THE ROLE OF NATIONAL AND TRANSNATIONAL CORPORATIONS IN THE GLOBALIZATION OF DAIRYING IN LA LAGUNA, MEXICO*

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In this article we examine the problems caused by globalization and transnational corporations in *La Laguna*, a region that spans the border between the states of Durango and Coahuila in north-central Mexico and which constitutes the country's foremost milk-producing zone. Our main objective is to describe how foreign corporations work along with national ones to form a "milk agro-food chain." We study corporations involved directly in the transfer, adaptation and diffusion of dairy technology, and we examine associated technologies such as irrigation, transportation, and seeds.

For transnational corporations (TNCs), the question of how to establish a corporate presence in developing countries is the central challenge to their globalization strategies. In Mexico, TNCs have established themselves mostly since 1964, when the Foreign Investment Act limiting foreign investment to 49 percent of capital was modified. The modification eased restrictions on foreign capital and encouraged the expansion of foreign firms into Mexico.

In La Laguna, we find a model of dairy production in which national, transnational and foreign corporations interact. Our analytical axis is the *Grupo Industrial LALA* (LALA Industrial Group), a Mexican company that articulates the regional dairy system. LALA takes part both in the production phase and in the industrialization or transformation phase – pasteurization, homogenization, and milk packaging. TNCs linked to the milk chain are found in the production phase. Even though LALA is a Mexican company, an examination of its role as an articulating agent allows us to understand the current modernization process, global articulation, and the presence of transnational and foreign capital in the region.

Our study is guided by the following hypothesis. The place or *positioning* of LALA in La Laguna's milk chain has promoted development of the regional dairy

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system. LALA has achieved this by constituting itself as the region's economically pivotal company. LALA has emphasized one particular link of the milk agro-food chain: the collection of raw materials for the transformation and industrialization of milk. Its focus allows many firms, including national, transnational and foreign, to penetrate into various other phases of production, specifically input supply. As a result, competition among companies is minimized, allowing each corporation and the milk chain as a whole to develop. Such interaction is based on a strategy currently convenient for both national and foreign sectors, although it may have been otherwise at another moment in history, and although it may be different today in other regions of the country where input supply, primary production, transformation and commercialization of dairy products are disputed. The main axis of this interactive regional strategy is currently based on the particular traits and prior history of LALA as an actor and how the TNCs and LALA have controlled different links of the dairy chain.

Most of the information we present was obtained from field research in the region. We interviewed some members of LALA's upper management as well as milk producers. We also gathered statistical information and documents from regional offices of government agencies such as the Ministry of Agriculture. We faced the greatest methodological difficulties in the collection of information regarding TNCs. We first identified the channels used by these corporations to publicize their products by reviewing three trade journals: *Unión Ganadera*, a regional publication; *Carne y Leche*, which has national distribution; and *Lechero Latino*, distributed throughout Latin America. We also gathered information at the National Cattle Farmers Congresses in 1998 and 1999, organized by dairy farmer organizations from the region. These meetings included specialized presentations, visits to high-tech dairy farms, and demonstrations where companies offer their goods and services linked to dairy activities. This approached permitted us to inventory TNCs operating in the region.

We first explore the general theoretical elements of the economic globalization processes which encompass the international, national and regional dairy systems. Then we describe the milk chain in La Laguna. Here we examine the performances of TNCs and of national agro-industries, focusing mainly on the region's industrial leader, Grupo Industrial LALA.

THEORETICAL ELEMENTS OF GLOBALIZATION

Socioeconomic globalization is a process as old as capitalist expansion itself. These processes constitute two sides of a single global phenomenon. However, during the second half of the twentieth century, globalization acquired specific aspects that determine the development of current capitalist accumulation.

In the late twentieth century, globalization became a process characterized by a set of three sometimes successive, sometimes overlapping stages (Benko 1996): (1) *internationalization* – associated with the development of export flows under a non-flexible accumulation paradigm run by nation-states; (2) *transnationalization* – related to investment flows and the insertion in countries of companies that transcend national borders and become directors of the accumulation process; and (3) *globalization* – linked to an accelerated technological development, a complete

reorganization of the global financial system, deregulation of the state, and installation of world organizations that produce information and regulation under a "flexible accumulation" paradigm (Harvey 1992).

In this evolution, the hypermobility of TNCs and the limited power of nation-states become problems of growing magnitude (McMichael 1994). In this process, it is important to establish how multinational corporations changed into transnational ones. This transformation altered the existing relationship between economy and politics, all the while serving to continue capital accumulation through investment and deregulation of economies in developed and developing countries (Bonanno, Constance and Hendrickson 1995).

Even when globalization is analyzed from various disciplinary perspectives, there is agreement that globalization emerges in the context of a new division of labor in the world (Fröbel, Heinrichs and Kreye 1977; Bonanno et al. 1994). The latter is based on at least three conditions: (1) the development of an inexhaustible potential work force in Third World countries, (2) the fragmentation of the productive process and the consequent possibility for most production phases to be carried out by the low-skilled work forces found in less developed countries, and (3) technological developments in transportation and communications that facilitate complete or partial production anywhere in the world, tending to decrease costs.

