

3.2.3 Trends and Patterns of Main Product Items

A. Bovine meat

The export of beef is growing rapidly

Beef is a product item representative of the Paraguayan livestock industry. 75% of its total production is destined for export, an important source of foreign exchange. The export growth of beef has been extraordinary. The annual average export value in 2000-2004, USD 153,960,000, grew significantly to USD 526,540,000 in 2005-2009, and reached the highest record USD 917,770,000 in 2010.

Routes of production and national distribution of beef

Where is beef produced and processed in Paraguay? According to the statistics on marketing and processing of cattle by departments, 1,598,678 heads of cattle were marketed and processed nationwide in 2009. Although three departments of the Western Region (outside the scope of this study) and Central department occupy the largest share in the country (“Others” in Figure 3.2-15), the role of 14 departments of the Eastern Region is not small, either. In the number of shipment which indicates the volume of production, sub-regions 1 and 3 are highlighted. In the number of slaughtered and processed bovine animals, the sub-region 1 is the highest with 15% of the total, or 240,250 heads. Particularly, Concepción department recorded 96.4% of the total or 231,495 heads.

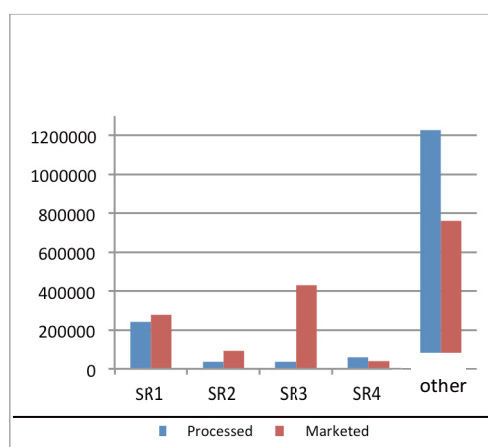


Figure 3.2-15 Number of cattle processed and marketed by Sub-regions



Figure 3.2-16 Flow of cattle into Central

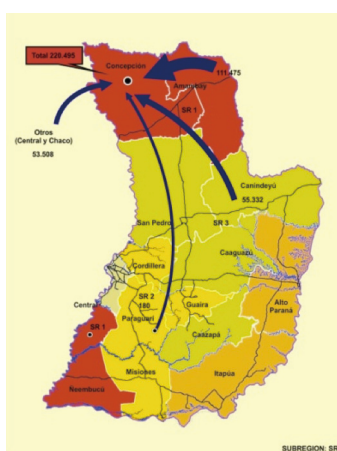


Figure 3.2-17 Flow of cattle into Concepción



Figure 3.2-18 Flow of cattle into Alto Paraná

The main bases of processing are departments of Concepción, Alto Paraná and Central of the Eastern Region, and the departments of Boquerón and Presidente Hayes of the Western Region. The graph shows the shipment channels to the three bases of the Eastern Region. 49.5% of the products of the Western Region and 14.8% of the products of the Sub-region 1 of the Eastern Region are shipped to Central department. In Alto Paraná department (Sub-region 4), the volume of supply of sub-region 3 (60.8%) is notable, followed by sub-region 4 (35%). If we look at the processing plants and distribution in the Eastern Region alone, cattle originating from sub-region 1 comprise the largest percentage of total processed heads, 47.8%. In terms of the production of dairy cows in the Eastern Region, sub-region 3 represents the highest percentage, while in terms of distribution and processing sub-region 1 represents the highest percentage.⁵⁴

The ARP has proposed to join efforts with the Directorate of Livestock of MAG and the Ministry of Industry and Trade to implement the system needed to cope with the increase in exports not only to the current destinations such as Russia and Chile, but also other countries whose demand for beef could increase potentially.

Social actors involved in the bovine meat sector

The process of production and distribution of beef is discussed in more detail, taking up Concepción department as an example. In sub-region 1, 91% of agricultural land is allocated to livestock, the highest among four sub-regions.

In 2009, a total of 276,341 heads of cattle have been shipped from sub-region 1 to the other regions. This number corresponds to 33% of all cattle marketed in the Eastern Region (from 836,548 heads), except Central department. In particular, Concepción accounted for 41.3% of sub-region 1 or 114,149 heads. The cattle processed at sub-region 1 represent 64.8% of the total cattle processed in the Eastern Region (370,844 heads). In particular, Concepción department accounted for 96% of the total, with 231,495 heads. Now -- who are social actors involved in livestock in Concepción?

There are currently 11,800 livestock production units in Concepción, of which medium- and large-scale farms that raise more than 50 heads represent only 8% (908 farms). However, these few farms have 90% of total cattle heads (727,307 heads) in this department. This translates into an average 801 heads per farm. Most of these medium- and large-scale production units are oriented to export their products to foreign countries.

⁵⁴ In the departments of Boquerón and Presidente Hayes, Western Region, raw materials processing plants are bought mostly within the same region, with a percentage of 76.4% and 99% respectively.

By contrast, small producers with less than 50 heads comprise 92% of total livestock production units or 10,829 farms. However, they raise only 10% of total cattle in the department (81,985 heads). This translates into an average 7.6 heads per farm, which is extremely small compared with the number of livestock raised by large and medium farms. The products shipped by many small producers are slaughtered locally and processed at the backyard of butchers without going through value chains of export products.

Value chain of bovine meat for export

As is observed previously, export markets for beef are expected to continue growing in the future. Is it possible for small producers who represent a large majority to participate in the value chain of products for export markets?

The value chain of beef export is in fact very simple (Figure 3.2-19). The products are delivered directly from large and medium farms to plants in Concepcion, where they are processed and freezed. They are then shipped and transported directly from the plants through the Paraguay River, then transported by ferry to Buenos Aires (Argentina), and taken to Russia, Chile, and so on. Around 800 large and medium farms of Concepción and 12 companies of suppliers of equipment and production materials are involved in the value chain.

