2. INDUSTRY

2.1 CURRENT SITUATION

2.1.1 General description

(1) Production and value added

1) Contribution to the national economy

The Paraguayan industrial sector represented 14.1% of GDP in 1998, according to the Central Bank of Paraguay. This percentage has declined gradually during 1990's from 16% to 14%. Compared to other Latin American countries, Paraguayan industry contributes little to the national economy. Among MERCOSUR countries, Brazil and Argentina achieve industrial proportions of around 25%. Uruguay, with a similar economic structure to Paraguay, has an industrial sector that accounts for 21-23% of GDP, including the mining sector.

Table 27 Industrial Growth and Contribution to GDP

	1991	1992	1993	1994	1995	1996	1997	1998
Growth Rate	1.1	0.4	2.0	1.5	3.0	△2.2	△0.2	1.0
Contribution to GDP	15.9	15.6	15.3	15.1	14.8	14.3	13.9	14.1

Source: Economic statistics, BCP

The Paraguayan industrial sector had negative real growth rates in 1996 and 1997, and it recovered to a positive rate of 1% in 1998. The average growth rate of the sector during 1991-98 was 0.8%, lower than the 2.5% overall GDP growth rate. The industrial sector has been played a secondary role in the economy, and its importance has decreased more since the onset of MERCOSUR.

Historically speaking, Paraguay has not employed any specific industrial policy. Even when most Latin American countries promoted industrialization through import substitution, Paraguay maintained an open economic system. Exceptions, such as cement, steel and petroleum refinery were limited in magnitude. The reasons for not pursuing an active industrialization policy were that the domestic market was small, and that it was cheaper to import industrial goods from neighboring countries than to produce and supply them domestically. It is also said that the former military regime did not want industrialization because it would promote labor unions.

2) Major industry groups

As we can see in the following Table, more than a half of industrial value added is concentrated in the food, beverage and tobacco industries, of which the food industry accounted for 38.4%. The beverage industry accounted for 11.8% of the industrial total in 1997. Other major contributors are: a) the textile industry - including leather products (9%); and b) the wood industry (14%). This means that the processing of raw materials from agriculture and forestry created approximately three-quarters of industrial value-added.

Table 28 Industrial Production 1997

CIIU	Value Added (US$1,000)	Share (%)	Employment	Share (%)	Value Added per Worker (US$)
31 Food, Beverage & Tobacco	737,093	50.9	30,527	16.8	24,145
32 Textile, Leather & Shoes	131,462	9.1	63,652	35.1	2,065
33 Wood & Furniture	202,595	14.0	21,630	11.9	9,366
34 Paper & Printing	97,890	6.8	7,382	4.1	13,260
35 Chemical & Petrochemical	76,126	5.3	7,100	3.9	10,722
36 Non-metallic Minerals	76,420	5.3	18,939	10.4	4,035
37 Basic Metal	2,734	0.2	3,467	1.9	789
38 Metal Products & Machinery	13,588	0.9	9,769	5.4	1,391
39 Other Manufacturing	2,953	0.2	19,103	10.5	155
Sub-total	1,340,861	92.6	181,570	100.0	
Handicrafts (Difference)	107,272	7.4	-	-	-
Total	1,448,132	100.0	181,570	100.0	7,976

Source: (Value Added) BCP
(Employment) Dirección General de Estadísticas Encuestas y Censos

As for employment, the Paraguayan industrial sector employed 10.0% of the economically active population, or 181,570 people in 1997 (see Table 28), declining from 11.1% in 1995, and 10.4% in 1996. The textile and leather sub-sectors absorbed more than one third of industrial employment. The second largest absorber was the food industry, followed by the wood processing industry and the non-metallic mineral industry (which produces cement, bricks and glass bottles).

Compared to the sector's US$8,000 average value-added per person (see Table 28), the industries that attained relatively higher productivity are the food industry (US$24,145), the paper & printing industry (US$13,260), the chemical industry (US$10,722) and the wood processing industry (US$9,366). These sub-sectors can be called the relatively modern industries of the country. On the other hand, the rest of the sub-sectors in the table created much less value-added per worker. These are the non-metallic mineral industry (US$4,035), the textile and leather industry (US$2,065), the metalworking industry (US$1,391), the steel industry (US$789) and other manufacturing (US$155). These sub-sectors are traditional industries, and may, except for steel, include substantial home industry. Observe that there is a dichotomy in Paraguayan industry in terms of labor productivity.

In the value-added column of Table 28, “handicrafts” was included, while the employment figure did not appear in this row. Therefore, the value added of “handicraft” should be distributed in each sub-sector, which includes traditional home industries. Taking this point into account, the productivity of the traditional sub-sectors should be slightly higher than the figures in the table.

3) Production by sector

Table 29 shows the production value of 28 industrial sub-sectors during the period of 1990-97. Industrial production as a whole increased by 62.7% in the current US dollars, between 1990-96, but decreased by 2.5% in 1997.

Among the 28 sub-sectors, the most important industry is food processing, which achieved 83% growth during 1990-97. A large increase was also seen in the beverage industry, which expanded more than 2.4 times. Chemical products for industrial use and plastic products increased their production significantly in 1993. The printing industry also grew almost three times between 1990-97. The cement and brick industry achieved a large increase in 1992 and 1995 of 49% and 43% respectively.

The trend of production in the wood, leather and textile industries should be noted, from the viewpoint of industrial linkage. The production of wood processing increased most significantly in quantity, while the production of wooden furniture was stagnant and almost constant in dollar basis. The leather tanning industry also expanded its production in the early 1990s and in 1996, while the shoe making industry, a typical downstream industry of leather did not show an increase of production in dollar terms. Another important sub-sector is the cotton industry. The textile industry peaked in 1991, after which it did not recover to the 1991 level as of 1996. Between 1990 and 1997, production in the garment industry fell by a total of six-sevenths. These three industrial groups experienced significant decreases in downstream fabrication, even though their upstream sub-sectors accomplished some increases in production.

Table 29 Production Value (Current US$ million)

		1990	1991	1992	1993	1994	1995	1996	1997
No.	TOTAL	1,844	2,143	2,216	2,287	2,489	2,844	3,000	2,953
311	Food Products (except beverage and tobacco)	653	741	826	806	935	1,033	1,200	1,196
312	Varied Food Products	66	54	52	50	58	62	63	71
313	Beverage	144	215	219	255	257	305	346	352
314	Tobacco	18	24	23	27	22	25	23	18
321	Textile	265	320	215	229	222	268	211	126
322	Garment	7	4	4	3	2	2	2	1
323	Leather and Its Products	31	86	75	99	102	1,169	143	138
324	Shoes	56	74	68	58	47	54	59	6
331	Wood Products (not Furniture)	252	274	267	290	347	415	403	439
332	Wooden Furniture	21	21	20	15	18	20	20	23
341	Paper	2.5	2.8	3.1	2.2	1.7	2.2	2.1	2.0
342	Printing	47	54	61	74	90	123	128	137
351	Basic Chemical substance	17	18	17	46	45	46	41	45
352	Other Chemical Products	30	30	23	29	30	31	29	3
353	Petrochemical Products	159	131	130	108	108	79	59	34
355	Rubber Products	1	1	1	1	1	1	1	1
356	Plastics	25	27	29	56	45	40	38	41
361	Ceramics	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1
362	Glass	9	8	11	6	4	5	4	0
369	Non-metal minerals	56	60	90	97	94	135	134	13
371	Iron and Steel	14	15	12	9	9	10	9	8
372	Non-ferrous Metal	5	4	4	4	2	2	2	2
381	Metal Products (not Machinery)	22	24	21	17	10	10	10	10
382	Non-electric Machinery	2	3	3	2	2	2	2	2
383	Electric Machinery	1.6	1.8	1.7	0.8	0.6	0.6	0.6	0.6
384	Transport Equipment	18	17	17	14	9	10	10	9
385	Measure. & Control Equip.	0.4	0.1	NA	NA	0.0	0.0	0.0	0.0
390	Other Manufacturing	101	10	NA	NA	6	6	6	6

Source: BCP

There are several declining industries: petroleum derivatives, glass, steel and other metal industries, electric and non-electric machinery, transport equipment, and measurement & control equipment. Most of them have been declining throughout the 1990s, and most experienced especially large declines in 1993 and 1994.

(2) Export of industrial products

The export of industrial products took off at the end of the 1980s. As a share of total exports, however, they decreased from 76.1% (1995) to 64.9% (1996), then to 49.9% (1997). Here, industrial products includes agriculture, livestock and forestry products that are processed before export, such as cotton fiber, fresh and frozen meat, sawn timber, etc. The following table shows declines in not only the share of industrial exports but also in the absolute value of their exports since 1995. Meanwhile, non-industrial exports increased drastically, mainly supported by soybean

exports.

Table 30 Paraguay's Industrial Product Exports (US$1,000)

	1992	1993	1994	1995	1996	1997
Non-industrial Exports	143,859 (21.9%)	237,823 (32.8%)	268,763 (32.9%)	219,936 (23.9%)	366,128 (35.1%)	572,977 (50.1%)
Industrial Exports	512,698 (78.1%)	487,395 (67.2%)	548,070 (67.1%)	699,395 (76.1%)	677,320 (64.9%)	589,802 (49.9%)
Total Exports	658,555 (100.0%)	725,218 (100.0)	816,833 (100.0%)	919,331 (100.0)	1,043,448 (100.0%)	1,142,779 (100.0%)

Source: "Economic Statistics" No.427, BCP
Note: Non-industrial exports include: cereals, oil seeds, coffee grain, silkworm, vegetables and live animals. Cotton fiber and sawn timber are categorized in industrial exports.