The new international division of labor (NIDL) opens the way for globalization since it makes productive processes more flexible and causes companies and transnational conglomerates to acquire preeminence over national economies. TNCs are derivations of monopolies, consortia and cartels that had been developing for some time in the international field. Their reign began under the shadow of the Cold War and, afterwards, under the "new world economic order." They arose with such force that they redesigned the world map in geoeconomic and geopolitical terms. They possess a strength greater than that of nation-states, for they progressively rid themselves of some impositions or limitations inherent to nation-states.

In this global context, states show a trend towards deregulation or to other kinds of regulation by ending production subsidy policies, privatizing some of their historical functions such as social security, intervening directly in markets through incentives (thus overcoming indirect intervention carried out through rent and price policies), and finally through the implementation of territorial policies, which are regionally designed according to the specific competitive traits of each region (Swyngedouw 1986, as cited by Harvey 1992).

Internationalization is constituted under the Fordist production paradigm. It rests on the concept of a labor force divisible into dissociated, but spatially united, temporal portions; the best example being chain production in large factories. The central factors now are the new instruments and technological rationales used to modify this space-time logic (Giddens 1994). This gives rise to the possibility of *spatial simultaneousness,* which, given new possibilities for producing in spatially distant locations (Hiernaux 1996), allows internationalization to transform into globalization. Therefore, transnationalization, whose space-time linearity allows it to traverse national borders, turns into globalization by making processes in different spaces simultaneous. It represents the ultimate expansion of markets and territorial restructuring where diversification, divisions and complements are

materialized around the planet.

Under this conception, globalization fragments space because each location has its very particular logic, depending on its competitive advantages. Different locations are connected or linked to capitalism's globality through their diverse logics. The existence of multiple logics opens a possibility for the inclusion of regions previously not considered incorporable because of their low development levels. Given the possibilities for global operations across far-flung territories opened up by spatial simultaneousness, no region is automatically excluded from incorporation into the global economy.

TNCs are the central actors in this process, for they are focused on capturing resources and surplus. They also play the part of integrating national structures and international capitalism within a unique global system. As we demonstrate below, the means for the integration of a local production process, i.e., a regional dairy system, into a global one is the product of the combination of actions between TNCs and national companies.

GLOBALIZATION OF THE DAIRY SYSTEM

With globalization, the strategies of agroindustries, including transnational ones, have undergone restructuring as the companies try to adapt to market conditions and the demands of international competition. Because these companies play vital roles in agro-food chains their transformations have repercussions on the organization and operation of these chains. It is not easy to identify a single global strategy regarding how companies participate in the global dairy system, although it is possible to mention some of the trends.

The first is a long-term trend, whereby TNCs make a direct investment in a country or market. They then depend on the development of products with local characteristics and which make use of regional inputs. Consequently, local brands for the country or region are born, implying a great flexibility within an individual TNC's production lines. In other words, local brands and personnel are retained and only technology is global.

The second trend concerns the strictly commercial exporting of dairy products, for which we present two examples. The first one concerns cooperative organizations, such as the New Zealand Dairy Board (NZDB), whose dairy product exports are valued at US$2,900 million. The NZDB employs 6,000 people (more than 70 percent of whom live outside the country) and is considered to be the biggest global exporter. The second case concerns private corporations, such as Dean Foods from Illinois. Among other products, this company produces and exports liquid milk, ice cream, yogurt and cottage cheese. Recently, it replaced Borden as the most important liquid milk processing and distributing company in the United States. It now is the third most important company selling dairy products in the North American market, behind Kraft and Nestlé (Dobson 1995).

A third trend is the development of companies that specialize in providing inputs and equipment to both milk producers and dairy agroindustries. In this manner, they join the national productive process in a regionally-differentiated way according to the developmental stage of the dairy system and to the governing production model

of each region. Large companies establish their strategies in terms of "global localization" (Beck 1998), in other words, by becoming a living part of the local production process. This strategy allows the penetration of companies that are very heterogeneous in nature and in size and which offer a wide variety of products, from pharmaceuticals and chemicals, feedstuffs, registered dairy cattle, milking equipment, cooling and packaging equipment, and even market and business management computer software.

The agroindustrial complexes generated by the action of foreign investors have developed regionally adapted strategies. Consequently, they construct a vertical and interdependent system where different actors play distinct parts – individuals and organizations are involved in production, transformation, transportation, storage, financing, regulation and commercialization of the worldwide dairy supply.

In the context of globalization, a company's profitability depends on production and productivity increases. In turn, these depend on technological inputs, most of which come from the United States and Canada. In addition, attention is focused on supplying "quality raw materials." Milk quality depends on inputs and imported technologies, on the rational use of genetic information for breeding more productive cows, and on optimized feeding of livestock. The relationship between milk collecting companies and producers will also have an effect on product quality, and producers receive bonuses determined by volume and milk characteristics.

Even though it is a highly perishable product, milk is one of the most marketable commodities on an international scale due to technological advances in its handling, operation, manipulation, conservation, packaging, storage and transportation. This particular characteristic of the world dairy system reveals a paradox within globalization: even though there have been open trade agreements between countries and trade barriers have been dropped for agricultural and cattle products since the 1980s, the dairy industry is one of the most regulated and controlled in the global agro-food system. This is expressed in protective and regulatory measures undertaken by countries that are dairy powers. Some examples are the EEC's price policies, Canada's fee system, and subsidies for producers in the United States. In the case of Mexican dairy products, this trade liberalization started in 1986 with the signing of GATT and was consolidated in 1994 with NAFTA.

