RURAL TERRITORIAL DEVELOPMENT. THE MILK TERRITORY IN SOUTHERN CHILE[1]

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Executive summary

The purpose of the analysis of the milk territory en Southern Chile is twofold: to examine the evolution of the Chilean dairy industry which was expected to fail when Chile became an associated member of the MERCOSUR regional agreement and, to understand the evolution of the milk territory associated to the dairy industry.

The territory selected is formed by 19 Comunas which contribute with approximately 65% of the country's total milk production and houses 12 milk processing plants. Land is mainly devoted to animal production with a big regional surface covered by different type of pastures, which in 1997 reached 145,000 has of artificial pastures; 525,000 has of improved pastures and 672,000 has of natural pastures.

Chile has traditionally imported fluid milk. The industry and the territory show important dynamism before Chile joined the MERCOSUR: Milk production increased at an average rate of 7.3% per annum, while milk delivery to the processing plants rose by an average rate of 11% annually. At that time, imports came mainly from New Zealand. Imports from MERCOSUR neighboring countries represented, on the average, 5% of total imports.

In 1997, in this territory, 900 millions of liters were delivered annually by about 15.000 commercial producers (81 percent of the total producers in Chile). At that time, 2572 producers handled more than 100 has. The territory also concentrated an important number of small producers. In 1997, 71% of the national dairy delivered by small producers came from this territory. A total of 4,500 producers were delivering their production to about 70 Milk Collection Centers.

In 1995-1996, a milk cost study indicated that very small producers and small-scale producers were facing total production costs that exceeded prices to producers. Most probably, these farmers recovered variable and cash production costs, but were incurring an economic loss. These producers reported low productivity levels. Additionally, small producers often face a quality problem that prevents them from obtaining a quality premium, which results in lower prices for the milk they deliver to plants. Such a price difference could be as much as 50 percent of the premium price.

Medium-sized and large milk producers reported higher productivity and lower average cost per liter. These producers were recovering total costs and making profits. Nonetheless, the more efficient milk producers in Chile reported higher production costs than mid-size and large milk producers from Argentina and Uruguay

Before Chile joined MERCOSUR the tax imports rates of the dairy sector were at the rate of 40%, 80% and 100% for power milk, butter and cheese, respectively. In 1974 the first change was made by equalizing the rate of taxes to 40% for all milk products importation. Since 1976, a progressive reduction on the tax import rate was implemented. The ad-valorem taxes went down from 30% in 1976, to 20%, then to 13%

in 1977 and finally in 1978, all these import taxes were uniformly fix to 10%. In 1990, import taxes were fixed uniformly at the 11% level.

In the negotiations to incorporate Chile to MERCOSUR, the milk sector was part of the list of exceptions in the trade agreement. However during 1995, in view that the sector would reach the self-sufficiency in short time, it was decided to look for alternatives of exportation and most dairy products were excluded from the list of exceptions. The reduction on the tariffs were agreed to be annual, progressive and automatic, and were established in terms of margins of preference; this is to say, that they are applied starting from the existing level of import tax rates for third party countries. In the list of reduction Chile incorporated the milk products with the exception of butter that was considered a sensible product, with an import tax rate reduction of 30%, the first year, to reach 100% reduction only on January, 2006.

Additionally, in 1997 Chile decided a unilateral and generalized reduction of all the levies rates that would start in 1998. It consisted in an annual reduction of one point from the initial 11%, until reaching 6% in the year 2003, which is the actual tariff rate valid for all the imported products, including those of the milk sector.

Despite the tax reduction, given the distortions of the international markets and the risk of dumping that would damage the national industry, eventually and for controlled period, specific safeguards have been imposed for a number of products.

Time series for 1999-2005 indicate that territorial milk production handled by processing plants has increased over time. The difference in the total amount of milk delivered to the processing plants between 1990 and 2005 is 31.7%, which corresponds to an average growth rate of 4.5% per annum. This is not a negligible growth rate for the industry, nor is it insignificant as regards the territory.

Apparently, a concentration process took place in which some producers abandoned the industry and the remainder increased their milk production. This may be a process through which small producers were excluded, in favor of middle and large sized producers. Is estimated that currently in the territory, there are about 62 Milk Collection Centers plus 11 recollection Centers, for more than 4,000 producers. Also the minor dairy industry of the region (mainly Cheese making) make up a total of 24 processing industries with 590 milk providers. This minor segment of the industry did process in 2005 a total of 110 millions liters. In comparison, the milk industry of major size received in 2005 a total of 1,200 millions liters, which represents 29% more production that 1997.

Enterprises with more than 50 employees increased between 2001 and 2004, while the number of those with less than 50 employees decreased over the same period. Nevertheless, occupation in both types of enterprise has increased, except in the province of Valdivia. As a proxy indicator of the milk production impact on the territory, changes in the number of industries and labor occupation indicates a positive impact and some economic growth in the territory. This seems to be related to the dynamics of the dairy industry.

In relation with the impacts and changes in the territory attributable to the evolution of the dairy industry, imports of dairy products continued, being Argentina and Uruguay the main providers. However, exports of milk byproducts also increased in a sustained manner. In 2005, Chilean exports went mainly to Mexico (66, 8%) and the United States (5, 3%). Other destinations are Peru, Costa Rica, Cuba, Venezuela and more recently son Central American countries. Two are the major milk products of the territory in the last years: Cheese (all types) and skimmed powdered milk with 26% fat content. Due to this production concentration, about 80% of national export cheese is produced in the territory, although producers expect a decrease in cheese exports in 2006.

These export products indicates a change in production strategy, related to competitive capacity building and consolidation in international markets since prices have not substantially changed. This change in production strategy demonstrates the competitive capacity of the Chilean dairy industry with other countries within MERCOSUR.

The territory has had a dynamic evolution that coincides with changes in the industry occurred after MERCOSUR. Such an evolution can be seen, overall, in a significant decrease in the levels of poverty and extreme poverty. In 2003, a 21.7% of the regional population was considered to be living in a situation of poverty, while in 1990 the level of poverty was estimated at 32.9% of the regional population.

Changes in labor use are often associated with rural-urban integration, dynamics of the agricultural sector and the direct links of the production chain to add value to agricultural production. Labor related to agricultural activities has decreased by 15.06% from 1990 to 2003, which is equivalent to an average percentage rate of 1.25 per annum. This means that non-agricultural activities and enterprises have also increased, as has the milk and milk processing industry also grown.

New companies and private investment seems responsible for increasing outsourcing to work in a more efficient way, achieving improvements in the installation of irrigation networks, internal trails for cows, drainage systems, fertilization, etc. The urban use of labor has also experienced changes. More people are reliant on services and retail commerce due to the increase in income over the period, and the growth of the dairy industry that creates an increased demand for production inputs, specialized services, professional occupation and several intermediate products that are demanded by milk processors and retail sellers.

Public investment provides an idea of changes in territorial priorities. Investment in roads and public services in Region X over the last 10 years has been remarkable. Some sectors, such as sanitation or even education, have witnessed a severe drop in investments in the territory, indicating that basic needs within these sectors have been satisfied. As mentioned before, private investment has been a constant and is responsible for the technical change and the industry growth.

Institutional conditions have also evolved in the territory. In general, there are two groups of milk producers associations. The first ones are representative of all agricultural producers at the provincial level, and within them are included the dairy producers as an important group. A second group of organizations are specifically representing interest of dairy producers. The organizations in this group account for two thirds of the whole milk production, within the X Region. In addition, small producers and cheese makers have created their own organizations. All these organizations point the evolution from only four producer's organizations that existed before Chile joined MERCOSUR.

There are a number of activities generated by a combination of rural and urban activities: transport of milk to the processing plants; external services, for the mechanical maintenance, repairs, an annual need of about 7 million litter of diesel , the transport of this fuel to the different gas stations, the demand of services by permanent and replacement drivers, who operate milking trucks that under open road conditions run almost 15 million of kilometers per year; technical assistants; retail and technical input stores; Services that give conferences, seminars, workshops, field days and technical trips were implemented. Centers to organize special events, such as: marketing activities, fairs, participation in animal and milk products shows, financing and banking services and a good supply of electricity energy, etc.

Some critical factors have influenced economic activities in the territory: The incentive system for recovering of degraded soils**,** which is a long term project aimed at mitigating the degradation process undergone by the soils This project includes financial help to farmers to incorporate phosphorus and calcium fertilization, for seeding and regeneration of pastures, plus the conservation or rehabilitation of degraded soils. The incentive program for improving irrigation and drainage conditions of the farm, linked to the improvement of the irrigation and drainage at the farm level. This involves the construction of new irrigation infrastructures, the improvement of the existing, plus the availability of bonus and especial credits to individual farmers.

Additional government programs include, for instance, an especial fund for the improvement of the animal health, including the concept of "Good Livestock Practices" at the livestock farm level; a program for the control of animal residues; an incentive to associative projects for improving management of the producers; a technical assistant fund; a program for the development of providers; a fund for improving technologic and productive development, and an artificial insemination and genetic improvement program.

In all these years there has been a substantial increase on infrastructure such as rural electrification, telecommunications, wideband Internet, sanitization of water supply, health and rural education and rural transportation medias. These have facilitated the introduction of main technological changes, which have improved significantly the levels of competitiveness of this industry beyond all the projections made in the middle nineties. Change such as the elimination of fresh not processed milk, which has been substituted by UHT, processed milk in the market; have made a significant contribution to the industry

There is a concentration of milk production on the territory. It has created an area of specialization in the territory that is concerned with all aspects related to the industry and its quality, but also with the input and labor supply and the services required for the industry. All these aspects strengthen the relationships between the dairy industry and the territory as to establish a strong link based on the industry as the engine of this relation.

The major and most important conclusion is that the Chilean dairy industry did not collapse as expected in virtue of the trade agreement between Chile and MERCOSUR. On the contrary, the dairy industry has been strengthened by accessing external specialized markets in countries outside the MERCOSUR region. This case is an example of an industry that takes advantage of an open economy and a regional trade agreement to grow, improve competitiveness and impact the territory in which the industry is settled, despite the odd forecast and expected outcomes due to the adjunction of Chile to the MERCOSUR.

The major challenge for the industry was to improve production efficiency and increase total production, since both Argentina and Uruguay report lower production costs and internal prices for fluid milk than Chile.

A number of factors are also responsible for the development of the dairy industry in Chile: Technological change has played a critical role to improve quantity, quality and profitability of livestock for milk and beef production. This is, perhaps, the single most important factor related to the change and strengthening of the dairy industry and the territory. Public policy and State lead programs have contributed to improve production potential and to increment competitiveness through different economic and production infrastructure incentives. Institutional development, translated into stronger organizations and integration of the industry, has been a crucial element to the introduction of technical change and social/economic integration around the industry. Public and private investments have facilitated technical change, territorial development, physical mobility and non-agricultural rural employment. Finally, the managerial capacity of a number of producers have influenced changes in by-products, creation of new brands, marketing strategies and specialization of firms that have improved the negotiation capacity and the sustainability into the markets.

Concentration of processing plants and big producer's farms is one of the direct consequences, including huge investments that increment differences among producers, not only because of share of production but because of economic capital and managerial capacity. Small dairy producers have decreased in number and in their milk volume produced. Several small producers either producing fresh cheese or providing fluid milk to small cheese producing plants which very often do not meet sanitary and harmlessness standards.

The impact that the productive sector has had on the socio-economic structure of the territory seems clear. The production and processing of milk forms the main economic motor for the territory, with noticeable spill offs regarding rural-urban links, including

changes in the use of labour, the gradual strengthening of the manufacturing, urban productive activities, transport and service sectors, as well as the type and amount of private and public investments.

1. Introduction

The analysis presented in this document referrers to the recent history of the main territory dominated by the dairy industry in Chile. In 1995, when Chile decided to become an associated member of the MERCOSUR regional agreement, milk producers and processors claimed that the industry would not be able to compete with others from Argentina and Uruguay, due to natural conditions, production costs and productivity levels. Bankruptcy was predicted and social and economic effects were mentioned as immediate consequences. This prediction has proven to be untrue. On the contrary, the Chilean dairy industry has expanded, exports have increased and the 'milk territory' seems to be benefiting from the effects of a dynamic industry that has become the economic engine of this area.

However, this successful story has not been free of crisis, uncertainties and innovative ideas translated into investment and production practices. Several important changes have taken place in the Chilean dairy industry in order to counteract negative outcomes. As a consequence, the changes have produced direct effects in some types of producer and in social production organizations, creating a concentration of producers and processors, which has caused other producers to leave the industry and weakened the strategy of small producers to improve quality and deliver their products to processing plants.