(3) Regional distribution of industry

Industrial enterprises are spread widely over national territory, owing to several factors such as proximity to raw materials or to the market, availability of human resources, infrastructure and other input materials for the enterprise. The following shows the major regional distribution of enterprises and employment, according to the Compendium of the National Industrial Census 1997.

Table 31 Regional Distribution of Enterprises and Employment

Department	No. Of Enterprises	Share	Employment	Share
Central	853	28.2%	27,241	32.4%
Asunción	722	23.8%	23,327	27.7%
Alto Paraná	293	9.7%	6,712	8.0%
Itapúa	237	7.8%	5,256	6.2%
Caaguazú	223	7.4%	4,750	5.6%
TOTAL	3,029	100.0%	84,110	100.0%

Source: Compendio de Censo Industrial Nacional 1997, Dirección General de Estadísticas Encuestas y Censos, BCP

It is clear from Table 31 that Asunción and Central Department have more than half of industrial enterprises and industrial employment. Alto Paraná and Itapúa are the next two departments in importance after Asunción and Central Department. These four regional territories represent about 70% of industry in terms of the number of enterprises and employment.

The location of central offices is concentrated as well: 31.7% of central offices are in Asunción, followed by 25.4% in Central Department, and then Caaguazú, Alto Paraná and Itapuá. The concentration in the capital and the principal urban centers can be partially explained by the lack of infrastructure in the interior region.

(4) Distribution of enterprises by scale

The dominant part of Paraguayan industry is composed of micro, small, and medium-scale industries. They use traditional production technology, have numerous production process problems, and their employees have a low level of productivity.

According to the 1997 National Industrial Census, nearly 9,000 industrial establishments were identified. One third of them were operating with more than 7 workers. According to the UIP (Unión Industrial Paraguaya), 98% of the industrial enterprises of the country are micro, small, and medium sized (firms with less than 100 employees), while 2% are classified as large-scale enterprises. The distribution of enterprises, defined by number of workers, is as follows:

Table 32 Size of Enterprises

	Definition by no. of workers	% of establishments
a) Micro enterprises	1-6	79%
b) Small enterprises	7-19	13%
c) Medium enterprises	20-99	6%
d) Large enterprises	More than 100	2%

Source: 1997 National Industrial Census

In 1996 there were 93,264 workers in the industrial sector, of whom 84,527 were directly involved in production, while the rest were involved in other activities of the enterprise. Of the total 93,264 employed workers, 59,735 were unskilled (63.8%), and 24,258 were semi-skilled (25.9%).

2.1.2 Overall trends and issues by sub-sector

(1) Agricultural processing industries

1) Structure and trends

The term agricultural processing here refers to the stage spanning from the time when agricultural products (including tobacco) and livestock leave the care of producers to the time when processed products are either sold to retailers and wholesalers or exported. The products concerned are limited to foods or the raw materials and are used in foods.

Although cotton is agricultural produce, it is not considered a form of food and hence is discussed in the next Section (2) Cottonseed, however, is included because it can be processed to produce cottonseed oil. Mixed feed, which includes corn, soybean extract cake, sorghum and by-products of animal slaughter, is considered a food as it ultimately ends up in meat, raw milk and eggs, and

therefore falls within the scope of agricultural processing.

At current value, total production in the industrial sector was US$2,953 million in 1997, of which agricultural processing contributed US$1,637 million or 55.4 %.[12] In the period 1990 to 1997, real production output relative to the industrial sector overall, rose slightly before falling 2.2 % in 1996. Average growth over this period was only 5.6 %. Agricultural processing, meanwhile, enjoyed 22.7 % average growth over the same period, despite minor blips in 1991 (2.6 %) and 1993 (0.9 %), and grew 7.6 % as a proportion of the total industrial sector.

In 1997, agricultural processing contributed 55.0 % of the added value generated by the industrial sector (excluding manual labor), or US$737 million at current value, and provided 16.8 % of the jobs in the industrial sector, employing 30,527 workers. The added value contribution was 3.3 times higher than the employment contribution, indicating that agricultural processing is about six times more productive than other industries in Paraguay. Agricultural processing industries have in fact been the driving force in boosting overall added value in the industrial sector, as well as per capita added value.

Exports of agricultural produce, and associated processed products, accounted for 56.4% of total exports in 1994. This figure shot up to 73.7 % in 1997, reflecting the declining fortunes of cotton and wood products). However, processed agricultural products remained at around 20-23 % during this period.

In 1997, domestic demand for processed agricultural products was US$2,046 million, compared to domestic production of US$1,637 million; 33.2 % of domestic demand was met by imports, while exports represented 16.6 % of domestic production.[13]

a) Production and domestic demand

Table 33 gives a breakdown of production output and growth rates by category using the 4-digit industrial codes.

[12] Source: (Output, Value Added) BCP, (Employment) DGEEC, BCP

[13] Production output and import/export value converted to current values. Alcohol and tobacco are commonly re-exported; excluding these two categories, imports account for 16.9 % of domestic demand and 18.5 % of domestic production is exported.

Table 33 Breakdown of Production Output and Growth Rates of Processed Agricultural Products by Category

Category	Breakdown of output (%)	Growth rates (%)	Category	Breakdown of output (%)	Growth rates (%)
3111Livestock products	22.8	1.0	3121 Other foods	3.9	1.0
3112 Milk products	7.2	76.8	3122 Pet food	0.4	−80.5
3113 Preserved food of fruit and legumes	0.3	44.8	3131 Alcohol	0.5	−31.7
3115 Edible oils and fats	18.7	81.5	3132 Wine	0.4	−11.7
3116 Flour and polished rice	8.3	−11.0	3133 Beer	11.8	107.0
3117 Processed flour products	8.3	16.2	313 Carbonated drink .etc	8.7	36.9
3118 Sugar refining	7.3	12.3	3140 Tobacco	1.1	−37.9
3119 Confectionery	0.3	−18.5	**Total**	**100**	**22.7**

Source: BCP (1982 prices of "Volumen y de la Producción Industrial"); Breakdown of output as of 1997; (Real) growth rates for 1990—1997.

Positive factors influencing production by category (excluding imports and exports of both produce and finished products) were the increase in the supply of agricultural produce and high population growth.

The supply of most categories of agricultural product is still rising, notwithstanding a drop in cotton (which affects cottonseed oil). Exports of agricultural product (where Paraguay has become increasingly competitive; see part b) that follows) are also on the increase, while imports are declining. Overall, then, the supply of agricultural product for agricultural processing has not been a limiting factor.

Population growth over the period 1990 to 1997 was 20.5 %, while agricultural processing grew 22.7 % in real terms over the same period. Although agricultural processing output per capita has remained relatively constant; the population increase has helped to push up total production.

Growth rates by category exhibit significant variation. Of the eight categories that account for at least 5 % of total production, beer had the highest growth (107.0 %), while flour and polished rice had the lowest (-11.0 %). Thus, over a period of just 7 years, agricultural processing industries have undergone massive structural change.

Table 34 shows the categories shown in Table 33 arranged into three groups: those categories that have grown faster than the population growth rate (A), those with negative growth (C) and those with positive growth slower than the population growth rate. (B)

Table 34 Categories Arranged by Growth Rate and Breakdown of Output

Rate of growth	Categories	Breakdown of output
A. Rate of growth > population growth rate	5 categories (milk products, preserved food of fruit and legumes)	46.7%
B. Population growth rate > rate of growth >negative growth rate	4 categories (livestock products, processed flour products, sugar refining, other foods)	42.3%
C. Negative growth rate	6 categories (flour and polished rice, confectionery, pet food, alcohol, wine, tobacco)	11.0%

Two factors that influence the breakdown of processed agricultural products are per capita GDP and consumer preferences. In general, as per capita GDP rises, the change in income elasticity tends to boost consumption of animal proteins and fats/oils, while carbohydrate consumption decreases. Furthermore, consumption of 'luxury' food lines tends to increase while consumption of staple foods remains constant. Consumer preferences for luxury items, while closely linked to per capita GDP, are also influenced by worldwide trends such as fast-food lifestyles and healthy eating.

Most of the five product categories in Group A are luxury items, in which consumption would be expected to increase with rises in per capita GDP. Per capita GDP has, however, remained relatively constant at around US$1,600 in real terms. Rising exports boosted production of edible oils and fats, but increases in the other categories are unrelated to per capita GDP and appear, therefore, to be linked to changes in consumer preferences[14], perhaps due to the 'demonstration effect'.[15]

Many of the categories where the rate of growth was less than the population growth rate are basic foodstuffs; although luxury lines such as confectionery, wine and tobacco also fall into this group, changes in consumer preferences appear to have been outweighed by the impact of imports.

In terms of production trends, rapidly changing consumer preferences in food can be considered a defining characteristic of agricultural processing industries in Paraguay during the 1990s. This manifests itself in the variation in growth rates among the different categories.

[14] To some extent, this is supported by changes in the per capita daily food supply. All categories were relatively constant throughout the 1980s; the averages were 291 g of cereals and grains, 514 g of potatoes, 184 g of meat and 138 g of milk and milk products. The corresponding averages for the 1990s are: 209 g of cereals and grains (down 28 %), 436 g of potatoes (down 15 %), 226 g of meat (up 23 %) and 181 g of milk and milk products (up 31 %). (Figures quoted from FAO "Food balance sheets.")

[15] The rapid increase in television ownership is a major factor behind the demonstration effect. According to annual UNESCO statistics, the number of television sets went from less than 100,000 in the 1980s to 500,000 by 1996. Also, the mode of purchase has shifted away from traditional retail outlets towards self-service supermarkets and fast food restaurants.