As we pointed out before, the milk market's international structure is characterized by the predominance of industrialized countries in production and exporting. This is mostly due to their technological innovations, production patterns based on supplying cattle with concentrated feed, and milk policies.

On the other hand, less developed countries have become dependent on developed ones because of the difficulties they face when trying to reach a competitive level in milk production to satisfy domestic needs. They come to depend on the more industrialized countries because of the adoption of technological paradigms and the implementation of dairy policies based on inaccurate market estimates. This forces them to become importing countries and weakens their self-sufficiency, as in Mexico's case. In 1995, the most important importing countries were Mexico with 6,595 million pounds, Japan with 5,182 and Algeria with 4,547. Between 1990 and 1995, Korea increased its imports 325 percent, Venezuela 179 percent and Hong Kong 145 percent.

A nation may be important as a dairy exporting or importing region depending on its export and import volumes, balance of trade, trade-consumption percentage, or the dynamics of a certain period (García, Martínez and Salas 1999). In dairy commerce within the global agro-food system, countries distinguished as important economic powers are preponderant. These countries, as a rule, control every aspect of the dairy chain, from primary production to machinery, inputs, industrial processing and even product marketing.

This unequal situation may be clearly observed in North America. Dairy policies in the United States and Canada seek to strengthen producers who are efficient and who can adapt to competitive conditions in national and international markets. US and Canadian policies are oriented towards stabilizing their internal markets, satisfying their population's and industry's basic needs, and ultimately, exportation. This has been achieved through increasing production and productivity by intensifying the use of technologies which are subsequently bought by Mexico.

The United States' dairy industry is renowned for its high efficiency. It has one of the highest yields in the world, as can be observed from how it supplies three-quarters of the regional production with half the cows. Canada stabilizes its production by focusing on domestic supply, not by stimulating increased production. However, it goes farther into more elaborate and sophisticated products such as flavored milk, filtered milk for infants and light products. For Mexico, on the other hand, dependency on the international market is structural, particularly for powdered skimmed milk, hindering the development of its productive system and generating a growing dependency on imports, mostly from the United States, to cover its domestic demand (Alvarez et al. 1997). Approximately 30 percent of total dairy exports from the United States were destined for Mexico during the first half of the 1990s (Burrell 1997).

There is, therefore, a differential context in dairy technology generation in the United States and Canada that is widening the gap between these countries and Mexico. Closing that gap will require greater and greater investments as time marches on. Some examples of where technologies are widening the productivity gap can be found in the use of the hormone bovine somatotropin (BST), reproduction techniques like *in vitro* insemination and embryo transfer, computer registry, and the development of communications technology for trade operations. This has contributed to an increase in production and yield per animal and a reduction in dairy herd size, as shown by figures for 1994. In the United States, the average annual yield per cow was 7,312 liters, in Canada it was 5,546 and in Mexico it only reached 1,165 (Martínez et al. 1997).

For Mexican agricultural and dairy sectors, globalization has resulted in the stimulation of exports, growth in food imports, the elimination of subsidies in an effort to heighten the competitiveness of domestically consumed products, budget cuts in development and production support programs, and the reduction of assistance programs for poorer sectors in rural communities (García and Martínez 1997).

In the framework of open trade, this situation brings forth an unequal competition between the United States and Latin American countries. Developed countries achieve self-sufficiency in dairy products and become global exporters, while

developing countries tend to import more, while the possibility of achieving self-sufficiency in dairy products escapes from their grasp.

Mexico finds itself in a very vulnerable position in the face of NAFTA. It is a net importer of dairy products and of inputs for dairying. It uses technologies designed and constructed according to models from the United States and Canada. However, there are differences regarding production and productivity, which puts Mexican producers in a very unequal position for international competition. The United States and Canada achieve food self-sufficiency in dairy products and produce a surplus destined for export, while the opposite happens in Mexico. Internationalization processes in dairying, mostly guided by TNCs, are accompanied by an economic regionalization as far as market distribution is concerned. This occurs not only for dairy products for direct consumption such as powdered milk, yogurt, cheese, desserts, and ice cream, but also for a great variety of goods and services like registered animals, food, semen, embryos, vaccines, medicines, equipment, raw materials for the industrialization of dairy products such as lactobacilli, butyric fat, and casein, as well as patents and consultantships.

THE AGRO-FOOD MILK CHAIN IN LA LAGUNA

Agroclimatic conditions favored that La Laguna be occupied by large *haciendas* operating as agricultural companies whose main crop was cotton, mostly for export. In the 1940s, the Mexican state broke up the haciendas and redistributed land in the region by establishing *ejidos* that held land collectively. However, the cotton production system and its orientation towards foreign markets was left untouched.

A shift towards dairying took place after 1950, in the context of a capital internationalization process which, aside from having the elements mentioned before, included the addition of agro-food transnational companies and the introduction of a new technological package that accelerated the modernization of the dairy production process.