This analysis illustrates not just the dynamics of a competitive industry, particular strategies and risky decisions made by private producers, but also a sectorial policy that has enabled the environment to introduce technological changes. The Degraded Soil Program implemented in the milk producing area and the National Irrigation Program has provided effective support to milk producers. Likewise, the managerial capacity to understand and deal with a market that was competitive but unknown to Chilean producers is one of the factors identified as decisive in strengthening the industry.

Analysis of this issue is presented in eight different chapters, including the present introduction. The second and third chapters provide a description of the territory, the economy and institutions in place in the industry and the territory before Chile joined MERCOSUR. These sections analyze basic conditions in productive and institutional areas before 1995, including a brief reference to the production conditions of potential country competitors who had already signed the MERCOSUR agreement. The fourth chapter summarizes modifications, implications and actual agreements accepted by Chile when it joined MERCOSUR.

Chapters five, six and seven deal with sectorial actors, the economic performance of the industry and some effects on the territory that took place after Chile joined the MERCOSUR and developed strategies to deal with competitor countries participating in this regional trade agreement. Chapter eight is focused on a discussion of the main effects and the major conclusions derived from this experience.

2. Definition of the 'milk territory'

The territory selected for this analysis is recognized as the milk producing area of Chile. In fact, approximately 65 percent of the country's total milk production comes from this area, where 12 milk processing plants are located. This condition is an indication of the characteristics of this territory, even if it is located in one of the most popular Chilean tourist regions, thanks to the natural landscapes that combine high Andean mountains, numerous lakes, hundreds of islands and beautiful waterfalls. The region in which this territory is placed has other economic dimensions such as aquiculture, forestry and its tourist industry, which are responsible for the relative economic prosperity of the region over the last ten years[3].

Due to the size of the territory, its diversity stands out not only in physical but also in economic terms. Livestock production takes place in both mountainous and low-lying areas that stretch from the Andes to the Pacific Coast. Its population is concentrated in a few urban centers that are important to the territory in terms of trade and economic activities. There are a number of organizations of a productive and social nature with different geographical coverage and membership size. Likewise, other economic activities related to forestry and receptive tourist industries, are relevant at territorial level. In fact, the bases for regional export growth can be found in the production and processing of fish as well as the forestry industry.

2.1 Determining the physical boundaries

The definition of a territory is not a simple task, since a number of variables and factors are to be accounted for in such a definition[4]. The influence of milk production and transformation is extended to a large geographical area. However, there is a need to set some limits to the 'milk territory' in order to define an area where this analysis can concentrate. For these reasons, livestock concentration is the major decision variable in order to include a *Comuna* (County) in the selected territory. The dairy industry is one of the territory's biggest employers and the activity that groups the most important production associations in the local rural economy. For the purpose of this document, it has been defined that a *Comuna* should have at least 30 thousand heads of cattle and a neighboring *Comuna* with a similar number of cattle, in order to be considered as part of this territory.

Accordingly, 19 *Comunas* form this "milk production territory", (for the purpose of this Report, we will call this *Comunas* the "territory") which covers most of the Central and Northern parts of the Lakeland Region of Chile (also known as Region X). These

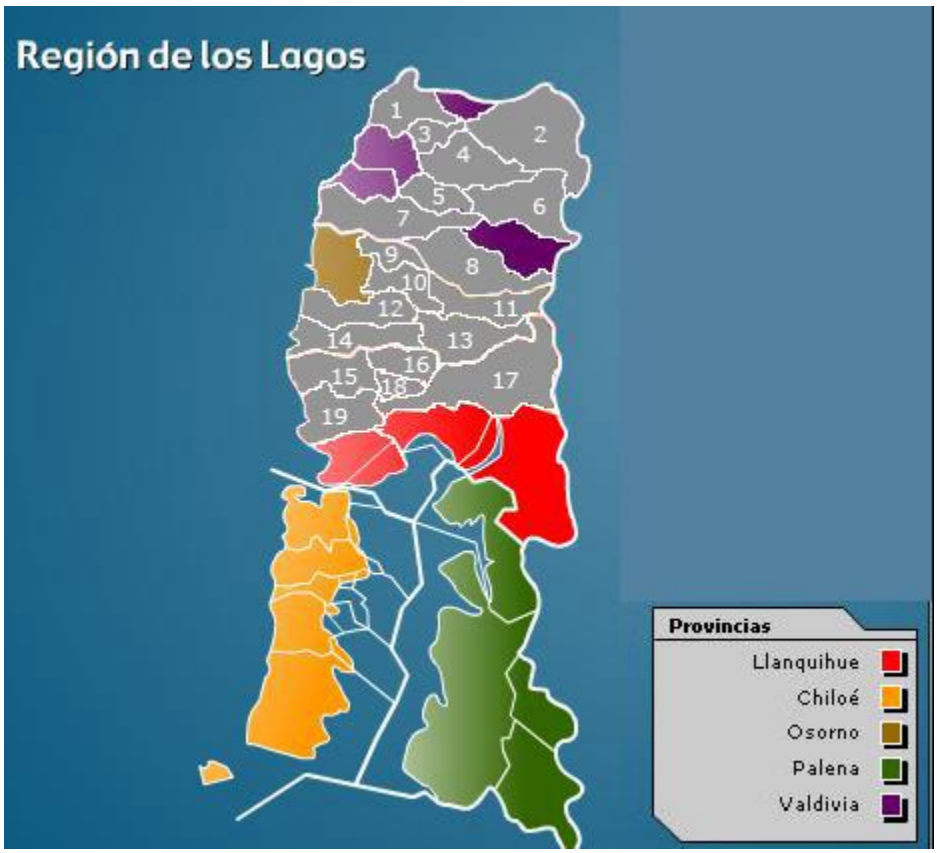
[3] www.subdere.gov.cl/1510/propertyvalue-24689.html

[4] Schejtman and Berdegue define a territory as the space that their agents recognize as necessary (or at least, possible) to contain and delimit the relations that they establish inside, between everyone and the "external world", in agreement of the development proyects and aims (objectives) that they intend to tackle.

Comunas are numbered in map 1[5] and belong to three of the region's provinces: Valdivia, Osorno and Llanquihue. The selected territory has 29.899km^2, equivalent to 44.62 percent of the region (INE, 2002).

Geographical characteristics of this territory are also heterogeneous. From the Andes to the coast, there is a central valley, the coastal mountain range and coastal planes. All have a different climatic influence, water availability for agricultural production and physical communication infrastructure. The most populated centers are located in the central valley and on the coastal planes.

Map 1 Location of *Comunas* in the territory



Source: INE. Census 2002

In 2002, the total population of the selected territory was close to half a million people, who then formed 135,425 households. This represents 46 percent of Region X and 51 percent of the rural population in the same area (INE, 2002). Some characteristics and changes in the population will be discussed on chapter 5 of this document.

[5] Numbers on the map correspond to the following Comunas: Futrono (6), La Unión (7), Los Lagos(4), Máfil (3), Mariquina (1), Paillaco (5), Panguipulli (2) and Río Bueno (8) in the Province of Valdivia. Osorno (10), Puerto Octay (13), Purranque (14), Puyehue (11), Río Negro (12) and San Pablo (9) in the Province of Osorno and, Fresia (15), Frutillar (16), Llanquihue (18), Los Muermos (19) and Puerto Varas (17) in the Province of Llanquihue.

2.2 Major rural production activities in the territory

Major land use as of 1997 is shown in table 1. The purpose is to provide an idea of the main agricultural activities in the territory. Undoubtedly, agriculture is an important activity to the economy of the territory. For 1997, INE reports 25,648 subsistence farms and 27,472 small farmers. There were 1,738 medium-size farms and 1,232 big farmers.

In 1997 the main regional crops production was, White wheat, with 26,500 has; Potatoes, with 18,000 has; Oats, with 4,200 has; and Sugar beet, with 5,400 has.

Lower areas of production were: Feed barley; Brewers Barley; Triticale; Rapeseed (canola) and feed annual crops and forages like turnips; lupine, ryegrass; maize and oats for fresh intake as soiling, silage or hay by animals. Within of fruit crops mainly important as export cash crops were varies type of berries (blueberries, strawberries, etc.) and to lesser extent apple orchards.

Table 1 Land use in the territory

		Ha
Arable land	Annual and permanent crops	97,339.0
	Planted grassland	132,167.6
	Fallow land	124.6
	Total arable land	229,631.2
Other land	Improved grassland	460,889.4
	Natural grassland	356,865.9
	Forest-land	64,415.0
	Native forest	729,566.3
	Indirect use (lakes, roads, etc.)	17,904.7
	Non-productive land	234,660.0
	Total other land	1,864,301.3
	Total land	2,093,932.5

Source: INE, National Agricultural Census, 1997.

Figures of crops surface for the present agriculture period 2006/2007, showed an important reduction to 21,000 has for white wheat and also for beet sugar with only 1,300 has for this period. Oats and potatoes crop keep a similar surface to year 1997, with 15,000 and 18,000 has, respectively. Barley, rapeseed, lupine and triticale, continue to be crops of less importance.

As expected, grassland, land and forest are by far the most important agricultural production activities. This still holds true today, as fisheries and tourism –two sectors with remarkable growth over the last ten years- are mainly located in other parts of the region. Moreover, native forest is protected by law and the area dedicated to it should only vary marginally. Forestry plantations may have experienced some growth, although this industry is also important in other sectors of the region.

Within the animal production sector, milk and beef production are the most important, being the territory for both items the number one zone of the country. This animal production is supported by a big regional surface covered by different type of pastures, which in 1997 reached 145,000 has of artificial pastures; 525,000 has of improved pastures and 672,000 has of natural pastures. Nowadays all these pastures still have a big potential for productivity improvement, due to lack of adequate management, overgrazing, and reduced level of phosphorus content of the soils, beyond the important improvement reach in the last years in that aspects.

Milk production and processing are thus important for the territory's economy. It has 81.9 percent of the region's livestock and 31.7 percent of the national herd (INE, 1997). The territory also houses 12 milk-processing plants. In 1997, this area used to have 62 milk storage centers, most of which have ceased operations (ODEPA, 2005).

In addition to milk production and processing activities, meat is also supplied to the regional and national market. Starting in 2003, beef has been exported in limited quantities (USD8.49 million in 2005). Today, beef exports are considered to be a potential economic activity in the region.

3. The milk industry conditions before Chile joined MERCOSUR

This section is devoted to understanding what the economic conditions were before Chile was officially admitted as a MERCOSUR member country. Challenges the industry had to face to overcome the anticipated adverse changes within the market are also discussed in this chapter.

3.1 Industry production and international trade before MERCOSUR

Between 1985 and 1994, the Chilean dairy industry had an accelerated and sustained rate of growth. This was due to a number of simultaneous issues at that time: a stable macroeconomic policy; appropriate sectorial policies; changes in average income and population growth. All these together helped accelerate the consumption of milk and its by-products. Some specific policy definitions in 1984 were as follows (Best UDEC, 2001):

- Specific tariffs on imports in order to correct for subsidies for milk production and exports in competitive countries.
- Transparency in trade practices through standards, sanitary rules, definitions of milk quality, etc.
- Improvement in national milk productivity through the implementation of the Technology Transference Groups Program (GTT).
- A powdered milk acquisition program for the mother-infant national program (SNS) as a response to international calls for powdered milk acquisition[6]

In addition, the industry initiated a vigorous program to diversify milk by-products to increase production of yogurts, cultivated milk, milk desserts, and flavored milk, etc.

Table 2 documents changes in milk production and delivery in the territory before Chile joined the MERCOSUR. Milk production increased at an average rate of 7.3 percent per annum, while milk delivery to the processing plants rose by an average rate of 11 percent annually.

Table 2 Total milk production and delivery in Chile
(Millions of liters)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Milk production	1,012	1,093	1,100	1,120	1,230	1,380	1,450	1,540	1,650	1,750
Delivered milk	588	666	667	681	771	890	948	1,021	1,121	1,236

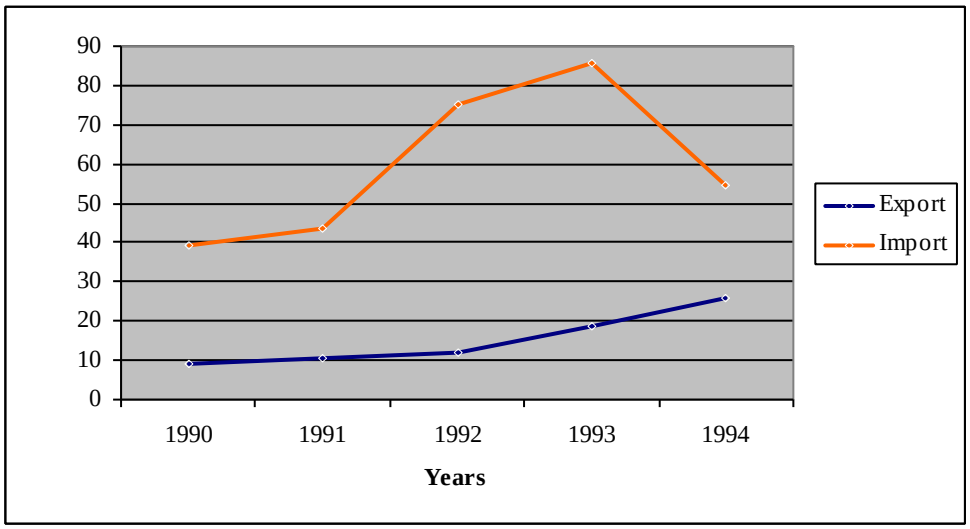
Source: ODEPA, agricultural statistics, 1988, 1992 and 2005.