Table 35 shows supply and demand estimates for processed agricultural products.

Table 35 Supply and Demand of Processed Agricultural Products (unit:US$ Million, %)

	1995	1996	1997
Demand	1,955 (100)	2,200 (100)	2,317 (100)
Domestic demand	1,768 (90.4)	1,954 (88.8)	2,046 (88.3)
Export	187 (9.6)	246 (11.2)	271 (11.7)
Supply	1,955 (100)	2,200 (100)	2,317 (100)
Domestic Production	1,426 (72.9)	1,632 (74.1)	1,637 (70.7)
Import	529 (27.1)	568 (25.9)	680 (29.3)
Domestic demand/domestic production×100	124.0	119.7	125.0
Export/Import×100	35.3	43.3	39.9
Import/Domestic demand×100	29.9	29.1	33.2
Export/Domestic production×100	13.1	15.1	16.6

It can be seen from Table 35 that agricultural products are dominated by export-dependent major crops such as soybeans, cotton and corn, while processed agricultural products essentially service domestic demand. In 1997, imports met 33.2 % of domestic demand and exports accounted for 16.6 percent of domestic production, and both figures are still rising.[16] While agricultural processing industries have traditionally serviced domestic demand, domestic demand has in fact already outstripped domestic production, and the industry is vulnerable to the vagaries of international markets.

Table 36 shows supply and demand statistics for processed agricultural products other than alcohol and tobacco (where re-exporting is rife). The situation here is quite different.

Table 36 Supply and Demand of Processed Agricultural Products other than Alcohol and Tobacco (unit: US$ million, %)

	1995	1996	1997
Demand	1,387 (100)	1,554 (100)	1,644 (100)
Domestic demand	1,209 (87.2)	1,319 (84.9)	1,383 (84.1)
Export	178 (12.8)	235 (15.1)	261 (15.9)
Supply	1,387 (100)	1,554 (100)	1,644 (100)
Domestic production	1,232 (88.8)	1,408 (90.6)	1,410 (85.8)
Import	155 (11.2)	146 (9.4)	234 (14.2)
Domestic demand/donestic production×100	98.1	93.7	98.1
Export/import×100	114.8	175.4	111.5
Import/domestic demand×100	12.8	11.1	16.9
Export/domestic production×100	14.4	16.7	18.5

In 1997, alcohol and tobacco imports were worth US$74 million and US$372 million

[16] Re-exporting (including smuggling) of processed agricultural products other than tobacco and alcohol is generally considered to be either non-existent or negligible in terms of the value of imports and exports in individual categories. For categories with relatively high import and export value (such as fresh tomatoes and citrus fruit), this can be attributed to factors associated with staggered harvest periods.

respectively, for a combined total of US$446 million, or 65.6 %, of all imports of processed agricultural products. If we exclude alcohol and tobacco from import/export and production calculations, then exports of processed agricultural products have been consistently higher than imports (even in 1998), and production is oriented more towards domestic demand. Furthermore, trade exerts an increasing influence on both imports and exports, just as in Table 36.

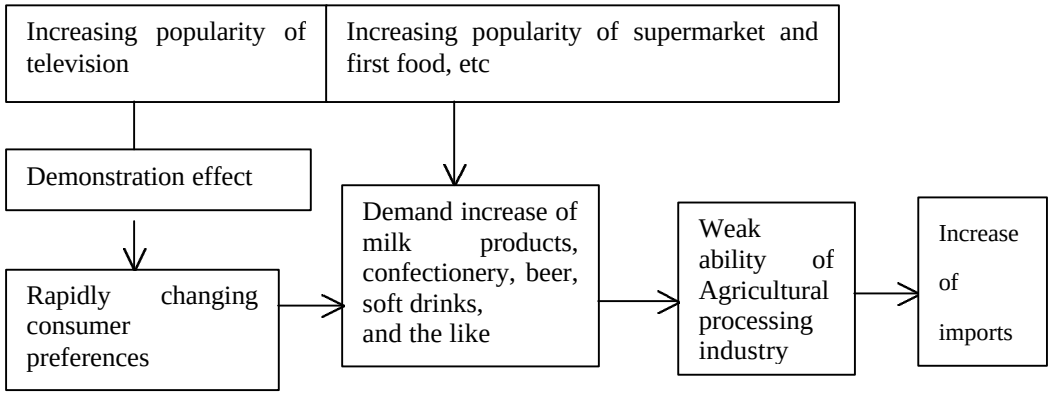
b) Structural characteristics

In summary, then, the structural characteristics of agricultural processing industries are as follows.

•Agricultural processing represents 55 % of the industrial sector in terms of both production output and added value. It is the leading industry by far, with both high growth and high per capita added value.
•Agricultural products are export-dependent, while processed agricultural products are essentially driven by domestic demand.
•Processed agricultural products are relatively vulnerable to import and export trends.
•Alcohol and tobacco together account for nearly two-thirds of all imports of processed agricultural products. Agricultural products have been continuously in excess of imports if those two items are included, and on the other side in excess of exports if they are excluded.
•Product categories are clearly divided between those which have grown during the 1990s and those where growth has remained constant or declined.
•Growth categories tend to be luxury items such as milk products, confectionery, beer, soft drinks and tobacco, while the others tend to be standard necessities.
•Growth in luxury items reflects rapidly changing consumer preferences in the 1990s. This phenomenon, considered quite unusual given that GDP per capita has not risen over the same period, can, perhaps, be partially attributed to the demonstration effect through the increasing popularity of television and supermarkets.
•Export competitiveness of luxury items is weak, and the domestic production has been shrinking by pressure of imports except for beer and dairy products.
•Demand has tended to rise in categories with high brand association—where individual products have short life cycles—as opposed to the basic commodities such as meat, flour and sugar. These categories are more suited to newer outlets such as supermarkets, and would therefore benefit from proper marketing such as market research, new product development, sales promotion and active development of new sales channels.
•The agricultural processing sector in Paraguay has a two tiered structure: while commodity lines are relatively export-competitive, luxury lines, where proper marketing is required, are swamped by imports.

The mechanism shown in Figure 17 demonstrates how the agricultural processing sector is inherently unable to meet demand.

Figure 17 Mechanism of How The Agricultural Processing Sector Is Inherently Unable to Meet Demand



2) Management issues

a) Companies surveyed

In the previous section, we identified defining structural characteristics with respect to production output and import/export trends. In this section, we examine management issues from an insider's perspective, drawing on the findings of interviews with 25 major firms in 14 agricultural processing industries (30 firms if including different arms of companies with multiple operations).

Table 37 Companies Surveyed and Their Industry Classifications

Manufacturing industry	Number of companies	Companies
Sugar refining	3	Azucarera Paraguaya, Azucarera Friedmann S.A., Cooperative Takuarea Lemutatsde(Otisa Ingenio Azucarero)
Flour miling	3	Trociuk, Cereals S.A., Marbopan S.A.
Bread-making	3	La Palmera S.A.,
Milk products	6	Asociacion de Colonias Mennonitas del Paraguay, Anahi, Agro-Industrial Guarapi S.A.(Lacteos Dona Angela), Colonias Unidas, Fernheim Ltda, Choritizer Komitee
Seasoning	1	Mickey
Poultry farming	1	Maehara S.A.A.C.I.
Confectionery	1	Alberdin es la Solucion
Beef	3	Exportadora Paraguaya de Carres S.R.L., Frigobeef, IPF(Industria Paraguaya Frigofica S.A.)
Chicken	1	Granja Avicola la Blanca S.R.L.
Oil expression	3	Compania Continental del Paraguay S.A.(Capsa), Cargill, Trociuk
Juice	1	Frutika
Mate	1	Lauro Raatz S.A.
Tobacco	1	Cimenz Calvo S.A.C.

Mixed feed	3	Trociuk, Agropar S.A., Colonias Unidas
Total	25(30)	

Although businesses in Paraguay have to some extent resigned themselves to the reality of political instability and the overpowering presence of neighboring Brazil, those who have a clear vision and well-developed strategies enjoy significantly greater success than those who do not. In general, Paraguayan businesses seem to be lacking in vision and strategic planning. [17] Even taking into account the small scale of most companies, the corporate structure is generally very simple—owner, manager, workers. This may be linked to the lack of suitable employees to serve as managers. Indeed, many respondents were keen to expand operations but hampered by the lack of managerial skills.

b) Personnel management

Many respondents reported a continual shortage of properly skilled workers (despite the plentiful supply of unskilled workers), particularly technicians for machine maintenance, staff with experience in marketing and trade, and capable managers.

Some respondents have reduced labor requirements to the bare minimum, supposedly in response to unfair legislation on working conditions. Most companies, however, deplore the shortage of skilled workers, although very few have proper training programs in place, either in-house or external. Many try to avoid the added financial burden of social insurance and welfare payments for full-time workers by employing casual workers or contract staff for simple clerical work and seasonal work.[18] Some companies even contract out maintenance. This situation is a barrier to skill development, not only for industry but also for the nation as a whole.[19]

Many Paraguayan exporters in fact operate under OEM (Original Equipment Manufacture) agreements with export markets, producing brands and designs to importer specifications. Many agricultural processing firms begin exporting under OEM agreements. Taking the next

[17] Interestingly, respondents who mentioned the impact of MERCOSUR and/or non-tariff barriers in nearby countries were less likely to be performing well, while those who did not (even those within the same industry) were more likely to be addressing these areas themselves. Few respondents were able to describe future scenarios in great detail. It should be noted that such impressions may well have been influenced by the types of participants in the study (whether senior management or ordinary workers, for instance) and the subjective opinions of the interviewers themselves.