Today, La Laguna is the most specialized and most modern dairy region in the country. This means having registered cattle; using artificial insemination, balanced feeds, chemical and pharmaceutical inputs, automatic milking devices and cooling tanks; and improving infrastructure and techniques for the handling and caring of dairy cattle. On the other hand, it also means having effective vertical and horizontal integration, encompassing the fodder production stage, primary milk production and its industrialization, and even distribution and direct commercialization. It is in this space of integration where transnational and national companies intervene and where they develop permanent relationships.

Below, we will describe the dairy production and transformation chain in the region according to information we have gathered. Analyzing each link of the chain will allow us to understand how national – specifically, LALA – and transnational agroindustries intervene and operate in the region.

The dairy agroindustrial chain for the region can be outlined as follows:

(1) The production of inputs for dairy industry productive processes, including fertilizers, seeds, and agrochemicals. In other words, everything that generates a productive foundation for dairying.

(2) The biological process of milk production, which is restricted to transformation of inputs by the animal into an interchangeable product with specific nutritional qualities.
(3) Milk collection and its transportation to an agroindustrial plant. In La Laguna, this phase is generally the responsibility of the transforming industry.
(4) The transformation process or agroindustrialization. In this phase milk is assumed to be an input.
(5) Milk or dairy product distribution, consisting of its marketing, promotion and transportation to trade or consumption centers.
(6) Finally, consumption of these products (this phase will not be analyzed here).

We illustrate the milk and milk derivatives chain in Figure 1.

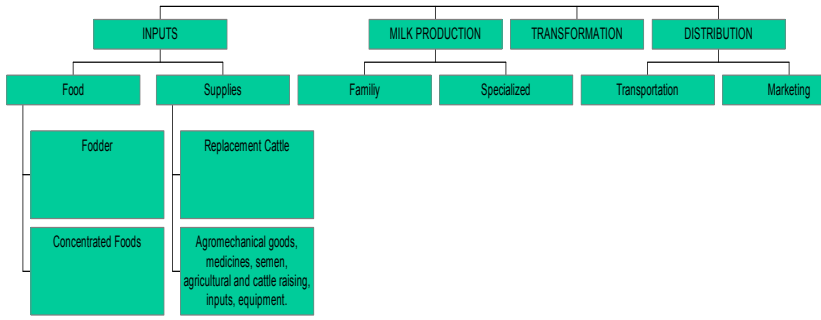

Figure 1. The Milk Production Chain

Inputs and the Role of TNCs

Regarding input supply, we have observed that national and transnational corporations intervene precisely and specifically, distributing the market among themselves. Fodder mostly is produced by dairy farmers, with unmet demand supplied by fodder companies. These companies frequently are part of an agroindustrial conglomerate such as LALA, which has its own fodder company and grants credit, through its own credit institution, to its dairy farmer partners.

For balanced feeds, which are basic for productivity and milk quality, the important participation of TNCs becomes evident. According to information provided by *Fideicomiso Instituido en Relación a la Agricultura – FIRA* (Trust Fund for Agriculture), in 1997 there were four main companies in the feed market in La Laguna: Ucialsa, which controls 87 percent of the market; Anderson Clayton with 6 percent; Purina with 5.2 percent; and *Zaragoza de Chihuahua* with 1.2 percent. It is important to point out that these companies manufacture their products mostly with raw materials, such as corn, sorghum and soy, which they obtain mainly from the United States.

Regarding the supply of replacement cattle, the Ministry of Agriculture

(SAGAR) in La Laguna presents data that indicate that in 1997 a total of 32,259 milker phenotype calves entered the region from the United States and Canada. Many of these animals were imported directly by producers through government credit programs and/or through Regional Cattle Farmers Associations. Also, some companies, such as LALA, provide a service for replacing and improving the herds of their dairy farmer partners.

Regarding other productive inputs, according to FIRA in La Laguna there are 8 companies that supply agromechanical goods, 31 veterinary pharmacies, 8 semen distributors, 20 agricultural inputs companies, and 7 equipment companies. The intervention of TNCs in this particular link of the chain is evident.

This information led us to investigate the existence of companies that provide the inputs and equipment required by dairy farms and fodder producing agricultural areas. We made an inventory of the companies that offer services or products linked to milk production. We registered 78 companies, 41 of which are linked to TNCs, 25 of which have their headquarters in the United States, 5 in Germany, 3 in France, 2 in Japan and 1 each in Israel, Spain, Switzerland, Holland, Italy and Canada. Table 1 shows the number of TNCs and national firms that operate in the region according to the products and services they offer.

As far as operations in the region are concerned, some firms, mostly the stronger companies (TNCs), have their own technical advisors and salesmen in the region. Smaller companies work through freelancers who sometimes represent several different companies, as is the case of semen sales. One example is a company called *Genética Mexicana*, which simultaneously represents several TNCs – such as ABS Global Inc., which leads the market in bovine genetics, artificial reproduction, and cloning, and has one thousand independent representatives in seventy countries; or SEMEX, which is of Canadian origin. We should mention that progeny tests are very costly and take a long time, about five to six years, to prove the genetic quality of a breeding animal or stud. The region has approximately 170,000 wombs (i.e., cows that have borne at least one calf) in production (LALA 1998:38), which allows for the quantification of the dimensions of semen demand, mostly if the replacement and reduction of imported calves, which represent around 25 to 30 percent of calves, are being considered.