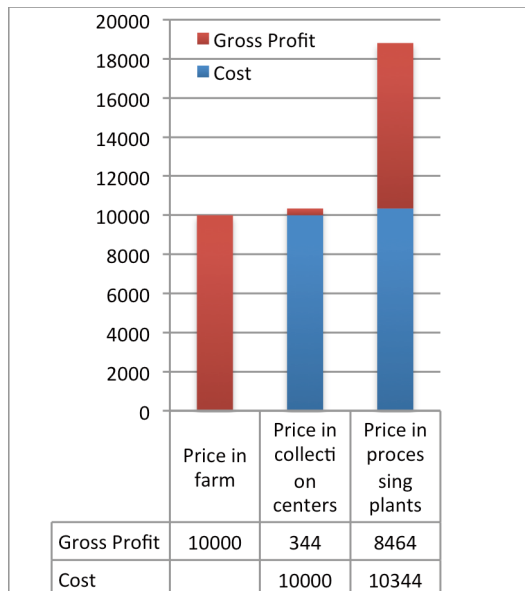


Figure 3.2-19 Cost and gross profit of beef for export

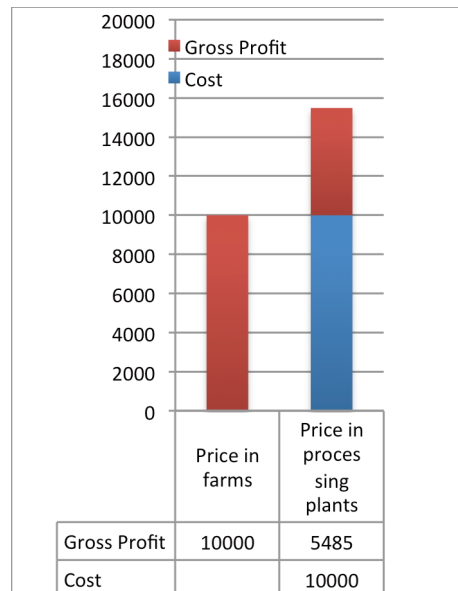


Figure 3.2-20 Cost and gross profit of beef for domestic consumption

The amount of shipment in 2009 is estimated to be total 1,104,496 million Guarani, and the amount of shipment per farm is 138,061,875 Guarani. Although the transport cost to the

processing plant only accounts for 4.5% of total cost, the price after processing is increased by 81.8% since they include processing cost and profit margin. The number of direct employees of the plant is estimated to be at least 320 workers. Also, five entities provide equipment and materials to the plant. Hence, the FOB price adds up to 2,077,334 million Guarani in total.

Value chain of beef for the local market

The next analysis is on the value chain of beef for the local market in which small producers are involved. It appears that the process from production to marketing is even much simpler (Figure 3.2-20). Although there is 21% of difference between the wholesale price of beef slaughtered and processed locally and the export price (FOB), producer prices do not differ much. The amount of shipment at farm gate is 12,696 million Guarani, and that per farm are 1,171,326 Guarani. There is a significant difference between the prices of small producers and medium and large producers, but this is not because the farm gate prices are different, but simply because the numbers of cattle shipped are vastly different between them.

If the unit prices at farm gate do not differ much between small producers and medium and large producers, would it be necessary for small producers to aim at export markets? The answer is yes. The price of beef in the domestic market tends to increase due to increased export price. However, considering that the consumption of pork, chicken and fish is also growing in domestic market, it is likely in the long run that consumption of beef is reduced if the total volume of consumption of meat does not increase. In this sense, there is no guarantee that the domestic price of beef would continue rising along the trend in recent years. On the other hand, export demand is incomparably greater than domestic demand. It is therefore necessary for small producers to make efforts to export their products abroad if they aim to increase the volume of shipment in the future.

Demand for grass-fed beef is growing

Behind the recent increase in export demand for beef is the fact that Paraguayan meat, including those produced by large producers, are “grass-fed beef.” In developed countries, cereal diet with high nutritional values has been widespread to improve efficiency of production. However, bovine animal, one of ruminant, has evolved to feed on only pastures. To avoid the experiences of bovine spongiform encephalopathy (BSE) caused by the use of meat and bone of ruminants as a supplement, markets of grass-fed animals have been increasing some of developed countries.⁵⁵ Paraguayan products can meet these requirements.

⁵⁵ According to the website “Bord Bia”, the “natural beef” that includes “grass-fed” and “organic” beef is 3% of the meat market with USD 400,000,000. This is the result of growth of over 20% in the last 5 years and is expected to grow in the future:
(<http://www.bordbia.ie/industryservices/alerts/Pages/GrassfedbeefdemandstrengtheninginUS.aspx?year=2010&wk=18>).

However, there are a number of challenges to overcome if Paraguayans are to increase exports. Some of them are listed below.

Challenge 1: Low productivity of small farmers

The largest challenge is low productivity of small farmers. While large cattle producers need between 1.5 to 2 years for the cattle to reach the marketable weight around 350 kg, small producers need between 4 to 5 years on average. In general, the fattening productivity of large producers is between 125–150kg/ha/year, whereas that of small producers is 80kg/ha/year. There is also a big difference in the productivity of breeding. The percentage of calves born per cow per year is between 70-75% for large producers who practice artificial insemination, whereas the percentage of small farmers is only 50%. The low productivity of the latter is due to not only the breed raised, but low basic technical capability such as grazing, fattening and reproduction.

Challenge 2: Threats related to the advancement of extensive production and loss of land by small producers

There are cases in which low productivity has had a negative impact on land security, the basis of production. Following the rise in international soybean prices in recent years except 2008, large producers, especially the Brazilians, have invested heavily, and their influences are coming also to Paraguay from east to west, including San Pedro, Caaguazú, Caazapá and Concepción. Meat productivity of small producers are estimated to be only 80 kg/ha/year, equivalent to prices between 400,000 and 480,000 Guarani in December 2010. Under the circumstances, large soybean producers offer to rent land of small producers with the amount more than a double of their income per hectare, and move on to its purchase in the future. There is no doubt that these short-term deals would threaten livestock development of small producers. Indeed, it is difficult for small producers to gain profits without selling their land unless the land is appropriate for adopting appropriate technology. The number of producers has been gradually declining in Paraguay and other countries. Those producers who do not have capital or capacity to adopt modern technology are forced to abandon agriculture and livestock that face hardship and risk. These producers migrate to urban areas, but face different challenges. To break through the vicious circle, there is a critical need to implement effective and efficient programs that would promote new productive activities other than agriculture and livestock.

Challenge 3: Deterioration of public safety

San Pedro in sub-region 3 and Amambay in sub-region 1 are characterized by a high incidence of crimes such as theft of livestock. However, this threat is expanding gradually to other regions, too.