[18] At one multi-national grain distributor with its own oil pressing factory, 70 % of regular employees are either casual workers or contract staff. At another grain and fruit company with its own juicing factory, the figure was 50 %. These figures do not include seasonal workers.

[19] If the disparity between official worker protection policy and the economic reality for industry is too large, workers will be polarized into two groups: a minority enjoying excellent working conditions, and the remainder, who are effectively denied access to skills training.

step—exporting high added-value products at their own prices—requires marketing expertise in areas such as research into destination markets and demand, independent product development, sales promotion and development of sales channels. Naturally, this applies equally to the domestic marketplace. Unfortunately, few of the companies surveyed appeared to possess these skills.[20]

c) Access to finance

In the agricultural processing sector, there is a tendency that payment requirements for lower processed goods tends to be faster than payments for higher processed goods. Operating funds are required in order to be able to pay for raw materials (agricultural produce) before the final products are made and sold. Boosting production levels requires more operating funds and plant and equipment investment for more processed products (with higher added value) than for less processed products.

All respondents felt that interest rates were too high.[21] Considering also the overly short repayment period on plant and equipment investment, access to finance is an area of critical importance for agricultural processing industries attempting to boost added value and become more competitive relative to other countries.

Exporters with L/C settlement terms are eligible for low-interest loans worth up to 70 % of the value of the L/C, using the L/C as collateral.

d) Marketing

The umbrella term 'marketing' encompasses a number of areas: market research, new product development, pricing, development of sales channels, sales promotion and distribution.

Supermarkets account for a rapidly increasing share of the domestic market, but many of the major producers cannot provide the sort of product development and sales promotion that supermarkets require. As a result, the major producers have experienced declining sales over the last two to three years.

This can be partly attributed to the fact that supermarkets generally take 30 to 60 days to pay for

[20] This observation is somewhat subjective, based on responses to marketing questions (for instance, regarding usage of brochures for clients and participation in exhibitions and trade fairs). Our conclusion was that only 6 of the sample of 25 companies (24%) displayed 'marketing skills.'

[21] The interest rate on short-term Guaraní loans for most companies was 27-28 %, compared to 13 % for dollar-denominated loans.

goods received, which makes boosting sales to supermarkets a costly exercise and effectively discourages many producers. Many of the goods on the shelves are in fact imported from Argentina, because most of the supermarkets themselves are Argentine-owned. Food producers in Argentina can obtain loans at less than half the interest of their Paraguayan producers. Argentine firms also tend to be more proficient at marketing their products.

Domestic producers in Paraguay who are experienced in new product development and enjoy good brand association can expect reasonably quick credit repayment from supermarkets. As supermarkets continue to grow, companies with good marketing skills have the potential to grow strongly, but the majority of businesses will be left behind and see sales decline. Many will be forced to scale down or close. The gap thus created may eventually by filled by imports.

Similarly, many firms are inexperienced at marketing themselves on international markets. Apart from the multi-national firms, exporters in the survey sample were generally beef packers, juice producers or agricultural cooperatives of soybean exporters. Export prices are determined on a FOB (Free on Board) basis, usually with factory or silo handover. According to some respondents, for exports to neighboring countries, using the importer's own trucks to take the goods to the destination country makes customs procedures easier. Thus, the buyer takes charge of distribution and enjoys a stronger negotiating position. As a result of poor marketing skills, many Paraguayan exporters seem to act more like factories or silos than profit-making ventures.

e) Exports

In general, companies involved in exporting know little about foreign markets and food regulations in other countries. A large number have experienced failure such as rejection at quarantine or return of faulty goods. Many respondents described export procedures as too complex and time-consuming. Others were critical of importing countries;[22] for instance, one company had its goods rejected because of a single incorrect word on a plant quarantine certificate. On the other hand, the three beef exporters in the sample did not report any problems with exporting.

In conclusion, while export procedures can be complex depending on the product, exporters themselves need to become more skilled at negotiating their way through the procedures.

[22] Refusal to accept imports because of mistakes on forms is a worldwide trend; the relationship between Paraguay (as exporter) and Argentina and Brazil (as importers) is irrelevant in this case. The standard procedure is for quarantine forms to be filled in by the exporter, clearly showing details such as the names of both exporter and importer and the type and quantity of the goods. The inspector checks the forms against the actual goods and signs them if all is in order. (Paraguay may use a different procedure; we have yet to establish this.) Exporters need to track down where mistakes are most likely to occur.

f) Export procedures and distribution costs

Though export is conducted, the procedure (14 – 27) is complex. Public notary is said to be necessary for every procedure. Therefore, the procedures for exporting take time. Since the delivery date may have been fixed with the client and export procedures cannot be started until goods are physically ready to be exported, the period available for production is shortened. This has brought a disadvantage for enterprises of low productivity. Because export procedures take so much time, the collection of export sales becomes slow, and it has a negative influence on the enterprise profits because of the high interest rates.

Furthermore, the cost competitiveness of exporting enterprises is weakened because export procedures cost 10% of the CIF prices. The complexity of the export procedures in Paraguay is not a non-tariff barrier created by the destination country. Instead, it can be said that Paraguay itself has created a non-tariff barrier for its exporters.

It costs US$2,000-2,500 to carry a 40-foot refrigerated container (about 20 tons loading) by truck from Asunción to Buenos Aires. The tariff is about double in comparison with tariffs in USA (for example, Denver-Los Angeles) with same distance and same driving time. Though the fare varies according to the conditions such as the use of the return trucks and use frequency, about two times seem to be high in Paraguay even in the case of a beef factory which is heavy user of the truck for export. High tariffs are also referred to in the book "Paraguay-Competitive Advantages" (Klaus Esser). Because Paraguay is an inland country, transportation is a more important strategic factor than for the countries that have seaports. An efficient transportation industry is necessary with low cost to raise the export competitiveness of the agricultural processing industries. It would be difficult for Paraguay to invite factories utilizing foreign capital for exporting.

g) Food hygiene

For processed agricultural products, in general, the closer to the consumer, the more processed the product. Stricter hygiene standards are required for more processed products, however. Hygiene is a completely different factor from strategic financial considerations such as production costs and product planning; it constitutes a non-negotiable, fundamental prerequisite in the production of processed agricultural products.

With the exception of fruit juice exporters and some beef exporters, food hygiene levels are generally poor, particularly at companies geared towards the domestic market. Nearly all firms are deficient in at least one of the following areas: factory layout, work standards, cleanliness, and

microorganism testing equipment and hygiene training.

Although the food industry is regulated by bodies such as INTN (Instituto Nacional de Technología y Normalización) and INAN (Instituto Nacional de Alimentación y Nutrición), the regulations need to be better enforced and more effort needs to be made to ensure that domestic regulations are realistic in terms of worldwide standards.

h) Production control

Productivity

Poor labor productivity was common to nearly all the companies surveyed, particularly with respect to material handling and the lack of automation in packaging processes.

The physical movement of articles between each stage in the process of transforming raw materials into finished products is generally achieved manually. Although motorized conveyor belts and forklifts are often too expensive to be a realistic consideration, many factories would benefit significantly from simple aids such as sloping conveyors or hand-operated jacks to facilitate movement of goods.

Packaging processes in agricultural processing industries—measuring, filling and packing—tend to require significant labor input. Even given the limiting factors of small production runs and changeover time associated with different products, reliance on manual labor is still great and there is considerable scope for automation.

Production Support

Nearly all respondents nominated power blackouts as a problem. Power blackouts halt production of half-finished products and shut down refrigeration equipment and freezers. This leads to major hygiene problems, particularly with bacteria-prone meat and milk products. Producers are obliged to install their own generators, which increases the burden of plant and equipment investment. The plentiful supply of cheap power in Paraguay is often touted as a sales pitch to attract foreign investment; yet the reality for food producers is that the power supply, while it may be cheap, is unreliable.

Virtually all machinery used in agricultural processing is made in either Brazil or Argentina. The absence of a fully developed local industry manufacturing food processing machinery (attributable to lack of domestic demand) has created two problems: first, nobody makes simple aids such as

small conveyors or work benches which would help boost productivity; and second, workers are generally unable to perform simple repairs and maintenance on imported machines, which creates the added cost of bringing in expensive non-Paraguayan engineers.

3) Export potential by product

a) Soybean products

In 1997, soybean production was 2,970,000 tons, of which 70.9% (2,105,000 tons) was exported in unprocessed form. A further 18.5% (550,000 tons converted to the equivalent volume of soybeans) was exported as extracted soybean oil and cake. Thus, 89.4% of soybean production went to exports, either directly or after processing. Looking at the figures for 1994-1997, processed (extracted) soybeans fluctuated in the range 496,000-594,000 tons without showing any sign of a general upward trend, while exports of unprocessed soybeans shot up 78.9%.[23] As a result, exports of processed soybean products steadily declined relative to the total, from 30.4% in 1994 to 18.5% in 1997 (see Table 38). At our interview with Paraguay's largest exporter of extracted soybean products, the company said that it was planning to maintain the soybean processing volume at current levels while increasing exports of unprocessed soybeans, so this trend appears likely to continue.

Table 38 Production and Exports of Three Major Soybean Products by Volume

	Volume (1,000 tons)				Componet ratio (%)			
	1994	1995	1996	1997	1994	1995	1996	1997
Production	1,796	2,394	2,670	2,970	100	100	100	100
Export volume of soybeans	1,177	1,064	1,548	2,105	65.5	44.4	58.0	70.9
Export volume converted to equivalent soybean tonnage	546	496	594	550	30.4	20.7	22.2	18.5
Export volume of crude oil	104	94	113	105	…	…	…	…
Export volume of extract cake	295	361	507	427	…	…	…	…
Total volume of export	1,723	1,560	2,142	2,655	95.9	65.2	80.2	89.4

Sources: Soybean production: 1997 statistics from the Ministry of Agriculture and Livestock; export volumes: OCIT.'Export volume converted to equivalent soybean tonnage' means the tonnage of unprocessed soybeans equivalent to the relevant quantity of export of processed soybean products; for crude oil, export volume is divided by the yield of 19%. Virtually all soybeans harvested in March and April are exported between March and September in that year. Thus, production and export volumes in a given year generally correspond quite closely.