[6] This decision was implemented by demanding that firms offering milk for the mother-infant national program already had an imported milk stock in Chile. After two years, this agreement was abandoned due to a price increase in feeding rations.

The growth rate of milk delivery indicates the high proportion of producers that entered the formal market. This formalization is usually associated with the increase in size and need to stabilize marketing practices in order to reduce risks.

In spite of the industry's expansion, Chile was a net milk and milk by-products importer, as shown in Graph 1. The strong increase in consumption in the early 1990s caused a rise in imports, due to the shortfall in the national production response. Increases in national milk production caused a sharp drop in imports, just before Chile formalized participation in the MERCOSUR. On top of this, some import speculation seems to have taken place, although this was not carried out very astutely.

Graph 1 Milk and milk by-product imports and exports
(USD millions. FOB prices for August 2006)



Source: Díaz and Williamson, "Acuerdos comerciales y competitividad: Evidencia del sector lácteo chileno", 1998.

Chilean imports mainly came from New Zealand and the European Union during that period. Imports were principally powdered milk, skimmed milk, butter, and cheese and milk serum. Imports from MERCOSUR neighboring countries were not significant as they only represented, on average, 5 percent of total imports. Imports from the USA accounted for approximately 13 percent (Diaz and Williamson, 1998).

Chile exported some milk products, even if their value was not very significant, as shown in Graph 1. Exports were mainly related to processed milk products such as concentrated milk cream, whole powdered milk and milk serum. (Díaz and Williamson, 1998).

3.2 Number and size of the dairy farms in the territory

According to a study of Dairy Competitiveness, carried out by Austral University in the year 1997 in X Region, there were around 15,000 dairy producers (commercial producers) that delivered their milk production to the formally established industrial processing plants. Such number of producers represented 81 percent of the total number

of producers that existed at the national level. Distribution by size and provinces included in the territory are presented in table 3.

Table 3 Number of dairy farmers and cows According to farm size and provinces

Size of the farm	Total		Valdivia		Osorno		Llanquihue	
	Nº Dairy Farmers	Nº of Cows	Farms	Cows	Farms	Cows	Farms	Cows
Total	15,204	360,624	6,511	139,792	3,857	127,965	4,836	92,867
Less of 1 ha	48	78	14	24	30	41	4	13
From 1 to 5 ha	1,386	3,877	706	1,924	463	1,406	217	547
From 5 to 10 ha	2,020	8,289	1,006	4,119	545	2,461	469	1,709
From 10 to 20 ha	2,836	16,297	1,315	7,421	669	4,275	852	4,601
From 20 to 50 ha	4,097	43,279	1,738	17,935	917	12,481	1,442	12,863
From 50 to 100 ha	2,245	47,485	869	18,062	496	13,280	880	16,143
From 100 to 200 ha	1,337	63,516	422	19,817	351	22,728	564	20,971
From 200 to 500 ha	952	101,386	302	33,699	293	39,409	357	28,278
From 500 to 1000 ha	226	48,001	98	23,049	82	18,420	46	6,532
From 1000 to 2000 ha	47	17,874	33	13,089	9	3,575	5	1,210
From 2000 ha. and more	10	10,542	8	653	2	9,889	0	0

Source: INE, VI National Agricultural Census, 1997. It included producers with one or more dairy cow.

This territory also concentrate the greatest number of small producers, associated to Milk Collection Centers ("Centros de Acopio Lechero" CAL). In year 1997, 71 percent of the national dairy small producers came from this territory. A total of 4,500 producers were delivering their production to about 70 Milk Collection Centers. The total annual volume of milk delivered at that time was 75 thousand millions of liters.

At the same time, the national Census of 1997 showed that in this zone the producers, were delivering 900 millions of liters annually, which represented 64 percent of the total production at the national level.

When the total annual volume of milk delivered to the industry for each producer is analyzed, for this zone the average was 82 thousand liter. While in the rest of the country the average for each producer was about 200 thousand liters annually

In addition, in this territory we found some smaller industries, mainly oriented to the cheese making. Ministry of Agriculture estimations indicate that in 1997, there were a total of 1,000 producers that were providing milk to this segment of about thirty smaller cheese making industries. It's important to note, that approximately one third of these industries are self-sufficient, processing for cheese, only the milk they produce on their own.

3.3 Basic economic relations before Chile joined the MERCOSUR

The reconstruction of production costs is always difficult in the absence of production records. In the particular case of milk production, costs are influenced by a number of variables: type of animal feed; breed and other cattle characteristics, and production technology are just a few of the factors influencing productivity and, as a consequence, production costs. In addition, scale of production seems to make a difference as well as specific location and conditions that influence transport costs.

Due to these factors, researchers and analysts often rely upon samples and surveys to distinguish the type of milk producers, differentiating in most cases by the size of heard. Average values are usually estimated from this data when generalizations are made.

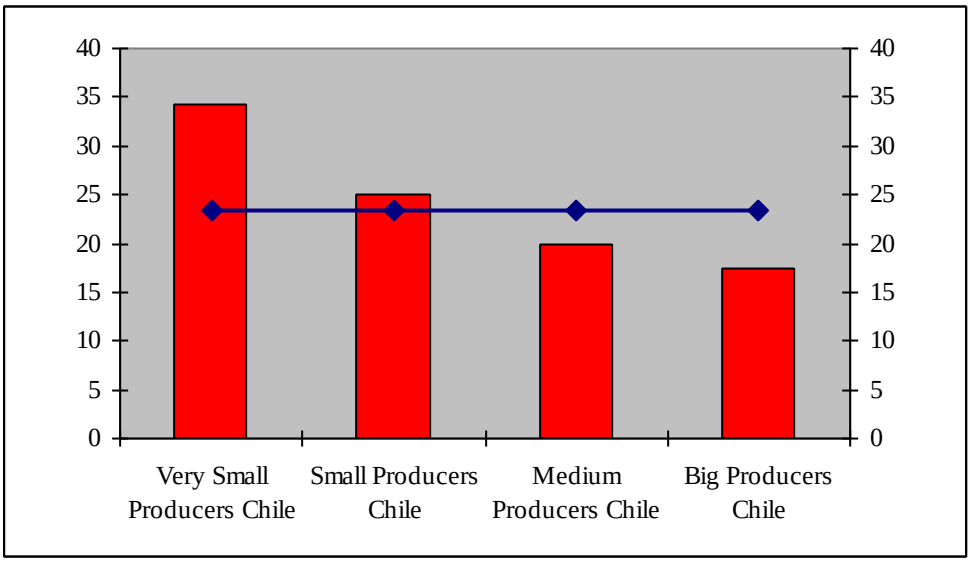
During 1995 and 1996, a cost study focused on very small, small, medium-sized and large milk producers was completed, and then published in 1998 (Díaz and Williamson, 1998). The total production costs were estimated for the three strata, regardless of actual expenditures in milk production.

Very small producers showed the worst results at that time. Production costs were calculated in USD34.2 cents per liter, with a productivity level of about 9.04 liters/head/day. Small-scale producers provided information that resulted in a calculation of USD0.25 cents per liter. Productivity was estimated at 12.16 liters/head/day. Medium-sized milk producers reported a production cost of USD0.20 cents per liter. Their productivity was estimated at 15.49 liters/head/day. And large milk producers reported a productivity of 19.03 liters/head/day. This resulted in a production cost of USD17.4 cents per liter.

Graph 2 represents differences in milk production costs and the average price obtained by producers in 1995-1996, which provides an idea of the profit margin for producers at that time.

The economic relations for very small and small milk producers were apparent just before Chile joined the MERCOSUR. Most probably, these types of farmers received enough to recover variable and cash production costs, but were incurring an economic loss due to their scale, which seems highly correlated to productivity. This economic condition helps to understand the concern and complaints of a number of producers at the time Chile negotiated its membership of MERCOSUR and severe modifications to trade tariffs were announced. Additionally, small producers often face a production problem in relation to quality that prevents them from obtaining a quality premium, which results in lower prices for the milk they deliver to plants. Such a price difference could be as much as 50 percent of the premium price. This makes a considerable difference, and is probably the main reason for the reduction of small herds within the industry.

Graph 2 Estimated profit margins by herd size



Source: Díaz and Williamson, "Acuerdos comerciales y competitividad: Evidencia del sector lácteo chileno", 1998.

3.4 Some comparisons of the industry with its MERCOSUR competitors

Argentina and Uruguay are Chile's natural competitors once MERCOSUR is in full operation for the three countries, even if imports to Chile from these two countries were not very significant before Chile signed the regional trade agreement. Due to differences in country and sector size, and some other production characteristics, it is impossible to analyze both competitors at the same time. In this section, a brief description of the conditions in each country is included and a simple cost comparison is presented.

3.4.1 The Argentinean dairy industry

Argentina has favorable biophysical conditions for milk production: a combination of natural and improved grasses, good all year around rain distribution, fertile pampas soils located close to large consumer centers, and the capacity to produce grains to supplement cattle feeds. One special characteristic is the relatively low cost of good land for cattle and milk production. The development of the dairy industry has attracted the presence of large national and multinational milk processing plants (Sancor, Mastellone, Nestlé, Danone, and Estancias Santa Rosa, among others). Accordingly, Argentina has a great capacity and potential for the dairy industry for both national and international markets (Anrique and others, 1999).

Argentina's milk production, disaggregated by use and going through the informal system, is summarized in Table 4, for the 10 years prior to Chile's membership of the MERCOSUR.

Table 4 Milk production in Argentina before Chile jointed the MERCOSUR (Thousands liters)

Years	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Milk for processing	4,387.0	4,156.1	4,477.4	4,393.5	4,980.1	4,614.0	4,353.5	4,728.3	5,082.0	5,800.9
Liquid milk	1,086.1	1,079.2	1,181.0	1,150.0	1,076.9	1,034.4	1,107.3	1,302.3	1,342.9	1,382.0
Milk going to the informal system	488.7	485.6	531.5	517.5	463,0	444.8	476.1	560.0	577.4	594.3
Total	5,961.8	5,720.9	6,189.9	6,061.0	6,520.0	6,093.1	5,936.9	6,590.5	7,002.4	7,777.2

Source: Department of agriculture, cattle farming, fisheries and food, www.sagpya.mecon.gov.ar.

Argentina's main export product before Chile joined MERCOSUR was powdered milk (2/3 of its total export value). In 1994, Brazil was the main buyer (67.2 percent of total exports) (Kouzmine, 2003).

In 1994, the value of Argentine dairy exports came to USD135.891 million, which is about seven times the value of Chilean exports. In 1995 and 1996, when MERCOSUR included Chile, Argentine exports increased to USD280, 000 million (Kouzmine, 2003).

In 1994, productivity was estimated at 14.27 liters/head/day for small herds (Díaz and Williamson, 1998). The productivity of large dairy farms ranged between 16.5 and 21.9 liters/head/day (Anrique and others, 1999). Average prices stood at USD 0.20/litre, with a variation of about USD 0.05 cents in both directions during the summer and winter[7]. Production costs fluctuated between USD 0.14 and 0.16 per liter, according to herd size (Díaz y Williamson, 1998).

3.4.2 The Uruguayan dairy industry

Milk production takes place in the southern region of Uruguay. Producers combine improved pasture and silage with decreased climatic uncertainty during the dry period. Extensive exploitations characterize Uruguayan milk production. Conaprole (the national milk producers' cooperative) controls about 60 percent of milk delivery to plants and about 70 percent of milk exports. 2,900 producers are affiliated to this cooperative. Average farm size is approximately 140 ha.

Milk production has increased in Uruguay. In 1999, it was estimated that milk production had expanded 3.7 times in 26 years (office of preparation and politics agriculture OPYPA & Ministry of cattle farming, agriculture and fisheries (MGAP), 1998). Table 5 illustrates increases in milk delivery, which total 32 percent in 1994 as compared to the 1985 production level. Nevertheless, total production has constantly decreased over the last five years or so.