There are two strengths that will help overcome those challenges above.

Cooperation between large and small producers

Since the vaccination of cattle raised by large producers is not sufficient to control the spread of infectious diseases, the ARP and the government have launched the vaccination campaign of cattle raised by small ranchers. Under the situations where public safety and security in rural areas are threatened by illegal occupation of land, theft of livestock, and so on, this Association officially promotes coexistence with small producers with the initiative of large cattle producers to work with small producers in order to share their production techniques and marketing channels.

Paraguay is known internationally as a country free of BSE and in this respect, there is no barrier for export. The Livestock Department of MAG and the ARP maintain the system of vaccination of almost entire herd of cattle, including those of small producers. For example, the National Program to Support Family Agriculture (PRONAF⁵⁶) is implementing a project that target small producers with support of ARP as a counterpart.

Environmentally friendly pasture management techniques

There is already an established system of pasture management techniques or intensive farming. For example, the Voisin Rational Grazing (PRV in Spanish) is an excellent production technique to achieve high productivity in a sustainable manner. The PRV has tangible effect on controlling soil erosion through promoting growth of grass, and contribute significantly to environmental conservation. The ARP and the Regional Agricultural Research Centre (CRIA in Spanish) have jointly developed the techniques of intensive farming and effective management of grass, and are beginning to spread among some large livestock farms. The extension of these techniques among small producers would be made feasible if cooperative relationships between large and small producers are utilized.

B. Cassava

Cassava plays an important role as a staple food crop for self consumption in Paraguay, and is the second most important one after soybean. Among the country's major crops, cassava is the only crop produced primarily by small producers.

⁵⁶ Programa Nacional de Apoyo de la Agricultura Familiar.

Production of cassava

According to CAN 2008, the Eastern Region is a major cassava producing area. In 2008, 225,073 units with 170,551 hectares of agricultural production area produced 2,317,744 tons of cassava. Of all agricultural production units, 90% consists of small producers with less than 20 hectares, in which the planted area of cassava is less than 1 hectare on average. The percentages of production by departments are: Caaguazú 18%; San Pedro 17%; Itapúa 12%; and Canindeyú 10%.

Distribution of fresh cassava

According to the 2008 data on arrival of goods at the central market of Asunción, the largest consumption area, 70% of total 56,411 tons of cassava arrived from San Pedro, 22% from Caaguazú, and 7% from Canindeyú. All these departments fall under sub-region 3 (Figure 3.2-21).

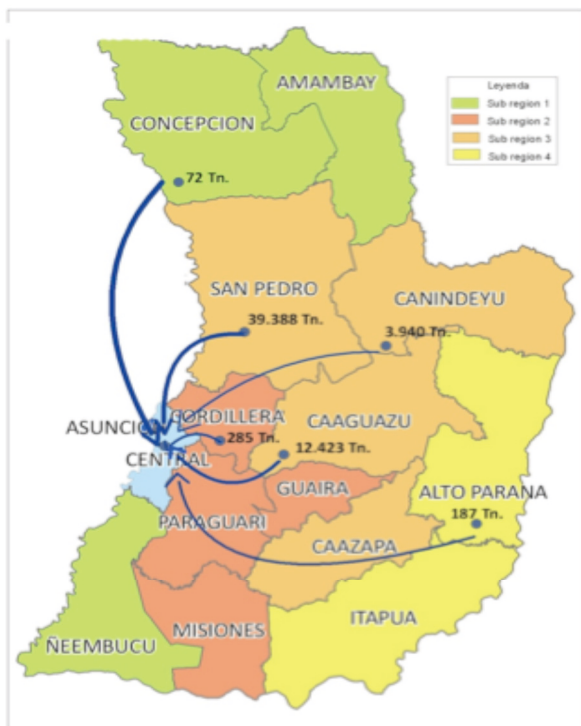


Figure 3.2-21 Marketing of fresh cassava

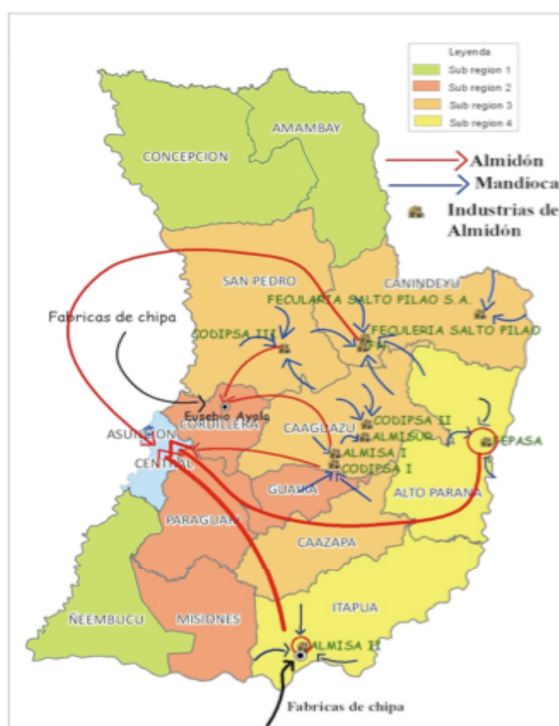


Figure 3.2-22 Marketing of cassava starch

The distribution within the nation is divided into three groups: (1) goods for the central market of Asunción; (2) goods for local markets; and (3) goods for processing. Although there are no official statistics, it was reported that 70% of total production was consumed locally, 25% was allocated to the central market of Asunción, and 5% for processing in 2007.⁵⁷

⁵⁷ ABC Suplemento Rural UN CULTIVO DE RENTA La Mandioca 29/8/2007.
<http://archivo.abc.com.py/suplementos/rural/archivos.php?pid=220192>

Production and distribution of cassava starch

There are six companies in the country that mechanically process cassava starch. These companies have total 11 processing plants in San Pedro, Canindeyú, Caaguazú, Alto Paraná and Itapúa. Figure 3.2-22 shows the distribution channels. Their processing capacity is 1,450 tons per day, which translates into annual processing capacity of 101,500 tons. However, the actual operation rate is estimated to be around 50% due to the lack of supply of raw materials. Although official statistics is not available on the volume of domestic production of cassava starch, the data provided by these processing companies reveals that 70% of cassava starch is oriented to export and the rest to the domestic market.