[23] According to the Export statistics, the export amount of oils remains stagnant between 1994 and 1997 . According to the output statistics of Central Bank, it increases smoothly during the time.

Extraction of Paraguayan soybeans produces 19% unrefined oil and 78% extract cake, which fetch FOB prices of US$509 and US$252 per ton respectively (1997 prices). The export value of one ton of processed soybeans is therefore US$509 x 0.19 + US$252 x 0.78 = US$293. The difference between this figure and the export price for unprocessed soybeans (US$252 per ton) represents the gross added value from processing. The gross added value in this case is US$41, a mere 14%[24] Thus, soybean extraction cannot be expected to achieve much in terms of boosting export value. [25]

We interviewed two of the top three exporters of soybeans and processed soybean products. During the interviews, it emerged that the largest company handles around 50% of all soybean exports, the next largest 31% and the third largest 8%; this means that three companies form a combined monopoly of 89% of exports.

These grain distributions have similar operations in neighboring Brazil and Argentina, and are naturally more interested in optimizing operations at the global level than in tailoring local operations to the circumstances of individual countries. Since Paraguay has a high soybean production volume but a small domestic market, there is little incentive for multi-nationals to produce finished products (refined oil and mixed feed) for the local market. Multi-nationals would also be likely to encounter resistance from local purchasers of crude soybean oil and extract cake if they were to venture into downstream processes, and would incur higher transport costs. (For instance, the purchase price at the factory is higher than for delivery to a riverside silo.[26])

For multi-nationals, soybean extraction and processing within Paraguay generates no additional profits overall, and can in fact be costly. While extract cake can be exported cheaply by ship (notwithstanding the high cost of transportation from factory to port), soybean oil must be carried on expensive rotary tank trucks. The grain distributors therefore view Paraguay primarily as a source of raw produce. This is borne out by the healthy growth in exports of unprocessed soybeans. One multi-national ships Paraguayan soybeans to Argentina for processing into refined oil, which is re-imported into Paraguay. Meanwhile, Paraguayan refining facilities are working at less than full capacity. This situation would not occur in a domestically owned industry.

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[24] Gross added value was US$44.10/ton in 1994, US$25.80/ton in 1995, US$13.50/ton in 1996 and US$41.50/ton in 1997. The corresponding added value ratios were 19.3%, 13.7%, 5.7% and 14.3% respectively; these vary considerably but are all fairly low.

[25] Taking into account the 'induction effect' on various agricultural processing and service industries involved in processing soybeans for export, GDP is roughly 1.7 times higher than for unprocessed soybean exports (Industry Analysis of the Flow-On Effect of Brazilian Economy and Soybean Exports, Hideo Ozaki and Yoshihiko Sugai 'Input-Output Analysis – Innovation & I-O Technique', Pan Pacific Association of Input-Output Studies, 25 March 1999)

[26] US$15 per ton higher for one company interviewed.

b) Livestock products

In 1997, production of livestock products was worth $374 million (at current prices), equivalent to 22.8% of the agricultural processing sector. The nominal growth rate was 6.3% and the real growth rate 0.1%.[27] The main types of meat produced are beef, pork and chicken. The three stages of livestock processing are: live animal, raw meat and processed meat products such as boiled beef, ham and sausage. However processed products represent only a small export market.

Live animal exports have become increasingly competitive. In 1997, 86,000 head of cattle, averaging 400 kg each, were exported. Beef is the most competitive meat export, by chicken, then pork. Around 1,300,000 cattle were slaughtered to produce approximately 293,000 tons of meat. The average animal is three years old and weighs 420 - 430 kg at slaughter, and produces a 53% yield of 220 - 230 kg.[28] The major export markets for Paraguayan beef are Chile and Brazil, which account for an increasingly large proportion of meat exports (75% in 1997, up from 42% in 1992). Overall export value is not growing. Whereas in Europe, every part of a slaughtered animal has some value, only certain parts of the animal can be sold in Chile and Brazil. Furthermore, markets in Chile and Brazil are starting to demand younger, more tender beef. In 1996 and 1997, annual exports (including refrigerated and frozen) were around 25,000 tons, but this figure is expected to drop by 30% - 40% in 1998 in the aftermath of the Real currency crisis in Brazil.

Recent years have seen improved cattle varieties that mature more quickly and produce better quality meat. Paraguay aims to eliminate foot and mouth disease—a major barrier to the development of new markets—by 2000. We interviewed three meat-processing plants geared primarily towards exports, and all exhibited adequate levels of cleanliness for exporting. However, on the domestic market, they cannot compete on price with fully domestic processors, who do not need to invest as much in plant and equipment. As a result, when the net working rate for the production of exports drops, it is difficult to cover the loss solely by means of domestic sales.

Thus, beef has considerable latent potential as an export. Exporters need to study trends in international markets and learn to market themselves more aggressively, and also strive for more consistent quality levels.

[27] The figures given below are taken from Central Bank, OCIT, FAO Annual Production and FAO *Food Balance Sheets*. Production volumes and breakdowns are in 1997 prices. Growth rates are averages for the period 1990 - 1997; nominal growth is current value in dollar terms; real growth is based on 1982 prices.

[28] Averaged from interview responses.

c) Dairy products

In 1997, production of dairy products was worth US$117 million, equivalent to 7.2% of the agricultural processing sector. The average annual growth was 15.1% in nominal terms and 8.5% in real terms, on a par with beer.

Milk cattle numbers also grew by 7.1% per year during the first half of the 1990s, but growth has been negligible since 1995. In 1998, there were 689,000 head of milk cattle in Paraguay, [29] 73% of them in the east (the main region of consumption) and 27% in the west. The main dairy products are drinking milk, yogurt, cheese, cream, butter, whey, ice cream and milk powder. Of these, the major exports are milk powder, butter and cheese.

A two-tiered structure has developed in dairy production: domestic production of perishable dairy products (milk and yogurt, usually supplied on a daily basis) is sufficient to meet domestic demand, while powdered milk (suitable for storage) is imported from Argentina. As raw milk production is fairly limited, domestic producers have tended to specialize in perishable products, which have until recently been highly profitable and enjoyed strong growth.[30] In the last few years, the difference in growth between successful and unsuccessful producers has become increasingly pronounced.

Although raw milk is 30% cheaper in Brazil and Argentina (17 cents versus 22 cents per liter),[31] imports have traditionally not been able to compete with local perishable milk products, which enjoy the advantage of proximity. Imports of long life milk and ice cream (as well as milk powder) are increasing, however, and as demand for milk products grows, Paraguay will no doubt become an increasingly attractive market for producers in neighboring countries.

Milk powder and butter exports from the EU (mainly France and the Netherlands)—a major export region alongside New Zealand and Australia—have become less competitive as a result of cutbacks in production and export subsidies in line with the Uruguay Round of GATT. Argentina and Uruguay, which are on a par with New Zealand in terms of latent competitiveness, see this as a major chance. The volume of milk obtained per head of milk cattle in Paraguay is currently quite

[29] According to FAO statistics, production of raw milk was 300,000 tons in 1997, but our estimate of milk production from milk cattle (based on interviews) is 220,000—240,000 tons. The difference can be attributed to the fact that the FAO statistics include milk taken from cattle other than milk cattle.

[30] According to one dairy producer, the ratio of recipe cost price to sale price is 44% for milk, 38% for long life milk and 30% for yogurt, while the ratios for packaging materials are 4%, 30% and 30%—36% respectively. Milk has a high recipe cost ratio but a low packaging ratio because the final product is sold relatively cheaply in polyethylene containers.

[31] From interviews.

low, so there is considerable scope for productivity improvement. Some agricultural cooperatives have already had success developing techniques for boosting milk output per head while reducing costs.[32]

The dairy processing industry in Paraguay currently faces both dangers and opportunities. Access to global markets has improved, but imports from nearby countries are on the rise.[33] Paraguay must endeavor to improve milking productivity while at the same time make its products more cost competitive by pursuing economies of scale through mergers and concentration of resources.

d) Fruit products

In 1997, the production volume of fruit products was US$5 million, or 0.3% of the agricultural processing sector. Average growth was 11.9% in nominal terms and 5.4% in real terms. The major processed fruit products are juice, canned fruit, frozen fruit and dried fruit. Although industrial statistics show production of canned fruit only, export statistics and interviews indicate a significant level of tetra-pack juice production.