[7] www.sagpya.mecon.gov.ar

Table 5 Milk production and delivered to processing plants in Uruguay (Million liters)

Years	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total production	894	901	901	931	952	975	1,001	1,078	1,115	1,179
Milk delivered	586	641	635	661	678	678	708	765	815	945

Source: OPYPA and MGAP, 1998

Exports from Uruguay are dynamic, but have not grown as fast as exports from Argentina or Chile. Export growth in Uruguay is associated with the elimination of export quotas and non-tariff barriers (Anrique and others, 1999). Brazil is also the main milk products importer (56 percent in 1994). In 1994, the value of Uruguayan exports totaled USD101,369 million, which is five times greater than Chile's exports for the same year. The export value of milk products from Uruguay increased after Chile joined the MERCOSUR (Kouzmine, 2003).

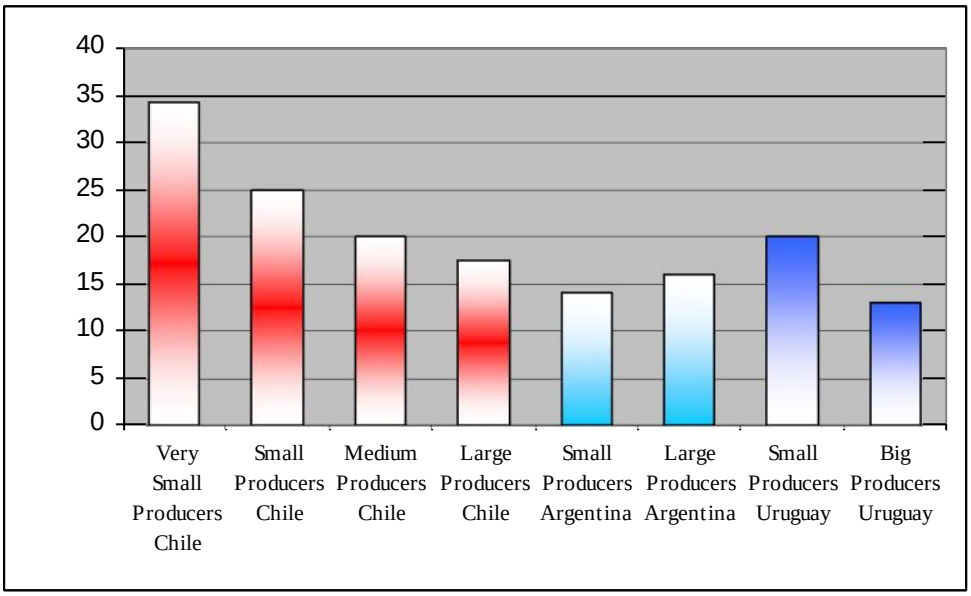
Uruguay has experienced developmental processes similar to those that have taken place in the Chilean milk territory: the number of producers has diminished (7,102 in 1985 to 6,348 in 1994) and the size of individual producers has increased, along with productivity (8.17 liters/head/day in 1985 to 11.36 liters/head/day in 1994) (Anrique and others, 1999). Production costs range from USD 0.13 for large-sized farms to USD 0.20 for smaller family businesses.

3.4.3 A synthetic comparison

In order to better understand the competitiveness of the MERCOSUR's main milk producers, and claims stemming from a number of Chilean sectorial actors that the MERCOSUR would be the end of the national milk industry, Graph 3 shows a comparison of production costs.

Of a liter of milk in Chile, Argentina and Uruguay around the time Chile joined the MERCOSUR, taking into account different studies mentioned in the analysis and the different size of farms that were included in these studies. Differences are evident and Chilean claims regarding a potential disaster for the local dairy industry are based on fact, even though imports to Chile at the time were not coming from these two potential competitors

Graph 3 Production costs at the time Chile joined the MERCOSUR
(Color code: Red: Chile; Light blue: Argentina; Blue: Uruguay)



Source: Díaz and Williamson, "Acuerdos comerciales y competitividad: Evidencia del sector lácteo chileno", 1998 and Anrique and others, "Competitividad de la producción lechera nacional", 1999.

4. Changes in trading conditions due to the agreement with MERCOSUR

4.1 Major changes on tariffs and parallel barriers for international trade of dairy products

The implementation of the so-called policies for international trade of the milking sector, started from the beginning of the process of economic reforms that were implemented in Chile since year 1974. Before 1974, the Chilean Government, imposed the State monopoly of all milk imports and exercised an absolute control over prices of milk products, which created slaughtering of replacement heifers, among other issues.

To the end of 1973 the tax imports rates of the milking sector were at the rate of 40 percent, 80 percent and 100 percent for power milk, butter and cheese, respectively. In 1974 the first change was made by equalizing the rate of taxes to 40 percent for all the milk products importation.

Since 1976 a new program was started by applying a progressive reduction on the tax import rate. The ad-valorem taxes went down from 30 percent in 1976, to 20 percent, then to 13 percent in 1977 and finally in 1978, all these import taxes were uniformly fix to 10 percent. The economic crisis of 1982 together with the entry of a new economic team to the government, with a vision more inclined to intervention and industrial development, was the reason for an increase on the imports tax rate to 20 percent. However, at the end of the 80´s, taxes were again reduced to 15 percent.

In 1990 the new economic authorities defined that Chile was only able to grow by accessing external markets. Therefore, new policies that reduced the import tax rate and fixed them uniformly at the 11 percent level were implemented. The only exception to this 11 percent was a group of agriculture products (wheat, oils and sugar) that were regulated by the prices band system. For these products, in the case they were undergoing a cycle of very low international prices, they were allowed to have an import tax rate slightly higher than 11 percent, but in no case higher than 35 percent, that was the maximum consolidated rate agreed by Chile with the GATT.

In the Uruguay Ronda, Chile reduced his consolidated import tax rates from 35 percent to 25 percent, but for a small list of products, this decrease was only the minimum agreed by the Ronda (10 percent), consolidated to a final figure of 31.5 percent. Such a list did include besides the already mentioned products with band prices, all the milk sector products.

Chile continued a unilateral opening of its economy in addition to bilateral trade agreements. In order to gain a better position for exports on international markets, Chile defined an aggressive policy to increase and diversify bilateral and multilateral international trade agreements. However, the option of leaving out a small list from these preferential agreements was exercised. Within these products, Chile always left out of these negotiations, the milk sector products.

With regards to the incorporation of Chile to MERCOSUR the negotiation started at the end of 1994 having as a goal to reach an agreement for a free market. Initially the milk sector was part of the list of exceptions in such agreement. However during 1995, the growth that the national milk sector, indicated that the national milk sector would reach the self-sufficiency in short time, and therefore was wise to look for alternatives of exportation. It is known that within trade agreements, exclusions for trading are reciprocal, and import barriers turn out to be export barriers. It inspired Chile to resign to these exclusions, favoring trade with Brazil that at that time concentrated 50 percent of the Chile exportations, and appeared to Chilean interest as a potential very attractive market.

After more than one year of difficult negotiations, on 25th of June 1996, Chile and MERCOSUR did sign and Agreement of Economic Complementation, that should start from October 1st of the same year. This was the first of the agreements signed by Chile that did include the entire universe of levies and benefits. The agreement only indicates some lengthier and slower periods for the reduction of levies for a group of more sensible products. The reduction on the tariffs were agreed to be annual, progressive and automatic, and were established in terms of margins of preference; this is to say, that they are applied starting from the existing level of import tax rates for third party countries. Consequently such a margin is gradually increased up to arrive to 100 percent (import tax 0). The list of the general reduction started with a preference of 40 percent up to reach the level of 100 percent in January 2004. In this list Chile incorporated the milk products with the exception of butter that was left out as considered a sensible product, with a import tax rate that was reduced only 30 percent, the first year, to reach 100 percent only on January 1st, 2006.

These benefits were reciprocal, and therefore applied in the same way to the Chilean milk products marketed out the MERCOSUR, but given the conditions that the MERCOSUR import tax rates were at the beginning higher, the Chilean products were confronted with taxes nominally higher at MERCOSUR. In turn the preferential margin acquired a higher value in term of the deviation of the commerce with respect to third party markets.

Additionally, in 1997 Chile decided a unilateral and generalized reduction of all the levies rates that would start in 1998. This reduction consisted in an annual reduction of one point from the initial 11 percent, until reaching 6 percent in the year 2003, which is the actual tariff rate valid for all the imported products, including those of the milk sector.

Despite the tax reduction, during the cutback process of the import tax rates, given the distortions of the international markets and the risk of dumping that would damage the national industry, eventually and for controlled period, specific safeguards have been imposed for a number of products.

4.2 Existing perception of the main participants on the effect of MERCOSUR

During the initial negotiations with MERCOSUR, clearly there were two types of contradicting perceptions within the different participants of the milk sector. While there was a group of participants that argued strongly of the need to keep the sector protected from the importations of third party country, especially from those country inside MERCOSUR that had comparatives advantage for milk production. There was another group that argued for the need of opening new markets, especially those that supported an opening of the Brazilian market. Clearly, between the second group, there were the industrial processing plants a the more advance group of dairy farmers

At the present, the overall general perception is that MERCOSUR did not bring benefits to the sector and many, without much back up arguments, think that MERCOSUR has been decisively detrimental for the development of the sector. However given the present low 6 percent Chilean import tax; MERCOSUR only can cause a reduction of the import tax to 0 percent, which in turn can generate only a small effect on the deviation of the market, as is supported by the MERCOSUR country price differentials.

Where there is a consensus among participants with respect to the negative effect that have had the monetary exchange conditions, (very low prices of US Dollar for the last years), which is a consequence of the exchange improvement conditions of the whole country. This condition still prevails as it considered that has had a very damaging effect for the whole sector.

Those that were supporting the opening and access to the Brazilian market, are now disappointed, because the potential benefits expected did not realized, due to internal difficulties that have challenge Brazil markets, as well as the unexpected growth that the own internal production has had.

There are also a group of producers that have the perception that competition conditions are unfair, due to the distortions that milk markets presents in several neighboring countries. Especial concerns in this regard are given to Argentina. This explains why there has been a constant request to the government authorities for the applications of protection and compensatory measurements, such as anti-dumping regulations or safeguards applied to the import taxes. Generally, authorities have responded positively to this request of producers and some protection measurement has been applied. A safeguard of 23 percent of the import taxes that will last for a year has been recently applied.

Some participants have indicated that under the actual conditions they are actually loosing money. This was the case of Parmalat industry when went bankruptcy. In the case of common powder milk, the industry make a profit ranging from 6 percent to 8 percent; this profit margin could be higher for those industries that have brand like, Nestle, Soprole, etc. Similarly, in the case of cheese the profits are in order of 6 to 8 percent and in the case of a brand cheese, like Colun this could reach up to 10 percent.

Fresh cheese, yogurts and desserts, have major profit margins of about 15 to 20 percent. In the later group the profit margin of butter.

However, for the case of powder milk the are some industries that during 2006, have declared that they have lost money, because they had to pay 24 cents per liter during the first semester to make powder milk during winter, having to face competition from the imports. Others claim that recently exports of dairy products have not been very profitable. There are others that say that are going even, which could also be valid according to the season. These margins declared by Soprole and Loncoleche in their Annual Balance, indicate profits ranging from 6 to 10 percent.

A real fact is that milk prices in the MERCOSUR countries, including Chile, have remained at different levels before and after Chile joined the Trade Agreement. This can be observed in graph 4. The fluid milk prices have gone through a slight reduction as compared with the prices in the year 1997 and the price estimated for 2006.

It is important to note, that there has been, as time passed, a variation in the characteristics of a number of elements of the quality of these fluid milk products, so these prices are not strictly comparable and difficult to adjust. For instances a number of national elaborated milk products have at present a much better final presentation, which allow them to be different to those products that are imported from MERCOSUR. This explain why the fluid milk importations products do not constitute yet, a significant competence, being the national consumers very much incline to purchase the traditional brand of national products. On the contrary, the prices of butter and Gouda cheese have undergone a significant reduction from 1997, being these reductions equivalent to 28 percent for butter and 11 percent for cheese (table 6). This is due to a greater competence from the imported products since in both cases these products are both commodities that are very similar to the manufactured national products with regards to its presentation in the market.

