

Small Producers' Access to Dynamic Markets: The Case of Beef in Nicaragua

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Acronyms

CABP	Central American Beef Project (managed by ILRI and financed by CFC)
CARCHO	Central American Retail Holding Company
CCA	Corporación de Compañías Agroindustriales
CETREX	Centro de Tramites de Exportación
CFC	Common Fund for Commodities
CLUSA	Cooperative League of the United States of America
CONAGAN	Comisión Nacional de Ganadera de Nicaragua
CORFOGA	Corporación Ganadera de Costa Rica
CSU	Corporación de Supermercados Unidos
DFID	Department for International Development (UK)
FAGANIC	Federación de Asociaciones de Ganaderos de Nicaragua
FAO	Food and Agricultural Organization of the United Nations
FISE	Fondo de Inversión Social de Emergencia
GDP(A)	Gross Domestic Product (for Agriculture)
HACCP	Hazard and Critical Control Points
ICI	Industrias Cárnicas Integradas
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
IICA	Instituto Interamericano para Cooperación en Agricultura
IIED	International Institute for Environment and Development
ILRI	International Livestock Research Institute
KIT	Keneglike Institut for de Trope
LAFISE	Latin American Financial Services
MACESA	Matadero Central S.A.
MAGFOR	Ministerio Agropecuario y Forestal
MSU	Michigan State University, East Lansing, US
PFID	Partnership for Food Industry Development (USAID – Project)
RAAN	North Atlantic Autonomous Region
RAAS	South Atlantic Autonomous Region
RIMISP	Centro Latinoamericano para el Desarrollo Rural
UNAG	Unión de Agricultores y Ganaderos
UPANIC	Unión de Productores Agropecuarios de Nicaragua
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

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Introduction

This study analyzes the role played by supermarkets in the commercialization of beef in Nicaragua. The hypothesis proposed by the researchers is that supermarkets are increasingly important as dynamic markets for agricultural products. This development, in connection with the trend toward rising beef consumption in an increasingly urbanized world (IFPRI, FAO, ILRI; 1999 and Slingenberg, Hendrickx, Wint; 2002), lends importance to beef production and commercialization. To date, existing studies on supermarkets as a marketing channel had not considered beef (Reardon and Berdegué, 2002; Berdegué, Balsevich, Flores and Reardon, 2003; Dries, Reardon and Swinen, 2004; Hu, Reardon, Rozelle, Timmer and Wang, 2004; and Neven and Reardon, 2004.) The Project to Promote Beef Productivity, Safety, Quality and Commercialization in Central America² [*Fomento de la productividad, inocuidad, calidad y del comercio de la carne bovina en Centro América*] seeks to use beef production as a vehicle contributing to the reduction of rural poverty, especially among small and medium producers. Small and medium producers' abilities to access to this commercialization channel—or rather, the obstacles that block such access—are of great importance to the INRI-CFC project. This was one of the main reasons for the organization's participation in this study.

Within this context, the following are key questions:

- Is beef commercialization via supermarkets (as dynamic markets) appropriate for small producers?
- Are producers' incomes through the supermarket commercialization channel economically better?
- Do supermarket definitions of quality and classification of beef negatively affect small producers, thus becoming barriers against access to this commercialization channel?
- Do public policies facilitate the participation of small producers in this chain?

This study seeks to answer these questions by applying the supply chain concept to the subject under investigation. The concept is very useful; it helps one to conceptualize the composition and structure of the chain, as well as the interactions between its actors. In the case of beef production, however, most actors do not feel like participants in a chain, without differentiating between a chain of production and a supply chain³ (Lundy et al. 2004; Kaplinsky, R. and Morris, M. 2001; Hobbs, Cooney and Fulton, 2000; or Iglesias, 2002.)

The first chapter presents the chain and its links with the retail sale items, beef processing, the base of production and the proportions between exports and sales to local markets, with the corresponding determinants. Chapter two presents the actors within the chain and the interrelations between them, offering insight into the power and relationships between different actors. Chapters three to five cover quantitative results, differentiating farms according to different commercialization channels, including technological aspects, management, level of organization, reasons for selecting a particular commercialization channel (chapter four) and the economic differences between producers in different channels (chapter five.) Chapter six analyzes policies for the inclusion of small producers. The final chapter discusses critical points and challenges for the future.

² The project is implemented by International Livestock Research Institute (ILRI) based in Nairobi, Kenya, with financing from the Common Fund for Commodities (CFC) based in Amsterdam, Netherlands. It operates in four Central American countries: Guatemala, Honduras, Nicaragua and Costa Rica. The planned project period is from 2003 to 2007.

³ Lundy et al. differentiate between a "productive chain" and a "supply chain." Actors in a supply chain are aware of their interdependence with other actors in the chain. The flow of information is intensive. In general, the chain is oriented toward the competitiveness of the entire chain rather than that of individual companies. The chain is guided by demand, and actors at its different links concentrate their efforts on the production of quality and value.

This study forms part of a broader investigation financed by the United Kingdom's Department for International Development (DFID),⁴ a collaborative effort between the Partnership for Food Industry Development (PFID) of Michigan State University (with AID financing), RIMISP, Red para el Desarrollo Rural de América Latina [Latin American Rural Development Network] and ILRI-CFC's Central American Beef Project (CABP), with financing from the Common Fund for Commodities (CFC). Beef commercialization was analyzed in Nicaragua and Costa Rica, and tomato commercialization in Nicaragua and Guatemala.

The beef chain was included in the study because livestock is a very important factor in the economies of Central American nations. Although not included in prior studies on supermarkets in the region, on this occasion the common interest among projects facilitated the chain's inclusion. In recent years in Nicaragua, this sector has been changing profoundly due to activities carried out by ICI (Industrias Cárnicas Integradas), a subsidiary of Grupo Más X Menos of Costa Rica.

The information generated for this study was obtained from two sources: (1) a survey applied to 180 ranchers, and (2) semi-structured in-depth interviews with key actors from the chain and its different links, such as livestock purchasers, auction owners, functionaries of industrial slaughterhouses, supermarket representatives, butchers, animal transporters, representatives of producers' organizations, and public sector officials (Ministry of Agriculture, Rural Development Institute [IDR], Ministry of Health, and Ministry of Industry and Commerce), who provided different statistics. In total, 25 people were interviewed. Some took part in follow-up interviews in order to cover more profoundly certain elements that arose in initial interviews.

Survey period and sample size:

Surveys were applied to 180 livestock producers in Nicaragua in June and July 2004. These surveys were oriented toward producers who sell their animals to the following three markets:

- 1) The market composed of La Unión supermarkets (CSU). Fifty-nine producers from the ICI channel were surveyed, out of a total of 130 producers in this channel⁵;
- 2) The market made up of industrial slaughterhouses. Eighty-two producers were covered, out of a total of 1000-4000 livestock producers who supply this channel;
- 3) The third market is the so-called "traditional" market, composed of ranchers who sell their animals to auctions, green corrals, and intermediaries who make on-farm purchases (including buyers for exportation of animals on the hoof to El Salvador, Guatemala, Honduras and Mexico.) The survey was applied to 39 livestock producers who supply this channel.

After having introduced all of the information, any out-of-range observations (outliers) were eliminated. Of a total of 180 observations, ten were eliminated for the following reasons: (1) the producers were actually merchants (which distorts variables regarding herd and animal sales); (2) producers were dedicated to the production of breeding cows and bulls (which distorts the prices of animals); and (3) the producers had large tracts of land and/or very large herds that would distort the survey data.

A maximum of one hour was necessary to apply the survey, which was divided into different components:

- 1) Information about the property
- 2) Information about the household and educational level of its members

⁴ The project financed by DFID is called "Realize Agricultural Income through Sustainable Economies" (RAISE). It is implemented through cooperation between International Institute for Environmental Development (IIED) of England, Keniglike Institut for de Trope (KIT) of the Netherlands, and RIMISP. On a global level, the project analyzes the situation in 14 countries. In Latin America, Ecuador, Nicaragua and Guatemala were selected.

⁵ ICI operates with three livestock buyers who, in turn, use some 130 producers (90, 25, 15) to supply the animals necessary to comply with contracts.

- 3) Information about cattle commercialization
- 4) Information about the size of operations
- 5) Information about technologies used on the farm
- 6) Information about the producer's level of organization
- 7) Information about the farm economy (prices, costs, investments, incomes, etc.)
- 8) Producer's opinion about the different channels of commercialization

The statistical analysis was processed at the Agricultural Economics Department of Michigan State University. The specific analysis for beef in Nicaragua was carried out by co-author Fernando Balsevich, using SPSS software (Statistical Package for the Social Sciences, Version 11.) This report basically includes the descriptive analysis, with a binomial analysis and a multinomial analysis for variables on household characteristics and the selection of commercialization channels.

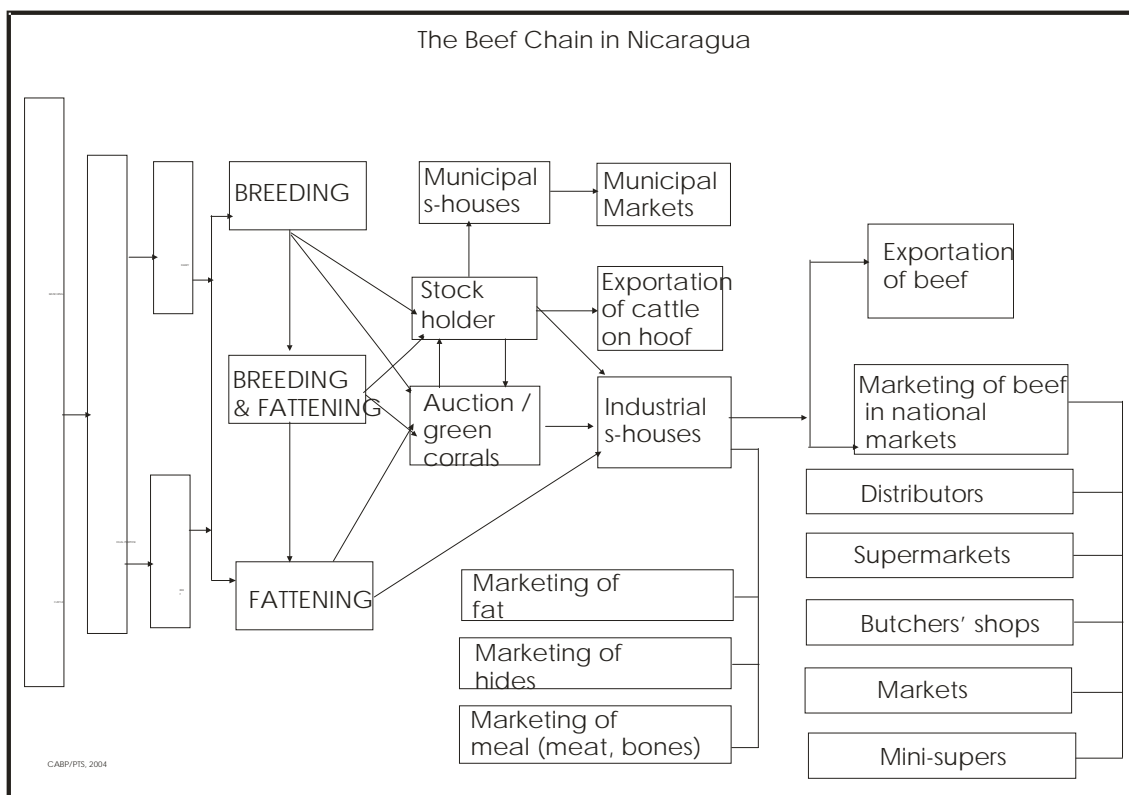
Chapter 1

Composition and Structure of the Beef Chain in Nicaragua

1.1 Development of the "Retail Sales" Sector for Beef in Nicaragua

Traditionally, the Nicaraguan beef sector has had a strong orientation toward exportation. This tendency toward extensive farms or haciendas and large herds began in the 1950s but decreased considerably during the revolutionary decade of the 1980s. After the Sandinista regime was voted out of office, the beef sector was revived. Today, beef and coffee are Nicaragua's most important export products.

Figure 1: The Beef Chain in Nicaragua



Source: prepared by ILRI-CFC's Central American Beef Project

In the early 1990s, the local market was more important in terms of the production and retail sale of beef than was exportation (see 1.2.2.) However, by the late 1990s export quantities had once again surpassed the volumes sold in the local market. Although annual per capita consumption ranges around six kilograms, the local market cannot easily be extended: beef consumption is extremely variable according to family income and meat prices (see Table 1.) Growing urbanization also has positive effects on the demand for beef (IFPRI, FAO, ILRI, 1999.)

Nevertheless, competition between different types of meat, including pork and chicken, limits local beef sales. The sale of chicken meat has grown enormously, surpassing beef consumption in spite of the elasticity of prices and incomes for meat consumption.

Technologically, the poultry industry has achieved international standards with imported technologies, and it has penetrated the red meat market. Chicken has achieved the image as a very inexpensive meat.

In spite of low meat consumption in general, the importance of the local market (for industrial slaughterhouses), as well as its structure, have been changing little by little over the past five years.

1.1.1 The Traditional Urban and Rural Meat Market

Traditional markets are the sites of the most significant retail sales in the country. They offer consumers a very broad variety of products, such as clothing, shoes, common household articles, and all types of foods, including fruits, vegetables and meats. Each municipality has its own market. In rural areas where there is insufficient demand for daily operations, markets open only on certain days. Most of the population purchase meat an average of twice per week.

Table 1: Beef Consumption per Population Quintile and per Capita (IICA/PROVIA, 2002)

ANNUAL BEEF CONSUMPTION HOUSEHOLD LIVELIHOOD SURVEY, 1998 POPULATION QUINTILES BASED ON CONSUMPTION*						
	1	2	3	4	5	Total
Volume in Lbs.						
Urban	231,886.50	1,498,214.40	4,807,555.40	10,718,524.60	28,951,765.90	46,207,946.70
Rural	517,406.80	1,813,302.50	2,517,139.20	3,504,188.10	3,969,556.60	12,321,593.10
Total	749,293.30	3,311,516.80	7,324,694.50	14,222,712.70	32,921,322.50	58,529,539.70
Per Capita Consumption in Lbs.						
Urban	1	4.1	8.9	16.0	36.4	17.7
Rural	0.7	3.1	5.9	12.1	23.5	5.6
Total	0.8	3.5	7.5	14.8	34.2	12.2

* The first quintile is the poorest.
Source: Household Livelihood Survey [*Encuesta de Medición del Nivel de Vida - EMNV*], INEC 1998

In terms of local consumption, traditional markets are very important for the sale of beef to low-income consumers seeking moderately priced products. Butchers and meat retailers operate in markets. The retailers obtain meats from wholesalers. Wholesalers and butchers, in turn, purchase and sacrifice cattle in local or municipal slaughterhouses. There are a total of 98 slaughterers. Local slaughterhouses, which in many cases are operated on behalf of the local government, charge a fixed amount for their services, and wholesalers and butchers take the carcasses, hides and viscera for retail sale or to retailers.

From municipal slaughterhouses, products come as un-refrigerated meat in the form of carcasses, half carcasses or front- or hind-quarter carcasses. The meat from animals slaughtered at night is available for sale early the next morning. Most markets lack installations to process parts into cuts or to refrigerate the meat. All meat and derivatives (such as viscera) are available for consumption the same day.

Considering the conditions of these traditional markets, it is very difficult to guarantee the safety of meat products. For example, meat retailers in Managua markets are so numerous that the Ministry of Health is unable to inspect all of them. Another obstacle is that sales begin

between four and five o'clock in the morning. Because of these difficulties, a practical arrangement was established between the Ministry of Health and the municipal government that grants market space to the retailer. Vendors must present vouchers that verify the origins of the meat, and the meat must come from certified or at least regularly inspected slaughterhouses. However, this arrangement is not very functional. A retailer may have a receipt for 100 pounds of meat from an industrial slaughterhouse but may sell up to 200 pounds of meat that same day. In Managua alone there are 359 meat (beef and pork) sales posts in the markets.⁶

1.1.2 Butchers' Shops

Butchers' shops (*carnicerías*) are retail sales points outside of the markets. They are found within residential areas in urban zones and in rural towns. Managua has some 163 of these household retail stores, offering consumers a supply of appropriate meats. Butchers' shops operate from morning until afternoon. Clients establish a conversation with the butcher and request meat cuts according to their specific preferences. This interaction seems very important to consumers. The same is true in Palí supermarkets, where the self-service area for meats is limited in order to facilitate interaction between consumers and the supermarket's "butchers."

Currently, traditional butchers are facing increased competition from distributors of the San Martín industrial slaughterhouse, which operates through a network of sales posts throughout the country. As a result and due to competition in quality, a number of butchers' shops have become re-sellers under industrial slaughterhouses. This is seen more in the capital than in rural areas (see the structure of local sales in section 1.2.3.)

Traditional butchers purchase animals (mainly cows) and render them in local slaughterhouses. It is less costly to purchase cows than young bulls. In general, these are discard cattle from dairy or dual-purpose farms. Cows that are not impregnated are also sold for slaughter. These are older animals (seven years and older), and therefore their meat is somewhat tough.

In 1997, Nicaragua's Ministry of Health (MINSa) prohibited the sale of un-refrigerated meat (IICA/PROVIA, 2002.) However, IICA has estimated that the commercialization of un-refrigerated meat in Managua markets represents up to 42% of all sales.

1.1.3 National Supermarkets

One national chain of supermarkets is called "La Colonia." This chain initiated supermarket operations in the 1960s. Its owners are Casa Mántica S.A. and Inmuebles Diano Marina S.A. Before the 1972 earthquake, Casa Mántica was a distributor of home appliances; afterwards it converted into the supermarket business. Currently, La Colonia operates seven branches in Managua, with no presence outside of the capital. In November 2003, La Colonia opened a super-center (*hipermercado*) considered to be the most modern supermarket in the country. In 1999, Casa Mántica S.A. received a four-million-dollar loan from the International Finance Corporation (IFC) for a four-year project to remodel its existing three supermarkets and to open three new branches.