At 446,000 tons, citrus fruits, such as oranges, mandarins, grapefruits and lemons, were the most common fruit, followed by bananas (71,000 tons) and pineapples (38,000 tons).[34] We will focus on oranges, which are relatively easy to process. Production of sweet oranges (Naranjo dulce) was 208,000 tons, and sour oranges (Naranjo agrio) 185,000 tons. Production of sweet oranges grew by an impressive 20.6% from 1996 to 1998, boosted by the first harvest of fruit trees planted several years previously (although the number of fruit trees overall has increased only marginally). Sweet and sour oranges are grown in quite different areas: Itapúa (23%), San Pedro (16%) and

[32] At one agricultural cooperative in the west, milk volume per head of producing milk cattle is 21 liters per day, while the cooperative processing plant pays farmers 19 cents per liter for raw milk. Productivity in raw milk is as good as in USA; purchase prices are only slightly higher than those in Brazil and Argentina. Some 26,000 ha of sorghum (used in mixed feed) was planted in 1997, up 2.6 times from the area planted in 1993. Farmers can obtain mixed feed for 15 cents per kg, and three liters of milk can be produced from one kg of mixed feed; thus, mixed feed costs 5 c per liter of raw milk, equivalent to 26% of the producer selling price. Around 20%—30% of feed goes to animals that do not actually provide milk, such as dry cows (not currently producing milk), cows that are yet to produce calves, and seed bulls. 25 % of raw milk obtained by the cooperative is turned into drinking milk, 25% long life milk, 20% yogurt and 28% cheese, while the remaining 2% is made into sundry products such as Dulce. Since the cooperative is situated some distance from the consumption regions, it is more involved in the less perishable milk products. It does not make milk powder (a valuable export) due to the lack of raw produce and money for purchasing the necessary equipment.

[33] Many respondents pointed out that although Brazil and Argentina now have lower tariffs in line with the requirements of MERCOSUR, these are effectively negated by significant non-tariff barriers to trade, such as quarantine procedures so long that the use-by date of the product expires and unreasonable demands with regards to documentation. Some producers have started sending sample shipments to Bolivia and Peru in a bid to create a niche market for exports there.

[34] MAG (1997/1998)

Caaguazú (13%) produce 62% of all sweet oranges, while San Pedro (68%), Cordillera (21%) and Caaguazú (7%) produce 96% of sour oranges.

Orange processing is mostly geared towards juice production. A juice yield of around 50% is obtained from washed oranges with the skin left on. To enable year-round juice supplies (as opposed to during the limited orange harvest season only), the juice is de-pressurized at medium temperature and condensed to one eleventh of its original volume, then frozen in drums. The frozen juice is then thawed as required and diluted with water to produce 'reconstituted condensed orange juice,' which is sterilized before filling. By-products of juice production include orange oil fragrance, made from the peel, and an extract of the juicing discards, which is dried and used in mixed feed.[35]

Fresh fruit exports have become less competitive, while exports of processed products, such as juice and canned fruit, have become more competitive and are steadily rising—the opposite of trends seen in other agricultural products. This can be attributed to changing demand patterns in fresh fruit markets (consumers ignoring seasonal factors and seeking fruit all year round), as well as rising imports of fruits not grown in Paraguay (such as oranges, melons and plums) in response to domestic demand. Fruit appears to be more competitive during harvest season, because processed fruit products (which require cheap fruit) are more competitive.

Orange juice exports have increased steadily over the last few years and now exceed imports. One of the companies interviewed in this study began with fruit tree plantations and steadily expanded from fresh fruit wholesaling into juice production, and now dominates juice exports. Only 15% - 20% of its juice services the domestic market, with most going to Brazil (50%) and Argentina (30% - 35%). There is said to have several hundred thousand hectares suitable for citrus fruit plantations in northwest Boquerón.[36] The average fruit yield in Paraguay is 20 tons per hectare; 100,000 ha of plantations therefore yields some 2,000,000 tons of oranges or 91,000 tons of condensed frozen juice, with an export value of US$80- 90 million. The bulk of the world's orange juice exports come from the West Atlantic (Brazil and Florida). Exporting to Pacific countries via Argentina or Bolivia would to some extent lessen Paraguay's geographical disadvantage. Fruit has the potential to be a highly competitive export, given the right combination of detailed planning and entrepreneurial flair in industry, and there is considerable scope for boosting exports of fruit products.

[35] One respondent sells dried extract to a mixed feed producer for US$55 per ton.

[36] From interview with local government in Boquerón.

e) Vegetable products

Vegetable products, although not shown in industrial statistics, are discussed here in light of their importance in small-scale farm policy development. Processed vegetable products include canned, frozen, dried and salted vegetables. The type of processing used is generally determined by the type of vegetable and market requirements. Tomatoes, for instance, can be made into canned whole tomatoes, canned puree and canned juice, while potatoes can be made into frozen fried potatoes and dried starch. Here, we will look at tomatoes, which are grown in large volumes and are relatively easy to process.

Vegetable exports are becoming less competitive overall, and exports of vegetable products (mainly canned vegetables) are declining. Imports of both fresh vegetables and processed vegetable products are increasing. For instance, the value of tomato exports (which account for over half of all vegetable exports) has remained relatively constant, while the value of imported tomatoes has increased, leading to an excess of imports (by value) in 1998. Paraguay does not export processed tomato products.

Per capita Vegetable consumption has fallen around 25% since the 1980s (the opposite trend has been observed in Brazil, Chile and Bolivia).[37] The decline can be attributed to the limited size of the market; attempts to encourage cultivation and increase yields have create a vicious circle in which producer prices fall and the cultivation discontinues.

For this reason, attempts to encourage vegetable cultivation must be accompanied by efforts to develop new markets for the resulting produce.[38] Selling excess harvest and produce not matching the required specification to processors is an inherently limited approach; instead, vegetable processing should be developed into a viable industry geared towards pre-determined target export markets and categories. This will lead to greater stability in cultivation patterns.

f) Wheat products

Table 39 shows production of wheat products in terms of primary products (wheat and bran) and secondary products (including biscuits, bread and pasta). According to the statistics, production of wheat flour was 50,000 tons in 1997, but our interviews suggested a figure of 100,000 tons. The same source gives 1990 production at 97,000 tons, with growth in production of secondary products based on wheat flour averaging 2.2% over the period 1990 - 1997. Overall, then, 100,000

[37] FAO *Food Balance Sheets*

[38] For instance, in Caaguazú department, a joint-venture tomato-processing factory is being considered with an Italian firm.

tons seems a more realistic figure. It would appear that the statistics for primary products shown below have been underestimated.[39]

Table 39 Production of Wheat Products

	Main products	Output (Million dollars)	Share accounted for in agricultural processing (%)	Growth rate (%/Year)	
				Nominal	Real
Primary products	Wheat , Bran	33	2.0	-2.2	-7.8
Secondary products	Biscuits, Bread, Noodles, Pasta	136	8.3	8.4	2.2
Total		169	10.3	5.5	0.0

Source:BCP

Milling produces wheat flour and bran. The flour yield is generally 70% - 75%, depending on the quality and type of wheat; the remainder (bran) is used for livestock feed.

Flour import and export trends resemble those for wheat: exports generally increase in good crop years and imports are required in bad years. Exports of secondary products are negligible or non-existent, while imports amount to around US$20 million annually. While Paraguayan wheat is high in gluten and good for bread, pasta is made from durum flour, which is high in protein and has softer gluten, while biscuits require flour that is low in both proteins and gluten. Imports of secondary products will thus be required to some extent in the short term.

g) Sugar products

Production of sugar products (excluding sugar-based confectionery and liquor distilled from sugar cane) was worth US$119 million in 1997, or 7.3% of the agricultural processing sector. Average annual growth was 7.9% in nominal terms and 1.7% in real terms. Industrial statistics classify sugar into centrifugal, or cured, sugar (azucar cristal) and unrefined sugar (miel de caña). Production of cured sugar was 109,000 tons (US$63 million) and unrefined sugar 115,000 tons (US$56 million). The share by volume of unrefined sugar was 52% in 1997, up from 49% in 1990.

Around 5% of the 224,000 tons of sugar produced is exported. Since 1996, the bulk of sugar production has gone to exports. Import levels are minimal and the CI value is close to 1. Most exports are of organically cultivated sugar products, which rely on product differentiation.

[39] During the 1990s, annual wheat production has varied considerably, from 200,000 to 500,000 tons. Taking into account exports and imports, the annual tonnage of wheat handled in Paraguay is 300,000 tons (equivalent to 210,000 tons of wheat flour). The discrepancy between this and the figure of 100,000 tons reported by the flour milling industry arises because the latter excludes smaller businesses and millers who are not members of the appropriate industry body.

The costs associated with sugar cane are only about half the international market price (the New York price) of raw sugar. In order to make raw sugar exports competitive, Paraguay needs to boost productivity both in sugar cane cultivation and at processing factories. Even then, though, it would have difficulty competing with Brazil, the world's single largest exporter of raw sugar. Given its landlocked status and limited production volume, Paraguay might be better to concentrate on targeting organic sugar exports (which fetch almost twice as much as ordinary raw sugar) in markets such as the EU, USA and Japan, where consumers tend to be more concerned about food safety issues.

h) Tobacco products

Tobacco production was worth US$18 million (1.1% of the agricultural processing sector) in 1997. The average annual growth rate for tobacco production is falling at – 0.4% in nominal terms and – 6.6% in real terms.

Most tobacco grown in Paraguay appears to be the Negro variety used in cigars. The 1998 yield was 14,000 tons. The three largest producers are Canindeyú (47%), San Pedro (26%) and Caaguazú (9%). Distributors buy dried tobacco from producers and sell it to processors, who process and grade the tobacco for export in leaf form. Domestic cigar production is negligible. Export competition has increased as a result of continuing exports from competitor countries despite falling demand for Negro in destination markets.

