy manufacturers.

### Competition for control of the district

The district of Củ Chi is at the center of a major battle between industrial players. On one side, the incumbent operator Vinamilk is trying to maintain its position and discourage other processors from coming to collect milk in the region. However, its hegemony has been eroding for some time. For example, FrieslandCampina, which markets the brand Dutch Lady, established itself through funding for development and production support. These two companies then provided outreach training to other farmers on pilot farms. These two companies won the right to collect in the zone. The IDP company (north Vietnam) tried to establish itself in the region but the attempt was unsuccessful. This failure compromised investments made by the company in northern Vietnam.

### 2016, a breakdown in the market

According to information released by local authorities, 2016 was a very bad year for dairy production in Vietnam and in Củ Chi. Until 2015, the price paid to the producer was at 12-14,000 VND (US\$0.5-0.7) per liter of fresh milk. In 2016, companies like Vinamilk started putting huge pressure on farms by refusing to buy milk from thousands of farms. In Củ Chi, nearly 800 farmers suddenly found themselves without access to any sales outlet. At the national level, the priority of dairy manufacturers is to buy powdered milk that is sold on the market at between VND 7,000 and 9,000 (US\$0.3) a kilo.

### Bewildered small farmers

This milk collection price crisis occurred while the market was booming. After generating revenue for numerous small farmers in the region for many years, the current collection system favors commercial farms with several dozen or even hundreds of cows. Some smallholders are organizing into cooperatives in order to secure outlets for their milk. The growth of cooperatives is not always supported by the manufacturers. In some cases, the cooperatives are supported by development projects or NGOs, as, for example, in Củ Chi.

# In the centre: going gigantic through technology

## A closer look at TH

The dairy farm run by the TH Milk group is one of the largest farms in the world in terms of the number of animals on a single site. In June 2015, the farm officially had 44,000 dairy cows, including 22,000 cows in lactation. The complex is located in the province of Nghệ An, 250 km outside Hanoi. The farm is built on two communes in the district of Nghĩa Đàn: Nghĩa Sơn and Nghĩa Hội. The closest town is Thái Hòa, about 10 km away. The exact position of the site is 19°24' N, 105°26' E. This new type of farm was set up in cooperation between the governments of Vietnam and Israel.

## Organized into clusters

The farm is managed through a pyramid system of farms (*trại*) organized into clusters (*cum*). Cluster 1 is composed of three farms (n° 1, 2 and 3); Cluster 2 also includes three farms (n° 4, 5 and 6) and a quarantine farm (n° 7). Two other clusters were under construction in 2015: Cluster 3 with two farms (n° 8 and 9) and Cluster 4 with three farms (n° 10, 11 and 12). The images available on Google Earth from CNES / Astrium in May 2013 provide precise details on the agricultural infrastructure. Two clusters of farms have already been built. The facilities of the industrial holding extend over 162 ha.

Satellite view of Cluster 2



© GoogleEarth, Spotimage (2015)

## How many animals are there really?

The importation of dairy cows from Australia, New Zealand, Canada and the United States, which began in 2009 and was suspended in 2012, was reported extensively by the press. The animals were 100% Holstein-Friesian (HF) cows. In November 2013, the project's first herd was composed of 13,450 cows and 12,800 heifers. According to De Heus, the TH farm had 31,000 dairy cows in May 2014. The number of animals raised on the TH farm was officially 44,000 dairy cows in 2015. This number was increasing.

Location of TH Milk clusters

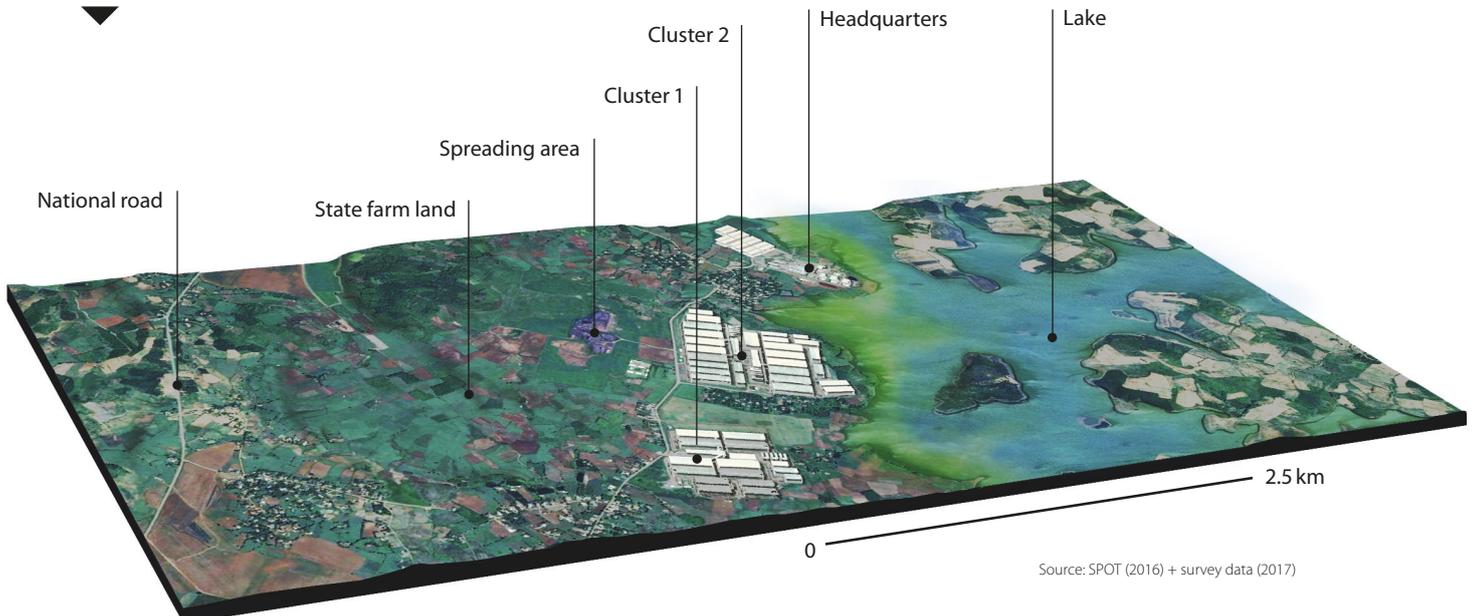


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## Ambitious production goals