Graph 4 Prices paid to Producer

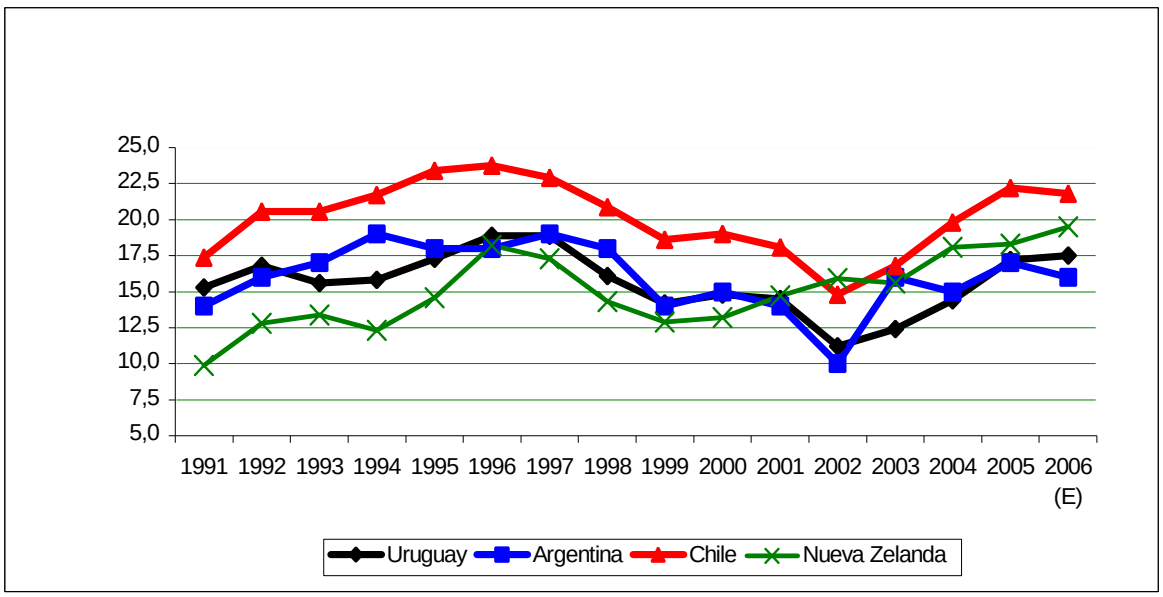


Table 6 Net Prices of the main milk products at Chile major markets (Thousands Chilean $ /September 2006)

Year	Full fat powder milk	Butter	Gouda cheese
	Thousands Chilean $/ton	Thousands Chilean $/ton	Thousands Chilean $/ton
1993	2.027	2.258	2.310
1994	1.881	2.271	2.150
1995	2.011	2.232	2.158
1996	2.095	2.254	2.266
1997	1.770	2.079	1.978
1998	1.730	2.075	1.886
1999	1.728	2.083	1.768
2000	1.808	2.189	1.931
2001	1.948	2.129	2.061
2002	1.782	1.966	2.064
2003	1.820	1.923	2.093
2004	1.909	2.011	2.100
2005	1.864	1.971	2.185
2006 (E)	1.850	1.950	2.170

(E) It is estimation
Fuente: ODEPA (s/f)[8]

[8] http://www.odepa.gob.cl

5. International trade after MERCOSUR

After Chile joined MERCOSUR, imports of dairy products continued. However, variation and instability are the major characteristics of these imports.

Table 7 Value of milk and milk byproducts imports
(Thousands US$ dollars CIF of Dic. 2005)

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Value of Imports	89.149	115.601	63.202	69.058	42.919	70.304	44.422	26.843	76.657	51.218	81.860

Source: Kouzmine, 2003 and ODEPA (s/f)

Since price variations are not a deterministic factor, quantities imported seem to be responsible for the pattern-less variation of import values (table 7). There are a number of explanations that help to understand these variations. For some actors, this has been a way of putting pressure on the national milk price because the processing plants are also major milk and milk byproducts importers. This is an unconfirmed behavior. For other actors, wrong decisions for speculation and for preparation for seasonal variation of the national production had resulted in huge imports at times in which demand was smaller than anticipated at a given price. This may explain yearly variation in the imports value.

In 2005, Argentina and Uruguay were the two major suppliers of Chilean imports. Imports from these two countries add to 83.8% of the total. Brazil and new Zealand add 14%. Argentinean Gouda cheese and Brazilian skim milk are also important components of Chilean imports. USA, France, Canada and Denmark are other countries from which Chile imports milk byproducts..

Milk and milk byproduct exports are also variable from year to year although such a variation is less intense than imports variation. Exports are forming a tendency during the period 2002-2005 by increasing in a steady manner (table 8).

Table 8 Value of milk and milk byproducts exports
(Thousands of US$ dollars FOB of Dic 2005)

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Export	41.923	39.886	41.458	38.730	41.913	34.373	54.866	51.448	62.157	91.611	119.232

Source: ODEPA (s/f)

In 2005, Chilean exports went mainly to Mexico (66,8%) and the United States (5,3%). Other destinations are Peru, Costa Rica, Cuba, Venezuela and more recently son Central American countries.

Exports shown in table 9 suggest an important change in the industry strategy to participate in international markets. These changes relate to increments in the export value of condensed milk, cheese and skim power milk. Export value has increased substantially.

Table 9 Major milk and milk byproducts exports
(Thousands US$ dollars FOB of Dic 2005)

Product/Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fluid milk	2.039	3.018	3.277	2.373	2.534	1.753	1.545	1.25	814	593	1.434
Skim powder milk	912	18	363	166	90	117	97	456	417	457	1.054
Whole powder milk	27.786	27.933	24.76	19.784	19.406	5.385	17.123	19.517	17.14	17.96	14.635
Condensed milk	-	-	-	-	-	-	-	15.607	23.991	31.735	40.653
Cheese	2.091	2.123	2.422	2.065	3.697	4.677	9.414	6.908	13.967	32.571	51.668
Manjar	-	-	-	-	-	-	-	4.683	3.418	3.71	3.183
Yogurt	4.058	3.148	3.332	3.254	2.333	847	375	163	73	23	20
Other products	5.038	3.646	7.305	11.089	13.853	21.594	26.312	2.864	2.337	4.564	6.587
Total	41.923	39.886	41.459	38.731	41.914	34.373	54.866	51.449	62.158	91.612	119.233

Source: ODEPA (s/f)

The change in production strategy most probably relates to competitive capacity building and consolidation in international markets since prices have not substantially changed. This indicates that reasons for strategic changes in milk byproducts exports should be examined in changes in productivity, profit margins and, particularly, competitive capacity with other countries within MERCOSUR.

On the other hand, per-capita milk consumption has experienced a sustained annual increment: It grew by 2,6% from 2004 to 2005. For 2006, per-capita consumption is expected to grow up to 125 liter, while in 2004 it was 117 liter, which is equivalent to an annual increment of 3,3%.

The territory shows the same tendency of production and exports detected at the national level. In 2005, about 55% of national exports stems from the milk territory, which represents an important increment from 41% that was the export share of the territory. Two are the major milk products of the territory in the last years: Cheese (all types) and skim powdered milk with 26% fat content. Due to this production concentration, about 80% of national export cheese is produced in the territory, although producers expect a decrease in cheese exports in 2006. Graph 5 1llustrates changes in export values.

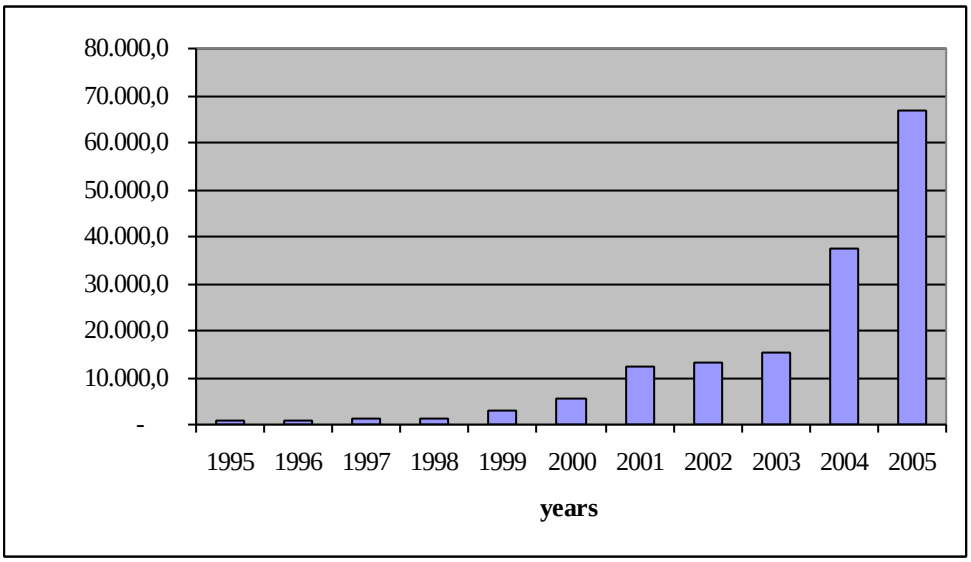
The third export product from the territory is milk serum in different presentations (sweet, sour and concentrated). This product has had a great evolution in the last two years. In 2006, expected exports add up to 21,7 million US dollars, which is a similar to the cheese value export value.

Mexico is also the major cheese buyer for the territory. Argentina, Brasil, Venezuela, Peru, the US, El Salvador, Guatemala, Honduras and the Dominican Republic are also important for the territory exports.

5.1 Production costs and margins

There exist several attempts to measure milk production costs in Chile (Universidad Austral, 1999. Quiroz and Luzzi, 2002. Fundación Chile, 2000. Ostrawiski and Deblitz, 2001). However, not all of them are comparable and no one covers the heterogeneity of producers (scale, annual and seasonal variation, etc.).

Graphic 5 Milk export value of the X Región
(Thousands US$ dollars FOB of Dic 2005)



Source: ODEPA (s/f)

Costs estimate methodologies are also different. Some include all production costs, others charge administration costs and jet other takes into consideration variable costs and some of the fixed ones. Keeping these limitations in mind, table 10, compiles the available cost estimates. Minimum and maximum prices show a variation of 30,7%.

Table 10 Milk production price estimates in Chile. 1999-2002
(US cents/lt. Current prices)

	Fundación Chile	U. Austral	Producer San Pablo	Producers X Region INIA	Center Los Lagos	Middle size herd	Big Size herd
Production price	15,0	15,8	13,0	13,5	14,0	17,2	16,0

Source: Quiroz and Luzzi, 2002 and Ostrawiski and Deblitz, 2001

Based on the available information, average production cost is 14,9 cents to the liter. This average cost is comparable with the average international price for the same period, which average is 22,2 cents/liter, as derived from table 11.

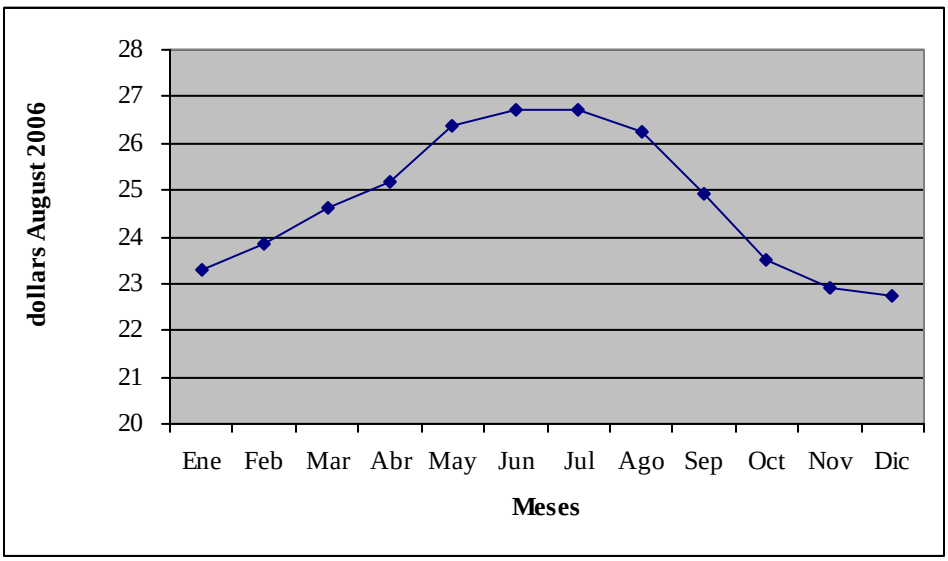
Table 11 Real prices received by producers in the X Region of Chile (US$ cents of August, 2006)

Years	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Prices	25,99	25,55	23,51	22,37	21,23	22,29	24,16	21,15	23,00	23,75	23,53

Source: ODEPA (s/f)

The comparison of costs and prices to producers clearly indicate a profit of about 6 cents per little, without including any transportation costs. To analyze theses figures, caution most be exercised because estimated averages do hide several differences among producers, product quality and yearly price variation which may make a difference, as illustrated in graphic 6.