Exports of cassava starch

The export of cassava starch gained a momentum in the recent decade. Although there are annual variations, both the amount and volume of exports and the average price per ton has shown an increasing trend (Figure 3.2-23). The export was only 2,178 tons with the USD 456,650 (FOB price) in 2001, but increased significantly to 25,688 tons with USD 12,310,919 in 2010. The unit price per ton also increased from USD 214 to USD 479 during this period. The main destinations of exports in 2010 are the member countries of Mercosur (90%), particularly Brazil (approximately 80%).

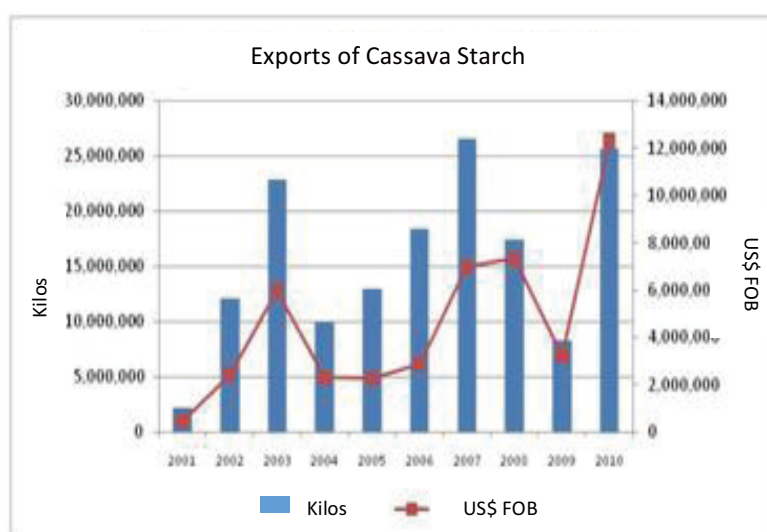


Figure 3.2-23 Exports of cassava starch

Small-scale production of fermented starch and processed products

Cassava starch is produced not only in the six plants mentioned above, but also in small-scale cottage factories. The “fermented starch” is one of the main products used for chipa (i.e., bread made with cassava starch, cheese and egg). Cassava is fermented in water first and dried afterward. As shown in figures 3.2-24 and 3.2-25, fermented starch has more valued added in comparison with industrial starch for export.

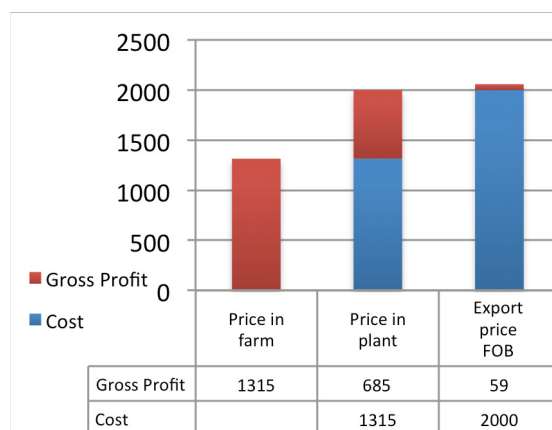


Figure 3.2-24 Cost and gross profits of starch for export

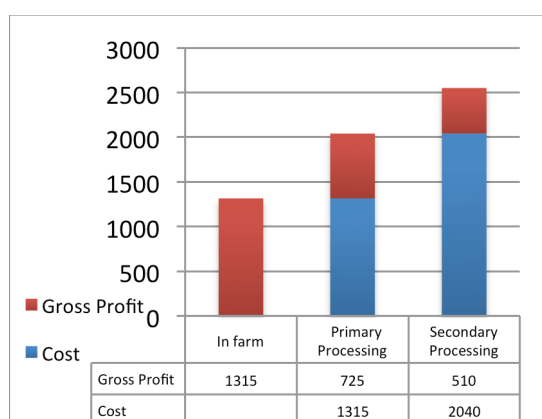


Figure 3.2-25 Cost and gross profits of fermentable starch

Central and Cordillera departments are known as the major production areas of chipa. According to a study by the MIC and Itaipú Bi-national Water Corporation in 2010, Guairá department supplied most of cassava starch used for chipa production using a value chain of this product (figure 3.2-26). To understand the distribution of cassava starch produced by cottage factories, and products prepared from the starch, the present study analyzed

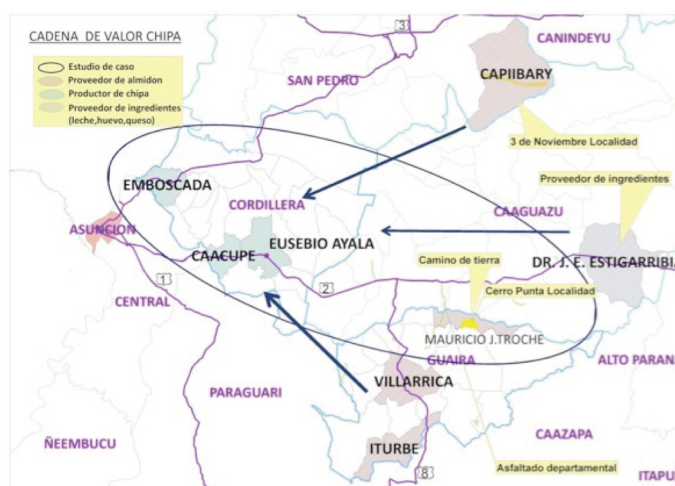


Figure 3.2-26 Example of marketing cassava starch

the value chain of leading producers and distributors of chipa in Cordillera department, and that of agricultural production units producing primary processed product in Guairá department.

First, cassava producers in Mauricio José Troche district of Guairá department harvested cassava, then 32 farms in the district undertook primary processing (milling and drying). Local intermediaries bought this product, and conducted secondary processing in which primary processed products were crushed, submerged in water, fermented, and dried. This secondary processed product was sold to 149 large and small chipa producers in Cordillera department. These chipa producers sold most of their products to stalls in drive-in or through over a hundred vendors. There are some producers who sell their chipa to vendors in Asunción. It is estimated that the volume of cassava starch procured by those producers reached about 900 tons annually.