We detected several companies that we may call TNCs because of their size, the volume of their operations abroad, their investment in research and development, their number of employees in this area and their operational dynamics. We also found that there are many companies that have foreign capital, though some of them are very small. These we have called foreign firms and some examples are a small group of farmers from the United States or from a kibbutz in Israel that have discovered some technological innovation and are marketing it around the world. This is the case of SAE Afikim, an Israeli company that has the name of a kibbutz and has subsidiaries in Waunakee, Wisconsin, USA. Its representative in the region is *Equipos y Accesorios de Ordeña*. It has developed and produced computerized market and dairy administration systems consisting of milk meters, individual cow identification, pedometers, software and individual weighing and feeding systems. Their systems allow them to determine each cow's yield, electrical conductivity of

Table 1. Number of Companies by Products Supplied to the Dairy Sector in La Laguna

Product	Foreign Capital Companies	National Capital Companies
Pharmaceutical and chemical: medicines, vaccines, agrochemicals, fertilizers, lubricants, disinfectants, detergents, etc.	14	4
Balanced foods, nutritional inputs, etc.	9	1
Equipment and machinery: tractors, trucks, agricultural machinery, milking and cooling equipment, food mixing and ensiling cars, fodder equipment, sprinklers and irrigation systems, pumps, motors, pipes, filters, extractors, fans, earrings for tagging, heat detectors, etc.	21	5
Genetics: semen, studs (breeding male animals) and calves.	6	3
Communication and surveillance equipment	1	
Fodder seeds	7	2
Training		1
Software	1	
Drilling services, collection of toxic wastes, geohydrological exploration, water and soil treatment, insurance and equipment and spare parts, etc.	3	6

Source: own information.

its milk and its activity level in number of steps taken by the animal per hour. However, in spite of its technological innovations and presence in several countries, its size and level of operations cannot bring it to the level of a TNC.

We observed that out of the forty-one foreign firms registered, those that work as corporations generally have a group of employees (veterinarians, agronomists, nutritionists, pathologists) that directly promote acquisition of their products by providing technical, managerial and sales support. However, the treatment a producer receives varies according to herd size – a greater number of animals implies a greater need for technologically advanced products and, therefore, preferential treatment. For example, in promoting BST, a small producer is visited at his farm and is given materials advertising the product and invitations to promotional meetings (these include a meal and a social gathering for those who attend). For producers who own at least 3,000 cows, the hormone vendors offer all-expenses-paid trips abroad, specifically to the United States, where the dairymen visit farms in the main milk producing states as well as meet researchers at prestigious universities. Thus, we observed a differential strategy for the introduction and promotion of a particular technology depending on the scale of production.

For small companies, but generally not for large corporations, contracting local sales representation is the best mechanism. In the first place, it is unnecessary to

determine a salary for the employee – he works on commission. Secondly, depending on the technologies he is promoting, if a small firm's product line is too narrow for a representative to earn a living, he can often complement it with non-competing products from one or more other companies. For example, he can represent pharmaceuticals, reproduction and genetics simultaneously.

There is a group of TNCs with products of a generic character and, even though they are promoted in the region, they do not depend on dairy activity. Such are the cases of Ford New Holland, General Motors, Honda, John Deere, and Mobil Oil. Even though it is not difficult to see links between dairy activities and agricultural machinery, or Honda's electric generators, these companies and their products, though necessary, are not closely linked to production.

Up to now we have seen the importance of the presence of TNCs and other foreign firms linked to dairy activity in this phase of the milk chain in La Laguna. Promotion and development of new technologies are introduced by various strategies, among which the role of a regional milk and dairy product company of national dimensions stands out: LALA. There is no open competition for substitution of outside technology but rather a complementarity facing a real scenario of production. In other words, it is very difficult to have resources to technologically innovate in each area in the milk production process and still keep a privileged position. The same TNCs that use multiple financing strategies with the purpose of having researchers in different countries and in different fields, are able to come up with innovations that they can later market.

Technological extension mechanisms used by TNCs include events, conferences, shows, promotions, technical support, research and informative articles, and building human capital. Their focus is on increasing productivity at the lowest possible cost in order to achieve greater production and income for the producer. However, this does not help avoid disputes between corporations in their efforts to introduce themselves in a specific market niche. Such is the case for BST promoted by Elanco Animal Health in competition with a Korean manufacturer that offers lesser quality BST at lower prices.

Milk Production

This process of technological modernization has led to dairy farms in La Laguna having a better yields per animal than elsewhere in Mexico. Furthermore, 1997 data show that a total of 169,717 cows were producing an average yield of 8,239 liters per animal, which meant an average annual production of 1,312 million liters, representing 16.4 percent of the national production, followed by the state of Jalisco with 1,231 million liters and 15.7 percent (SAGAR 1998).

In La Laguna, milk is produced by privately- and ejido-owned herds, although the private dairy farmers predominate. There are collectived dairy farms, a legacy of the ejido system, and conglomerates, such as Chilchota, but these are a minority. Every dairy farm is articulated "backwards" with input suppliers, and "forwards" with processing and transformation agroindustries. LALA collects milk among its partners, complemented by purchases for the balance of its needs from non-partner farmers in the region.

Milk processing plants differ from each other in size, the genetic quality of their

herds, the kinds of technology they use, their infrastructure, the way they handle their cattle, their productive yield and the degree of links they have with agroindustries.