Graphic 6 Prices US$ Cent wihtout IVA in dollars August 2006



Source: ODEPA (s/f)

6. Changes and evolution in the territory after MERCOSUR

The aim of this chapter is to provide a vision of some changes in the territory associated with the consolidation and modifications to the strategy of the sector as an economic engine, in order to adjust to market and trading conditions after Chile joined the MERCOSUR.

6.1 Changes in population and poverty in the territory

In 2002, the total population of the selected territory was close to half a million people, who then formed 135,425 households. This represents 46 percent of Region X and 51 percent of the rural population in the same area (INE, 2002). In the territory, 64.6 percent of the people are classified as urban dwellers, leaving only 35.4 percent as rural inhabitants. Between 1992 and 2002, the population grew by 7.2 percent, although the population of some *Comunas* actually decreased during this period (Fresia, Los Muermos, Puerto Octay, Río Bueno, Río Negro and San Pablo). These are all small communities with a high proportion of rural population where, most probably, migration of young people has been a mitigating factor. This information is presented in Table 12.

Table 12 Population of the milk production territory

Comuna	Total 1992	Total 2002	Urban 2002	Rural 2002
Fresia	13,013	12,804	6,144	6,660
Frutillar	13,107	15,525	9,118	6,407
Futrono	14,048	14,981	8,399	6,582
La Unión	38,740	39,447	25,615	13,832
Llanquihue	14,386	16,337	12,728	3,609
Los Lagos	18,564	20,168	9,479	10,689
Los Muermos	17,054	16,964	5,707	11,257
Máfil	7,176	7,213	3,796	3,417
Mariquina	17,952	18,223	8,925	9,298
Osorno	127,769	145,475	132,245	13,230
Paillaco	18,152	19,237	9,973	9,264
Panguipulli	30,162	33,273	15,888	17,385
Puerto Octay	11,051	10,236	3,403	6,833
Puerto Varas	26,529	32,912	24,309	8,603
Purranque	20,176	20,705	13,236	7,440
Puyehue	11,027	11,368	3,932	7,436
Río Bueno	32,981	32,627	15,054	17,573
Rio Negro	16,026	14,732	6,583	8,149
San Pablo	11,178	10,162	3,478	6,684
Total	459,091	492,389	318,012	174,348

Source: INE Census 1992 and 2002.

Osorno is the main urban center of the selected territory and has about 130 thousand inhabitants. It is a center of economic activities with a relative concentration of banks and businesses; there is also a regional university, an airport and other facilities for local and

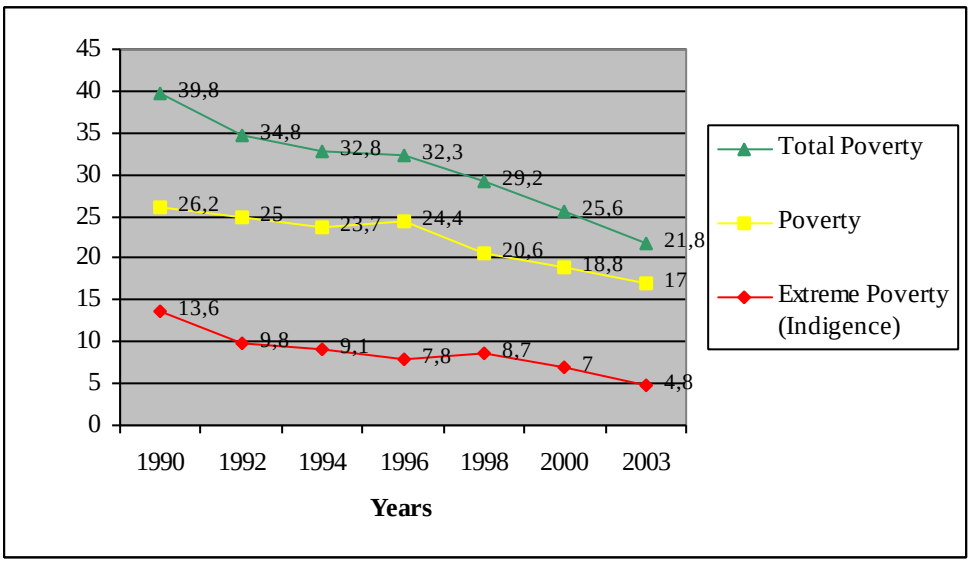
regional economic activities. As a province, Osorno is in fact the second most populated area of Region X with 221,509 inhabitants. All other urban centers are much smaller, and some have a higher proportion of rural population.

According to the last population census (2002), 102,093 persons in Region X define themselves as part of an indigenous ethnic group. This is equivalent to 9.5 percent of the regional population. Within the national context, 14.7 percent of the indigenous population is located in this region.

This area has shown a significant decrease in the levels of poverty and extreme poverty, which seems to be related to the increase in social spending. In 2003, as shown in Graph 7, a 21.7 percent segment of the regional population was considered to be living in a situation of poverty, while in 1990 the level of poverty was estimated at 32.9 percent of the regional population. Poverty has decreased in 15 out of 42 *Comunas* in the region. Extreme poverty (indigence) shows a similar evolution over this period, decreasing from 13.6 percent in 1990 to 4.8 percent in 2003.

However, average autonomous income in the region is lower that the same figure at national level. The difference is even greater when comparing urban and rural autonomous income. This explains why the poverty level in Region X is higher than the national average.

Graph 7 Evolution of Poverty and Extreme Poverty in Region X



Source: MIDEPLAN, CASEN survey, 1990 – 2003

The regional Human Development Index (HDI) improved from 1994 to 2003. Nevertheless, Region X belongs to the group of regions with the lowest HDI in Chile. This condition has not changed since 1994. In fact, San Pablo, Rio Bueno and Lago

Ranco are *Comunas* with a very low HDI within the national context. This indicator corresponds to the lowest level of Satisfied Basic Needs of these *Comunas*[9].

6.2 Evolution of the territory's economic engine

There are 12 milk processing plants which are recipients of milk produced in the territory. As shown in Table 13, five of these plants are located in Osorno and the other seven in different *Comunas* within the territory.

Table 13 Location and handling per milk plants in the territory

Location	Milk plant	1999	2000	2001	2002	2003	2004	2005
Frutillar	CAFRA	37,027	37,246	41,015	32,450	32,643	32,022	29,435
Futrono	QUILLAYES - PETEROA	13,840	11,995	13,886	15,262	13,291	17,220	15,626
La Unión	COLUN	213,179	225,376	262,635	267,361	280,887	310,450	331,540
Llanquihue	NESTLE CHILE S.A.	133,670	131,956	152,502	146,907	130,626	144,973	155,445
Los Lagos	SOPROLE	60,425	57,971	64,840	63,821	55,885	57,573	68,371
Osorno	SOPROLE	113,126	103,260	108,497	107,700	98,342	103,948	124,810
Osorno	NESTLE CHILE S.A.	114,423	114,815	128,876	129,673	118,851	128,998	127,207
Osorno	LONCOLECHE	97,350	101,788	113,306	100,552	95,956	116,336	127,892
Osorno	AGROLACTEOS CUINCO LTDA.	4,852	7,702	12,315	16,575	21,611	23,126	27,395
Osorno	CUMELEN . MULPULMO	41,046	52,004	61,370	65,093	74,235	91,827	98,292
Puerto Varas	LACTEOS PTO. VARAS S.A.	24,798	10,077	7,379	10,321	17,607	30,541	20,039
Río Negro	CAMPO LINDO	1,240	1,282	1,149	1,135	1,043		
Total Territory		854.976	855,472	967,769	956,848	940,976	1,057,015	1,126,053

Source: ODEPA, Milk bulletin, 1999 – 2005.

These plants collect 94.5 percent of the milk produced in Region X and 65.4 percent of total national milk production. These numbers clearly highlight the relevance of the region's milk industrialization capacity. Looking at the time series included in Table 9, it is clear that territorial milk production handled by processing plants has increased over time. The difference in the total amount of milk delivered to the processing plants between 1990 and 2005 is 31.7 percent, which corresponds to an average growth rate of 4.5 percent per annum. This is not a negligible growth rate for the industry, nor is it insignificant as regards the territory.

Some of these plants belong to multinational corporations that handle an important proportion of milk and dairy by-products around the world. Soprole, for example, is part-owned (57 percent) by the New Zealand group Fonterra. Soprole operates five plants in Chile and two of them are located in the milk territory (Osorno and Los Lagos). These two plants together controlled 17.1 percent of milk produced in the territory in 2005 (ODEPA, 2005).

[9] www.subdere.gov.cl/1510/propertyvalue-24689.html

It is important to mention in this section that the increase in milk delivery coincided with a decrease in the number of producers that delivered milk to plants. According to Best UDEC, in 1980 there were 22,000 milk suppliers, but in 1995 this number had dropped to 15,623 producers. By 1997, the number of milk suppliers to processing plants stood at 13,478. Apparently, a concentration process took place in which producers abandoned the industry and the remainder increased their milk production. This may be a process through which small producers were excluded, in favor of middle and large sized producers (Best UDEC, 2001).

Nestlé is another multinational corporation which operates two plants in the territory, handling more than 25 percent of territorial production. COLUN is a Chilean cooperative and the biggest plant in the territory. It handles 29.4 percent of total milk production in the area and 19.2 percent of total national production (ODEPA, 2005).

According to studies made by Austral University from 1997 to 2005, the number of milk producers had been decreased by a total of 10,000 in then whole country, corresponding to an estimated figure of 8,300 producers located in the territory under study. However these figures should be taken cautiously, since from year 1999 a number of small producers were incorporated to Milk Center Collection, being accounted from them onwards as only one production unit. Despite the previous comment, is estimated that a significant number of small producers had gone out of their business, ceasing milk production. This reduction of small producers however, have no had a big impact on the total volume of milk produced, since in 1997 the segment of small producers accounted for only 16 percent of the total milk delivered to the bigger processing plants (less than 100 thousand liter per annum)

Is estimated that currently in the territory, there are about 62 Milk Collection Centers plus 11 recollection Centers, for a total of more than 4,000 producers. Also the minor dairy industrial of the region (mainly Cheese making) make up a total of 24 processing industries with 590 milk providers. This minor segment of the industry did process in 2005 a total of 110 millions liters. In comparison, the milk industry of major size received in 2005 a total of 1,200 millions liters, which represents 29 percent more production that 1997

6.3 The productive and major inter-sector relationships and economic chains

Changes in inter-sector relationships are very difficult to measure due to the lack of precise instruments, for example, an input-out table. Deductions based on variables such as labor allocation, or industrial development to process agricultural production, are indicators of the impact that the positive dynamics of the dairy industry has on the territory.

Changes registered by the national industrial survey, ENIA of INE are presented in Table 14, per province. It is interesting to observe that enterprises with more than 50 employees increased between 2001 and 2004, while the number of those with less than 50

employees decreased over the same period. Nevertheless, occupation in both types of enterprise has increased, except in the province of Valdivia.

Table 14 Changes in enterprises and employment in the territory

Enterprises with 50 or more employees	2001		2004	
	Nº	Average occupation	Nº	Average occupation
Region	92	22,742	109	28,844
Llanquihue	38	11,644	45	11,955
Osorno	10	1,565	12	1,824
Valdivia	23	3,518	26	3,042
Enterprises with 10 to 49 employees	2001		2004	
	Nº	Average occupation	Nº	Average occupation
Region	112	2,054	121	2,236
Llanquihue	22	453	38	821
Osorno	38	62	34	554
Valdivia	36	693	32	110

Source: INE, Annual industrial national survey, 2001 and INE, Annual industrial national survey, 2004

Interpretation of Table 14 is not straight forward. However, changes in different industrial trends, by plant size, may indicate that, on the one hand, business mergers are detected within this survey, and on the other, that intensity in industrialization may be occurring to increase average labor use with existing plant capacity.

As a proxy indicator of the milk production impact on the territory, changes in the number of industries and labor occupation indicates a positive impact and some economic growth in the territory. This seems to be related to the dynamics of the dairy industry. According to those consulted, direct employment in the industry has not decreased in spite of the technological changes introduced, primarily by the big plants, which tend to gain efficiency in labor use, becoming more capital than labor intensive. This may be explained by important increases in production and by-product exports.

6.4 Changes in labor use

Changes in labor use are often associated with rural-urban integration, dynamics of the agricultural sector and the direct links of the production chain to add value to agricultural production. When these factors work in the same direction, Non-Farm Rural Employment (NFRE) increases and becomes strong and stable. Income related to NFRE is usually important and often greater than agricultural income (Berdegué and others, 2004).