Potential of demand growth

Both production and demand in the world market of cassava starch has been increasing in recent years. In particular, demand of cassava starch for industrial purposes has been increasing steadily since it has been recognized for its excellent quality as chemically modified starch, by its viscosity and reduced incidence in causing allergic reactions.⁵⁸ There are companies that already invested or plan to invest in their infrastructure to produce chemically modified starch in Paraguay.

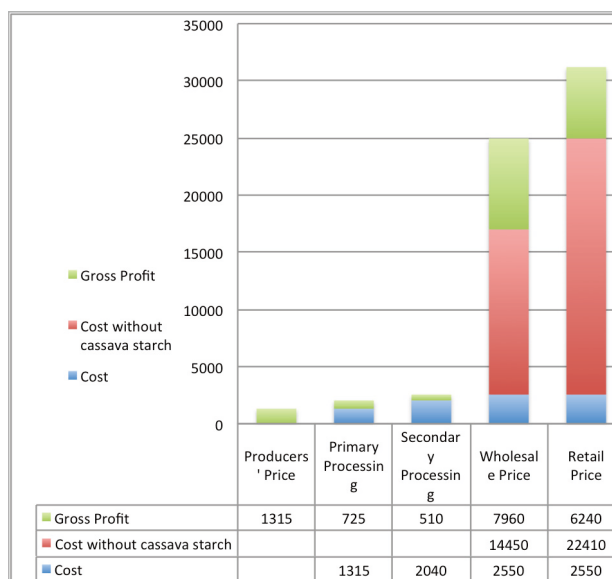


Figure 3.2-27 Cost and gross profit of Cassava starch and chipa

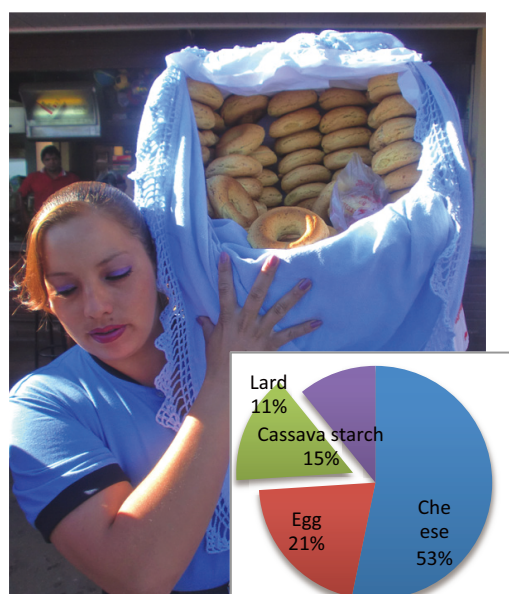


Figure 3.2-28 Price comparison of chipa raw materials

Family industries and small processing plants can provide fermented starch to the market of chipa processing. Fermented starch is used as a raw material for bread baked with cassava starch, consumed very much in Latin-American countries.⁵⁹ Fermented starch produced in family industries has been already exported to Colombia in 2007.

Next, the challenges of cassava starch industrialization are discussed.

Challenge 1: Improve yield and meet market demand

As shown in Figure 3.2-29, the large part of soil in Eastern Region is suitable for cassava production. The average yield of cassava production in 2008 was 16 tons per hectare, a fairly

⁵⁸ Agriculture & Livestock Industries Corporation - Demanda mundial de los productos de almidón, marzo de 2010 <http://www.alic.go.jp/starch/jyukyuu/world/201003-01.html>

⁵⁹ Al dejar sumergida la mandioca triturada en el agua por un determinado tiempo se produce el almidón fácilmente fermentable.

competitive yield even in the world market.⁶⁰ However, the yield is not necessarily high if it is compared with that of the countries that have invested in improving variety and boosting business production. The underdevelopment of industrial use of cassava in Paraguay is because this crop has been traditionally produced for self-consumption, not for cash crop.

Before introducing mechanized production techniques, it is necessary to invest in improving production of small producers who are the main producers of this crop. A critical first step might be to raise awareness among producers about the need to adjust from the current practice of extensive production to programmed and controlled production. It is reported that this alone is likely to increase yield up to 20 tons per hectare.⁶¹

Another critical issue is the possibility of cultivating different varieties to respond to market demand. There are nine varieties that can be harvested in relatively short periods, and other news varieties developed by MAG.⁶² It is necessary to organize production strategically for different uses (self-consumption, livestock food, national market, processing market, etc.) by combining different varieties and crop cycles.⁶³

Challenge 2: Strengthen trust between small producers and large processing enterprises

It is not enough to strengthen technical capacity of producers and increase yield to construct a solid industrial cluster. Most of cassava produced annually is destined to the national market of fresh products, and there is no difference of prices between raw and processed cassava. Besides, starch processing companies face difficulty procuring sufficient raw materials throughout a year

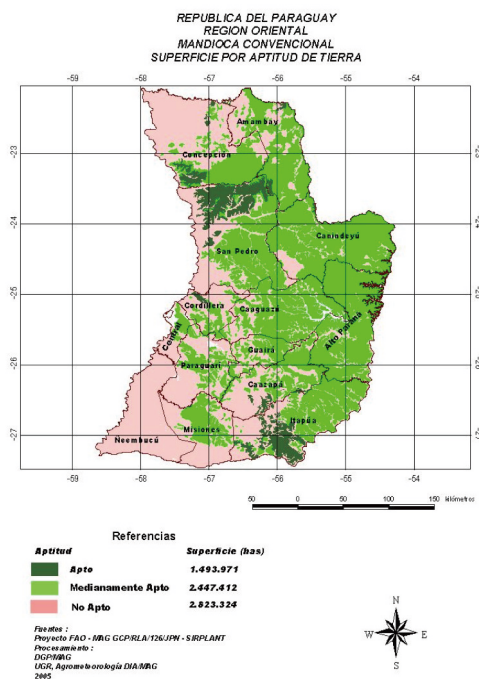


Figure 3.2-29 Map of land suitability for conventional cassava

⁶⁰ De acuerdo con los datos de FAO (2005), el promedio mundial está en 10,9 toneladas/ha, con un máximo de 27,9 (India). Paraguay se ubica en el Segundo lugar entre los 14 principales países productores, y en América Latina se ubica en el primer lugar, con un rendimiento más alto que Brasil que es el país en el que hay mayor desarrollo del clúster industrial de la mandioca.