Three major types of dairy farms in the region can be identified: (1) those that use advanced technology – they are mainly owned by large capitalists from the private sector who control agricultural and cattle raising dairy activity and the industrialization and commercialization of dairy products; (2) those that use fairly common technology – they generally are mid-sized and small producers from ejido stables and some from the private sector; and (3) those who use obsolete or traditional technology, that is, their techniques are rudimentary – they are mostly small producers from ejidos and some private owners.

Hence, we find ourselves in a regional dairy subsystem characterized by large dairy farms owned by private capitalists, ever more modern and growing; ejido dairy farms that were created with support from the state in the 1970s; and small individual dairy farms, which generally use technology but on a smaller scale (García et al. 1999). Producers in La Laguna in 1997 were classified accordingly, as is shown in Table 2.

The technologically-advanced dairy farms average more than 200 wombs, depend on hired personnel, use mechanized milking systems, have horizontal and vertical organization, own modern facilities and possess high levels of entrepreneurial competence. The technologically-unsophisticated dairy farms average fewer than 30 wombs, use family labor, have either manual or portable milking systems, use average quality fodder, have unsophisticated facilities and possess low levels of entrepreneurial competence.

According to LALA (1998) there were 169,717 wombs producing in La Laguna. Of this amount, the producers in the first group own 157,552 wombs, that is, 92.8 percent of the total, while producers in the second group own 12,165, which represents 7.1 percent. In calf and heifer ownership, the proportions are very similar, 93 percent vs. 7 percent and 91.6 percent vs. 8.4 percent, respectively.

Such differences, however, are not determinant factors for milk buying companies. We were able to witness this during our field research when we saw that even small producers sell to large companies such as LALA. The key conditions for selling are quality and milk cleanliness.

It is here that differentiation really has an impact, since obtaining good quality milk depends directly on the equipment, feed and other inputs used, which in turn depends on capital availability. An alternative for family producers has been horizontal organization. An example is collective access to cooling equipment that holds large amounts of milk that make it into the industrialization stage. This means that producers will receive a higher price for each liter of milk. However, if they are not able to do this, they must sell at a lower price to micro-companies that make cheese and cream. This situation poses a paradox that is very common in a globalized environment. It concerns the fact that, though these farmers own their means of production and thus have the independence and economic self-sufficiency that has always characterized dairy farmers, now they are told by companies how to produce and what kinds of products they need. This gives farmers two choices: adapt to conditions imposed by these companies and embrace technology offered

Table 2. Types of Dairy Farms in La Laguna, 1997

Type of Stable	Number of Farms	Number of Producers	Number of Wombs
Technologically advanced or specialized milking facility (types a and b)	297	965	153371
Technologically unsophisticated or family milking facility (type c)	67	591	11850

Source: LALA 1998.

by TNCs or leave the "business." This is similar to the situation observed in the region los Altos de Jalisco (Rodríguez and Chombo 1998).

Milk Agroindustrial Transformation

In 1997, as was already pointed out, 1,312 million liters of milk were produced in La Laguna. Participation of regional companies in milk collection in La Laguna in 1996 is shown in Table 3. Most of the milk produced in La Laguna was destined to become pasteurized milk (790 million liters), followed by cream and butyric fat (314), ultrapasteurized milk – UHT (206), yogurt (29), and other derivatives (55).

One of the most important aspects of the milk transformation process and a cause of great debate among the social actors involved, such as cattle farmer associations, the state and corporations, is the importation of inputs such as powdered milk, lactoserum, lactobacilli, and UHT packages. Here, the intervention of TNCs is again of great importance. For example, in the case of powdered milk, M.E. Franks, of St. Davis, Pennsylvania, USA (but owned by the Belgian company Ecoval) has the governments of Mexico and Algeria as its main clients and takes advantage of its position under NAFTA to benefit from subsidies that are transmitted by government programs from the United States.

As we can see from Table 3, all the dairy agroindustries operating in the region are domestic and the participation of LALA stands out. For LALA, this link in the chain is vital. To keep its position it has had to constitute itself into a conglomerate of companies.

Role of *Grupo Industrial Lala* in the Dynamics of the Regional Dairy System

Information on the origin and development of this group was obtained through an interview with Dr. Rolando Herrera, Head of Technology Support at LALA, as well as from LALA magazines. According to Dr. Herrera, LALA

> is a holding company. It began as a cooperative society, back in the late forties and LALA was born from the needs of producers facing a mandate from the government of the state of Coahuila in which selling non-pasteurized milk was prohibited. There had been a very important problem with brucellosis and tuberculosis. It had been detected that milk was highly contaminated and therefore the Coahuilan government imposed this law; it put a lot of pressure on small producers and they decided to join forces. The *Unión de Crédito de la Laguna* was first formed, which helped them get necessary resources to set up the first pasteurizing plant, *Pasteurizadora del Nazas*. From this, LALA was born. It will turn fifty years old and what started as an association and then as a cooperative society is now an industrial holding company.