"Non-farm" is understood as the manufacturing or service sectors. The manufacturing sector includes processing of farm products, and services include trade in farm products. Employment applies to either self-employment or wage-earning employment.

Table 15 Rural labor use in the milk production territory 1990 and 2003

	1990		2003	
Occupation	Nº	percent	Nº	percent
Agriculture	99,512	79.81	73,131	64.75
Commerce and hotels	4,296	3.45	8,74	7.74
Construction	3,38	2.71	5,636	4.99
Electricity, gas and water			210	0.19
Financial services & insurances			709	0.63
Government	1,146	0.92		
Industrial	4,137	3.32	7,251	6.42
Mining	536	0.43	77	0.07
Personal services and households	6,25	5.01		
Social services	4,208	3.38	13,986	12.38
Transport & communications	1,214	0.97	3,176	2.81
Unspecified			26	0.02
Total	124,679	100.00	112,942	100.00

Source: MIDEPLAN, CASEN survey, 1990 – 2003.

Main labor uses in the territory are summarized in Table 15. It is important to note that labor related to agricultural activities has decreased by 15.06 percent from 1990 to 2003, which is equivalent to an average percentage rate of 1.25 per annum. This means that non-agricultural activities and enterprises have also increased, due to the fact that the milk and milk processing industry has also grown. This follows the trend observed in dynamic rural areas of Chile and other Latin American countries (Berdegué and others, 2004).

Activities related to the territorial economic engine, such as transport and communications or industrialization, have increased over the territorial average. In addition, informants claim that the urban use of labor has also experienced changes. More people are reliant on services and retail commerce due to the increase in income over the period, and the growth of the dairy industry that creates an increased demand for production inputs, specialized services, professional occupation and several intermediate products that are demanded by milk processors and retail sellers.

6.5 Rural-urban links

Rural-urban links are also evaluated through the eyes of informants, in the absence of relevant data presently being prepared by ODEPA. As mentioned before, the economic influence of the dairy industry is clear in the territory's urban sectors.

There are many business people from other sectors entering the dairy industry, producing a great impact both on rural and urban areas. Garcés, Delano, Heller and the Ferosor Company, are new participants within the dairy industry, but there are also external capitals such as those from the New Zealand based "Manuca" group, which has invested in more than 5.000 ha incorporating several dairy production areas, with much greater

production in each one. These new investments produce an increase and changes to different types of rural and urban employment.

Besides the production companies, several management services companies have been set up. Among the most important are: Todoagro, with economic interests in more than 250 land sectors. In 4 or 5 years it has also received contributions from Corfo, and today it has direct programs with several large and medium-sized dairy companies.

Also, during the same period other bodies have been set up to provide technical-commercial advice, which have included the participation of foreign experts both from New Zealand and Australia (Best Fed); these have been led by the specialist Les Sanders, and there are a number of producers now following their recommendations. Neither must we forget another body recognized by the dairy sector: the Universidad Austral (Southern University, which has a well-established team of professional specialists in dairy matters and forage production, with experience attained from the preparation of the 1997-1999 competitive study requested by ODEPA and the dairy industry. This same team has provided recommendations to Soprole within the context of the Best Dairy Producer contest for 2005 and 2007. Additionally, and together with the INIA, it plays a major role within the Dairy Consortium, a body that plays an important part in meeting the challenges of placing research within the reach of both producers and the industry, in order to enable the dairy sector to compete at international level.

Another body offering numerous services is Cooprinsem, which provides milking equipment, veterinary services and pharmaceuticals, product inputs, dairy supplies and a milk testing lab (accredited by the Chilean National Standards Institute or INN). Before Chile joined the MERCOSUR, this laboratory, with its state-of-the-art equipment, monitored a total of 45.000 cows; today it monitors more than double that number. Before Chile entered MERCOSUR, the organization had a contract to provide a limited service to no more than two enterprises; but now almost every sectorial company goes to Cooprinsem, which provides bulk tank and individual cow testing to most of the Chilean dairy industry, and is highly trusted by both producers and manufacturers. This role has an enormous potential, particularly now that payments are being made for composition, a system that requires more samples for analysis. Cooprinsem also provides administration advice and distributes computer programs to be operated by producers. Moreover, it maintains direct links with the International Farm Comparison Network (IFCN), which allows the Chilean dairy sector to be placed within the international context and so compare its level of competitivity.

The installation of these and other companies related to the production of milk is allowing many milk producers to outsource their work in a more efficient way, achieving improvements in the installation of irrigation networks, internal trails for cows, drainage systems, fertilization, etc.

From the point of view of infrastructure and added production values, for large transnational companies such as Nestlé and Soprole (Fonterra), and to a lesser degree for medium-size companies, there is a lot of expectation regarding the export market, for

which they need to invest in new technologies and economies of scale so as to gain efficiency. These investments are present in the production of cheese and its derivatives, as well as dealing with environmental challenges such as those established in Decree 90, which regulates the environmental requirements of production.

6.6 Public and private investment per type and sector

Public investment figures provide an idea of changes in territorial priorities as far as public needs and interests are concerned. As shown in Table 16, total and sectorial expenses have changed over time. Public investment reached its maximum in 1997, basically pushed by investment in public works which is, in general, the single most important investment sector.

Investment in roads and public services in Region X over the last 10 years has been remarkable. It is important to point out that the physical road network in the milk production region is good, reaches all production areas and is open all year around. In 2002, the total road network had 10,608.2 kilometers, although 72.5 percent was formed by unpaved roads[10]

Table 16 Public investment in Region X in nominal terms

	Ministry of Public Works	Sanitation	Ministry of Housing and Urbanism	Ministry of Health	Ministry of Education	Sports and Recreation	Social Investment	Total public sector investment
1990	15,140,912	1,953,510	7,654,485	786,799	0	0	69,560	25,605,266
1991	22,002,922	3,116,436	12,458,062	611,060	22,600	57,003	60,593	38,328,676
1992	18,428,424	2,868,590	12,309,245	5,961,451	21,049	28,304	75,356	39,692,419
1993	14,676,101	2,690,452	13,733,222	5,943,524	38,223	70,828	45,555	37,197,905
1994	25,095,108	3,144,084	14,779,760	10,323,889	312	47,610	146,185	53,536,948
1995	30,611,779	6,267,529	16,442,891	9,948,273	16,727	0	154,946	63,442,145
1996	45,296,092	7,163,535	22,279,294	3,900,612	55,433	11,274	486,298	79,192,538
1997	65,691,196	6,981,110	20,484,884	2,580,713	0	52,485	408,944	96,199,332
1998	48,310,154	4,517,338	20,876,640	1,880,609	68,443	44,756	978,575	76,676,515
1999	42,221,544	0	21,144,725	768,229	182,349	130,547	371,581	64,818,975
2000	33,189,049	0	26,101,766	310,797	264,883	20,513	149,885	60,036,893
2001	40,596,331	0	24,086,480	1,078,142	108,628	14,268	65,836	65,949,685
2002	32,673,626	0	25,585,657	688,114	268,932	75,023	699,166	59,990,518
2003	50,596,548	0	26,482,775	204,884	207,133	105,128	226,232	77,822,700
2004	39,414,644	0	28,870,949	382,918	62,548	323,024	387,965	69,442,048

Source: MIDEPLAN, http:.sir.mideplan.cl.

It is interesting to point out that some sectors, such as sanitation or even education, have witnessed a severe drop in investments, indicating that basic needs within these sectors have been satisfied. Important for the territory are investments in roads and housing, not

[10] http://sir.mideplan.cl

only because of the size of the investments involved, but because they represent growth in the countryside and in the population's standard of living.

Private investment is a lot more difficult to measure due to the lack of records. Available information through informants indicates that in addition to the 24 milk processing plants, there are 98 medium and large cheese factories in the territory, some of which have been set up during the last five years.

There are other private investments in the territory. Soprole, for instance, is investing about USD10 million to enlarge its processing plant. A private investor from New Zealand has also entered into the industry, and several medium sized plants have increased their capacity through investment and technical changes.

7. Changes in social and institutional conditions

7.1 Milk producers associations

There are a considerable number of milk producers associations in the territory. Some are very active mainly in supporting the trading interests of their members. These associations also play other roles by carrying out additional activities such as supporting technical assistant and dairy farm economic evaluation programmes, organizing important milk and agricultural fairs, seminars and technical conferences, helping with the editing and publication of specialized magazines and radio programs for producers as well as representing the interest of different group of producers before the local authorities

In general, there are two groups of milk producers associations. The first ones are representative of all agricultural producers at the provincial level, and within them are included the dairy producers as an important group, since they constitutes the most relevant activity in the region. Within this group we find Saval (Valdivia),[11] Sago and Fedagro (Osorno) and Agrollanquihue (Llanquihue). All of them, at the same time, are part of a bigger organization called CAS (Agricultural Consortium of the South), where all the organizations of agricultural producers of the southern part of Chile are included.

A second group of organizations are specifically representing interest of dairy producers. These are: Aproval (Valdivia), Aproleche Osorno and Aproleche Llanquihue. All of these three producers' organizations account for two thirds of the whole milk production, within the X Region. In turn all these organizations are included in Fedeleche, (National Federation of Milk Producers), entity that involved at the national level all the dairy producers associations at the provincial level, within the whole country

On the other hand Acoleche, organization that represents at the national level, small dairy producers that deliver their daily production to Collection Centres delivers this raw milk production to the different important processing industrial plants within the region.

Aproqueso is another organization that involved the majority of the industry plants that process milk for cheese production being its representation also at the national level. Another recent organization is Exporlac, entity created to organize at the national level all the enterprises concerned with the exportation of dairy products

Fenaleche is the organization belonging to the dairy cooperatives that manufacture milk products, while Asilac, in an analogue way, gather all the milk industries that are funded with funds coming from the private sector. In Asilac are included the four biggest milk processing industries in the country which are: Nestlé, Soprole, Watt's Loncoleche and Vialat, (ex Parmalat). Both Fenaleche and Asilac are organization with representation at the national level.

[11] The Valdivia province is partially considered, only respect of the areas which are involved in milk production.

From all the producers or industry associations mentioned above, that are presently active, at the inclusion of Chile in MERCOSUR, only existed Saval, Sago, Fedagro, Agrollanquihue, Fenaleche and Asilac. This means that all the rest of associations were created quickly as a consequence and in response of the great growth and development of the dairy national sector leaded by the intensification of the Chilean opening process of the national economy, followed by the insertion of Chile to the international markets.

7.2 Number of dairy commercial firms formally registered at the territory

According to the Ministry of Agriculture statistics in 1997 on the territory a total of 12 dairy enterprises had in operation 18 processing plants.

There were about 30 cheese making industries or plants of minor size that were not considered on the previous statistics. Among these, the main were Puerto Octay, Quimey, Kumey, Don Ricardo, Dollinco, Dos Castaños, Los Ulmos, Los Muermos, Mayai, Estero Largo and Huentelelfu.

At the present time only 10 out of the 12 dairy enterprises that were operating in 1997 are still operating, Soalva and Universidad Austral were closed and Dos Alamos was bought by Soprole. Soprole has now a total of 12 plants operating in the region.

Additionally to the 10 major milk enterprises, at the present are in operation 24 minor processing plant making cheese. The major dairy industries received in 2005 a total of 1,200 millions Liters of milk, while the minor cheese making industries received in 2005 a total of only 110 millions of liters

7.3 Rural and urban activities connected to the dairy industry in the territory

Linked to the dairy regional industry, there are a number of activities that are generated by a combination between rural and urban activities. However the statistics associated with the level of these activities are either difficult to find or directly are not existent.

What follows is a list of a number of these types of activities. The transport of milk from farms to processing plants, according to the actual volume of milk transported, generate the need for the use of about 180 tank tracks that on average have a daily run of 250 kilometers. This transport activity also imply the use of external services, for the mechanical maintenance, repairs, an annual need of about 7 million litter of diesel , the transport of this fuel to the different gas stations, the demand of services by permanent and replacement drivers, who operate milking trucks that under open road conditions run almost 15 million of kilometers per year in paved and rural roads, plus the payment of toll for the use of main highways, specialized professional technical assistant services provided by Agro mists, Dairy specialists, Veterinary MD, that deliver their services directly to dairy farms. Services that provide technical sales of dairy inputs such as, products for keeping a hygienic milking, products for the proper feeding and nutrition of cows, and specialized products like medicines, pesticides.