⁶¹ ABC Suplemento Rural UN CULTIVO DE RENTA La Mandioca. <http://fw3.abc.com.py/suplementos/rural/archivos.php?pid=186679>

⁶² Dellacha, Juan M. Biotecnología en el MERCOSUR, 2003.

⁶³ MAG Cassava 2007/2008 P3 However, under the condition that small producers do not sell their land to soybean farmers.

because of seasonal fluctuation of cassava price.⁶⁴ The relationship between the processing companies and cassava producers is not solid.

In fact, there are some companies which have already made efforts to address these problems. For example, a processing company from Caaguazú has been consolidating cooperative relationships not only with cassava producers, but also with packaging companies, collection centers and private financial institutions, which constitute the value chain. The producers, on their part, seek to sign a contract with the processing company to provide raw material in a stable manner. Thus, this scheme increases merits for both parties. Through this contract, the starch company facilitates the producers to obtain credit from a local private financial institution. Currently intermediaries play the role of financiers with whom producers negotiate credit amounts and repayment.

Challenge 3: Revitalize starch processing plants

During the last government, over ten small cassava starch communal plants were built with financial aid from royalties of Itaipú Bi-national Corporation. Currently, many of them are not operational and do not supply the national market with raw material. However, if those idle plants could be revitalized, starch for the domestic market could be processed locally in the production areas. This would also help facilitate participation of small cassava producers in the value chain in those areas.

It was reported that the lack of proper management is one of the main reasons for the idle cassava processing plants. There is, however, a successful case in which the Association of Almidoneros from Santa María (General Morínigo, Caazapá) has been managing their processing plants properly and has opened a chipa restaurant. This Association composed of 20 member producers which process starch in a small plant for sale to the local market and chipa producers in Cordillera. Reportedly, the key to success was that the Association developed management capacity with support of MAG and GTZ.

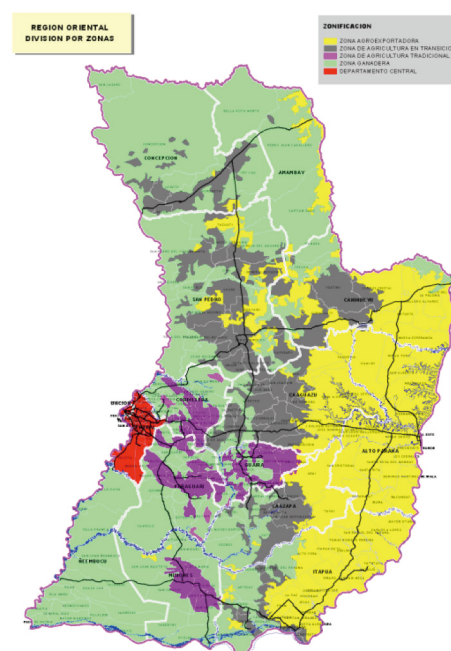


Figure 3.2-30 Map of land uses of the Eastern

⁶⁴ ABC Rural Supplement AN INCOME CROP Cassava.
<http://fw3.abc.com.py/suplementos/rural/archivos.php?pid=186679>

C. Soy

Sixth place in production and fourth place in exports

Soy is one of the most representative crops of Paraguay in terms of its contribution to the economy. According to the Paraguayan Chamber of Exporters of Cereals and Oilseeds (CAPECO)⁶⁵, the area planted was 2,680,000 hectares, and produced 7,300,000 tons in 2010,⁶⁶ There are 11,710 large and small production units of soy registered in the country, with an average of 48 hectares per farm, according to the data from CAN 2008. Disaggregating by departments, Alto Paraná is the major producer with 741,842 hectares, Canindeyú with 469,834 hectares, Itapúa with 480,721 hectares and Caaguazú with 318,664 hectares. These four departments together represent 81.5% of the land in which soy is planted in the country. (The yellow areas in figure 3.2-20 show the area of soy and beans production.)

Paraguay is the sixth largest country of soy production in the world after USA, Brazil, Argentina, China and India. Likewise, it is the fourth largest country of soy exports after Brazil, USA and Argentina (USD 1,587 million). The main export destinations are the Netherland, Italy, Turkey, Russia and Spain. The exports to European countries account for more than 70% of total soy exports of Paraguay.

560,000 people are involved in this cluster

Approximately 75% of total soy production is destined to export and 25% to processing (soy oil, soybean meal pellets for animal feed). Soy constitutes the agricultural product that has the largest cluster in Paraguay, where over 10,000 producers, 14 large cereal exporting companies, 46 agrochemical companies, 66 agricultural machinery companies, and a large number of agricultural engineers are involved. Adding brokers, transportation, and employees of processing companies, it is estimated that 560,000 people are involved in this cluster.

Soy value chain

The example of an Itapúa company is presented below to illustrate a value chain of soy. In 2008 this company bought 290,000 tons of soy, of which 72,500 tons (25%) were sold in the domestic market as processed products (oil and others) and the remaining 75% was exported. The value chain is simple such as follows: producer → transport → silos → processing plants → storage → sale in the national market.

In 2009, the average price of producers was of 320 dollars per ton, and the average export and sale price of processed products in the country was 450 dollars per ton, yielding gross profits of approximately 40%. The economic impact in the production phase was 92,075,000 dollars for

⁶⁵ CAMARA PARAGUAYA DE EXPORTADORES DE CEREALES Y OLEAGINOSAS (CAPECO).

⁶⁶ Entre enero y noviembre de 2010, Banco Central del Paraguay.

2,200 producers.⁶⁷ In the export preparation phase of non-processed products and in the processing phase, 33 people were directly employed and generated 101,250,000 dollars for export, and 30,563,000 dollars for processed products (soy oil, flour and shells feed), totaling 131,813,000 dollars.

Demand keeps increasing

Analyzing the world trend of demand, soy producers expect that the demand for soy would keep increasing due to an increasing demand of soy-based oil in China and a reduction of North American export associated with the increase of soy export as a biodiesel.⁶⁸ An increase in the world demand of soy flour for feed is also expected. It is certain that soy production in Paraguay will certainly continue to play a major role in the national economy, but the following challenges remain unaddressed.