Cigarettes are produced locally from imported cigarette tobacco. The value of cigarette tobacco imports is roughly equal to the value of *Negro* tobacco exports. Imports of cigarettes and other finished products were worth US$365 million in 1997, some 26 times the value of domestic production of tobacco products and close even to the value of soybean exports. While accurate figures on the percentage actually consumed within Paraguay are unavailable, it is suspected that most of them are re-exported or smuggled.[40]

In conclusion, the tobacco industry in Paraguay is out of kilter with actual market demand, and is therefore missing out on important opportunities. In order to capitalize on the enormous potential of the tobacco industry, farmers should switch to the *Rubio* variety,[41] processors should start

[40] Through e-mail inquiries we heard of a major tobacco peddler in Ciudad del Este who was importing Brazilian products in huge volumes (without paying the tobacco consumption tax) then taking them back into Brazil without paying duty. After the Brazilian Government tried to shut down the operation, the peddler set up a makeshift factory in Ciudad del Este producing cigarettes entirely from Brazilian tobacco, which are then sold in Brazil as Paraguay products. Paraguay has become a haven for evading Brazilian consumption taxes. In a sense, Paraguay holds the Brazilian market in tobacco products.

[41] One company (currently trialling *Rubio* production) noted that although conditions in Paraguay are quite suitable for growing *Rubio*, farmers prefer the *Negro* variety as it does not require such expensive drying equipment.

making cigarettes from local ingredients, and the practice of re-exporting should be replaced with exporting of local products.[42]

(2) Other manufacturing industries

1) Structures and trends

Paraguay's manufacturing industry includes food, drink, tobacco, textiles, clothing, leather shoes, leather goods, furniture, woodwork other than furniture, paper products, printing, chemicals, oil products, rubber, tires, plastic, ceramic, glass, non-metal minerals, iron and steel, non-ferrous metals, metal hardware, construction materials, ornaments, transport equipment, medical supplies, photographic film, optical equipment, timepieces, and games and toys. The companies and associations that the member of the industrial sector of the Study visited were grouped into seven categories: textile, leather, woodwork, paper processing and printing, chemical, metal and steel, and others. Due to the importance of the ceramic industry, we have described it separately. The number of companies and associations for which the survey was conducted are as follows:

Table 40 Firms Visited by EDEP Members in charge of the Industrial Sector

Type of Industry	Firms Researched
1.Textile Industry	
Spinning	1
Weaving, Cleaning	3
2.Leather Industry	
UIP	1
Leather Tannery	1
3. Wood Industry	3
4. Paper Manufacture/ Printing	
Bag manufacturing and printing	1

Type of Industry	Firms Researched
5.Chemical Industry	
Medicine	2
Pesticide	2
Soap, detergent	3
Plastics	1
6. Iron, metal processing	
Iron Products	1
Barge	1
Non-ferrous metal processing	2
7.Other Industries	
Bed Mattress	1
Fire Extinguisher	1

a) Textile industry

The structure of the textile industry is as follows: Cotton plants (raw cotton) cultivated and harvested by farmers are brought into ginneries, and then to cotton mills for spinning. These form

[42] Consumption of tobacco products tends to be governed by brand image and advertising as much as quality and price considerations. Given the need for proper marketing, production of leading overseas brands under OEM contracts might also prove a viable option.

the upstream section of the industry. The spun cotton is then woven into fabric and dyed. This is the mid-stream section of the industry. The downstream section includes the apparel manufacturing industry. This type of pyramid structure, wherein product types increase as processing progresses, is characteristic of the textile industry. These processes are separated in most cases, and there is no one factory that integrates the whole process. Approximately 5 % of the cotton is processed domestically, which accounts for 16 % of the manufacturing industry GDP.

Cotton cultivation has existed throughout Paraguay's history. Both cotton production and the area of cultivation in Paraguay has been in decline since the peak period from 1980 to 1985.

A direct relationship between the agricultural industry and cotton producers is limited. Only 10 % of the producers are directly linked to the industry through credit. 63 % of ordinary producers receive credit through brokers. Therefore, raw cotton is produced on a commercial basis, whereby the product is sold to ginneries through brokers. During the early stages of cotton production, both productivity and the standard of production technology were quite low which limited profits.

There tends to be an insufficient supply of raw cotton in Paraguay due to the industry's structure (as described above). This is in contrast to Brazil, where raw cotton supplies are abundant. The lack of access to the ocean is, as always, a constraint.

The spinning and weaving factory in Pilar, one of the largest of its kind in Paraguay, acquires raw cotton from local farmers as well as from Argentina (which lies on the other side of the river) in order to perform the entire process, from removal of seeds (ginning) to fabric weaving.

Table 41 Volume of Production of Cotton Products
(Unit: Fiber 1000ton, Cotton yarn Ton, Cotton fabrics 1000meter)

	1990	1991	1992	1993	1994	1995	1996	1997
Fiber	218	208	143	151	137	153	116	68
Cotton yarn	442	576	576	605	546	601	575	336
Cotton Fabrics	14,648	19,170	19,170	20,129	18,172	19,989	18,870	10,922

Source: BCP

Table 42 Production of Cotton Products (Unit: US$1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Textile	264,716	322,078	215,158	228,987	222、352	277、258	219、217	137,390
Cotton Fiber	235,396	265,086	164,909	184,750	179,568	253,703	196,072	114,245
Cotton Yarn	658	1,12	915	1,019	991	1,180	1,109	652
Fabrics	18,659	28,815	26,058	29,013	28,200	39,565	31,134	18,021

Source: BCP

Paraguay's cotton production sector has sufficient production capacity and spinning factories to operate for 100-120 days per year, including the harvesting period. Although it operates at 100 % of its nominal capacity, the machines have suffered from their concentrated operation, age, and lack of maintenance. There were 48 ginneries in Paraguay and production capacity amounts to 302 tons per hour, some of which is currently inoperable.

The production of cotton has decreased over the past few years due to factors such as weather, continuous cropping, downsized cultivation scale for farmers, and management problems. Over the past 5 years, five spinning companies have faced bankruptcy and ceased operation. Although there exists an agricultural policy to subsidize raw cotton, it has not been sufficient to overcome the problems of small-scale spinning factories. Furthermore, government policy has apparently been inconsistent.

The aforementioned company is carrying out its own basic product-quality inspections on raw cotton, yarns, fabrics, and dyed fabrics in accordance with international standards. It is making efforts to manufacture internationally compatible products and is planning to qualify for ISO9000 standards during 1999. More than 60 % of its products are exported to neighboring countries and Europe. The company has joint agreements with companies in neighboring countries and is internationally competitive. Although the factory is equipped with dust collection robots, there is still quite a lot of cotton dust and further improvements in industrial hygiene are required.

Let us look at the downstream textile industry. The largest apparel manufacturer in Paraguay has license agreements with Western companies in addition to its own brand. This company also manufactures ready-to-wear clothing and has agreements with neighboring countries. Nevertheless, even it is suffering from sluggish exports due to factors such as cancellations resulting from the Brazilian monetary crisis, import restrictions imposed by the Argentine government, and the unfavorable product image of "Made in Paraguay." The company is currently riding out this situation with domestic sales.

Its factory is equipped with the latest computer-controlled equipment, used to carry out motion analysis of people (who form the basis for production control), and its welfare facilities are also quite good.

A small-scale manufacturer of knit goods operates using a batch system and mostly sells domestically. The company's products include children's clothing, general ready-to-wear clothing, and high-class ladies' fashion and design. It exported to the West in the past but dropped this operation due to the complex and time-consuming exporting procedures involved.

Table 43 Installed Capacity of Final Cotton Products

Spinning Mill	Capacity (ton)	Flat Loom	Capacity (m)	Knitten Loom	Capacity (m)
Conventional System	11,634	Production of Linens	13,960,000	Jersey, etc.	4,600,000
Open end	8,000	Production of Poplins, etc.	34,440,000		
Total	19,634				

Source: CADEP（Selected sub-sectors Final Report 1999.3.24）

There are 15 laundry companies, who are mainly subcontracted by companies specializing in apparel products such as jeans. Because the apparel industry is not doing very well due to sluggish exports, the operating rate of the laundry companies is low. Also, a lot of used clothing has been imported from Southeast Asia in the past few years, which has added greatly to the difficulties faced by the laundry industry.

b) Leather industry

Paraguay has a very active meat production industry, and consequently there is a large production of cowhide. Most of the hides are delivered to tanneries either as raw hide or salted or dried hide. The hide material is tanned using chromium sulfate to become either Wet Blue products or tanned leather, which is then sent to the next process—refining tanning (crust leather)—in which the hide is cleaned, dried, and divided in half and then shaved, stretched, and cut into specified sizes. It is then dyed as required by the client, before shipping. Currently there are 112 leather companies, of which seven produce 76 % of the leather used for domestic consumption. 72 % of the industry consists of small businesses.

According to the 1995 MIC Survey on the leather industry, various technologies are used:

i) Small Factories, Small Businesses（Manual Operation/Semi-Mechanized）
This level has machines suited to leather manufacturing and can produce Wet Blue products and processed goods stemming from them.

ii) Medium and Large-sized Companies (Semi-Mechanized/Mechanized)
The tanning factories categorized as large companies are equipped with modern as well as traditional machinery. At this level, products that satisfy international requirements can be produced without any difficulty. Generally speaking, the large factories process the hide material into half-finished goods, finished goods, or Wet Blue products.

Table 44 Production Capacity and Facility According to Size of Leather Firms

	Number of Firms	Production Capacity	Capacity of Production (%)	Number of Employees	Facility
Large Companies	7	1,326,000	76	Over 60	Mechanized
Medium Companies	11	164,400	10	10～60	Semi-mechanized
Small Companies	22	126,600	7	Below 10	Semi-mechanized
Artisan Companies	72	128,460	7		Manual
Total	112	1,745, 460	100		

Source: CADEP Report

1,488 people (47 %) are employed by large companies, 360 (11 %) are employed by medium-sized companies, and 1,325 (42 %) are employed by small or very small companies. The total number of employees in this sector is 3,173.