Currently, La Colonia has centralized the purchase of perishables with virtual storage. It does not have a central warehouse and lacks its own transport. Suppliers deliver their products directly to the supermarkets. Red meat is purchased from three industrial slaughterhouses (MACESA, Nuevo Carnic and San Martín.) Formerly, the largest supplier was the San Martín plant, whereas the other two were used to complement or complete the purchase of certain volumes or cuts. Recently, however, La Colonia changed its beef purchasing strategy in favor of MACESA (Matadero Central S.A.), which is now the main supplier. This change was due to a

⁶ According to information provided by the Ministry of Health, SILAIS Managua

special arrangement between Casa Mántica and Bancentro/LAFISE, which is co-owner of the MACESA slaughterhouse and offered La Colonia a thirty-day payment period for purchased meat (vs. the seven-day period normally offered by suppliers.) Clearly, La Colonia found the payment conditions offered by MACESA to be more attractive.

In La Colonia supermarkets, the sale of farm products represents 42% of total sales. Three hundred different fruit and vegetable products combine to represent 10% of sales. The sale of meat represents 10%, of which 7% is beef.

Meat is sold in plastic bags or boxes according to the different cuts selected. Thirty- or sixty-pound boxes are vacuum packed. All La Colonia branches have an area for the presentation of meat cuts in displays, for sales to customers, for the preparation of meat cuts and for the packing of portions for the self-service section. Since La Colonia purchases meat from the three industrial slaughterhouses, the supermarket proposed that they deliver pre-packaged cuts for the self-service section labeled with their respective company names or brand names. For the supermarket, this would provide an opportunity to reduce butchering costs. However, the slaughterhouses did not accept the offer.

A few months ago, La Colonia began its “noches frescas” [fresh evenings] promotion, in which prices were reduced by up to 25% for certain perishables after 6:00 PM. This offer also applied to fresh meat. However, the selection of products with reduced evening prices was drastically decreased as of July 2004.

La Colonia’s “target group” includes middle- and upper-class consumers. In order to maintain its clientele, the supermarket chain must compete with the “La Unión” chain of supermarkets, which also serves the same population segments (see 1.1.4.) Through promotions such as “noches frescas” and by offering its own economical brand of certain goods (“Ecomax,” used to market vegetable oil, canned tuna and coffee), the supermarket is attempting to capture a broader customer base including other segments of the lower-income urban population.

In addition to the La Colonia chain of supermarkets, there are a number of mini-supers. These are small supermarkets, established within installations of up to approximately 400 square meters. Some mini-supers sell beef, using this service for publicity purposes. The exact number of these establishments is not available. According to the Ministry of Health, a total of 49 supermarkets sell meat within the metropolitan area. This indicates that in addition to the supermarket chains described above (La Colonia-7, Palí-11, La Unión-5, PriceSmart-1, for a total of 24), there are a similar number of small supermarkets that offer retail sales of meat. Their main suppliers are the distributors of the San Martín slaughterhouse or, directly, the other two plants.

1.1.4 Multinational Supermarkets

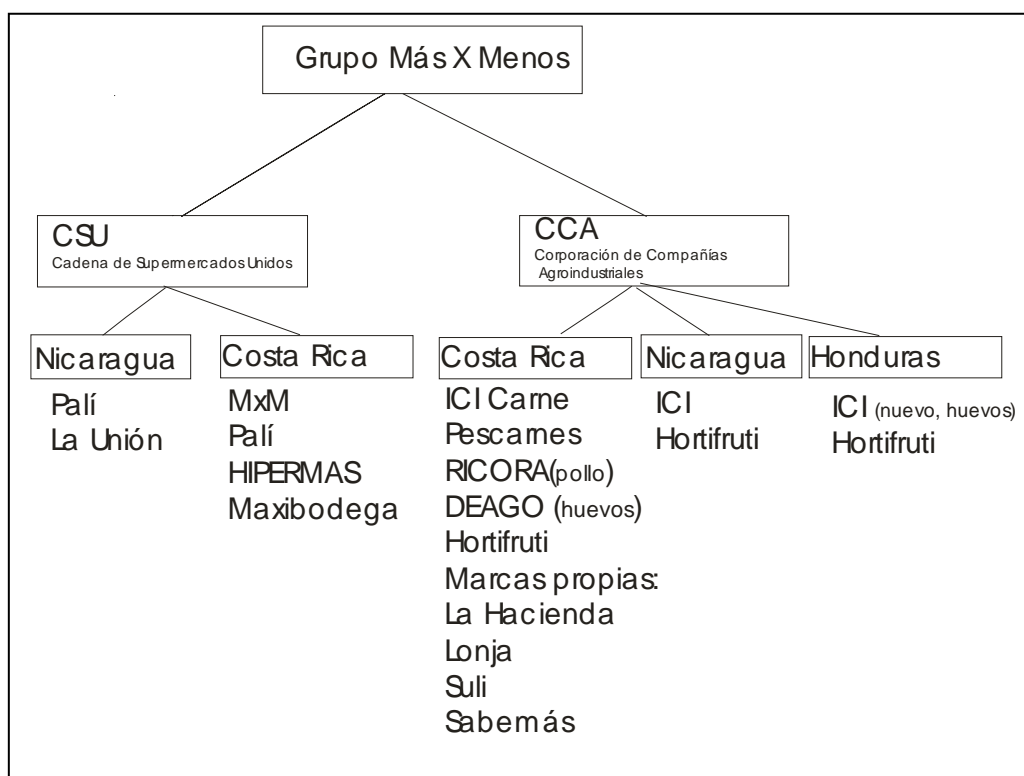
Currently, two multinational supermarket chains are active in Nicaragua. One is PriceSmart (USA) and the other is CSU (Cadena de los Supermercados Unidos) of Costa Rica.

The PriceSmart chain has 29 stores within the United States and thirteen other countries. It also has a license for eleven stores in China and one in Saipan, Micronesia. It has only one supermarket in Nicaragua.

PriceSmart’s basic principle involves the concept of commercialization by membership. For this reason, it founded the Price Club, through which members can take advantage of high-volume and low-cost operations to obtain better prices for a wide variety of merchandise.

PriceSmart also sells beef, which it purchases exclusively from the San Martín slaughterhouse in sixty-pound boxes. Monthly sales average approximately 120 sixty-pound boxes of beef.

Figure 2: Structure of Grupo Más x Menos in Central America



Source: ICI, CSU office in Managua, and CCA web page

CSU is the supermarket corporation of Costa Rica's Grupo Más x Menos. It has entered into a new cooperative relationship with the Guatemalan chain La Fragua and the Royal Ahold multinational chain of the Netherlands. In 2002, the three groups founded CARHCO (Central American Retail Holding Company), whose total sales volume is 1.613 billion euros (2003). It has 332 supermarkets in the five countries of Central America (Guatemala, Honduras, El Salvador, Nicaragua and Costa Rica.)

Within this holding company, Grupo Más x Menos has basically two lines of action: the CSU, with its different types of supermarkets; and the CCA (Corporación de Compañías Agroindustriales), which supplies and organizes the supply of farm products for supermarkets. Nicaragua's ICI (Industrias Cárnicas Integradas), discussed below in this chapter, is an interesting element in terms of beef commercialization.

In Nicaragua, CSU operates two different supermarket chains: Palí and La Unión. Both are coordinated by the CSU office in Managua, which also coordinates beef purchasing and sets the prices for each supermarket. Prices are fixed according to store location and competition. Each supermarket carries out surveys of prices offered by its competitors (butchers' shops and other supermarkets.) Survey results are sent to the CSU office, which decides the prices of different cuts. Unfortunately, it was not possible to obtain exact figures regarding the sale of beef from this office.

Palí supermarkets focus on population groups with limited buying power. The stores are not air-conditioned, and displays are very simple. In general, customers must remove products from boxes. Aside from perishables, there are no attractive presentations; rather, Palí supermarkets follow the discounter concept. Customers cannot pay with credit or debit cards; only cash is accepted. The concept and design of storerooms and cold rooms are standardized, using the same warehousing system in all supermarkets. This facilitates movement by personnel between different branch stores. Meat sections in Palí supermarkets are 20- to 24-foot-long refrigerated display cases. ICI meat deliveries occur daily (except in certain rural

supermarkets that receive meat four days per week.) Currently, CSU operates 20 Palí supermarkets in Nicaragua: 11 in different areas of the capital and nine in the provinces (mainly in departmental capitals.) Palí supermarkets penetrated the capital and country very quickly. In 1998, there were only three Palí supermarkets and no La Unión supermarkets in Nicaragua; today, the chain is made up of twenty Palí and five La Unión supermarkets.

La Unión supermarkets seek to attract middle- to upper-class customers. They are air conditioned, and their products are offered in attractive displays. Perishables sections occupy significant space in each supermarket. La Unión supermarkets compete with La Colonia and are always located close to a La Colonia branch.

Together, La Unión and Palí sell beef from some 1,200 cattle per month. Both supermarkets receive the same quality of meat, which they offer at different prices. CSU claims that beef sold in Palí supermarkets is less expensive than that offered by La Colonia even with the latter's 25% discount on "noches frescas," and that many restaurants purchase their beef from Palí.

In this context, ICI (Industrias Cárnicas Integradas S.A.) plays a very important role. **Figure 2** (on the page above) shows that ICI is a subsidiary of CCA and is currently present in Costa Rica (where the first ICI company was founded), as well as in Nicaragua and Honduras.

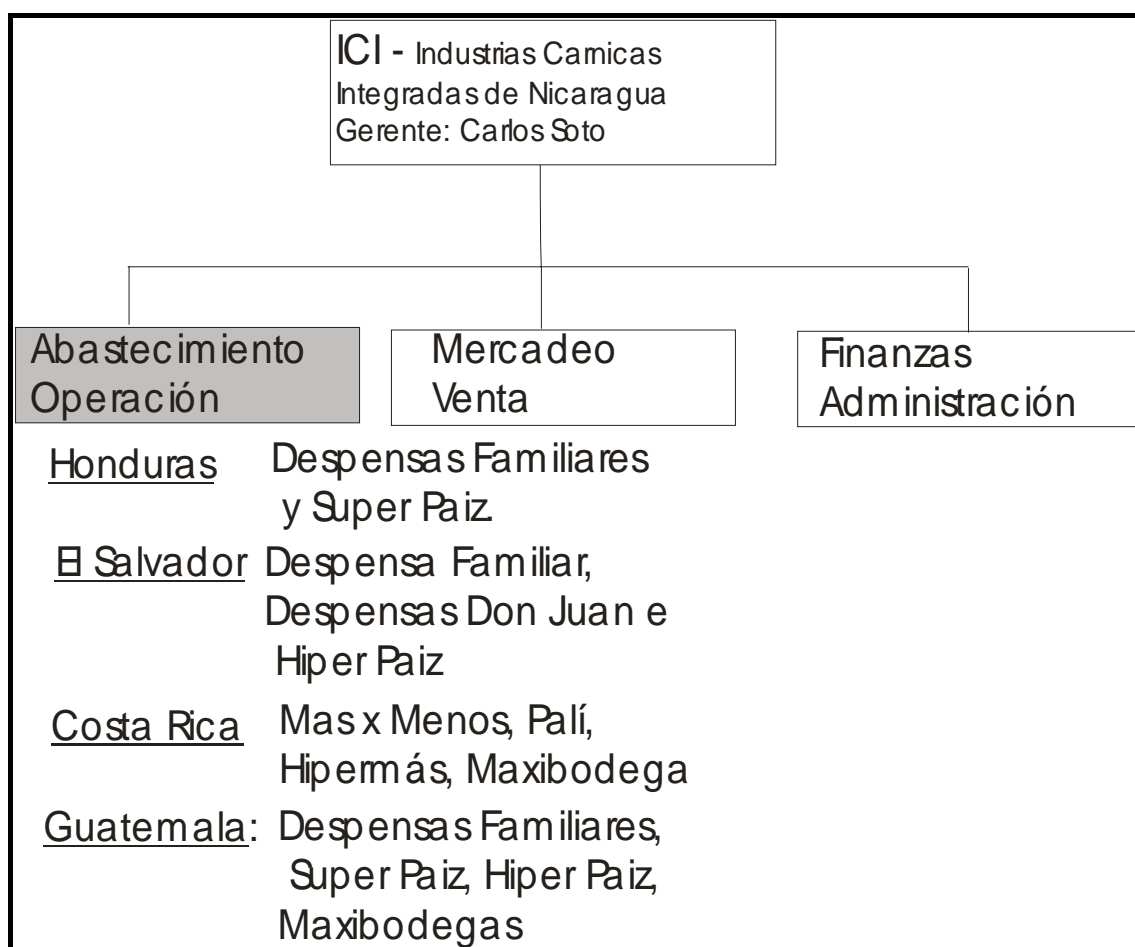
ICI was established in 1986 in order to concentrate beef and pork processing and thus to supply Corporación Supermercados Unidos (CSU) sales points. Its main operating plants are located in Alajuela (Costa Rica) and Managua (Nicaragua). Its installations are among the most modern of their kind in the Central American region, also supplying La Fragua supermarkets in El Salvador.

Its operating process begins with the purchase of cattle on the hoof, which is then processed for the final consumer. This includes deboning, the preparation of cuts, preparation of prepared meats and elaboration of packaged meats. Throughout this process, ICI operates under HACCP standards, ensuring the quality of its products.

ICI offers the following products:

- Fresh beef, pork, lamb, veal and rabbit for retail sale in different cuts and presentations (ground, steak, viscera, chops, roasts, fine cuts, etc.)
- Prepared beef and pork, BBQ style, for frying, prepared with different recipes (with herbs, with spices, and others), and a line of prepared spicy and breaded meats
- Smoked pork and beef
- Pork rinds
- Formed meats, in different figures or presentations
- Packaged beef and pork products, including hot dogs, vienna and other sausages, bologna, hams, salami and pâté.

Figure 3. Structure of Industrias Cárnicas Integradas (ICI) of Nicaragua



Sources: Interviews with ICI, CCA webpage

Industrias Cárnicas Integradas (ICI) was established in Nicaragua in 1998 and in Honduras in 2003. In Nicaragua, the company plays an important regional role (see Figure 3.) In addition to supplying the two types of supermarkets in the country, ICI of Nicaragua also provides meat products to supermarkets in El Salvador, Honduras and Guatemala. ICI purchases animals through its buyers and processes them at the San Martín industrial slaughterhouse. In 1998, ICI had difficulty finding a certified slaughterhouse that was prepared to process larger numbers of cattle. It began by working with the Los Brasiles slaughterhouse in Managua, but faced significant problems. In 2000, the San Martín slaughterhouse offered its services.

The number of cattle processed has increased continuously, from 1,100 animals in 2000 to a current total of 4,800 heads per month. ICI employs four people to ensure quality control at the slaughterhouse. Of all processed cattle, 1,200 remain in Nicaragua. A significant number of carcasses (2,800) are exported to El Salvador. Exportation to Honduras also began in June of this year.⁷ A small amount of cuts and viscera is exported to Costa Rica, and Guatemala receives one container per week.

⁷ Honduras revoked the certification of Nicaragua's three industrial slaughterhouses in 2002. The certification process remained incomplete until November 2003, when San Martín and Nuevo Carnic were certified for exportation to Honduras. Discussion and arbitration between the two countries lasted for almost two years and was tumultuous before SIEGA became involved. Nicaragua considered Honduras' actions to be a non-tariff barrier protecting its industry from competition.

ICI occupies an intermediary position between supermarkets and slaughterhouses. It has its own quality requirements for beef. Carcasses must weigh 212 kg with white fat, and the meat must be red and without hematomas. Producers are paid by check through the ICI office, eight days after slaughter. Prices depend on carcass weight in kilograms. For the processing of an animal, ICI pays a basic price of US\$ 30.00. The price for processing is reduced if ICI leaves viscera and/or other parts or derivatives with the slaughterhouse. ICI's processing of 4,800 animals per month represents 12% of all cattle slaughtered at the national level.

In order to improve control over the fluctuation of cattle supply, ICI has gone halves in ownership of some 1,200 animals. During a certain season, competition for cattle is very strong. Between late May and late July, ranchers use new pastures growing in the rainy season to fatten their animals, which lose weight during the dry season. For this reason, the producers sell few animals during this period, and those they do market are sold strictly by price.

However, ICI must comply with contracts signed with supermarkets in the five countries. ICI buyers have a network of some 130 cattle ranchers (*engordadores de novillos*) from whom they regularly purchase animals. The producers then organize the transport of the cattle to the slaughterhouse.

Among the producers who sell to ICI, there are two groups that organize in order to obtain better prices for their cattle. With a greater number of animals between them, these producers are in a better position to negotiate with ICI. Larger quantities also reduce transaction costs for cattle purchases, and these reductions can be transformed into more attractive prices for the producers.