Challenge 1: Address social problems and deforestation

The soy production area has expanded rapidly. The volume of production doubled over ten years from 291 million tons in 2000. Today, large commercial companies and large producers continue to buy or lease the land of small producers, expecting the demand for soy to rise in the future. This movement has been accelerating the loss of land of small producers and causing social problems. So far, policy measures such as programs of occupational change for those producers who no longer work on agriculture is absent. The purchase of land by Brazilians has been sometimes perceived as cultural invasion among Paraguayans. At the same time, an unchecked expansion of soy production has been increasing stress on environment such as forests. In fact, many native forests have been lost due to the expansion of agricultural land for the purpose of increasing soy production.

Challenge 2: Grow out of production techniques dependant on agro-chemicals

Currently soy production techniques depend heavily on the use of agro-chemicals and fertilizers. If the use of these techniques would be continued for a long period, their impacts need to be analyzed and monitored over extended periods of time. A study of water by an research institute in Europe found that there is no significant harmful effect of application of chemical materials at least in a short period.

⁶⁷ Delivery price at farm gate: Approximately USD 400/ton.

⁶⁸ The most important factor behind the growth of exports is ensuring efficient water transport, and the biggest limiting factor is the reduction of water level in rivers during the dry season, hampering navigation. There's a shipbuilding company median Japan is building a shipyard for shallow draft barges capable of navigating in the dry season, considering the future increase in trade volume.

Paraguay has already begun introducing environmentally friendly techniques in the last decade under the initiatives of the Chamber of Commerce and Industry of large producers. These consist of cultivation on contour lines, incorporation of green manure, forest fringe around crop land to reduce dispersion of agro-chemicals, and so on. It is necessary to continue developing these eco-friendly techniques to increase sustainability of production.

D. Sesame

Sesame is a representative cash crop produced by small producers oriented to specific firms.⁶⁹ Originally small producers began producing sesame as a substitute of cotton. For example, in sub-region 1, sesame occupies 84% of cash crops oriented to specific firms. The export demand of sesame is expected to expand further in the future. A case of value chain of this product is presented below.

Social actors of sesame

A case of sesame production in Concepción department of Sub-region 1 is analyzed. The value chain of sesame consists of two large export-oriented processing companies (Kemasen y Shirosawa). Both companies have established a simple distribution channel that consists of production → collection centers → processing plants outside the department → export. Social actors directly involved in the value chain are approximately 10,000 producers and four suppliers of equipment and materials used at the production stage.

Value chains of sesame

The producers clean harvested sesame, and package them in the bags provided by the processing companies. Then, the packaged products are transported four collection centers in Horqueta and Yby Yau (there are two in each town) using the trucks provided by the processing companies. Sesame is then transported to the processing plants in Limpio and Mariano Roque Alonso. The social actors involved at

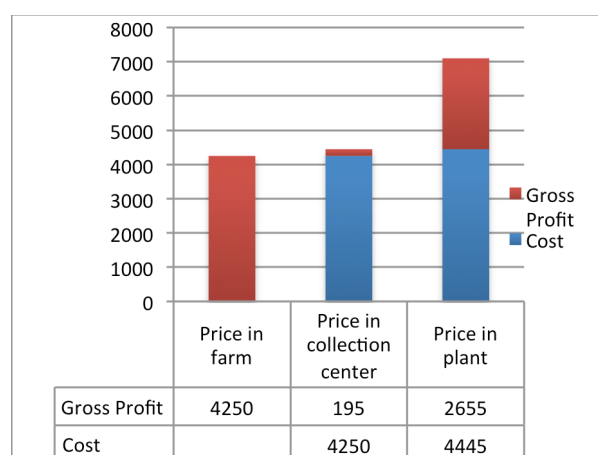


Figure 3.2-31 Cost and Gross Profit of sesame

⁶⁹ The products are classified into four groups: (a) cash crops produced by large companies and producers, (b) cash crops produced by small producers to sell to certain companies, (c) other cash crops produced by small producers, and (d) subsistence crops of small farmers. Of these, Sesame is a product representative of the group (b).

the processing stage are approximately 60 full-time employees in the processing plants and 13 suppliers of equipment and materials.

The value added generated in Concepción department account for merely 4.5%, including the value generated by transportation to the collection centers and the packaging process before leaving for the plants outside the department. The transportation cost from the producers to the collection centers is paid by the processing companies. The case of value chain in Concepción makes clear that the value added at the distribution stage is minimal, and the number of actors is much fewer than that of producers.

High demand for export

According to the Paraguayan Chamber of Exporters of Sesame (CAPAXSE), the area of sesame planted expanded from 5,640 hectares in 2002 to 21,635 hectares in 2008.⁷⁰ This Chamber expects that the export demand for sesame, including Japan, continues to increase, and that the export volume of Paraguay would triplicate in the near future. In fact, the processing companies reported that they had already made investment to expand processing capacity to meet increased demand in the future, and therefore the current processing capacity far exceeds the current volume of production.

The challenges to be addressed in order to realize those potentials are pointed out below.

Challenge 1: Declining soil productivity

The largest challenge at the production stage is how to alleviate declining soil productivity. The soil productivity is typically measured by the yield per hectare (unit yield). Since sesame production began in Concepción, soil productivity declined from 750 kilograms per hectare to 575 kilograms per hectare, or 30% of reduction. The extent of this reduction is equivalent to 16,332 million Guarani and 1,633,200 Guarani per production unit, having had a major impact on income of producers. The decline of soil productivity is primarily due to the current production system that has been exploiting soil without taking measures to recuperate soil productivity, such as fertilization and rotation crops, This decline is therefore a predictable consequence.

Challenge 2: Quality management

Besides declining soil productivity, quality management is another issue to be addressed. Facing the declining yield and the proliferation of plagues, producers in some areas used agro-

⁷⁰ La superficie sembrada en 2002 en la Región Oriental de 15.000 hectáreas aumentó a 75.000 hectáreas en 2008. La mayor zona de producción de Concepción es Horqueta donde el sésamo ocupa aproximadamente el 53% de la superficie sembrada.

chemicals, mixed them with sesame produced without agro-chemicals, and shipped them to the export market. This incident has been reported by importing countries, and Paraguayan sesame has lost trust in the international market. Facing this situation, processing companies began introducing quality management system that extends from production to export.

Assistance to small producers by export processing companies

Small producers currently sell their products to specific export processing companies, and the latter provides technical assistance and support for the former. Although the numbers of producers who have received technical assistance from processing companies are still limited since this put extra cost on processing companies, it is expected that their assistance would help address the challenges indicated earlier.