Services that give conferences, seminars, workshops, field days and technical trips were implemented. Centers to organize special events, such as: marketing activities, fairs, participation in animal and milk products shows, financing and banking services and a good supply of electricity energy. Services from certified Analytical Laboratories offering the producer a number of analyses to assess for instances water quality, heavy metals, feed composition and the presence of toxins like aflatoxin

Services provided to keep production, reproduction and genealogical records for individual dairy farms, services providing the printing of specialized form for dairy farmers, supporting state an regulations to improve irrigation and drainage of small farmers and also and special program for the improvement of degraded soils that help farmers to restore the minimum fertility level of soils.

The public knowledge of established regulations and procedures in animal health, such as the programs for the control and eradication of a number of animal diseases; programs for insurance and accreditation; program for the cortication of exports; environment controls; internal taxing and revenue services; control of the electric services and supervision of the direction of labor office.

Services providing Technological and Statistical Information from INE, ODEPA, Central Bank, Customs Registry Office, INIA (National Institute for Agricultural and Animal Research)

Other activities connected are manufacturing of special dairy clothing, security equipment, industrial building and machinery mounting, availability of specialized milk processing, products for the dairy industry products (milk coagulants, salt additives, and disinfectants), services for water treatment, and treatment of manure residues, medical assistant and labor mutual security.

8. Critical factors that have influenced economic activities in the territory

8.1 Public policy and programs

Some decisions of agriculture policies directed to compensate the milk industry were created once the participation of Chile in the MERCOSUR was formalized. These policies and other national programs already in operations allow producers to improve competitiveness.

Two of the most important public programs are: a) the **incentive system for recovering of degraded soils.** Based on the Law 16.604 from 1998, the Chilean government created a program financed for 10 years, in order to mitigate the degradation process undergone by the soils. This project includes financial help to farmers to incorporate phosphorus and calcium fertilization, for seeding and regeneration of pastures, plus the conservation or rehabilitation of degraded soils; b) an **incentive program for improving irrigation and drainage conditions of the farm.** This program has consisted in a number of initiatives linked to the improvement of the irrigation and drainage at the farm level. This has involved the construction of a number of new irrigation infrastructures, the improvement of the existing, plus the availability of bonus and especial credits to individual farmers. This project is independent of the MERCOSUR experience but has been applied in the territory.

Additionally, others programs and incentives to improve the competitiveness have been created after the agreement with MERCOSUR, that include, for instance, an especial fund for the improvement of the animal health, including the concept of "Good Livestock Practices" at the livestock farm level; a program for the control of animal residues; an incentive to associative projects for improving management of the producers; a technical assistant fund; a program for the development of providers; a fund for improving technologic and productive development, and an artificial insemination and genetic improvement program.

In general terms, as compared to the situation existed in 1997, the public institutions like CORFO, INDAP and SAG have significantly increased their staff of professional and technical personnel dedicated to support to the dairy industry. For example, SAG has taken the lead of the functions connected to the exterior commerce, the accreditation of processing plants, the control of residues, and farms program certification.

There are also some programs for improving credit access. With regards to the concession of funds to the milk processing industries, CORFO (Corporation for the Development) has been the main support, with different lines of credit for the refinancing as second floor bank of the banking sector. Also INDAP have provided short and long term credits for individual or organizations of small producers. Also credits for irrigation and drainage improvements have been given together with guaranteed fund for small and middle size producers.

8.2 Investments and technological changes

In all these years there has been a substantial increase on regional infrastructure such as rural electrification, telecommunications, wideband Internet, sanitization of water supply, health and rural education and rural transportation medias.

In addition, main technological changes introduced by the major dairy industries in the region have improved significantly the levels of competitiveness of this industry beyond all the projections made in the middle nineties. One the greatest accomplishment of the milk industry was the elimination of fresh not processed milk, which has been substituted by UHT, processed milk in the market.

The following are just some of the technological improvements that the bigger size milk processing has achieved during recent years:

- The use of nitrous oxide for allowing the storing of milk powder for extended period of time.
- The total replacement of fiber transport tanks by the non rust refrigerated steel tanks that allow an increase in the volume of transported milk.
- The use of ISO accreditations norms for quality products and systems.
- The inclusion of traceability for all the manufactured products.
- The total elimination of collection milk cans, by refrigerated tanks.
- The treatment for the save elimination of milk solid and liquid industrial residues.
- The safe treatment, recycling and use of manure and fecal residues at the farm dairies.
- The modernization of the packing of a number of milk consumer products.

On other hand, the marketing strategy of the big enterprises, like Soprole and Nestle, is based on the diversification of products they are to generate together with the incremental participation and availability of different brands that allow them to sale and compete in different segments of the market, with up to three brands of products. Nestle has one main brand (very well prestige), but sometimes make use of other brands (“Lechera del Sur”) looking for an identification with the production zone and with a processing plant that was purchased several years ago. Other companies like Loncoleche, has a second brand, and the strategy has been the strengthening of different lines associated to especial products: without lactose, milk reinforced with calcium, free fat milks, smaller sizes containers, of lower cost (quick meals); more economic presentation (UHT in black plastics, cans similar to other brands, different colors, etc) more friendly with the environment. Colun Cooperative, in the last years, has had a strong entry to the market of fresh cheese and yogurt, having with those products an important growth.

Other middle size enterprises, like Surlat and Mulpulmo, also diversified production by preparing especial own brand to third party (i.e., Supermarkets). Same happens with Mulpulmo. They all are searching for widening their coverage to the national level. One important strategy of the sector and in particular of Nestle is to identify products that are

connected to, with conducts leading to healthy type of living, sports, etc. In the same regard goes the publicity made by Colun.

Additionally, the great majority of the big milk industries have put forward strategies for the exportation of their products. All of them have declared that they are heavily betting for the exportation, by investing on technology and increasing their scale of operation, in order to gain efficiency on their productive process. Other middle size industries, together with an improvement of efficiency, look at the export of products with more added value and the search of niche markets, as for instances the possibility of exporting to Central America

Technological change is strongly associated with important investment. Thos is the case of the new drying tower built by Soprole, to dry milk in Osorno. This is an investment of more than US$ 25 millions. The same industry develop and investment on cheese making, which has made this industry the major Chilean exporter of cheese, gaining a lot in efficiency, that allowed almost the double of the previous volume of production. Other investments to increase manufacture capacity with new lines of production, are been developed by Colún, Loncoleche, Lechera Frutillar, Mulpulmo, Surlat, Cuinco, together with several others cheese factories.

8.3 The concentration and specialization of producers

As has been already stated there is a concentration of milk production on the territory. This concentration refers to the number of producers and to the volume of milk produced, which actually is equivalent to 70 percent of the total milk production in the country. In this regards there are some studies that indicate that in the next years, this level of production could easily go over 75 percent of total milk produce at the national level.

Middle size and specially the biggest producers, are each day the more advanced and specialized. It can be confirmed that the bigger producers concentrate a bigger share of the total of production. There is a big concern regarding feeding aspects, particularly all the aspects related to the efficiency of utilization of pastures. Also the proper energy supplementation to improve the total solid content of milk is another concern, since the industry, since several years ago, is oriented to pay and bonus the milk according to the solid content and also the sanitary quality. This is, in particular and per se, an area of specialization that is concerned with all aspects related to the assurance of the quality of the milk being produced. The health of the herd tied up with the genetic improvement are very much linked to the search of higher solid content of the milk

Despite of this concern, the estimations are that no more than 3 percent of producers have reached the necessary standards of excellence of technical expertise and productivity level, and that still exist a lot of room to continue improving the diverse factors that affects milk production level.

With regards to the small producers, their situation is different. The actual structure of the milk business, make it difficult for them to access the incentive of prices pay by the

industry. Despite this difficult situation, many small producers still have found in milk production their main productive axel that have allowed them to keep in the business

Therefore it can be stated that the middle size and big producer stratus have both registered a huge productive advance, being the productivity per cow and by hectare significantly improved. But, still the strongest change has been observed in regards to the structure of costs, factor that is considered of significant importance in the future management of the business by the farmer.

As far as the industry is concerned, there are also unequivocal signs of geographical concentration that obviously is similar or correspond with the observed concentration of producers.

In the industry there is also a degree of specialization, that is referred in this case to the milk elaborated products, being the X Region the one that concentrates the greatest cheese production, particularly of Chanco and Gouda type; powder milk manufacture, dry whey; butter and in a growing fashion the UHT fluid milk, which at the national level has displaced the traditional pasteurized milk.

9. Conclusions

The major and most important conclusion of this analysis is that the Chilean dairy industry did not collapse as expected in virtue of the trade agreement between Chile and MERCOSUR. On the contrary, the dairy industry has been strengthened by accessing external specialized markets in countries outside the MERCOSUR region. This case is an example of an industry that takes advantage of an open economy and a regional trade agreement to grow, improve competitiveness and impact the territory in which the industry is settled, despite the odd forecast and expected outcomes due to the adjunction of Chile to the MERCOSUR.

It has to be pointed out that before this particular trade agreement was signed, Chile had already chosen an "outward looking" general development model, where external opening was given a strategic role. The aforementioned can be best appreciated by observing the fall in tariffs that affected the dairy industry, which from being close to 100 percent at the beginning of the 1970s, had dropped to just 11 percent in the early 1990s, prior to negotiations with MERCOSUR, as a consequence of unilateral policies to open up the economy implemented by the Chilean government. The possibility that the Brazilian market were an opportunity for any industry surpluses and the need to open new markets for other products, conducted Chile to a further unilaterally lower tariffs on all products to just 6 percent, within a five year period, regardless of the MERCOSUR agreement.

The major challenge for the industry was to improve production efficiency and thus increase total production, since both Argentina and Uruguay report lower production costs and internal prices for fluid milk than Chile.

However, production increases are not attributable only to the possibility of facing competition with neighbouring MERCOSUR countries. A number of factors are also responsible for the development of the dairy industry in Chile: Technological change has played a critical role to improve quantity, quality and profitability of livestock for both milk and beef production. This is, perhaps, the single most important factor related to the change and strengthening of the dairy industry and the territory. Public policy and State lead programs have contributed to improve production potential and to increment competitiveness through different economic and production infrastructure incentives. Institutional development, translated into stronger organizations and integration of the industry, has been a crucial element to the introduction of technical change and social/economic integration around the industry. Public and private investments have facilitated technical change, territorial development, physical mobility and non-agricultural rural employment. Finally, the managerial capacity of a number of producers have influenced changes in by-products, creation of new brands, marketing strategies and specialization of firms that have improved the negotiation capacity and the sustainability into the markets.

These remarkable changes in the Chilean dairy industry are not free of consequences and second round implications. Concentration of processing plants and big producer's farms

is one of the direct consequences, including huge investments that increment differences among producers, not only because of share of production but because of economic capital and managerial capacity. Small dairy producers have decreased in number and in their milk volume produced. Milk collection and storage centres, supported by INDAP to improve small producer's negotiation capacity, have reduced in number. Several small producers either producing fresh cheese or providing fluid milk to small cheese producing plants which very often do not meet sanitary and harmlessness standards.

A proportion of small producers who have not implemented such technological changes have lost the competitive edge, and are thus unable to benefit from economies of scale, and many have consequently chosen to change over to beef production, with others opting for sheep farming. However, such changes have also implied a certain level of renovation based on new technologies as previously mentioned; additionally, they also imply important investments in the capacity to open up and sustain new markets, which is a process that also needs to be properly examined.

However, it is not necessarily the size of producers that represents the main factor to successfully keep up with external competition. Small producers who implemented technological changes have been able to continue working within the dairy sector. In general, such changes have not been overly expensive. For example, having a cold tank for milk storage, developing better practices for managing grasslands, and improved sanitary procedures for milking and looking after herds, has allowed them to stay competitive.

The impact that the productive sector has had on the socio-economic structure of the territory seems clear. The production and processing of milk forms the main economic motor for the territory, with noticeable spill offs regarding rural-urban links, including changes in the use of labour, the gradual strengthening of the manufacturing, urban productive activities, transport and service sectors, as well as the type and amount of private and public investments.

From a public point of view regarding the capacity to integrate and strengthen the territory, advances have been significant. The support given to the sector by national bodies and different actors within the political arena has been prominent. It normally receives a level of multidimensional support that other sectors are unable to obtain. It is a fact that, beyond differences related, for example, to political parties, most everyone shares the idea of supporting the interests of the dairy industry. This is expressed in the way that favourable policy decisions are taken regarding the dairy sector, such as the safeguards that are presently operating.

It is well accepted that the developmental basis of this territory depends on the drive provided by the milk industry and that the region's productivity is identified with the industry. The economic cycles that affect the diary sector have a clear and direct impact on the whole territory. However, the fact that the territory itself includes a large number of districts, where those that are predominantly rural have a relatively low level of non-agricultural employment, coexist alongside with those which are much more urban in

composition, means that such changes in the dairy industry are not evenly distributed throughout the territory, and tend to affect more rural areas.

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