Table 2: Situational Summary of Supermarkets and Beef Sales in Nicaragua

<i>Supermarket Type</i>	La Colonia	Palí	La Unión	PriceSmart	Mini-Super
<i>Branch Locations</i>	Only in Managua	Managua and departments	Only in Managua	Only in Managua	Managua and departments
<i># of Branches</i>	7	11 in Managua 9 in departments	5	1	Number unknown, 25 selling beef
<i>Volume of Beef Sold</i>	7% of total sales	Together, sell 1,200 carcasses per month (equal to 24 MT)		3.27 MT (120 60-pound boxes)	Volume unknown
<i>Plans for Expansion</i>	4 more branches	4 more	1 more branch in Managua	unknown	Very dynamic

1.1.5 Niche Markets

Organic meat is a developing niche market in Nicaragua. In a strict sense, this meat is not organic meat but rather the meat from animals fattened on certified pastures. The organization that certifies these pastures is OIA (Organización Internacional Agropecuaria) of Argentina. The cost of certification is US\$ 400.00, and certification can be obtained when pastures are not fertilized with mineral fertilizers or treated with herbicides or insecticides. Inspections are held each year to verify that the farmers are complying with requirements. To date, 43 farms have been inspected and 36 (with a total of approximately 80,000 manzanas of pasture) have received the respective certification.⁸

⁸ This demonstrates that this niche is occupied mainly by large-scale ranchers who seek to obtain better prices for their cattle. CLUSA has initiated negotiations with OIA for a type of joint certification for livestock community groups in order to integrate small producers as well.

This initiative involves a multi-institutional effort. Initiated by CLUSA (Cooperative League of the United States of America), it now receives support from CONAGAN (Comisión Nacional de Ganaderos de Nicaragua), IICA (Instituto Interamericano para Cooperación en Agricultura) and the Nuevo Carnic slaughterhouse, which is certified to process animals raised on organic pasture.

Officially, organic meat is called "new meat" (*nueva carne*), and the United States is considered its main market. A contract has also been established with a Costa Rican company that purchases 4,000 pounds per month for hotels, restaurants and specialty butchers' shops. CLUSA's Small Farmers' Market negotiates as a distributor with La Colonia, selling organic meat in six of the chain's seven supermarkets. The consulting firm Agrisystem International is the initiative's representative in the United States; it also acts as an agent, identifying potential clients. Currently, there are two buyers of this meat in the United States.

1.2 Composition of the Meatpacking Industry

The meatpacking industry in Nicaragua is dichotomous: its two components are municipal slaughterhouses and industrial slaughterhouses, both of which are responsible for the processing of animals (but not the exportation of live animals.)

1.2.1 Municipal Slaughterhouses

There are a large number of municipal slaughterhouses, public companies managed by the respective municipal government or mayor's office. Currently there are 98 municipal slaughterhouses. The term "company" probably does not apply to most of these establishments. Rather, they are public services for the local population and butchers' shops. Municipal slaughterhouses provide slaughtering services and charge an average price of 100 córdobas per head. Incomes go to the respective municipal government which, for this reason, has an interest in maintaining services in operation, even while facing certain problems.⁹

These slaughterhouses do not process meat cuts. Many installations lack the minimal facilities required to ensure hygienic treatment of carcasses and to guarantee the safety of the final product. Of the 98 slaughterhouses, only the largest in the departmental capitals work under the control of the Ministry of Agriculture's Animal Health Department. The other, smaller establishments slaughter perhaps five or ten animals per week and operate without public oversight. The clients of these slaughterhouses are almost exclusively the butchers who work in local markets or have their own shops for retail meat sales.

⁹ In May of this year, the Ministry of Health closed the municipal slaughterhouse in Estelí. In a series of articles, the daily *La Prensa* reported on the dispute between the municipal government (as owner of the slaughterhouse) and the Ministry. The slaughterhouse had a capacity to slaughter 300 animals per month.

Table 3: Municipal Slaughtering in 2003 and Percentage of Cows Slaughtered

Municipal Slaughtering in 2003

Department	Total	Monthly Average	Total # of Cows	Percentage of Cows
Estelí	4,376	396	3,769	86.13
Madriz	2,076	189	997	48.03
Nueva Segovia	5,233	476	2,597	49.63
Leon	10,658	968	8,548	80.20
Chinandega	13,590	1,235	10,562	77.72
Managua	62,508	5,683	36,479	58.36
Granada	5,704	519	4,559	79.93
Masaya	8,807	801	4,317	49.02
Carazo	4,873	443	3,488	71.58
Rivas	3,418	311	2,661	77.85
Chontales	8,493	590	4,923	57.97
Boaco	2,351	214	1,596	67.89
Matagalpa	8,228	748	6,814	82.81
Jinotega	4,489	408	3,685	82.09
RAAN, RAAS, RSJ	9,777	889	4,918	50.30

Source: MAGFOR and Municipal Governments

Table 3 clearly shows that municipal slaughterhouses sacrifice a high percentage of female cattle. These are usually older discard cows with tough meat. The prices for cows are significantly lower than those for steer. Butchers follow a strategy of purchasing this less expensive prime material in order to offer moderately priced beef to their customers. Consumers use the meat for soups, or they tenderize it or cut it into small pieces. This strategy allows dairy and dual-purpose farmers to sell their discard cows and thus take part in the (tough) beef business.

In addition to the municipal and local slaughterhouses, there is also a private slaughterhouse that provides services for clients and processes meat for local consumption. It lacks HACCP certification¹⁰ but operates under inspection by the Animal Health Department. The current example of this type of slaughterhouse is PROINCASA in Tipitapa, close to Managua. Formerly, Los Brasiles slaughterhouse operated in a similar manner, but it closed permanently in 2002 after being subject to seizure by the electric company due to payment arrears.

1.2.2 Industrial Slaughterhouses

In the early 1990s, municipal slaughterhouses sacrificed more animals than industrial slaughterhouses, even though there were more industrial slaughterhouses then than there are today. Throughout the decade, a consolidation process occurred within the industry, involving economic crises among almost all of the establishments, and the closing of several.

¹⁰ HACCP stands for Hazard and Critical Control Points. It represents a set of international standards for food handling.

Table 4: Consolidation of the Meatpacking Industry in Nicaragua

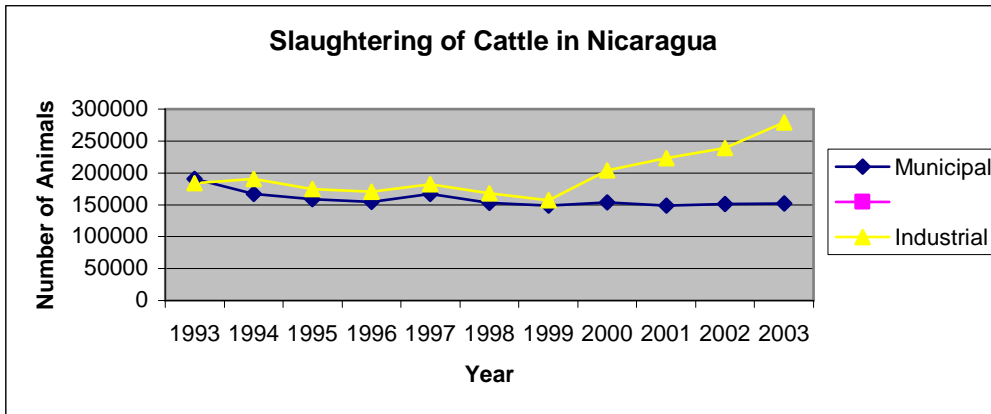
Industrial Slaughterhouse	Location	Installed Capacity: Animals / Day	Crisis Period	Current Status
San Martín	Nandaime, Carazo	400	1998/99	Active
MACESA	Juigalpa, Chontales	400	1999/2000 (closed for 12 months)	Active
Nuevo Carnic	Managua	400	-	Active
PROINCASA	Tipitapa	?	?	Active
Los Brasiles	Managua	?	2000 – 2003	Closed
CONDEGA	Estelí	?	1998	Closed
EMCASA	Estelí	150		Closed
San Carlos	San Benito,	150	2000	Closed
IGOSA	Rivas	?	1995	Closed

Sources: IICA/PROVIA, MAGFOR and Slaughterhouses

Tables 5 and 6 (see below) demonstrate the two aspects mentioned above. In 1993, municipal slaughterhouses sacrificed more animals than industrial slaughterhouses. Beginning in 1994, industrial plants surpassed municipal plants and, at the same time, the industry's consolidation initiated. The San Martín and MACESA slaughterhouses (the latter of which formerly operated under the name AMERISQUE) obtained cooperation from banks, enabling them to consolidate their business and cash flows. BANCENTRO is co-owner of MACESA, and San Martín is supported by Banco Uno. Statistics on San Martín also illustrate the effects of its business with ICI, which clearly helped consolidate the slaughterhouse. National processing dropped in the mid 1990s, increasing again in 2000 to the same level as in 1993. Industrial slaughtering has grown continuously, to a certain extent at the cost of municipal slaughtering. In recent years, municipal slaughtering has oscillated at around 150,000 animals per year, whereas industrial slaughtering increased substantially in 2000 and has reached new records. This is probably another consequence of ICI operations, which increased its slaughtering activities from 1,100 head per month in 2000 to a current volume of 4,800 head per month. This results in a total of 57,600 animals per year (which, for the sake of example, corresponds to the capacity of each of the slaughterhouses in the early 1990s.) If one were to subtract the number of ICI animals from the total number of animals currently slaughtered by San Martín, then the resulting volume would correspond to the number of animals slaughtered in 1998. ICI activities represent 47.5% of San Martín's slaughtering volume, providing incomes of US\$ 1,728,000. The crisis faced by the livestock sector in the 1990s also affected the exportation of cattle on the hoof.

Figure 4 (see page below) clearly illustrates this development. It seems that the volume achieved by municipal slaughterhouses has stabilized at approximately 150,000 head, but industrial slaughtering has increased to a level double that of municipal volume.

Figure 4: Municipal and Industrial Slaughtering of Cattle in Nicaragua from 1993 to 2003



The remaining industrial slaughterhouses (San Martín, Nuevo Carnic, MACESA) have HACCP and USDA certification for exportation to the United States. HACCP certification is provided by MAGFOR through its Department of Animal Health and Inspection. Certification for exportation to the United States is approved by agents of the United States Department of Agriculture (USDA), who regularly visit and inspect the slaughterhouses. Each country that imports Nicaraguan beef has its own certification system; it may carry out its own inspections or accept, for example, the certification of others (such as the USDA.)

In general, the slaughterhouses have similar internal structures. At the center is the slaughterhouse itself, which receives its material from a Livestock Department that coordinates the purchase of cattle. Formerly, San Martín employed its buyers directly, but now they work as independent agents. The slaughterhouse has 20 buyers who cover some 4,000 registered producers. If necessary, the company can also make use of 60 “coyotes” or freelance buyers who provide cattle when required. Each slaughterhouse has an exportation unit as well as a local sales unit. The slaughterhouse structures also include administration and accounting departments.

The beef production process is illustrated in **Table 5**. In industrial slaughterhouses, the process takes several days. Cattle must be placed in corrals some twelve hours before slaughter, where they are inspected ante-mortem in order to ensure that they are healthy animals.

Table 5: National Beef Extraction from 1993 to 2003 in Nicaragua
National Extraction 1993 - 2003

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Municipal	190215	167518	158610	154885	167210	152885	148978	153630	148795	151204	152328
Industrial	184104	190124	174793	170291	181841	168317	156830	204124	223489	238849	278823
On hoof	55019	38551	9805	9427	14443	27247	49413	72078	74870	64529	64154
Total	429,338	396,193	343,208	334,603	363,494	348,449	355,221	429,832	447,154	454,582	495,305

Source: MAGFOR and slaughterhouses

Table 6: Industrial Slaughter by Industrial Slaughterhouses over the past ten years in Nicaragua

Summary of Industrial Slaughter per Calendar Year 1993-2003

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
San Martín	68,835	75,430	64,618	60,514	69,231	62,958	69,798	88,852	82,952	94,707	121,150
Amerisque/ MACESA	55,910	59,932	55,125	56,360	60,310	49,483	20,587	13,941	62,437	65,242	69,251
Nuevo Carnic	61,358	54,762	55,052	53,417	52,300	55,898	60,984	90,134	89,948	78,334	81,523
Los Brasiles							5,481	11,197	8,134	566	8,899
Total	186,103	190,124	174,795	170,291	181,841	168,339	156,850	204,124	243,471	238,849	280,823

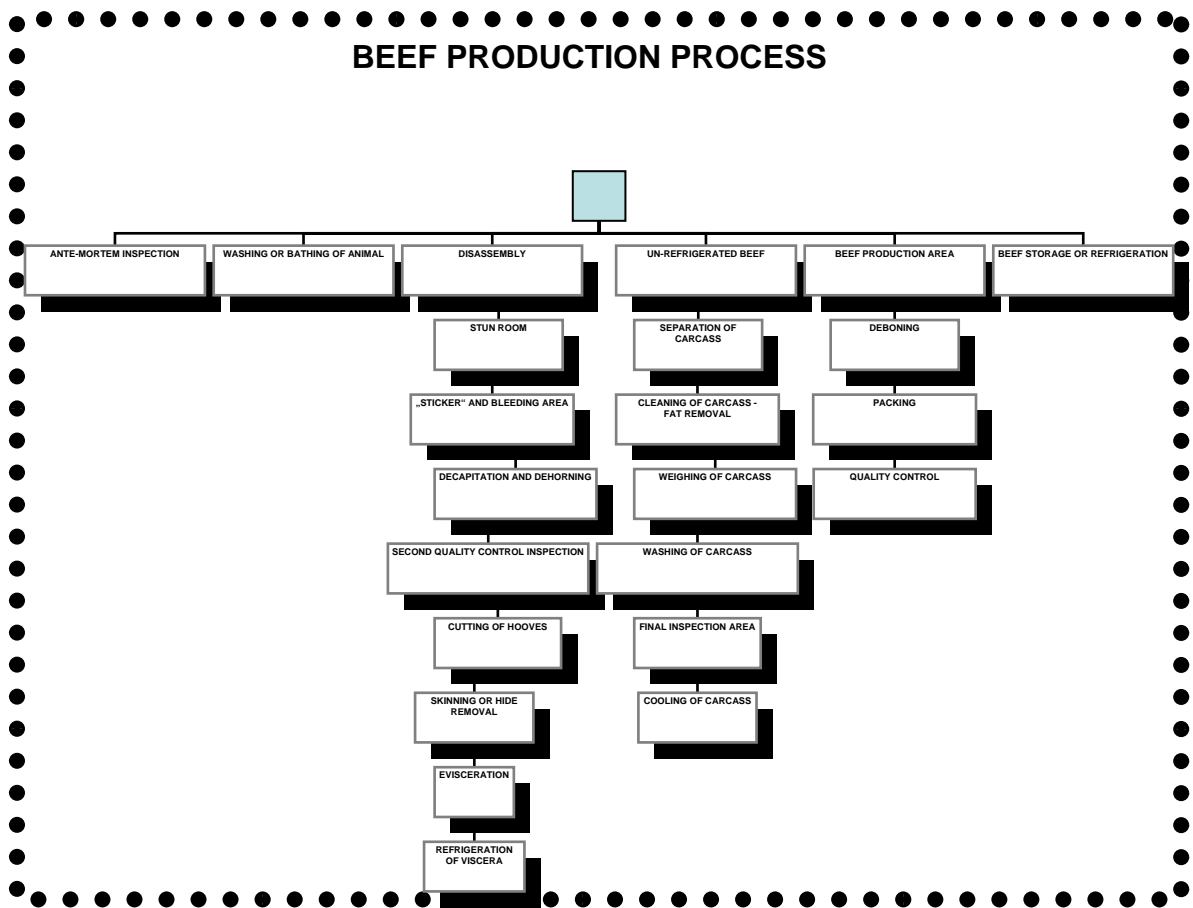
Source: MAGFOR and slaughterhouses

The beef production process involves a transformation of prime materials. Approximately 53% of an adult steer is extracted as the carcass (meat and bones.) The rest is offal: hide, viscera, hooves, head, rumen, etc. In turn, processing of the carcass provides 76% meat and 24% bone. The main products and byproducts obtained from slaughter are: select cuts, industrial cuts, edible viscera and others. Inedible byproducts include fat, meat and bone meal, leather, fetal blood, fetuses and others.

Select cuts are commercialized at refrigerated temperatures of between 28° and 32° F, and industrial cuts (BM-95, CH-E-85, CH90, others) are frozen at temperatures of between 10° and 0° F, for subsequent processing. The former products have a useful life of between 45 and 60 days, and the latter of approximately six months. Select cuts are packed in polyethylene bags and 60-pound boxes (in whole, uncut pieces.) Industrial cuts are packed in 30-pound boxes.

A series of different cuts are produced for exportation. Only industrial cuts are exported to the United States. Select cuts are exported to other countries in Central America and the Caribbean.

Figure 5: Outline of the Beef Production Process in an Industrial Slaughterhouse



Source: IICA/PROVIA

The following table summarizes the different cuts produced in industrial slaughterhouses:

Table 7: Types of Beef Cuts Produced in an Industrial Slaughterhouse

TYPES OF CUTS

Select Cuts		Industrial Cuts		Viscera
Code	Common Name	Code	Common Name	
TDR	Filete	BR	Posta de pecho	Liver
FM	Filete Mignon	SH	Posta de ratón	Heart
LCH	Lomo de Costilla	CH	Cecina	Tongue
RE	Lomo Grande	TR	Recortes	Tail
SL	Trasera de Lomo	CM	Carne Molida	Kidneys
SB	Cabeza de Lomo	CBL	Carne en cubito	Udder
PY	Punta de Salón		Costilla alta	Spleen
ER	Mano de Piedra			Testicles
INS	Posta de Pierna			Marrow
KNX	Posta Corona			Intestine con pretina
CTL	Contra Lomo			Hueso de Aguja
HT	Lomo de Entraña			Soup bones
THC	Trasera de cecina			Hueso de Chombón
OUT	Salón Blanco			Meat for dogs
ST	Paleta Pequeña			Pellejos
PC	Punta de Cacho			
CL	Posta de paleta			
PG	Posta de Gallina			
	Tira para Asar			

Source: Industrial slaughterhouses

The first five select cuts are considered luxury items and thus are subject to the 15% Value Added Tax (*Impuesto sobre el Valor Agregado* – IVA.) According to the industry, this tax also applies to cattle exported on the hoof. The tax for each animal totals US\$ 14.00, but this regulation is not applied by customs offices. Material losses during the transformation process are estimated in the following table:

Table 8: Coefficients Used to Determine Commercialization Margins

Coefficients	Values
Loss of weight in farm-to-slaughterhouse transport	5%
Loss of weight between cattle purchase / entry to slaughter	8-10%
Yield rate of un-refrigerated carcass	53%
Percentage of meat on carcass	76%
Total coefficient of meat in the slaughtering process	40.3%
Loss due to refrigeration of carcass	1-2%
Yield rate of byproducts	47%
Yield rate of byproducts after packaging	0.10%

Source: IICA/PROVIA

The transformation process of an animal on the hoof into one kilogram of deboned beef has an efficiency rate of 38.3%. Margins in the beef chain are demonstrated in **Table 9** (estimates made by IICA for the chain in Nicaragua in 2002.) The market seems very dynamic, but percentages remain the same.