Table 3. Principal Milk Collecting Firms in La Laguna, 1996

Company	Millions of Liters	Percentage
Grupo Industrial LALA (domestic)	748	60.4
Chilchota Alimentos (domestic)	145	11.7
Productores de Leche Pura (domestic)	99	8
Lácteos de Oriente (domestic)	53	4.2
Monica's Foods (domestic)	47	3.7
Pasteurizadora Lerdo (domestic)	37	2.9
La Risueña (domestic)	22	1.7
Lácteos Mayrán (domestic)	15	1.2
Others	51	3.7
Total	1237	100

Source: LALA 1998.

The group has several companies and they are all related with production, commercialization, packaging and transportation of milk and its derivatives, as well as with raw materials for milk production. LALA's food plant facilities were among the first ones of their kind in the country to hold an important position in sales volume regarding finished products for dairy cattle inputs. It is also owns the third largest balanced feed company in the country. This company supplies its partners in the group, but it also sells to other farmers and other regions in the country, mainly in Chihuahua, Aguascalientes, Nuevo León and Zacatecas.

Another company called *Envases Especializados* (Specialized Containers) was founded in 1971. It was born as a result of a dispute between Tetra Pak and LALA. The former is a world leader in packaging. It rents, but does not sell, machines to manufacture milk containers, and it sells the inputs required, such as cardboard, ink, plastic and metal. The problem presented itself because packaging represented a high percentage of the sales price. However, retail prices remained relatively static due to the specific way milk prices are established in Mexico. At that moment, LALA decided to look for another alternative and entered a joint venture with a Norwegian company called European Licensee of Pure-Pak (ELOPAK), buying a Pure Pak franchise for packaging that later benefitted from the association of ELOPAK with the Japanese company Shikoku. At a regional level, the company *Envases Especializados de La Laguna* was founded as a part of the LALA group (Pruneda and Wong 1995). Thus, the company was able to reduce its production costs by finding an alternative technology that allowed it a certain degree of autonomy in an input.

On the other hand, milk that was being produced in the region by this group had saturated the local market and it was necessary to find other markets by venturing into Durango, Monterrey and eventually into Mexico City. Today, the group's milk is sold practically nationwide through regional pasteurizing plants or through distributors all over the country in the case of their ultrapasteurized package.

Currently, LALA collects approximately 2 million liters of milk daily and

processes it in its different plants. The milk comes from approximately 460 LALA partners, which are distributed in 172 dairy farms with an average of 570 cows each. It is important to point out that the average yield often surpasses 30 liters per cow a day, which shows the importance of intensification and the kind of producers associated with the group.

The distribution pattern of LALA's partners by size is: 3 percent have herds of more than 2,000 cows, 20 percent have between 1,500 and 2,000, 15 percent have between 1,000 and 1,500, 40 percent between 500 and 1000, and 23 percent have less than 500 (the summed percentages exceed 100 due to rounding). Dairy farms associated with LALA range from 10-cow herds to those with 2,500 cows in production, but we must note that even the smaller ones have to be technologically up-to-date because producers must use mechanical milking devices and deliver milk that has been cooled.

All of LALA's partners, notwithstanding their size, receive the company's services, particularly those regarding technological advances which tend to support the modernization of production for both small and large producers. As Herrera notes:

> Every one of them is a priority, all our partners receive service. Technical support regarding feeding, nutrition, handling, breeding, sanitation, reproduction and quality control of the milk are areas where they receive services. Besides, they have the credit union service, a milk collection service and services of other companies such as LALA chemical products, in the area of sales and assistance regarding chemical products, detergents, etc. They have LALA tires service and car tune ups, and food plant service.

Raw material quality is a central concept rising from the competitive conditions imposed by the market and has been a pivotal point for the consolidation of *Grupo LALA*. Special programs have been implemented to give the partners needed support in the handling and nutrition of cattle, as well as in technological aspects including individual cold thermoses, mechanical milkers, and automated vacuuming, but mostly for, says Herrera, "… a very strict quality control based on a system of rewards and punishments, so that milk keeps its quality standards. Standards we have today are superior to average standards of the states." This quality is reflected in the price producers are paid for their milk, and it is here where the system of rewards and punishments is applied. At the time of our research, LALA was paying 2.52 pesos per liter as a base price plus bonuses for fat and an equation that considers somatic cells, total bacteriology, protein content, milk temperature and cleanliness.

We may conclude that LALA, which started as a cooperative society, has made its way through different stages in the development of a regional dairy system and market by turning first into a conglomerate company, and then into a holding company. This group of companies is committed to different links in the milk chain, that is, from input supply to the production of raw material, then to its transformation, industrialization, commercialization, marketing, and distribution domestically and abroad.

Distribution and Marketing

Products sales to companies are found at three different levels, depending on the size of the company. First, there is a local market where all companies working in

the region participate indiscriminately and where it is very difficult to find companies from outside the region. The regional milk market in 1997, mainly in pasteurized milk, is segmented as follows: Grupo LALA, 70 percent; Chilchota, 15 percent; Bell, 8 percent; and Lerdo, 7 percent.

The second market for fluid milk and other derivatives for LALA implies placement of the product in the main cities of Mexico City, Monterrey and Acapulco, from which retailers, such as supermarkets, can be supplied. Companies in La Laguna participate with 30 percent of the pasteurized milk and UHT market at a national level, with Mexico City as the most important market.

The third level consists of the foreign market. The most important products exported from La Laguna are natural and flavored milks, UHT and other derivatives, with the almost exclusive participation of LALA.