As a concrete measure, processing companies are recommending small producers to adopt crop rotation using legumes that can fix nitrogen from the air to the soil.⁷¹ Their technical assistance does not include the use of fertilizers since this requires investment of small producers.

The presence of collection centers should be seen as strength to enhance capacity. These centers are “nodes” between small producers and processing companies. If these facilities could be converted to a space of communication among small producers and between small producers and extension technicians, there is a potential to strengthen capacity of small producers effectively with limited resources.

E. Dairy products

In livestock industry, the second highest export items after beef are dairy products. Milk is produced throughout the country, and sub-regions 3 and 4 have established industrial clusters that extend from the purchase of raw materials to processing. In sub-region 3 there are 45,095 production units (dairy farms), which raise total 147,152 heads of dairy cows. Among these, 40,030 are Holstein, a breed of high capacity for lactation. In sub-region 4, there are 55,019 heads of dairy cows, of which 11,752 are Holstein. Approximately 90% of livestock production units are small producers with less than 50 heads, which raise predominantly Holstein.

⁷¹ Leguminous crops usually contain rhizobia that can fix nitrogen from the air. The use of these crops in rotation system can increase soil productivity.

Social actors and value chain of dairy farming

As a case study, the value chain of milk in Itapúa (sub-region 4) is analyzed. In this department there are 29,825 heads of cows, of which only 13.3% are Holstein, and milk production depends largely on small livestock production units (dairy farms).

The value chain of milk starts with 350 to 450 dairy farms directly contracted by processing companies in southern Itapúa and Alto Parana. These dairy farms produce milk with provision of equipment, materials and technical assistance from a dairy processing company, such as mixed feeds, nutritional supplements, milking equipment, vaccination, primary milk storage containers, grass seeds, grass cultivation techniques, and others. In addition to the dairy processing company, the producers buy remaining grain from local silos and equipment from local distributors. Thus, this value chain involves three organizations at the production stage. The unit price of delivery of raw milk from those dairy farms is 1,425 Guaraní per liter.

These farms combine their own milk with that of other farms, excluding self-consumption, and sell approximately 71,000 liters per day to the dairy processing company.⁷² This results in a sale of around 36,423 million Guaraní a year at the production stage. The dairy farms transport their products (raw milk) to 42 and 5 collection centers of Itapúa and Alto Paraná, respectively. Coordinators of the dairy farms are attached to respective collection centers. The processing company collects raw milk every two days at these centers, and transports them to the processing plant located in Hohenau in Itapúa.

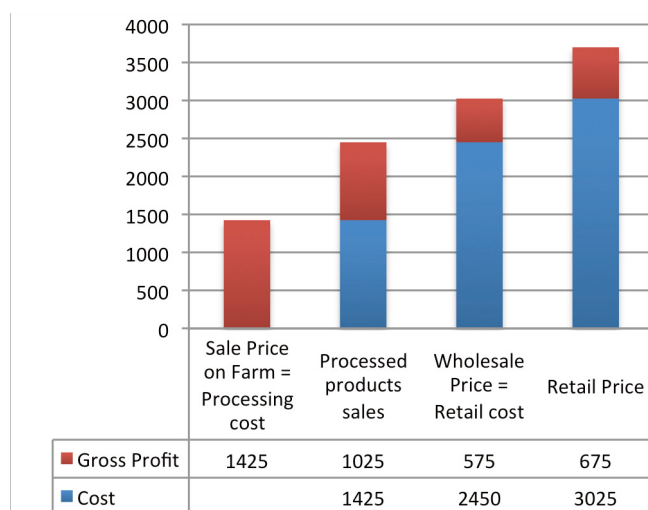


Figure 3.2-32: Cost and gross profits of dairy products (kg/Guarani)

In this plant, 58 employees work full time. Other entities involved in this process are fifteen, including suppliers of sugar (for the production of yogurt), paper packaging, and so on. The plant spends 62% of the raw materials for the production of milk, 27% for yogurt, and the rest for other products such as cheese. The product is marketed with 2,450 Guaraní per liter, which includes

⁷² According to a study under EDRIPP, the average collection of raw milk 71,000 liters per day can be broken down into 48,000 liters of the approximately 400 farms directly contracted by the processing company, and 28,000 liters of other dairy farms.

gross profit 71.9%.⁷³ Net profit of the plant is around 6%, and the remaining 94% are costs for production.

The products of the processing plant are sold to retailers (supermarkets and others) through wholesalers. The average price of dairy products is in 3,700 Guarani per liter. Gross profit generated at the wholesale and retail stage account for 51% of sales price at the processing plant. Approximately 50% of dairy products are consumed in the metropolitan area.

Needless to say, the processing plant for dairy products in Hohenau is the core of this value chain. The 47 collection centers not only handle the products together, but also play an important role as a forum for communication between companies and producers to provide the technical assistance and monitoring.

Possibility of increase in demand

The dairy processing company studied above expanded its production capacity by 30% in the last five years up to 33.74 million liters annually. The actual production in 2010 was approximately 25.56 million liters, with an operating rate of about 75%.

It is often reported that the demand for milk in the domestic market has become saturated. However, the annual consumption of dairy products per capita in Paraguay is only 83 liters (measured by quantity of milk), which is low compared with neighboring countries and falls short of 145 liters, the minimum-recommended consumption level by the World Health Organization (WHO).^{74,75} Considering that the Paraguayan Chamber of Dairy Manufacturers and the Livestock Department of MAG are planning to organize a campaign to promote milk consumption, it is likely that the domestic market would grow in the coming years.

The demand for export is also expected to increase in the future. For example, the dairy company under the current study reported that neighboring countries, particularly Brazil which is experiencing rapid economic growth, cannot meet demand with domestic production only. Apparently the company was consulted by Brazilian companies if it is possible to export their products by the amount of 100,000 liters per month. The analysis above indicates that it is quite possible to sustain market development in export in the short term and the domestic market in the medium to long term.

⁷³ The average price of milk per liter and the other products indicated.

⁷⁴ Brazil (127 liters), Argentina (192 liters), Uruguay (221 liters), according to 2002 FEPALE report.

⁷⁵ To achieve the recommended by WHO, maintaining current productivity calls for increased 33,866 head more. "Exploitation of medium and small farms in Paraguay", 2004 MAG/JICA.