Table 9: Cost Structure and Profit Margins at Different Stages of Transformation

Agent	Margin C\$/kg	Cost		Profit		C/B Ratio
		C\$/kg	%	C\$/kg	%	
Producer	27.9	11.6	42.0	16.2	58.0	1..4
i. Holding of cattle	0.3	0.2	74.0	0.1	26.0	0.35
ii. Transformation of cattle on hoof to un- refrigerated meat carcass	8.4	5.18	62.0	3.2	38.0	0.62
iii. Transformation, packing and distribution to wholesaler	0.0	0.0	0.0	0.0	0.0	0.0
Total for wholesaler (i+ii+iii)	8.7	5.38	62.0	3.3	38.0	0.61
Retailer	6.8	5.5	81.0	1.3	19.0	0.23
TOTAL	15.4	10.88	71.0	4.5	29.0	0.42

Source: IICA/PROVIA

These estimates show that the producer has the better margin. At the same time, however, they include a series of producers, as explained in the section on production systems. Calves are produced on dual-purpose farms, sold to farms dedicated to the development of weaned calves, and then sold again—with a margin, of course—to a fattening farm. The fully-developed animals are delivered to the industry for transformation, sometimes through intermediaries (intermediaries are active in almost all sales.) For these reasons, the table above must be interpreted with great care.

1.2.3 Beef Production for Exportation vs. the Local Market

The three slaughterhouses that “survived” the sector’s consolidation apply all of their different strategies in order to ensure their future existence. As mentioned above, the industry was always oriented toward beef exportation. Currently, Nicaragua is the largest beef exporter in the region. **Table 10** shows the exports achieved by the three slaughterhouses over the past eight years. The table gives a distorted image, however, because San Martín and ICI are presented as a single company. In reality, San Martín exports lesser quantities. The amounts exported by MACESA and Nuevo Carnic are comparable.

Table 10: Exports by Industrial Plants from 1996 to 2003

Annual Exportation of Deboned Beef per Industrial Plant, 1995-2003 Volume in thousands of pounds

Plant	1996	1997	1998	1999	2000	2001	2002	2003
San Martín + ICI	10869	13363	11932	12784	14487	13394	15027	20365
Nuevo Carnic	12572	12033	12449	15211	22037	17297	20181	20312
MACESA	12061	14511	11064	4798	2778	15746	19885	20716
Total	35502	39907	35445	32793	39302	46437	55093	61393

Source: MAGFOR

Table 11: Exportation per Plant and Destination in 2003 (Volume in pounds)

Exportation per Plant and Destination in 2003 (in pounds)

Country	Nuevo Carnic	San Martín + ICI	MACESA	Total
Mexico	1,422,959	3,261,182	2,234,927	6,919,068
Guatemala	121,672	2,726,268	3,154,361	6,002,301
El Salvador	6,147,959	7,801,423	1,702,849	15,652,231
Puerto Rico	4,245,465	1,508,595	4,359,069	10,113,129
United States	10,385,730	7,524,739	8,748,984	26,659,453
Costa Rica	196,190	427,117	213,702	837,009
Honduras	0	89,609	0	89,609
Panama	0	429,245	1,860,989	2,290,234
Total	22,519,975	23,768,178	22,274,881	68,563,034
Carcass Exportation to El Salvador	3,213,552	9,203,958	43,340	12,460,850

Source: MAGFOR, Plants and CETREX

Table 11 shows that the United States remains an important market for industrial cuts. Together, however, regional countries have surpassed the United States as a single market. This is especially true of El Salvador, which is currently the most important regional market for both cuts and carcasses. Nuevo Carnic's largest market is the United States, but it also exports significant quantities to El Salvador and Puerto Rico. MACESA's main markets are the United States, Puerto Rico, Guatemala and Mexico; through its affiliations, it also exports to Panama. San Martín exports to the United States, Puerto Rico and Mexico. Its exports to El Salvador, Guatemala, Honduras and Costa Rica are mainly the result of ICI activities.

The tables above illustrate the importance of exports. Nevertheless, the industrial slaughterhouses are reconsidering their strategies toward the local market which, for San Martín, represents some 40% of all business. San Martín had a large percentage of local sales to La Colonia supermarkets, but because of the special contract with MACESA, it lost part of this market and its local sales to La Colonia dropped from 10% to 3%. San Martín is attempting to compensate for this loss in the local market with its strategy of distributors, of which it has 23 in the capital and departments. A distributor functions like a franchise: the slaughterhouse assists the distributor, requiring a certain design and basic conditions, such as refrigeration, for example. The distributor takes the economic risk, but San Martín sets the prices for cuts and forces butchers' shops to purchase products through distributors for subsequent re-sale. These shops must not re-sell beef at lower costs than the distributors.

The new arrangement between MACESA and La Colonia shows that MACESA is also attributing more importance to the local market, especially through supermarkets. Since access to CSU supermarkets is closed, they exploited the national chain in order to capture a part of the local market. In this way, MACESA is able to commercialize 10% of its production through the supermarkets, replacing San Martín and taking advantage of La Colonia's expansion.

In recent years, 10% of Nuevo Carnic's sales occurred in the local market. Currently, this slaughterhouse only supplies cuts to CSU supermarkets such as La Colonia. The plant's local market is made up of wholesalers (40%), La Colonia supermarkets (10%), ICI (10%), and the Police Department supermarket (6%); the remainder is sold to butchers' shops in the Pacific Region of the country. The second option of a diversification strategy involves organic or "new meat." This is a niche market, but it shows possibilities for expansion toward neighboring countries.

1.3 Beef Cattle Production in Nicaragua

1.3.1 The Agriculture and Livestock Sector: Structure, Size, Area of Pasturage, Number of Producers

The farming and ranching sector was responsible for an average of 25% of Nicaragua's Gross Domestic Product (GDP) during the 1990s. Beginning in 2000, however, its participation increased, reaching 28%. At this level, agriculture and livestock make up the most important productive sector of the national economy.

Livestock GDP includes bovine, porcine and poultry activities. It represents 9% of the country's total GDP and 34% of the combined agricultural / livestock GDP.

Cattle activities in Nicaragua include beef production, dairy production and the exportation of cattle on the hoof. Together, these activities represented an average of 6% of total GDP, 25% of agricultural / livestock GDP and 74% of livestock GDP during the period from 1990 to 2001.

Beef exportation has ranged between 55 and 59 million pounds per year as of 1990, generating incomes of between US\$ 56.9 and 65.6 million. Currently, this is the second largest product with respect to export value. Beef and coffee together are traditionally responsible for more than 50% of Nicaragua's export earnings.

The employment generated by this activity is very significant, comparable to that generated by basic grain (corn and beans) production. It is calculated that 120,700 jobs are generated at the farm level, along with approximately 3,000 meatpacking jobs in municipal and industrial slaughterhouses, for a total of 123,700 positions. Jobs are also generated in the supply of inputs, cattle transport, cattle commercialization, beef commercialization, saddlery, and other activities, although these positions have not been quantified.

According to the National Agricultural Census of 2001, there are 2.6 million head of cattle in Nicaragua. This bovine population is held on 96,900 farms throughout the country, meaning that 49% of all farms carry out ranching activities. Of the total cattle population, 68% are female and 32% male. Of the females, 23% are birthing cows (*vacas paridas*) and 12% are sterile cows (*vacas horras*). There are 931,564 cows (35%) and 84,505 bulls (3.2%) of reproductive ages, providing a ratio of 11 cows per bull.

Table 12: Nicaraguan Cattle Herd per Sex and Category

MALES	840,762	FEMALES	1,816,277
Bull calves (<i>terneros</i>)	337,150	Cow calves (<i>terneras</i>)	309,831
Young bulls (<i>novillos</i>)	371,516	Young cows (<i>vaquillas</i>)	574,882
1<2	181,403	1<2	234,650
2<3	129,707	2<3	202,352
3 and older	60,406	3 and older	137,880
Young bulls for reproduction (<i>toretas</i>)	33,328	Cows	931,564
Stud bull (<i>toro semental</i>)	45,939	Sterile cows (<i>horras</i>)	315,977
Other bulls	5,238	Birthing cows (<i>paridas</i>)	615,587
Oxen	47,591		

Source: CENAGRO III

The greatest percentage of Nicaragua's herd of cattle is found in the regions and departments with the worst conditions in terms of economic and social infrastructure.

This means that the location of productive zones does not coincide with the location of industrial slaughterhouses, except in Boaco / Chontales, where the Matadero Central, S.A. (MACESA) slaughterhouse is found. Other production areas have only municipal slaughterhouses nearby.

According to CENAGRO, some 64,885 farms (67%) of between zero and fifty manzanas in size hold a stock of approximately 699,100 head of cattle (26% of the total), with an average of ten head per farm. Approximately 26,391 farms (27%) ranging between 50.1 and 200 manzanas hold 1,096,833 head of cattle (41% of the total), with an average of 46 animals per farm. Some 5,718 farms (6%) of over 201 manzanas hold 861,028 head of cattle (32%), with an average of 151 head per farm. This shows that most livestock activity is concentrated in small- and medium-scale productive operations.

Table 13: Cattle Distribution per Farm Size 2001

Cattle Distribution per Farm Size					
Size (mzs)	# Head	Percentage	# Farms	Percentage	Head / Farm
0-10	135,888	5%	23,802	25%	6
10.1-20	136,361	5%	14,687	15%	9
20.1-50	426,929	16%	26,396	27%	16
50.1-100	551,213	21%	17,261	18%	32
100.1-200	545,620	21%	9,130	9%	60
201-500	504,948	19%	4,402	5%	115
>500	356,080	13%	1,316	1%	271
Totals	2,657,039	100%	96,994	100%	27

Source: CENAGRO III

Of all of this cattle, it is assumed that the animals appropriate for beef are young bulls (*novillos*) and oxen (*bueyes*),¹¹ 68% of which are concentrated in six departments of the country: the South Atlantic Autonomous Region (RAAS), Chontales, Matagalpa, Boaco, Río San Juan and León.

Tables 13 and 14 clearly illustrate that cattle are concentrated on farms with more than 50 manzanas. The relatively high percentage of oxen on farms of up to 50 manzanas is probably due to their significant use as draught animals on these farms, which usually combine agriculture and livestock activities. With a load capacity of one-half animal unit per manzana due to low-level productivity (see Table 13), ranching requires large amounts of land, and land is cheaper in mountain areas far from urban centers. As a result, ranchers purchase land or convert forest into pasture instead of investing and improving the pasturage of existing grazing land. This leads to the advance of the agricultural frontier. In recently converted zones, rains continue for several years, making it possible to produce livestock with low investments, without summer feeding and on natural pasture. However, such natural resource consumption is not sustainable in the long term.

¹¹ The use of the term *novillo* is different in Nicaragua and Costa Rica. In Costa Rica, *novillo* means a castrated male animal to be fattened. In Nicaragua, it is a male animal to be fattened, but without castration. Another term for male beef cattle is *torete*. The practice of castration is not much appreciated in Nicaragua; beef producers fatten male animals, applying hormone implants in the final phase of fattening in order to keep the steer calm and prevent fighting among the herd. This practice is also known as “chemical castration.”

Table 14: Beef Cattle Distribution per Farm Size in Nicaragua in 2001

Beef Cattle Distribution per farm Size						
Farm Size (mzs)	Young Bulls (Novillos)		Oxen (Bueyes)		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
0-20	22,259	6%	19,228	40%	41,487	10%
20-50	34,980	9%	10,265	22%	45,245	11%
50-100	55,626	15%	7,270	15%	62,896	15%
100-200	73,255	20%	4,854	10%	78,109	19%
>200	185,396	50%	5,974	13%	191,370	46%
Total	371,516	100%	47,591	100%	419,107	100%

Source: CENAGRO III

Interest in ranching as a productive sector is sustained by the potential of Nicaraguan land. There are approximately 4.5 million hectares of land suitable for extensive cattle ranching, representing 38% of the national territory.

1.3.2 Livestock Systems

The following livestock systems can be differentiated in Nicaragua:

- Specialized dairy
- Purebred cattle breeding
- Dual-purpose
- Development
- Fattening

Specialized dairy is based on the crossing of zebu breeds (such as Brahman) with dairy breeds (such as Friesian Holstein or Brown Swiss.) Purebred dairy breeds cannot adapt to tropical climates and thus provide equal or lesser amounts of milk than zebu breeds. The crossing of zebu and dairy breeds improves climate tolerance and increases milk production. Under the specialized dairy system, cows are milked twice daily. Milk yields range between six and ten liters per cow per day. Concentrated feed must be provided in order to achieve ten liters per animal under Nicaragua's tropical conditions. Of larger sizes, specialized dairy farms are very scarce in Nicaragua. Specialized dairy farming requires significant investments in installations for milking and refrigeration.

Purebred cattle breeding involves the breeding of tropical purebred cattle (such as Brahman, Gir or Nelore), of beef breeds (such as Hereford, Angus, Charolais or Limousin), or of dairy breeds (such as Holstein, Fleckvieh, Brown Swiss or Jersey.) Tropical breeds have a genetic base that enables crossbreeding, ensuring adaptability to the extreme local climate and production of expected volumes of beef and/or milk.

Dual-purpose farming involves dairy production and the development of calves. In milking, three fourths of the yield is used for dairy production and one fourth for calf development. Calves consume milk and pasturage for better results. Dairy production provides daily revenues for the farming family, and the sale of calves offers additional incomes. Dual-purpose farms sell bull calves after weaning at the age of eight months and weight of 120 kilograms. Cow calves are raised in order to replace discard cows. Most small farms use the dual-purpose system and are involved in beef production through the sale of calves for fattening and through the sale of discard cows.

On development farms, bull calves are not sold after weaning but rather when they reach a weight of between 220 and 280 kilograms and a height of between 48 and 50 inches. In some

cases, certain dual-purpose farms also develop calves for sales at more attractive prices. Approximately 15% of livestock farms are dedicated to this activity.

The fattening of cattle is a production system that is complementary to dual-purpose farming, in which the young bulls produced in the breeding and development systems are developed and finalized. Approximately 10% of ranchers in Nicaragua are dedicated to this activity. Generally, this system is employed by producers with farms that are extensive enough to allow for the purchase of animals that have completed their initial growth phase and have reached a height of 50 to 52 inches and weight of between 280 and 300 kilograms. In approximately one year, these animals are fattened to 400 kilograms.

Table 15: Indices of Livestock Productivity in Nicaragua

Technical Indices	Estimates
Birth rate (%)	46
Rate of effective weaning (%)	43
Calf mortality (%)	10
Adult mortality (%)	3
Average age at slaughter (years)	3.5-4
Average weight at slaughter (Kg.)	380-400
Duration of lactation (days)	180-190
Daily milk production per cow (liters)	3.5

Sources: FECALAC / IICA/PROVIA/USAID Livestock Extension Project

Table 15 shows a selection of data that illustrate deficiencies in beef production. The indices that most affect beef production and quality are birth rate, effective weaning and average age at slaughter. Birth rate affects all types of livestock activities. Here, the rate implies that a cow gives birth to a calf every two years or more. Without calves, there is no beef production. Effective weaning and age at slaughter are correlated, highlighting the deficient feeding that results in beef of sub-optimal quality.

In 2001, the Ministry of Agriculture and Livestock (MAGFOR) estimated the costs of beef production for the rancher. **Table 16** demonstrates that a producer has average costs of US\$ 0.87 per kilogram of beef. The costs structure in this table has large calculatory cost blocks such as capital financing (21%) and pasture costs (23%). The concept behind the estimation of pasture costs is not clear, but assuming that most pastures are natural and thus without real costs, the value probably represents a calculatory cost.

Table 16: Cost to Produce One Kilogram of Beef in 2001 in Nicaragua

CONCEPT	TOTAL COST C\$	COST US\$	%
LABOR	1.20	0.07	8.4%
ANIMAL FEED	0.64	0.05	5.5%
PASTURE	3.13	0.23	26.9%
VETERINARY MEDICINE	0.36	0.03	3.1%
IMPLANT	0.87	0.07	7.5%
TRANSPLANT	1.02	0.08	8.7%
INFRASTRUCTURE MAINTENANCE	0.65	0.05	5.5%
FINANCING OF CAPITAL OPERATIONS	2.77	0.21	23.8%
FIXED ACTIVITIES	1.00	0.08	8.6%
TOTAL	11.64	0.87	100.0%

Source :MAGFOR

1.3.3 Producers' Organizations and the Participation of Small Producers in Beef Production

Tables 13 and 14 show that most livestock farms are small farms. In order to achieve increased integration and better participation of small farms in the chain, a certain level of organization is required. Organization facilitates the provision of services for production, such as inputs, technical assistance, training and product commercialization. Organization is also useful for aspects of representation and the combining of interests. In spite of these advantages, however, the majority of small producers and small ranchers are not organized. In Nicaragua there are many organizations that represent groups of livestock producers or farmers that have certain inclinations toward small or large producers or political affiliations. The following are brief summaries of some organizations relevant to the beef chain:

UNAG (Unión Nacional de Agricultores y Ganaderos) was founded in 1981 in political affiliation with the Sandinista movement. UNAG represents some 38,000 producers, farmers and ranchers. The organization has a variety of activities, including the "Campesino-to-Campesino" extension program and initiatives for rural education in which family centers provide basic education and agricultural training to the sons and daughters of farmers in remote rural areas. UNAG also promotes agribusinesses, mainly for farm products and, in some cases, dairy products. Since 2002, UNAG has been promoting a rural youth employment initiative. Currently, no UNAG activities emphasize beef production.