According to Vietnamese newspapers, at the beginning of the project the farm aimed to produce 200,000 tons per year. According to Afimilk, the company processed 300 tons per day (109,500 tons per year) in 2012 and reached 500 tons per day in 2015 (182,500 tons per year). In June 2015, according to Mr Tấn, the director of milk processing, production was 450 tons/day and could reach 500 tons/day in winter, which met the company's objectives.

3D modelling of the organization of Clusters 1 and 2



Source: SPOT (2016) + survey data (2017)

## The difficult question of feed

Feed management relies on a Total Mix Ration (TMR) approach using computer software. The ration is based on mixing: i) a silage-based forage ration; ii) a concentrated industrial feed; and iii) other supplements such as salts and nutrients. The silage mix is based on different kinds of fodder: maize, Mombasa guinea grass (*Panicum maximum*), and other imported raw materials such as Alpha-alpha dry hay and soybeans. In 2015, fodder requirements were estimated to be 850 to 1000 tons per day or 31,0250 to 36,5000 tons per year. Each of the 44,000 cows needs about 7 tons of fodder per year, or 20 kg/day. The farm also produces sunflower and peas. Industrial concentrates are supplied by four international food companies. The land on which the cattle feed is produced is part of a former state farm that has now become a cooperative and is still owned by MARD.

Workers on a TH farm



© TH Milk (2015)

Cluster 2 seen from the sky



© TH Milk (2015)

## Effluent management, a subject of debate

The solid part of the manure is managed in the barn as “deep layers” of litter. These layers are composed of straw and crop residues. They are a good fertilizer and are sold to nearby rubber and coffee plantations. In principle, the liquid part of the effluents is treated in industrial plants. Water is treated in three stages: sedimentation, filtration and chlorine treatment. Treated water is discharged into the nearby lake. The treatment capacity is 500 m<sup>3</sup>/day, which seems quite insufficient. According to some newspapers, the risk of pollution in neighboring areas is very high. About 600 households were affected by the pollution of rivers and underground drilling. These families were relocated to other villages.

## A technological farm

The Afimilk company provided the herd management tools. They are based on an individual recording schedule using AfiFarm software. Each cow is equipped with an electronic chip and a leg sensor to monitor its activity. The electronic chip can record the quantity of milk produced at each milking, and the microbiological quality of the milk measured by electrical conductivity. Farm staff is mainly composed of Israeli engineers from Afimilk who are responsible for managing the farm. About 100 Vietnamese make up the workforce. The company tries to promote social welfare by employing local people. However, the impact on employment is very limited and falls far short of the goals announced at the start.

Pollution and displacement of communities



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## TH's marketing campaign

To fully understand the merits of this mega-farm in relation to the debate on agriculture production models, the TH company's marketing techniques should be considered. The company is proud to present the farm's modern features, which are a selling point for consumers. Cattle are shown in clean barns with quality feed and an international team dedicated to animal care. For many Vietnamese consumers, milk from the mega-farm is “safe” and the quality is superior to other brands supplied by small family farms. In the main cities of the country, the company has opened shops devoted to the sale of TH milk. These shops are copying the design of a famous electronics brand to sell milk as a technological product, which is what milk is in Vietnam.

## What is the future for milk-sheds?

### The “local” image confronting mega-farms?

Faced with the development of mega-farms, can a network of dynamic family farms be maintained within the milk production basins? To a certain extent, the answer may be found in the field. Indeed, Mộc Châu, Ba Vì, Gia Lâm, Đà Lạt and Cù Chi are all names of districts which are well known and respected by Vietnamese households. Consumer know that these regions produce milk and identify products with their names. They often associate mountain landscapes with pastures and dairy production. However, to firmly establish the development of dynamic milk-sheds, producing milk is not enough. These milk-sheds need to develop emblematic products. Ba Vì has a long tradition of milk candy while Mộc Châu was the first to supply Hanoi with cheese (Mộc Châu tomme cheese). For a number of years, a goat cheese farm has been operating in Ba Vì. A Japanese entrepreneur is producing mozzarella and camembert from Đà Lạt cow milk. These products can enable a diversification of markets outlets and anchor dairy production to a local setting, which could be called “territorialisation”.

Tasting yoghurt in the Ba Vì dairy



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Ba Vì mountain as a dairy landscape



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### Territorialisation: risks and opportunities

The local anchoring of production and the development of brands or geographical indications is not without risk for manufacturers. The history of the IDP company in Ba Vì illustrates these difficulties. After signing a partnership agreement with the district of Ba Vì, the company sought to develop a certified brand, “Ba Vì milk”. But to expand its collection area, the company then sought to develop other more generic brands. In the south of the country, during the milk price crisis of 2016, the district of Cù Chi wanted to develop its own product brand. However, the district’s identity was not sufficiently distinct to be able to support the development of a label or a geographical indication. Nonetheless, consumers are looking for quality, and even organic products. These experiences demonstrate the importance of the role of local authorities and industrial firms. It is clear that the future of milk-sheds in Vietnam lies in a collaboration between the State, companies, and farmers.

Tasting cheese in the Ba Vì research centre



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