We must keep in mind that in this region there is no competition among the TNCs regarding milk. The presence of TNCs in the milk market is found elsewhere in Mexico. Nestlé, for example, has most of its suppliers in los Altos de Jalisco and in the area around the Gulf of Mexico. Its main product is powdered milk (Nido) as well as a number of food products that require this ingredient. A second example is Parmalat, an Italian company that recently arrived in Mexico. It gets its milk from los Altos de Jalisco, and its main product is liquid milk. In other words, there is competition for milk as an input for the transnational dairy industry, but this is centered in the state of Jalisco. What we want to highlight here is that the market for liquid milk is held mainly by national companies, and only one transnational company competes in this area, but its presence is limited to the state of Jalisco.

CONCLUSIONS

LALA, since the 1970s, at the forefront of the region's dairy chain transformations, has made much effort to achieve greater vertical integration with primary producers. It promotes fodder production and the adoption of an intensive production model in milk processing plants. It supports farm modernization, providing dairy farmers with credit to purchase inputs and equipment, as well as with technical and managing support so the herds produce the required volumes of milk, thus ensuring the timely availability of milk for its plants. In this way, LALA has turned into the protagonist in the productive chain, through fodder and balanced feed supply to dairy industrialization and distribution systems that reach important urban centers that constitute its markets.

LALA also has promoted the horizontal integration of producers. This can be seen in associations among producers, including among ejido members, small and large capitalist and agroindustrial producers, or between private sector and ejido farmers. These associations have given rise to the establishment of *Sociedades de Producción Rural* (Rural Production Societies), *Asociaciones en Participación* (Associations in Participation), *Sociedades de Solidaridad Social* (Social Solidarity Societies), *Sociedades Mercantiles* (Mercantile Societies), *Grupos Solidarios* (Solidarity Groups), and *Cooperativas* (Cooperative Societies). Agroindustries impose on primary producers the conditions for the purchase of milk, including requirements for the installation and use of cooling tanks to deliver cold milk. This encourages producers to gather together in one of the above associational forms.

These organizations are good for the permanence and expansion of the dairy agroindustry, as well as for helping primary producers survive in this branch of production. This development of a regional agroindustry shows the adaptability of local producers and their ability to act when confronted with modernizing and globalizing processes within the Mexican economy.

As we mentioned above, there is no competition for the collection of milk by the TNCs or from foreign firms in the primary phase. These companies have a special interest in introducing their technologies as goods or services in the region and, to achieve this in the milk agroindustrial chain, they turn mostly to the input phase, though they are no less important in subsequent phases. We should mention that in these, a link is established with large regional pasteurizers who will be the promoters and buyers of a TNC's products.

As a general conclusion, we can state that the presence of TNCs in the region has been regulated and has developed because producers were able to organize some time ago. Through their own company (LALA) they were able to place themselves at the critical points in the dairy food chain: production, commercialization, industrialization and distribution. Their own organization has integrated milk producers vertically through a cooperative organization, forcing the TNCs to restrict their field of action fundamentally to inputs and primary production. On the other hand, the globalization process allows for a wide technology supply in terms of quality and price, in a world where distance is no longer a limitation, so that technology is easily substituted allowing for quick upgrades to the milk producing system. In other words, today it is possible for dairy farmers in the region to acquire technological innovations not only from large TNCs but also from a number of small foreign firms that have discovered alternatives at varying costs, because of the ease of transportation and computer technology.

From information and evidence presented in this document the following specific conclusions may be drawn:

(1) TNC and foreign firm participation in specific phases of production, such as inputs, equipment, packaging, has made it possible to achieve the high technological levels in La Laguna, turning it into one of the main intensive dairy regions in Mexico. Thus, we can state that there is a strong foreign capital presence in the "backwards" articulation, that is, in the supply of imported inputs.
(2) Globalization as a process allows small firms that have been able to produce technological innovations in dairy activities to compete with the large TNCs, and each one in this way satisfies its niche in the market. For producers, this implies having access to all kinds of technology as long as they have the necessary capital, without getting vertically integrated with large corporations.
(3) The capability to attain a comparative advantage, competitive or acquired, in La Laguna region in general, and in LALA's case in particular, is due to a permanent increase in the quality and volume of milk produced, where one fundamental element has been the forms of articulation between producers and agroindustries as well as between national and transnational companies.

LALA's development has resulted from a visionary strategy of adaptation to changing global market conditions and from the development of competitive strategies of articulation with TNCs. This includes "backwards" strategies in input

provision and "forwards"strategies towards markets where the main competition lies with other national companies like Alpura, and transnationals like Nestlé or Parmalat. However, there are different scenarios, with each firm distinguishing preferential regions to sell its products and looking to reinforce key elements, such as, in this case, pasteurized milk. The important and outstanding development of LALA must not be confused with an already obsolete corporate strategy consisting of monopolistic attitudes, although it might be timely to warn of this danger that would break the scarce and costly equilibrium achieved up to now in La Laguna.

Finally, it is very important to point out that two questions have emerged from this investigation that will guide our future research. One is understanding exactly how relationships between foreign firms in the region and LALA have been built in historic terms. The other is knowing the relationships between these firms and national companies that, as we saw, also operate in the region in the supplying of inputs to the dairy chain.

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