FAGANIC (Federación de Asociaciones Ganaderas de Nicaragua) is the top structure of regional livestock producers' associations. It represents some 25,000 producers through their associations, with an inclination toward large producers. FAGANIC offers political representation to affiliated members, as well as machinery import services and credit programs, charging half of the monthly membership dues of the associations. Services for members are provided through the associations. Some associations offer veterinary pharmacies, machinery services, technical assistance and training, as well as organize their own livestock fairs. FAGANIC is the private sector counterpart organization of the ILRI Project in Nicaragua. In order to generate incomes, FAGANIC manages its own farms.

For approximately the past ten years, a number of dairy **cooperatives** have been operating. These organize dairy farmers, manage milk storage centers and negotiate milk prices with buyers. The cooperatives, in particular, are a result of the PRODEGA dairy project financed by Finnish Cooperation in the 1990s. In addition to implementing activities to strengthen the cooperatives, the PRODEGA Project supported efforts to build a series of milk storage installations. The cooperatives have members that are limited in number but strongly united. Currently there is a trend toward the merger of neighboring cooperatives. To their members, the cooperatives offer diverse services such as the sale of inputs, negotiation of milk prices, technical assistance, training, artificial insemination, etc. The cooperatives may serve as a base to organize, for example, the transfer of weaned calves to development or fattening farms or the joint sale of discard cows.

UPANIC (Unión de Productores Agropecuarios de Nicaragua) is another top organization. It is a member of COSEP (High Council of Private Enterprise) and thus represented the agricultural sector in negotiations regarding the United States / Central America Free Trade Agreement (CAFTA). UPANIC represents a very broad spectrum.

CONAGAN (Comisión Nacional Ganadera de Nicaragua) members include UNAG, UNILECHE, FAGANIC, FONDILAC, ANCGAP, EXPICA (Central American Livestock Exposition) and the industrial slaughterhouses (Nuevo Carnic, San Martin and MACESA.) Every two years, the presidency of CONAGAN alternates between UNAG and FAGANIC. CONAGAN actively seeks dialogue with the government in order to express and advocate the interests of livestock producers. Since it unites the different livestock organizations and the beef industry, CONAGAN could be an ideal platform for the beef sector in Nicaragua. Given its structure, CONAGAN has the potential to become a coordinating and regulating institution for the sector, thereby

facilitating quality standards and a beef classification system, for example, as does CORFOGA in Costa Rica.

In addition to the formal organizations, there are also informal entities of cooperation. In the case of producers who supply animals to ICI, for example, there are two groups that combine their cattle in order to offer larger quantities and negotiate better sales prices and conditions.

Chapter 2:

Connections with Market Agents and Market Selection

2.1 Attributes of the Product

In the beef chain there is a set of products that are commercialized and can be classified in two categories:

- animals of different ages and weights, and
- different types of beef

2.1.1 Quality Classification Systems

In the category of animals, weaned calves weighing from 120 to 180 kilograms are commercialized as a product, along with developed young bulls weighing 280 to 300 kilograms and young 400-kilogram steer for sacrifice at the slaughterhouse.

The first two types of animals are commercialized according to appearance and at an agreed price. Buyers arrive at the farm. Scales are not usually used to weigh the animals; rather, weights are estimated and a total price is negotiated for the animal. Appearance includes an examination of the teeth. Cattle intermediaries are very knowledgeable about the concept of dental development in cattle. In other markets, such as auctions and green corrals, the animals are weighed and prices per kilogram are defined.

The classification of animals sold to the industrial slaughterhouses includes the following characteristics:

- Sex
- Age
- Weight
- Fat
- Musculature

The system in Nicaragua is not as advanced as that in Costa Rica (see the CoopeMontecillos case study.) However, these five characteristics are used to classify animals when they are put up for sale. Unlike the sale of cattle on the hoof, however, beef classification involves the quality of the carcass in terms of weight, fat and musculature. Age and sex are applied to classify live animals.

With respect to sex, female animals are differentiated from male animals. Females always receive lower prices, since it is assumed that they are older and will provide a tougher meat than young and fattened bulls.

Age is defined before slaughter. Permanent and deciduous teeth are counted. Animals less than four years old are preferred for slaughter.

Carcass weight is defined differently by each slaughterhouse. ICI, for example, classifies an optimal steer carcass at 212 kilograms. San Martin considers a 190-kilogram carcass to be the best quality and worthy of the highest price. The Nuevo Carnic slaughterhouse requires a steer carcass to weigh 179 kilograms. Lighter animals are “punished” with a reduction in price per kilogram.

Fat must be white in color. A yellowish color means that the animal was very old.

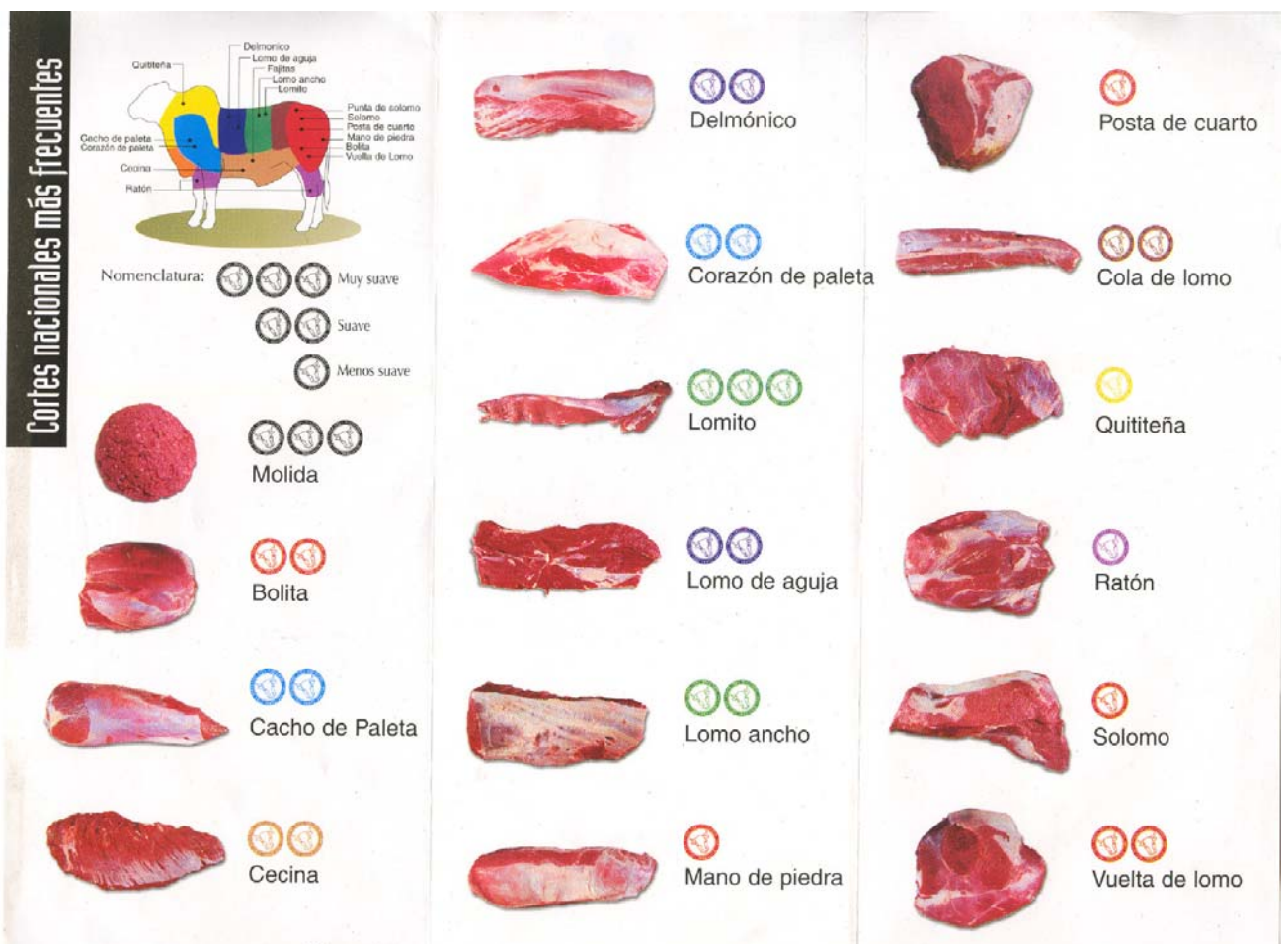
Musculature must be well-developed and red in color. Blows received during transport or in corrals result in black hematomas in the musculature.

2.1.2 Typical Cuts

In the category of beef, the terms “carcass” and “carcass exportation” are used. Carcasses are important in defining the quality of the animals. Industrial slaughterhouses pay for cattle to be slaughtered according to carcass quality. Other products in the category of beef are industrial cuts for export to the United States and deboned beef in select cuts. For the regional market, there are some 19 different cuts (including ground beef) for retail sales, along with viscera.

The diagram below shows the most common cuts for retail sales. Excerpted from the bulletin published by CORFOGA (Corporación Ganadera de Costa Rica), the diagram is described in detail in the 2004 Costa Rica – Pérez report and the 2004 Jano report.

Figure 6: Most Common Cuts for Retail Sales



Source: CORFOGA

2.1.3 Animal Health and Food Safety

Animals destined for slaughter in an industrial slaughterhouse are subjected to ante-mortem analyses by veterinarians. The animals must be taken to the slaughterhouse at least twelve hours before slaughter. The veterinarians are responsible for verifying that the animals are healthy. If sickness is detected, the respective animal must not be slaughtered with other animals. After the slaughter, the veterinarian carries out a post-mortem analysis, reviewing the animal's musculature for signs of muscular cysticercosis and internal organs for possible infections by other internal parasites or other diseases.

Other aspects of beef safety involve residua from implants or medicines. If it is proved that such residua surpass the ranges established as "normal," then the carcass must not be used for human consumption. These controls are carried out through the taking of samples and laboratory analyses.

The functioning of the animal health and food safety system is a regulatory mandate implemented by the Animal Health Department of the Ministry of Agriculture, together with the Ministry of Health. The Ministry of Health, for example, has the power to close a slaughterhouse for lack of hygiene. The Ministry of Agriculture has a permanent team of veterinarians and technicians assigned to the industrial slaughterhouses. The Animal Health Department certifies the slaughterhouses under the concept of HACCP. Municipal slaughterhouses—or at least the largest of them—are inspected regularly by Animal Health Department veterinarians.

2.2 Attributes of the Transaction

2.2.1 Actors in the System

There are many actors in the system. Pursuant to its objectives, however, this report will concentrate on business actors. In this system, it is possible to differentiate between the trading of animals and the trading of meat. From the perspective of this study, the following actors are most significant:

- Producers of calves for development and for fattening
- Intermediaries in the animal trade
- Green Corrals
- La Subasta (auction house)
- Municipal slaughterhouses
- Butchers
- Industrial slaughterhouses
- ICI
- Wholesalers
- Retailers
- Supermarkets
- Butchers' shops
- Distributors

Cattle producers and their different production and specialization systems were described above in section 1.3.

Intermediaries in the animal trade are of great importance to producers, since they facilitate the distribution of animals to different farms, the exportation of animals on the hoof, and the sale of cattle to slaughterhouses. Intermediaries who travel from farm to farm and who purchase cattle in cash represent a welcome convenience to many producers; these agents assume the transaction costs (although sales prices are lower in order to compensate for said transaction

costs.) Buyers or agents of the industrial slaughterhouses and of ICI are considered to be within this group of intermediaries.

IICA/PROVIA distinguishes between the following types of intermediaries:

- i. **Stock holders** are agents dedicated to livestock and commerce. They have significant economic possibilities to purchase large quantities of cattle through collectors that they finance. They have corrals to gather the cattle purchased from adjacent farms. These agents can sell cattle on the hoof at the corrals or transport the livestock to industrial or municipal slaughterhouses. They assume all costs of transport and sales procedures. Usually, stock holders mobilize over 200 head per month and operate within a network of 500 farms.
- ii. **Collectors** are agents who travel from farm to farm (mainly of small producers) in order to purchase and transport cattle to stock holders' corrals. Collectors purchase cattle on the hoof in cash with resources financed by stock holders. Usually, the collector is a rancher who offers small producers the advantage of assuming all transaction costs.
- iii. **Traders** are agents who purchase at the loading platform and are usually the final intermediary. They decide whether to sell to the slaughterhouse or to another corral. Traders pay in cash and assume responsibility for transport to the final sale location. (IICA/PROVIA, 2002)

In reality, the differences between these types of intermediaries are not completely clear; there is continuous overlap between the groups.

Green Corrals have been operating for eight years as a group of nine partners. They move between 6,500 and 7,000 animals per month and up to 90,000 head per year. Green Corrals are a platform for bilateral cattle deals. They provide scales and safety at a cost of 20 córdobas per head. In addition to the nine partners, there are eleven other buyers who are registered with the Green Corrals and enjoy one week of credit for payment of the established sales prices to the seller. Green Corrals sometimes function as cattle re-sellers. Because of the quantity of cattle moved, Green Corrals are the most important platform in Nicaragua.

Managua's La Subasta (auction house), a corporation with several shareholders, has existed for 30 years and is the oldest in Central America. It is located on the Northern Highway (*Carretera Norte*), a strategic site due to the proximity to Nicaragua's largest market. Most buyers purchase cattle for slaughter, such as butchers and the buyers employed by the industrial slaughterhouses Nuevo Carnic and San Martín. Few buyers come from MACESA because of its distance from Managua. Re-sellers from León and Chinandega also visit La Subasta to purchase animals for subsequent transport and sale in these regions. Other clients include Salvadorans, Guatemalans and Mexicans who purchase cattle for export on the hoof (up to 25,000 head per year.) The Managua auction house notifies buyers about the prices and quantities of past auctions via electronic mail.

La Subasta functions twice weekly: on Wednesdays and Fridays. Most animals are traded on Fridays. All cattle that arrive at La Subasta are sold. Four trucks are rented for transport. The owner of these trucks works almost exclusively for La Subasta, charging 3% of the total sales value for transport services.

La Subasta pays sellers via checks. It grants seven days of credit to certain buyers. Currently, some 24 buyers have credit lines with La Subasta. Other buyers are allowed to transport purchased animals only after having paid for them in cash.

Animals are taken to La Subasta in lots, and each lot has its own corral. The animals are marked with their lot or corral numbers, as well as individual identification numbers. Entering the auction area, the animals pass over a scale in order to determine their weights. The number and weight of each animal is listed on a whiteboard, and the auctioneer begins by

proposing an initial price per kilogram. Before the auction, registered clients receive a list of lots. La Subasta keeps statistics on sales according to the different categories of animals. Most auctioned cattle are females.

Municipal slaughterhouses provide slaughtering services for local butchers, who also act as animal buyers. Butchers purchase cattle directly from producers or from Green Corrals or La Subasta. Purchased animals are processed in municipal slaughterhouses, and the beef is sold to final consumers in the butchers' shops.

Industrial slaughterhouses have teams of buyers who make direct purchases from producers. Most of the resulting beef is exported; a small percentage is sold in the local market. At 40%, the San Martín slaughterhouse sells the highest percentage of its beef on the local market.

ICI behaves very much like the slaughterhouses. Through its small team of buyers, it purchases the number of animals necessary to supply CSU supermarkets in Nicaragua. Most of its production is exported to El Salvador, Guatemala, Honduras and Costa Rica.

Wholesalers in markets purchase beef from industrial slaughterhouses. They also process cattle (under inspection) in municipal slaughterhouses.

Retailers purchase from wholesalers, from industrial slaughterhouses and from San Martín distributors in order to sell to final consumers in local markets or butchers' shops.

Supermarkets play a more important role in the commercialization of beef for the final consumer. Meat sold in supermarkets comes exclusively from the three industrial slaughterhouses.

Butchers' shops are important actors in the sale of beef to consumers. These shops occasionally purchase animals for processing.

Distributors take part in the local sale of beef from San Martín industrial slaughterhouse. San Martín uses a franchise system. The distributors sell different cuts of beef at prices defined by the slaughterhouse. The business risk is assumed by the distributor, but San Martín provides support through a loan for furniture and refrigeration equipment. The distributors' clients include butchers' shops that sell beef from certified slaughterhouses.

2.2.2 Relations between Actors

The study applied the chain concept in order to analyze flows, actors and their interrelations. In the introduction, it was stated that the different actors are not aware that they form part of—or function as links—in this chain. The relations between different actors can be categorized as:

- Competitive
- Service-oriented
- Complementary

Competitive Relations

As a type of relationship, competition (for animals and market influence) occurs between the three industrial slaughterhouses. The industry experienced a strong crisis with the disappearance of five slaughterhouses in recent years. The remaining plants experienced their own economic crises (resulting in the temporary closing of El Amerisque slaughterhouse, which subsequently reopened as MACESA.) With the sector's consolidation, the slaughterhouses became differentiated in their exportation strategies. **Table 10** above illustrates the different emphases on exportation.

The first plant to discover the local market was San Martín, which currently allocates 40% of its beef production to local sales. Nuevo Carnic sells 20% of its production on the local market,

compared to MACESA's 10%. Strong competition for the local market began only recently. MACESA obtained an exclusive contract to supply beef to the national chain of La Colonia supermarkets. Because of this contract, San Martín suffered considerable loss; it is seeking to recover by extending its network of distributors. Nuevo Carnic is attempting to exploit the niche market for "new meat" from cattle raised on certified organic pastures. This niche shows potential in the local market as well as in exportation. In addition to its network of distributors, San Martín benefits economically from the processing of beef for ICI (which utilizes almost 50% of the slaughterhouse's capacity.)

Since access to CSU supermarkets is very restricted and controlled by ICI, the slaughterhouses compete for local sales to La Colonia, which puts the supermarket chain in a good negotiating position. La Colonia tries not to "over-exploit" this position and maintains business relations with all three slaughterhouses.

Supermarkets exclusively sell good quality beef from the certified slaughterhouses, but they also compete for customers from different sectors of the population. With their "discounter" concept, Palí supermarkets target customers from lower economic brackets. In this way, they do not compete directly with La Colonia but rather with a number of mini-supers (small local supermarkets stocked with basic daily goods, some of which also sell meat.) Palí offers the same quality beef as La Colonia and La Unión. Palí supermarkets have been well accepted; since 1998 the chain has opened 17 branches and is now extending beyond the capital city. La Unión competes directly with La Colonia, but the five La Unión supermarkets have not grown with the same dynamics as those of the Palí chain. La Unión opened its supermarkets over the past five years. Meanwhile, La Colonia has opened four new supermarkets since 1999. In general, these supermarkets have captured clientele under the traditional system. The same mechanism applies to the sale of beef. The production of un-refrigerated beef has dropped and the production of innocuous, refrigerated beef has increased.

Competition also exists between other actors involved in retail sales, such as butchers' shops, beef distributors and retailers in local markets.

Similarly, the high level of animal processing creates strong demand for cattle for slaughter, thus increasing competition among buyers and between Green Corrals and La Subasta. During certain times of year (at the end of the dry season), the decision to sell is based solely on price. During these periods, the business relations that buyers attempt to establish with producers of good-quality cattle are relative and do not guarantee a supply of animals.

Service-oriented Relations

Green Corrals and La Subasta offer services for the purchase / sale of cattle. Both are places that offer significant quantities of animals, where buyers can compare quality more objectively than on the farm.

Municipal slaughterhouses are also service institutions. They slaughter animals upon demand by clients, such as butchers or wholesalers in local markets. Because this is a local activity, there is little competition between municipal slaughterhouses.

Complementary Relations

Complementary interactions exist between butchers' shops and industrial slaughterhouses when the shops sell beef from the slaughterhouses.

2.2.3 Contracts

The system and chain sometimes establish formal contracts, but informal contracts are more common between cattle producers and buyers. Buyers usually seek to build ongoing relations with producers who provide better cattle in terms of quality and quantity.

As a means of regulating interrelations between actors, contracts involving beef exportation are more common between the industrial slaughterhouses and their international clients. In the case of sales to La Colonia, a contract has been signed between MACESA and the supermarket chain. Orders for restocking are more informal and are generally placed by telephone.

There is a formal contract for the processing of ICI animals in the San Martín slaughterhouse. This contract defines the processing price and the rebates offered in exchange for animal parts. It also regulates ICI's sale to San Martín of carcass parts for which there is little demand in CSU supermarkets.

Green Corrals and La Subasta traditionally employ informal contracts. Trusted clients enjoy a credit line in paying for purchased cattle. If the terms of such credit are violated, the client loses this privilege in future purchases.

2.2.4 Evolution of the System

The beef chain in Nicaragua has experienced many changes over the past five years. Three factors were responsible for these developments.

The first factor was the consolidation of the industrial sector. The three surviving industrial plants captured a significant percentage of slaughtering activities for the local market from municipal slaughterhouses.

The second factor was the enormous growth of supermarket chains in Nicaragua as a local market with great potential for development and expansion.

The third factor was ICI's introduction into the arena, which changed the quality and classification of animals. In spite of Ministry of Health regulations in 1997 prohibiting the sale of un-refrigerated beef to consumers, supermarkets purchase and sell un-refrigerated beef in their displays. ICI's entry and the supply of refrigerated meats from certified slaughterhouses put pressure on other supermarkets to compete with the same quality of beef. This also opened the supermarkets' doors to industrial slaughterhouses, facilitating the creation of a local market for export-quality beef (even though some slaughterhouses supplied supermarkets with B-quality beef, resulting in complaints and disadvantages in terms of competition.)

Chapter 3:

Characteristics of Family Farm Systems within the Channels of Commercialization

This section presents the results of a descriptive statistical analysis of the 180 producers in the different channels of commercialization, including characteristics such as: household, use of technology, farm management, level of organization and financing of investments. The three channels of commercialization are: (1) ICI and the CSU supermarkets; (2) the industrial slaughterhouses; and (3) the traditional market with La Subasta, Green Corrals, butchers who purchase on the farm, and buyers of cattle for export on the hoof. The tables below include symbols of significance (evaluated to a maximum of 10% significance.) The symbols a, b and c represent t-tests between:

a= ICI and slaughterhouses

b= ICI and the traditional market

c= slaughterhouses and the traditional market

The asterisk (*) shows whether there is a significant difference for categorical counts or variables (using the chi square distribution.) It indicates that significant difference exists between the three groups (it can be between two or between one.)

3.1 Household

Table 17: Socioeconomic Characteristics of Beef Producers in 2004, per Circuit

	Total	ICI	S-houses	Trad.	Sig.
Characteristics of the Household					
Number of members of the household (avg.)	4.87	4.29	4.866	5.85	a,b,c
Average age of household members (years)	32.32	33.1	31.87	31.979	
Female producers (%)	5.4	6.9	5.3	2.9	
Age of producer (years)	47.4	47.2	46.8	48.9	
Educational level of producer *	1.84	1.94	1.85	1.66	
Educational level of family *	1.80	1.87	1.78	1.73	
Infrastructure					
Access to piped potable water (%)	66	67	69	56	
Access to electricity (%)	51	45	60	44	
Access to materials outlets (%)	86	95	84	76	*
Distance to market (km.)	219.2	238.3	253.0	111.9	b,c
Distance to main highway (km.)	32.0	42.2	22.3	35.9	
Income and Labor Structure					
Producer's experience in livestock activities (years)	23.1	19.2	25	25.4	a,b
Main activity is livestock (%)	94	88	99	94	*
Livestock activity is:					
Dual purpose (%)	86.8	81.0	94.7	79.4	
Specialized dairy (%)	2.4	1.7	2.7	2.9	
Breeding (%)	43.7	44.8	46.7	35.3	
Development (%)	61.7	67.2	60.0	55.9	
Fattening (%)	74.3	89.7	77.3	41.2	
Number of family members who work the farm (avg.)	1.5	1.2	1.5	2.3	b,c
Family members with non-rural incomes	1.4	1.3	1.3	2.0	b,c
Has means of transportation (%)	69	78	67	62	
Number of Observations (#)	167	58	75	34	

Source:

Notes:

* No education = 0; primary education = 1; secondary education = 2; university education = 3

With respect to household characteristics, there is significance between the three channels. The families of producers within the ICI channel are smaller than families in the other channels, and fewer of their members work the farm. This aspect seems typical of commercial farms. There is no significant difference with respect to education. The farms of ICI and slaughterhouse suppliers are farther away than those of suppliers to the traditional market. This leads to two interpretations: 1) traditional channels are often local channels (such as butchers' shops); and 2) the other farms are farther away because land is less expensive near the agricultural frontier, making it possible to establish larger farms for livestock (see Table 18.) ICI producers have less experience with livestock. This may be an indicator of producers with more of a commercial orientation, influenced less by family tradition.

Table 18: Farm Size and Ownership

	ICI		Slaughterhouse		Trad.		Total		
CURRENTLY	Mean	CV	Mean	CV	Mean	CV	Mean	CV	SIG
Owned (mzs.)	645.40	0.69	628.39	0.68	364.44	0.72	580.56	0.72	bc
Obtained for usufruct (mzs.)	0.00	---	14.61	4.59	0.00	---	6.56	6.92	a
Obtained through rent (mzs.)	2.59	7.62	3.73	6.33	2.94	5.83	3.17	6.62	---
Tomada a Medias (mzs.)	15.17	5.39	0.00	---	8.82	5.83	7.07	7.58	---
Rented out (mzs.)	0.00	---	0.00	---	3.18	5.40	0.65	12.00	---
Dadas a medias (mzs.)	0.00	---	0.93	7.51	0.00	---	0.42	11.22	---
Total (mzs.)*	663.16	0.65	645.80	0.65	373.03	0.70	596.29	0.69	bc
	ICI		Slaughterhouse		Trad.		Total		
FIVE YEARS AGO	Mean	CV	Mean	CV	Mean	CV	Mean	CV	SIG
Owned (mzs.)	585.76	0.73	567.51	0.80	403.91	0.99	540.54	0.81	b,c
Obtained for usufruct (mzs.)	0.00	---	5.33	6.82	0.00	---	2.40	10.20	---
Obtained through rent (mzs.)	0.00	---	0.00	---	0.00	---	0.00	---	---
Tomada a Medias (mzs.)	0.00	---	0.00	---	8.82	5.83	1.80	12.92	---
Rented out (mzs.)	10.34	7.62	0.80	0.00	0.24	0.00	4.00	0.00	---
Dadas a medias (mzs.)	0.00	---	0.13	0.00	0.00	0.00	0.06	0.00	---
Total (mzs.)*	575.41	0.71	571.91	0.80	412.50	0.96	540.67	0.79	b,c
	ICI		Slaughterhouse		Trad.		Total		
CURRENT vs. 5 YEARS AGO	Mean	CV	Mean	CV	Mean	CV	Mean	CV	SIG
Current total	663.16	0.65	645.80	0.65	373.03	0.70	596.29	0.69	
Total 5 years ago	575.41	0.71	571.91	0.80	412.50	0.96	540.67	0.79	
Significance	Sig. at 1%		Not Sig.		Not Sig.				

With respect to farm size, there is significance when the ICI and industrial slaughterhouse channels are compared to the traditional channel. The comparison of ICI farm sizes today vs. five years ago is significant at 1%. Traditional farms have decreased in size, although not significantly, whereas farms of the ICI and slaughterhouse channels have grown in size. This is a typical scenario for livestock, where more land is required than for farming, and more commercially-oriented ranchers (channels 1 and 2) increase their farm sizes in order to produce larger quantities and/or to deliver fattened animals to the channels on a regular basis. What remains to be verified in this context is whether the "modern" producers purchase their land from traditional farmers or extend the livestock frontier themselves.

3.2 Technology

Table 19: Technologies Employed

		ICI		S-houses		Trad.		Total	
		n	(%)	n	(%)	n	(%)	n	(%)
Uses animal identification system	No	11	19	7	9	6	18	24	14
	Yes	47	81	68	91	27	82	142	86
	Total	58	100	75	100	33	100	166	100
Keeps production records	No	34	60	46	61	23	70	103	62
	Yes	23	40	29	39	10	30	62	38
	Total	57	100	75	100	33	100	165	100
Vaccination	No	1	2	0	0	3	9	4	2
	Yes	57	98	75	100	31	91	163	98
	Total	58	100	75	100	34	100	167	100
Internal antiparasite treatment	No	0	0	0	0	1	3	1	1
	Yes	58	100	75	100	33	97	166	99
	Total	58	100	75	100	34	100	167	100
External antiparasite treatment	No	8	14	3	4	5	15	16	10
	Yes	50	86	72	96	29	85	151	90
	Total	58	100	75	100	34	100	167	100
Vitamins	No	1	2	3	4	2	6	6	4
	Yes	57	98	72	96	32	94	161	96
	Total	58	100	75	100	34	100	167	100
Hormone implants	No	31	53	41	55	29	85	101	60
	Yes	27	47	34	45	5	15	66	40
	Total	58	100	75	100	34	100	167	100
Practices castration	No	53	91	66	88	30	91	149	90
	Yes	5	9	9	12	3	9	17	10
	Total	58	100	75	100	33	100	166	100
Practices dehorning	No	17	29	11	15	8	24	36	22
	Yes	41	71	64	85	25	76	130	78
	Total	58	100	75	100	33	100	166	100
Uses salt as mineral supplement	No	1	2	1	1	5	15	7	4
	Yes	57	98	74	99	29	85	160	96
	Total	58	100	75	100	34	100	167	100

With respect to the technologies employed there are almost no differences; technologies are very similar in the three commercialization channels. The use of hormone implants is slightly higher in the ICI and slaughterhouse channels. In this sense, the percentages are not very high, but the implications for safety remain unclear and the results of residua analyses have not been published. This corresponds with the practice of not castrating steer for fattening but rather of using hormone implants to keep the animals calm so that they do not lose weight or harm each other in acts of aggression.

3.3 Management

There are no significant differences between the circuits with respect to pasture management. The percentage of improved pastures remains low, and the use of natural pastures prevails. The highest —but still not significant— percentage of improved pasture is found among producers in the traditional channel. The pasture management practices of fertilization, irrigation and fumigation are not common in any of the three circuits.

In terms of genetic materials, circuits one and two are very similar with Brahman-Holstein and Brahman-Swiss Pardo crosses. This is somewhat surprising. The two crosses indicate dual-purpose usage, and the Brahman-Holstein cross is not favorable for beef production. Producers in the traditional channel use more pure Brahman animals, which are thought to provide a tougher meat.

3.4 Organization

Table 20: Associative Characteristics of Beef Producers per Circuit (%)

	Total	ICI	S-houses	Trad.	Sig.
Participation in formal associations of any type					
Yes (%)	43.7	31.0	54.7	41.2	*
No (%)	56.3	69.0	45.3	58.8	
Total	100	100	100	100	
Active associations (2004)					
Yes (%)	38.9	27.6	49.3	35.3	*
No (%)	61.1	72.4	50.7	64.7	
Total	100	100	100	100	
Changes in association in the last five years (1999-2004)					
Number of producers with no change in association (%)	52.1	48.3	53.3	55.9	
Producers who increased in association (%)	7.2	6.9	8.0	5.9	
Producers who decreased in association (%)	3.6	0.0	5.3	5.9	
Services received from associations/cooperatives (2004)					
Technical assistance (%)	13.8	13.8	17.3	5.9	*
Inputs and equipment (%)	15.0	17.2	16.0	8.8	*
Training (%)	12.0	8.6	17.3	5.9	*
Credit (%)	3.6	3.4	2.7	5.9	*
Servicing of machinery (%)	4.8	1.7	8.0	2.9	*
Marketing (%)	7.2	6.9	9.3	2.9	*
Artificial insemination (%)	4.2	3.4	5.3	2.9	*
Veterinary services (%)	11.4	10.3	14.7	5.9	*
Processing or packaging of products (%)	3.0	1.7	4.0	2.9	*
Transport of products (%)	1.8	0.0	2.7	2.9	*
Scale for weighing of cattle (%)	3.0	3.4	0.0	8.8	*
Auction for sale of cattle (%)	0.6	0.0	0.0	2.9	*
Jointly owned cattle (%)	0.6	0.0	0.0	2.9	*
Number of observations (#)	167	58	75	34	

Table 20 clearly demonstrates that the producers who sell through channel one (ICI) are less formally organized. The hypothesis is that producers with a commercial orientation are more inclined toward individualism or prefer to organize more informally. According to ICI data, there are two producers who are organizing the commercialization of cattle with other producers. They collect quantities of animals in order to achieve a better position in negotiating the sales prices and conditions of the cattle. This type of informal organization appears in the survey. It could also be a mechanism through which smaller producers are integrated into the circuit. Producers who sell to the slaughterhouses have a significantly higher level organization than those of the other two channels.

Although producers in the traditional channel are frequently members of organizations, they also have less access to technical assistance and other services. In all three channels, membership in associations is higher than the percentage of producers who enjoy these

services, which may be an indicator that the organizations do not provide such services. This aspect is illustrated in **Table 21** on access to and sources of technical assistance. **The public sector does not...** This highlights the opinions about the lack of services after the reform of public services

El sector público no Esto enfatiza el cuento del vacío de servicios después de la reforma de los servicios públicos como extensión e investigación brinde más esos servicios y el sector privado no ha entrado en estos servicios. Para los productores son servicios no existentes.

Table 21: Access to and Sources of Technical Assistance

	Total	ICI	S-houses	Traditional
Access to technical assistance				
Receive (%)	24.6	24.1	29.3	14.7
Do not receive (%)	75.4	75.9	70.7	85.3
Total	100.0	100.0	100.0	100.0
Source of technical assistance				
Supermarket	0.0	0.0	0.0	0.0
Formal company that purchases products for supermarket	0.6	0.0	1.3	0.0
Veterinarian or technician from association, cooperative or group	9.0	6.9	12.0	5.9
NGO or project	4.2	5.2	2.7	5.9
Government	7.2	5.2	12.0	0.0
Commercial firm	3.6	5.2	4.0	0.0
Agro-industry (Industrial slaughterhouse)	0.6	0.0	1.3	0.0
Intermediary	0.0	0.0	0.0	0.0
Neighbor	0.0	0.0	0.0	0.0
Other	2.4	3.4	1.3	2.9

3.5 Financing

The characteristics of financing include investment aspects and access to credit.

Table 22: Investments Made in Beef Production per Circuit

	Total	ICI	S-houses	Traditional	Sig.
Investment in farm within the last 5 years					
Corral (%)	64.1	53	76	56	
Scale (%)	11.4	17	11	3	
Artificial insemination equipment (%)	7.8	5	8	12	
Tractor (%)	8.4	5	11	9	
Shed or warehouse (%)	31.7	26	41	21	
Artificial water supply, man-made lake (%)	16.8	9	21	21	
Some type of investment (%)	73.7	62	87	65	
Investment amount (in C\$)					
Corral (C\$)	57,959	41,371	51,160	105,421	bc
Scale (C\$)	24,337	30,680	12,450	56,000	ac
Artificial insemination equipment (C\$)	11,409	13,067	10,553	11,450	
Tractor (C\$)	137,357	146,667	132,375	141,333	
Shed or warehouse (C\$)	44,840	37,467	37,323	93,929	
Artificial water supply, man-made lake (C\$)	29,628	65,600	15,944	35,214	a

Total investment	97,085	82,181	85,386	156,036
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The survey asked about typical livestock farm investments, such as in corrals, scales, sheds, source waters, insemination equipment and/or the existence of a tractor. Producers who commercialize through the ICI channel invest less than those in other channels. **Table 22** shows significance in the amounts invested in corrals between the ICI and slaughterhouse circuits and the traditional circuit. There are significant differences with respect to investment in scales between ICI and slaughterhouse producers and between ICI and traditional producers. In addition, there is significant difference between ICI and slaughterhouse producers with respect to investment in artificial bodies of water.

Table 23: Access to Credit per Circuit

	Total	ICI	S-house	Trad.
Access to credit				
Receive (%)	19	14	24	15
Do not receive (%)	81	86	76	85
Source of credit (number of producers)				
Bank (%)	10.8	6.9	16.0	5.9
Supermarket (%)	0.0	0.0	0.0	0.0
Company that purchases for supermarket (%)	0.0	0.0	0.0	0.0
Association, cooperative or group (%)	1.8	1.7	2.7	0.0
NGO or project (%)	1.2	0.0	2.7	0.0
Government (%)	0.0	0.0	0.0	0.0
Commercial firm (%)	0.6	1.7	0.0	0.0
Agro-industry (%)	0.0	0.0	0.0	0.0
Intermediaries / buyers (%)	0.0	0.0	0.0	0.0
Neighbors or moneylenders (%)	0.0	0.0	0.0	0.0
Other person or organization (%)	1.2	0.0	1.3	2.9

Analysis of **Tables 22 and 23** shows that investments are made in all three commercialization channels, but that there is almost no access to credit. This indicates that investments must be financed through other sources, such as non-agricultural incomes, savings and the producers' own capital. Most producers do not receive formal credit (75-86% in the three circuits.) The slaughterhouses and ICI do not grant loans to their cattle providers. As seen in section 2.2.3, relations are too informal, especially during periods of cattle scarcity when producers sometimes change their sales decisions at the last minute. In such situations, the slaughterhouses and ICI would not be able to recover their loans.

Table 24a: Average Number of Heads Sold and Number of Beef Producers per Commercialization Channel (Total Heads)

Commercialization Channel	Total		ICI		S-houses		Trad.	
	Avg.	n	Avg.	n	Avg.	n	Avg.	n
Exporters of cattle on the hoof *	59	19	57	8	67	8	46	3
Sell to Auction	159	7	39	2	80	1	238	4
Sell to Green Corrals (or "Plaza de Alajuela")	136	13	77	3	119	6	206	4
Intermediaries	55	56	34	13	28	15	80	28
Butchers	8	16	13	7	4	5	6	4
ICI buyers	119	56	119	56				
Other supermarket buyers	380	1	380	1				
Other plants (MACESA, Nuevo Carnic, Arreo, Montecillos)	179	25	88	3	191	22		
San Martín (Nandaime)	145	74	96	17	160	57		
Local / municipal slaughterhouse								

* Exportation to El Salvador, Honduras or other countries.

Note: Avg. = average number of animals delivered by a producer; n = number of producers who deliver through this channel

Table 24b: Average Number of Head Sold and Number of Beef Producers per Commercialization Channels (Steer)

Commercialization Channel	Total		ICI		S-houses		Trad.	
	Avg.	n	Avg.	n	Avg.	n	Avg.	n
Exporters of cattle on the hoof *	50	14	42	5	60	6	46	3
Sell to Auction	93	4					93	4
Sell to Green Corrals (or "Plaza de Alajuela")	107	9	53	3	78	3	191	3
Intermediaries	15	22			6	4	27	18
Butchers	9	1	9	1				
ICI buyers	113	56	113	56				
Other supermarket buyers	380	1	380	1				
Other plants (MACESA, Nuevo Carnic, Arreo, Montecillos)	144	25	83	3	153	22		
San Martín (Nandaime)	128	71	80	15	142	56		
Local / municipal slaughterhouse								

* Exportation to El Salvador, Honduras or other countries.

Table 24c: Average Number of Head Sold and Number of Beef Producers per Commercialization Channels (Cows)

Commercialization Channel	Total		ICI		S-houses		Trad.	
	Avg.	n	Avg.	n	Avg.	n	Avg.	n
Exporters of cattle on the hoof *	1	1			1	1		
Sell to Auction	73	4	39	2			108	2
Sell to Green Corrals (or "Plaza de Alajuela")	29	9	24	2	42	5	14	2
Intermediaries	24	45	30	12	10	12	28	21
Butchers	4	15	4	6	4	5	4	4
ICI buyers	6	9	6	9				
Other supermarket buyers								
Other plants (MACESA, Nuevo Carnic, Arreo, Montecillos)	35	8	5	1	39	7		
San Martín (Nandaime)	16	33	16	4	16	29		
Local / municipal slaughterhouse								

* Exportation to El Salvador, Honduras or other countries.

Chapter 4:

Determinants for Commercialization Channel Selection

Table 24 illustrates the sale of animals per channel, along with the use of different channels according to the different types of animals. The table shows that producers who sell to ICI almost exclusively provide steer (*novillos*) but, at the same time, have a broader variety than producers in the other commercialization channels for the sale of other types of animal (such as discard cows, Table 24c) through other channels.

This chapter will analyze the significance of the producers' variables or characteristics that explain their adoption of commercialization channels, including access among certain producers to the CSU supermarket channel, industrial slaughterhouses or the traditional channel. This analysis was carried out using two econometric models.

4.1 Determinants for the Adoption of a Commercialization Channel from Three Options (ICI/CSU, Slaughterhouses, Traditional Market)

Firstly, the multinomial logit model will be used to measure the significance and effect of producers' characteristics in the selection of commercialization channels.

This market adoption model is expressed as follows:

$$P(Y_j = j) = \frac{\exp(\beta'_j X_i)}{\sum_{j=0}^2 \exp(\beta'_j X_i)}$$

where:

- i represents each producer ($i = 1, \dots, 168$);
- j represents the commercialization channel to which a producer sells, where $j=0$ for producers who sell to the traditional channel; $j=1$ for producers who sell to the ICI-CSU channel; and $j=2$ for producers who sell to the industrial slaughterhouses;
- P represents the probability that a commercialization channel be selected by a producer i ;
- X_i represents the vector of characteristics of the producer and his/her farm, including the following variables: sex of the producer, age of the producer, education and experience of the producer, size of household, non-rural income, availability of means of transport, membership in associations, distance to market, farm size, credit and technical assistance.

In order to identify the marginal effects of vector X_i on the probability of the selection of a commercialization channel δ_j , the partial derivatives of the vector of characteristics must be obtained in the following manner:

$$\delta_j = \frac{\partial P_j}{\partial X_i} = P(Y = j) \left[\beta_j - \sum_{j=0}^{j=2} P(Y = j) (\beta_j) \right]$$

The effects of the vector of characteristics of the producer and of his or her farm on the selection of the commercialization channels represented by ICI-CSU and the industrial slaughterhouses, as compared to the traditional channel, is illustrated in the table below.

Table 25: Determinants of the Adoption of Beef Markets in Nicaragua
(Multinomial Logit Model)

	ICI-CSU			Industrial Slaughterhouses		
	Coefficient (SE)		Sign	Coefficient (SE)		Sign
Constant	-0.8823	2.1530		-2.1600	2.1443	
Sex of the producer^a (female=0; male=1)	-0.1166	0.2324		-0.0195	0.2623	
Age of the producer (years)	0.0018	0.00408		-0.0013	0.0041	
Education of the producer (years)	-0.0029	0.06258		0.0079	0.0631	
Experience (years in tomato production)	-0.0092	0.00452		0.0097	0.0045	
Size of household	-0.0498	0.03255	**	0.0188	0.0326	*
Means of transport^a (has=1, does not have=0)	0.2259	0.1020	**	-0.0499	0.1280	*
Association^a (member=1, non-member=0)	-0.1702	0.1107		0.2742	0.1106	**
Distance to market (km.)	0.0003	0.0005	**	0.0010	0.0005	**
NRFI = dichotomous variable on access to non-rural income	-0.0124	0.0322		-0.0071	0.0318	
Credit = amount of credit used	6.48e-08	0.0000		-9.18e-08	0.0000	
Ta^a = dichotomous variable that determines whether or not the producer receives technical assistance	0.1310	0.1246		-0.1096	0.1239	
Number of observations: 137			LR Chi-square:		83.86	
			Pseudo R2:		0.2898	
Function of Log likelihood: -102.77			Prob > chi2		0.0000	
			Significance:			
Notes: ** = 5% level of significance, * = 10% level of significance.						
Traditional market is the comparison or base group						
^a dy/dx for the value of moderate change of the binary variable from 0 to 1						

In both channels, family size has negative significance: a 5% level of significance in the supermarket channel and a 10% level of significance in the slaughterhouse channel. This result could be an expression of the “modernity” corresponding to the “modern” channels and, at the same time, to a lower number of children. The slaughterhouse channel probably also has the image of a modern channel because to producers it implies export quality beef.

In the same two channels (ICI/CSU and the slaughterhouses), the availability of a means of transportation has a 5% level of significance. This variable seems consistent with the variable of distance to market. As explained above, the largest farms are found in more remote areas where land is cheaper and can be purchased more readily (both types have increased in size.) At the same time, however, a means of transportation is required to manage the farm, maintain communications and purchase inputs.

Employment off the farm does not have a significant effect for producers who sell to the supermarket and slaughterhouse channels.

Association has a 5% level of significance for producers who select the slaughterhouse channel. The difference in association between producers who provide animals to the supermarket channel and those who deliver to slaughterhouses is a very interesting factor that still lacks a consistent explanation and thus requires further analysis. In section 3.4, it was noted that producers in the slaughterhouse channel have changed in terms of association over the past five years, but the balance remains positive. ICI producers have increased their level of association but remain at a level of 50% with respect to slaughterhouse producers.

4.2 Determinants for the Adoption of the Supermarket Channel (Supermarkets vs. Slaughterhouses and the Traditional Market)

Although this study has presented separate analyses for the three marketing chains, another important objective is to establish the determinants for access to the supermarket channel (not only access to a determined chain.) Therefore, a probit function¹² is used in the second econometric model in order to analyze effects of the vector of characteristics of the producer and his or her farm in the selection of two markets, represented by supermarkets (CSU) vs. the slaughterhouse and traditional markets.

The probit model is represented by: $G(z) = \Phi(z) \equiv \int_{-\infty}^z \phi(v)dv$ where $\phi(v)$ represents normal distribution $(2\pi)^{-1/2} \exp(-z^2/2)$. This model measures the probability of a producer's access to the supermarket channel, given the producer's characteristics:

$$P(y=1/x) = P(y=1/x_1, x_2, \dots, x_k)$$

where:

- i represents each producer (i = 1, ..., 145);
- j represents the commercialization channel to which a producer sells, where j=0 for producers who sell to the traditional channel; j=1 for producers who sell to the CSU and La Colonia channel;
- P represents the probability that a commercialization channel be selected by a producer i;
- X_i represents, as in the multinomial model presented above, the vector of characteristics of the producer and his/her farm, including the following variables: sex of the producer, age of the producer, education of the producer, size of household, availability of means of transport, association, access to electricity, cattle as a proxy for savings and capitalization, distance to market and farm size.

This is a binomial analysis in which channel 1 is ICI or supermarkets and the comparison group includes the slaughterhouses and traditional market. The results differ slightly, but basically the negative significance of family size continues to be a factor. In this analysis, size of household continues to have a negative significance for selection of the channel. The level of significance is 10%.

For the supermarket channel, experience working with livestock has a negative significance of 5%. Availability of a means of transportation remains important, but not so much because of

¹² Probit and logic models are generally used indistinctly and usually generate the same results (Wooldridge, 2002).

distance (for reasons of the producers supplying slaughterhouses.) However, being organized is now not an important factor and EXPERIENCE does play a negative role.

It seems that ICI does the same as HORTIFRUTI in the sense that both seek out producers with less experience (regardless of age.)

4.3 Producers' Opinions about Sales Channels

The survey included a section in which producers were asked for their opinions about commercialization channels and about certain specific variables, such as prices linked with each channel. Independently of the producers' opinions, this is important in a more subjective sense and addresses the predisposition or image that producers hold about access to a determined marketing channel.

With respect to the producers' opinions about commercialization channels (where possible responses were: good, fair, bad and no answer), it is interesting to note that the producers were unaware of other commercialization channels (lack of information.) Those in the traditional channel seemed not to be very content with the channel, whereas those who sell to ICI were very happy with this channel.

All producers believed that only the best quality cattle are sold through the supermarket channel, and that feeding in general and dry-season feeding in particular are very important to achieve this quality.

Producers in the supermarket channel were very content with the prices they receive for the sale of their animals. Factors such as security of continuous sales, seriousness of the buyers, confidence in the scales, and respect of payment dates, among others, were highly esteemed by producers in the ICI chain. This contrasts somewhat with the results shown in **Table 26** (below), which demonstrate that ICI producers receive lower prices than producers in the other commercialization channels.

Chapter 5:

Effects of the Commercialization Channels

5.1 Economic Effects at the Farm Level

Table 26: Price, Sale and Number of Animals per Circuit and Type of Animal

	ICI		Ind. S-houses		Traditional		Total		Sig.
	Avg.	CV	Avg.	CV	Avg.	CV	Avg.	CV	
Price (head)									
Bull calves	2,641	0.2	2,570	0.2	2,561	0.2	2,593	0.2	
Cow calves	2,436	0.2	2,318	0.3	2,367	0.3	2,369	0.2	
Young cows	3,877	0.2	3,832	0.3	3,639	0.2	3,809	0.2	
Young bulls	4,619	0.3	5,125	0.2	4,943	0.3	4,913	0.3	a
Cows	5,946	0.4	4,749	0.3	5,109	0.3	5,238	0.4	ab
Bulls	13,386	0.4	10,177	0.5	10,322	0.4	11,335	0.5	ab
Oxen	9,009	0.2	8,408	0.2	8,452	0.2	8,631	0.2	a
Weighted *	4,357	0.3	4,867	0.3	4,304	0.3	4,583	0.3	ac
Sales (head)									
Bull calves	2	4.1	4	4.7	24	3.0	7	4.9	bc
Cow calves	0	7.6	0	--	0	--	0	12.9	
Young cows	0	7.6	1	6.1	1	3.3	1	6.5	
Young bulls	152	0.8	167	1.1	59	2.1	140	1.1	bc
Cows	21	2.1	29	2.7	37	2.5	28	2.6	
Bulls	0	6.5	1	6.9	2	3.1	1	5.6	b
Oxen	0	--	0	8.7	0	--	0	12.9	
Total	177	0.8	201	1.1	123	1.5	177	1.1	c
Stock (head)									
Bull calves	53	0.8	51	0.7	26	0.8	46	0.8	bc
Cow calves	50	1.0	50	0.7	26	0.8	45	0.9	bc
Young cows	60	0.7	59	0.8	27	0.8	53	0.8	bc
Young bulls	126	0.9	107	0.9	36	1.2	99	1.0	bc
Cows	135	0.7	113	0.8	57	0.7	109	0.8	bc
Bulls	6	1.4	6	0.9	5	1.4	6	1.2	
Oxen	2	0.9	2	1.1	1	1.3	2	1.0	bc
Total	433	0.6	388	0.6	177	0.6	360	0.7	bc

Producers who sell through the supermarket channel indicated that they receive lower prices for their best product (young bulls or *novillos*) than producers in the other channels. However, this result is significant only in the comparison between the supermarket and slaughterhouse channels. If weighted prices are compared, the ICI price is slightly higher than that of the traditional channel, with much less significance than the slaughterhouse channel.

Prices for cows in the ICI channel are significantly higher than in the slaughterhouse channel, and the slaughterhouses pay much less for cows than buyers in the traditional channel. This effect is probably due to the fact that producers attempt to sell animals in lots, seeking to force buyers to include discard cows in their purchases. ICI purchases fewer cows than the other channels, but this difference is not significant. On average, producers in the supermarket and slaughterhouse channels sell more young bulls and, at the same time, fewer bull calves than producers in the traditional channel. There is significance between the total numbers of animals sold in the supermarket channel and the traditional channel.

With respect to the number of animals on the farm, producers in the supermarket and slaughterhouse channels have larger quantities than producers in the traditional channel. This difference is significant for all types of animals and for total number of animals.

It seems that the price for animals is not the only decisive factor in the decision to select one channel or another. Survey results show that aspects such as the possibility of continuous sales to a channel, the seriousness of the buyer, and respect of payment terms received percentages of around 100% and appear to be very important to producers. Such factors motivate producers to accept lower average prices than those they would receive through other channels that do not offer similar advantages.

5.2 Effects for Market Agents

These results are somewhat surprising because, in interviews, buyers and representatives of ICI indicated that they pay the same price as the slaughterhouses, especially during the season of high demand and low supply. On the other hand, however, these results seem similar to commercialization results, where HORTIFRUTI is the tomato buyer for the supermarket channel. HORTIFRUTI is part of Grupo Más x Menos' CCA and also purchases the best quality produce at a lower price than other agents (see the Balsevich report.)

Compared with the slaughterhouses, ICI cannot offset the prices of different types of animals (between young bulls and cows.) In 2003, 25% of all animals processed by San Martín slaughterhouse were cows, whereas the percentage for Nuevo Carnic was 22% and for MACESA 10%. ICI purchases only young bulls and sells only the meat of young bulls to its clients. It could be that ICI sells the few cows it purchases (due to obligations or favors) to San Martín, where its animals are processed.

Chapter 6:

Analysis of Current Policies to Support the Inclusion of Small Producers and to Achieve Better Results

6.1 Public Policies and Institutions

Current public policy documents regarding livestock were prepared within the context of Nicaragua's National Development Plan (NDP). Written as an input for the National Development Plan, the Livestock Development Program recognizes the importance of livestock and lists five objectives:

1. Improve the competitiveness of bovine production
2. Improve infrastructure, industry and pasture areas
3. Promote the organization and integration of livestock chains
4. Increase the level of capitalization of small livestock producers
5. Promote programs and services in support of livestock activities

All documents address the concept of the chain and clusters. Their authors are clear that the challenge in coming years will be to improve competitiveness. In this sense, one indispensable task will be for the public sector to modify general conditions for the private sector. With the Central American Customs Union, the United States / Central America Free Trade Agreement (CAFTA) and the Free Trade Area of the Americas (FTAA), competition between member countries is imminent and industries are expected to experience strong development.

Policies affecting the livestock sector are not defined only by the Ministry of Agriculture and Forestry (MAGFOR) but also within other entities such as the Ministry of the Environment and Natural Resources (MARENA), Ministry of Industry and Commerce (MIFIC) and Ministry of Health (MINSAs).

MARENA, for example, regulates and governs new land development and the conversion of forest into pasture in order to prevent the appropriation of lands near to the agricultural frontier (as occurs in the Bosawas Natural Reserve in the Río Blanco region and other areas.) This will be a very important aspect in the immediate future because the effects of such conversion can now be seen in autonomous zones of the southern and northern Atlantic Coast regions (RAAS and RAAN.) Tougher regulations could promote the intensification and improvement of existing pastures instead of the conversion of natural resources (forests and natural reserves.) Aggravating the problem is the fact that it is less expensive to purchase additional land or move to new plots than to improve existing pastureland.

MIFIC facilitates exportation and negotiates bilateral contracts (i.e. with Mexico) and multilateral free trade or exportation agreements under special conditions. In cases of conflict, MIFIC negotiates with the involved country or asks the WTO to defend Nicaragua's interests.

MINSAs inspects slaughterhouses and retail meat sales posts. The strict implementation of regulations could have a significant effect on the structure of local sales. However, to date MINSAs does not have the capacity to inspect all sales posts in the markets.

One of the public sector strategies involves implementation of international cooperation projects that promote innovations. For example, over the next few years an attempt will be made to improve the genetic make-up of the national herd through a project financed by Japanese cooperation.

Nevertheless, today's reality is completely different. Reforms of the public sector and of services in the 1990s have affected the rural scenario. Producers have almost no access to

technical assistance. Institutions such as producers' organizations or cooperatives have not been able to fill this gap. Many such organizations are politicized or are being used by their functionaries as trampolines to jump to higher political positions. Few of the organizations are clearly oriented toward the needs of their members. For the moment, the Ministry of Agriculture and Forestry has no specific activities planned for the livestock sub-sector. Producers have no access to credit to finance their investments. Five banks went bankrupt in recent years, due partly to the mentality of not repaying loans. Descriptive tables have shown that it is possible to activate capital for investments but that this means a much slower growth (perhaps organic) of the farms. Another problem that must be resolved by the public sector is that of land ownership titles, which also has a great deal to do with access to credit since property can be used as a guarantee for mortgage loans.

Public policies for the industrial sector greatly favor exportation and the identification of new markets. In the case of beef, the government has facilitated access to the Taiwanese market. This Asian country has stopped importing beef from the United States because of the case of "mad cow" disease identified late last year. At the same time, the public and private sectors receive training from the United States Department of Agriculture in order to meet new requirements for exportation to this country.

6.2 Private Sector Policies

The policies and strategies seen in the private sector involve an effort toward integration. During the economic crisis faced by the slaughterhouses and subsequent sector consolidation, the industries obtained new allies in the financial sector. The San Martín slaughterhouse earned the trust of Banco Uno as an equity capital partner, facilitating access to capital for necessary investments. The same occurred with the MACESA slaughterhouse, which now cooperates with the Latin American Financial Services Group (LAFISE), of which BANCENTRO (Banco de Crédito Centroamericano) is an affiliate. In addition, slaughterhouses such as San Martín follow an outsourcing strategy. San Martín's Farm and Ranch Department has privatized the activities of buyers who formerly were direct employees of the company. Now they work on commission, assuming economic risk. Another slaughterhouse strategy is to create a network of distributors for direct sales in local markets. This strategy is applied by San Martín, as mentioned above, but is also employed by the CoopeMontecillos slaughterhouse in Costa Rica (see the Jano case study, 2004.)

The strategy of integration and outsourcing is also seen in the chain of Más x Menos supermarkets. This group has developed a number of companies that supply different agricultural products, such as ICI and HORTIFRUTI. These companies purchase directly from producers, thereby eliminating intermediaries. According to Hobbs (1996), this improves animal welfare because livestock move directly from the farm to the slaughterhouse, without having to be loaded and unloaded at auction houses. At the same time, it facilitates the traceability of animals and reduces transaction costs. Another advance by ICI toward integration is that it has gone halves with a producer on 1,200 head of cattle in order to fill gaps in the supply of animals. This may be a step toward introduction in the production of cattle for fattening, but the mechanism of joining with a producer seems much more flexible in terms of ensuring the number of animals required for supply contracts. Another tool could be the preparation of production contracts. Through formal contracts, ICI could demand certain technologies or other aspects, such as animal welfare, that affect the quality of beef.

ICI practices outsourcing in the slaughter of animals. It has still not established its own slaughterhouse but currently uses San Martín (which still has a greater capacity and has become the largest slaughterhouse in Central America.)

Another strategy may also involve the development of products for niche markets, such as "new meat" as a type of organic meat. The case of "La Nueva Carne" is an interesting example under an institutional perspective. There is broad cooperation between CONAGAN, IICA, the Nuevo Carnic slaughterhouse and CLUSA. This shows that alliances are necessary to identify

and develop these types of niche markets. Another niche may involve conventional beef marketed as grass-fed or range beef. For the slaughterhouses, there is the option of developing their own brand names and of producing and packaging finer cuts for self-service according to consumers' demands (convenience food.)

It will be very important for slaughterhouses and supermarkets to study and understand the demands of their clients, as well as to institutionalize this mechanism of "listening" to clients in order to obtain continuous information about changes in consumers' demands for beef. Constant communication with clients also facilitates the "training" of consumers.

Experience has clearly shown that a slaughterhouse cannot enter the local market with lower quality products when there are other competitors offering excellent, top-quality goods. This means bringing local standards closer to international standards. Comparing the situation in Nicaragua with that of Costa Rica, the other beef exporting country in Central America, one notes the presence of CORFOGA (the livestock corporation) and its impact on the beef sector and chain (see Pérez, 2004.)

Chapter 7:

Challenges for the Future

7.1 Probable Scenarios

Supermarket chains are expected to grow in coming years. The potential for growth in Nicaragua is oriented toward departmental capitals, and the Pali chain is now exploiting this potential. Supermarkets will increase their sales of beef in spite of the traditional markets. For reasons of safety, in the next few years the slaughterhouses will eliminate a percentage of municipal processing, or the municipalities will have to invest heavily in the improvement of their installations or build with resources from the Emergency Social Investment Fund (*Fondo de Inversión Social de Emergencia – FISE*.) The latter is not probable because of the number of municipal slaughterhouses that still exist in Nicaragua, most of which are in deplorable conditions.

The importance of traditional markets and butchers' shops will decrease. Butchers' shops have the option of becoming specialty shops, offering special cuts for an exclusive clientele.

Due to the lack of purchasing power among most of the population, beef consumption will not increase much during the next several years. The economic situation will not see great positive change, and competition from other meats will check the growth of the beef sector. Growth will occur mainly because of increases in population, not because of increased per capita beef consumption.

7.2 Public Sector Activities

One public task will involve improving the safety of meat products in butchers' shops and local markets through better control over municipal slaughterhouses. The demand for consumer protection will also increase in rural areas.

A very important task for the public sector will be to facilitate the creation of a platform for the chain. In this way, the beef chain can become a supply chain oriented toward the quality of the final product and toward the competitiveness of the entire chain rather than of individual companies (Lundy et al, 2004; Hobbs et al, 2000; Kaplinsky and Morris, 2001; Kaplinsky, 2000; and Kaplinsky and Fitter, 2004.) This does not mean that the public sector must direct the platform but that it can probably use its convocational capacity and authority to initiate the platform's creation, perhaps assuming the role of moderator in conflicts. The study by Zylbersztajn and Pinheiro Machado Filho for the beef chain in Brazil demonstrated that coordination in a chain can result in a competitive advantage.

The experience of a single case of Bovine Spongiform Encephalopathy (BSE) clearly illustrates the need for an international system of animal traceability. Almost overnight, the United States lost one of its most important markets, Asia, and negotiations to determine the age of animals appropriate for slaughter greatly complicate a possible renewal of exports. Nicaragua and its neighboring countries must prepare themselves very soon for a system that ensures animal traceability. However, this may be more of a barrier against small producers' integration into the export channel; or it may lead again to the creation of two different markets: the export market with traceability and the local market without bar codes.

This is likely to require concerted action between the public and private sectors. The Federation or National Livestock Commission of Nicaragua (*Comisión Nacional de Ganadería de Nicaragua – CONAGAN*) must play a proactive role in this discussion.

7.3 Private Sector Activities

The channel classification system in Nicaragua is not very well-prepared or transparent for producers, and information about the topic is limited. If one compares the CoopeMontecillos system (see the Jano report) to the system used by ICI or the slaughterhouses in Nicaragua, the differences are clear. With the differentiation of criteria, classification becomes much more objective.

The private sector (supermarkets as well as slaughterhouses) probably needs to forge closer relations with cattle producers and facilitate technological innovations. One option for this would involve production contracts with producers. In this way, the commercialization channels would have more influence over the technologies used (very relevant in terms of hormones, implants, etc.) For producers, this would mean access to credit (see Key and McBride, 2003.)

Some of the opinions demonstrated that there is little information and transparency with respect to the different commercialization channels and their functioning. The solution to this deficiency should be one of the main tasks of the private sector and of producers' organizations.

Associations must play more of an active role in the chain, providing services, facilitating alliances and organizing networks.

For some time, discussions and negotiations have been underway at the OIE and WTO level regarding the vaccination of animals against foot-and-mouth disease and the possible exportation of the beef of vaccinated animals. For the Central American region, this would mean the loss of a competitive advantage against countries such as Uruguay, Argentina and Colombia, which produce beef at much lower costs.

7.4 Areas of Investigation and Pending Questions

The survey and farm characteristics show that beef production is in the hands of large farms, whereas small producers play a marginal role, providing calves for fattening and selling discard cows. One question for further study is whether small producers can be integrated into the beef chain and, in this way, gain access to the supermarket channel with support from large producers (who would market the cattle of small producers together with their own stock.) This system, which may also develop into a type of outgrower system, could potentially facilitate the integration of small farmers as well as lower transaction costs.

The aspect of association, and specifically its negative correlation with the supermarket channel, was a surprise and obviously warrants further investigation.

A general factor will be to carry out an in-depth analysis of the role played by small supermarkets. Farina's publication about the development of small producers in Brazil indicates that these supermarkets must not be overlooked, since they play an important role in food commercialization in Brazil (Farina et al., 2004.) This analysis would also be interesting with respect to the sale of beef in these establishments. Ministry of Health data indicate that a number of these small supermarkets currently sell beef in Managua.

Data on prices paid for animals in the different channels, illustrated in section 5.1, demonstrates that the supermarket channel pays significantly less than the slaughterhouses. This result coincides with results for tomatoes and requires further analysis.

References / Bibliography

Lundy, Mark et al.; 2004. CIAT Proyecto de Desarrollo de Agroempresas Rurales: Diseño de Estrategias para aumentar la competitividad de cadenas productivas con productores de pequeña escala; field manual (90 pages) – corresponding website: http://www.ciat.cgiar.org/agroempresas/pdf/manual_de_campo_final_sept04.pdf.

Kaplinsky, Raphael and Morris, Mike; 2001. Handbook for Value Chain Research, prepared for IDRC; corresponding website: www.ids.ac.uk/ids/global/pdfs/VchNov01.pdf.

Kaplinsky, R.; 2000. Spreading the gains from globalization: what can be learned from value chain analysis? IDS Working Paper 110, IDS, Sussex, UK www.ids.ac.uk/ids/bookshop/wp/wp110.pdf.

Kaplinsky, R.; Fitter, R.; 2004. Technology and globalization: who gains when commodities are de-commodified? Int. J. Technology and Globalisation, Vol. 1, No.1, 2004.

IICA/PROVIA - Instituto Interamericano de Cooperación para la Agricultura; 2002. Fortalecimiento del Sector Privado Para la Formulación de Políticas Agrícolas (IICA/PROVIA): Estudio de la cadena de comercialización de la carne bovina; unpublished draft document.

International Finance Corporation (IFC); 1999. Project: Casa Mantica, S.A. e Inmuebles Diano Marina, S.A. (La Colonia) <http://www.ifc.org/ifcext/lac.nsf/Content/SelectedProject?OpenDocument&UNID=DBFCA987BC6424A58525688E0078E3D0>.

For information on PriceSmart, consult the web page: www.pricesmart.com.

Pomareda, C.; 2004. Adjustments in the Livestock Sector to Supermarkets' Strategies: The Case of Costa Rica; Paper presented at FAO International Seminar on Structural Change in Livestock Sector: Social and Environmental Implications for Policy Making; Bangkok, Thailand; January 27-29, 2004.

La Prensa:

18-01-03: "Alcalde se opone a cierre del rastro"

22-05-04: "Carniceros rechazan el cierre de rastro"

09-06-04: "Tensión entre MINSAs y Alcaldía de Estelí"

IFPRI, FAO, ILRI; 1999. Livestock to 2020: The Next Food Revolution. Discussion Paper No 28, May 1999.

Government of Nicaragua; 2003. Propuesta de Plan Nacional de Desarrollo.

Government of Nicaragua; 2003. Propuesta de Estrategia de Desarrollo Rural Productivo.

Government of Nicaragua; 2003. Estrategia Rural.

Government of Nicaragua; 2004. Política Nacional de Innovación Tecnológica Agrícola y Rural.

Key, N. and McBride, W.; 2003. Production Contracts and Productivity in the US Hog Sector. In: Amer.J.Agr.Econ.85(1), February 2003, pp. 121-133.

Zylberstein, D. and Pinheiro Machado Filho, C.; 2000(?). Competitiveness of Chain in Brazil Meat Agri-food.

Slingenberg, J.; Hendrickx, G.; Wint, W.; 2002. Will the Livestock Revolution Succeed? In: AgriWorld Vision Vol. 2, No 4, 2002, pp. 31-33.

Farina, E.M.Q.; Nunes, R.; de A Monteiro, G.F., 2004. Supermarkets and their Impacts on the Agrifood System of Brazil: the Competition Among Retailers. Paper presented at the 88th European Association of Agricultural Economists, Paris – May 2004.

Iglesias, D. H.; 2002. Cadenas de Valor como Estrategia: Las cadenas de valor en el sector Agroalimentario; working document, INTA Argentina.

Hobbs, J.E.; Kerr, W.A.; 1999(?). Structural Developments in the Canadian Livestock Subsector: Strategic Positioning within the Continental Market.

Hobbs, J.E.; 1996. A Transaction Cost Approach to Supply Chain Management. In: Supply Chain Management, Volume 1, No 2, 1996, pp. 15-27.

Hobbs, J.E.; 1996. Transaction Costs and Slaughter Cattle Procurement: Processors' Selection of Supply Channels. In: Agribusiness, Vol. 12, No 6, pp. 509-523 (1996).

Hobbs, J.E.; Cooney, A. and Fulton, M.; 2000. Value Chains in the Agri-Food Sector (What are they? How do they work? Are they for me?)

Berdegú, J.; Balsevich, F.; Flores, L.; Reardon, T.; 2003. The Rise of Supermarkets in Central America: Implications for Private Standards for Quality and Safety of Fresh Fruits and Vegetables; final report for the USAID-RAISE/SPS project on private standards in Central America.

Reardon, T.; Berdegú, J.; 2002. The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development. In: Development Policy Review, 2002, 20 (4); pp. 371-388.

Dries, L.; Reardon, T.; Swinen, J.F.M.; 2004. The Rapid Rise of Supermarkets in Central and Eastern Europe: Implications for the Agrifood Sector and Rural Development. In: Development Policy Review 2004; forthcoming.

Hu, D.; Reardon, T.; Rozelle, S.; Timmer, P. and Wang, H.; 2004. The Emergence of Supermarkets with Chinese Characteristics: Challenges and Opportunities for China's Agricultural Development. In: Development Policy Review 2004; forthcoming.

Nerven, D. and Reardon, T.; 2004. The Rise of Kenyan Supermarkets and Evolution of their Horticulture Product Procurement System: Implications for Agricultural Diversification and Small Holder Market Access Programs. In: Development Policy Review 2004; forthcoming.

Pérez, E.; 2004. El Acceso De Pequeños Y Medianos Ganaderos De Carne A Mercados Dinámicos: El Caso De Costa Rica.