Of the 112 leather companies in Paraguay, only eight belong to a trade association. These eight companies account for roughly 90 % of the entire production output. Many companies do not belong to a trade association because they find it difficult to pay the monthly fee of US$60, and because they have problems cooperating with discrepant management policies arising from differences in business scale. This situation could cripple the effectiveness of the activity as a trade association.

However, the trade association belongs to the Union Industrial Paraguaya (UIP), by which it is governed, as well as the industry and commerce union and the agricultural products exporters union. It is also negotiating with those government offices with which it has a direct relationship, including the Customs House, MAG, and MIC.

The gross value of leather products, listed by scale of factory, is shown below.

VS = Direct costs (cost of hide + other materials) + processing cost (wages, depreciation, interest payments, etc.)

Table 45 Breakdown of Production Costs According to Factory Size

	Artisan Factories	Small and Medium Factories	Factories of High Class Products
Direct Cost	84.6	84.6	79.6
Leather	71.1	68.1	54.5
Other Materials	13.5	16.5	25.1
Value Added	15.4	15.4	20.4
Wage, Depreciation, Interest	5.1	9.6	11.7
Profit	10.3	5.8	8.7

Source: CADEP

Most of the raw hides are domestically produced, but some are imported from Brazil and Argentina. Argentine hide is of good quality and costs 50 to 100 % more than Paraguayan hide. This is a result of different processing procedures used after skinning at the slaughterhouse, including hygiene considerations.

Table 46 Production of Leather Products

(Units: Salt Dried Leather and Soles - 1,000 ton, Tanned Leather - 1,000, Shoes - 1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Salt Dried Leather	29	19	18	25	27	29	37	36
Soles	5	5	5	7	7	8	9	9
Tanned Leather	3,754	27,243	26,241	30,630	26,073	28,550	35,545	34,649
Shoes	4,287	4,569	4,620	4,100	2,811	2,952	3,247	3,247

Source: BCP

Table 47 Production Value of Leather Products (Unit: US$1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Leather Products	30,861	85,916	74,841	99,419	102,019	121,099	141,559	176,276
Salt Dried Leather	4,842	4,571	3,945	5,811	6,716	7,986	9,770	9,398
Soles	15,961	28,834	24,889	36,660	42,366	50,381	56,237	55,013
Tanned Leather	4,872	50,836	44,591	54,818	50,475	59,808	73,807	70,380
Shoes	55,581	74,200	67,863	58,107	47,376	54,105	58,689	564,967

Source: BCP

Paraguay is lacking in both technology and manpower in this field, and, combined with insufficient capital, the industry is in decline. Another undeniable reason for this decline has been insufficient market development and surveys.

One can also see domestic leather bags in cities. They look slightly inferior to imported leather bags in weight, appearance, design, and convenience, but they are less expensive. In the shoe factory that Mr. Sato (a JICA expert) inspected, foreign-design products were manufactured manually with defects rate of 5-30 % on average. The defects are not so bad, however, that they cannot be sold on the domestic market.

Paraguay's tanning industry has a long tradition of technical and quality control, and its leather

products are much improved. Early leather factories were run by craftsmen, which was followed by the gradual entry of large companies and foreign companies with new technology. Current tanneries can be categorized by level of operation such as mechanized, semi-mechanized, or manual work. Technological adjustments have been introduced in line with the natural environment and existing facilities.

The mode of transport employed by the leather industry is river transport. It is not particularly vital to use river transport if one considers the value of leather products in terms of weight. It appears that one leather products manufacturer has decided to allocate 30 % of its products to the domestic market in 1998. However, the company has had bad experiences in the past in terms of domestic clients failing to keep to their payment agreements. As a result, it has decided to allocate 90 % of its products to the export market.

c) Woodwork industry

In Paraguay, the following products are manufactured from timber: construction materials such as primary-processed (unfinished) roundwood, plywood, veneer, and flooring; and furniture such as tables, chairs, shelving, doors, frames, and kitchen cabinets.

Table 48 Production Volume of Wood Products

(Unit: Sawn Wood - ton, Plywood, Veneer, Flooring- 1,000 M^2, Building Materials, Furniture – 1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Sawn Wood	970	766	764	814	979	1,043	1,001	1,059
Plywood	62,596	92,769	92,595	98,614	99,600	104,082	99,919	105,125
Veneer	2,534	2,773	2,767	2,947	2,976	3,065	2,942	3,089
Building Materials	762	2,282	2,277	2,425	2,499	2,596	2,466	2,539
Flooring	9,611	7,501	7,486	7,937	8,053	8,536	8,109	10,055
Furniture	401	522	521	379	359	366	348	348

Table 49 Production Value of Wood Products (Unit: US$1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Sawn Wood	163,845	136,608	132,868	145,220	188,966	227,262	221,119	240,928
Plywood	70,342	110,122	106,699	117,064	127,890	150,920	146,841	159,239
Veneer	4,663	5,389	5,221	5,729	6,258	7,277	7,079	7,661
Building Materials	4,201	13,472	13,053	14,322	15,643	18,724	18,026	19,507
Flooring	3,693	3,045	2,950	3,237	3,536	4,233	4,075	5,208
Total	251,778	274,311	266,566	290,104	347,413	415,378	402,846	439,392
Furniture	20,509	20,652	20,202	15,413	18,064	20,094	19,722	22,703

The growth rate of the woodwork industry in 1995, 1996, and 1997 was 4 %, 5 %, and 6 % respectively.

The 7,000,000m3 of naturally wooded area is decreasing, partially due to illegal logging. On the other hand, efforts have been made in afforestation, and the materials for the processing mentioned above quite often come from afforested wood. The afforestation program is promoted by the Forestry Agency and the Natural Resources and Environment Agency of the Ministry of Agriculture and Livestock, but the program is not progressing very well, partly due to insufficient funds.

Laws 536 and 422 of Paraguay affect the ownership of forests and the lumbering industry. These laws were laid down 25 years ago and there are discrepancies with regard to today's situation. A system of subsidies for afforestation also exists, offering up to US$1,000 (on average US$600) per hectare, but it appears not to have been applied much recently due to insufficient funds.

Illegal logging is also prevalent, and smuggling of lumber is an everyday occurrence. The authorities concerned are quite concerned about this, but find it difficult to implement countermeasures. The illegal export of timber from Paraguay is a serious problem, and a rapid resolution is urgently required.

The woodwork industry uses wood as its raw material. Material costs have increased gradually due to early felling, the reduction of forested areas, and the increased costs of transporting wood to remote areas. The afforestation of this country started quite late, and planting does not yet exceed 2,000 ha.

The vice-chairman of the Forestry Association in Coronel Oviedo expressed his concern that Paraguay’s lumbering industry may disappear in 4 to 5 years if the current situation continues. The association once had 42 member companies, but this has been reduced to about 20 due to bankruptcies and ceased operations.

The flooring products seemed to be of good quality.

The wooden furniture factory that Mr. Sato (JICA expert) visited was a cottage industry with few employees. It makes "to order" and does not utilize any retail outlets or advertising; nonetheless, the factory produces relatively good quality furniture and appears to have a stable client base. However, the machinery lacks safety devices. The company uses domestic material and its market is also domestic. It does not seem to be threatened by MERCOSUR.

One company we visited acquired 40 % of its material from afforested wood, whereas another company is increasing its competitiveness in terms of price and quality by holding its own forest resources. The industry's profits are maintained by effective use and appropriate management of

company-owned forests (natural forests and afforested areas).

Bank loans for afforestation are rather restrictive, and limited to financing the afforestation of specific areas. Law 536 on agricultural finance credit promotes afforestation.

The low technical expertise of the woodworking industry's labor force also needs to be addressed. The companies surveyed commented on the basic importance of skilled labor in controlling the quality of the final product.

The companies we visited indicated that the drying process (technology) was a new technology. Drying is a basic treatment needed to ensure sufficient quality of the product.

Another important factor is meeting changing demand. Product demand is always undergoing change, and the company must acquire technology to meet that change. Generally, the market demands light woodwork products at a low price. A company must invest in modernization in order to produce these new products.

One company is planning to put new investment into manufacturing "carpenter plates," which consists of material left over from laminated products that is formed into a conical shape. This company has sufficient stock of the material to generate an initial profit above actual cost, which is crucial to this new investment. The total investment amounts to US$1,000,000. They also have an investment plan to become self-sufficient in raw materials by modernizing the factory and by conducting afforestation.

d) Paper and printing industry

The volume and amount of production are shown in Table 50.

Table 50 Production of Paper, Paper Products and Printing (Unit: US$1,000)

	1990	1991	1992	1993	1994	1995	1996	1997
Volume of Production: Paper/Paper Products	235	241	238	126	117	131	114	115
Value of Above	2,513	2,787	3,063	2,194	1,722	2,243	2,051	1,978
Printing	46,533	54,200	61,081	74,474	90,478	123,000	127,913	137,361

Source: BCP

As can be seen from the table above, the production of paper and paper products is decreasing, while printing-related products are experiencing an upward trend due to increased demand. One could attribute this to the idea that because demand cannot be met domestically, there has been an

increase in imports of unprocessed paper products.

At a medium-sized factory that we visited, where paper and corrugated cardboard are manufactured by fewer than 100 employees, there were old machines and a low level of production, yet it seemed to be a stable business operation. The company uses cash to purchase its raw materials from a domestic broker, and it uses its own craft liner paper (in addition to that which is imported from Brazil) to produce corrugated cardboard to meet customer demand. Most of the cardboard is for domestic consumption, although some of it is exported to a company affiliate in Argentina.

With inexpensive raw materials and wages, as well as the assurance of energy, this kind of company could achieve stability in its operations, even without any new investment, by servicing its machines to increase productivity and improve quality.

There is one printing factory that imports craft rolls from Brazil to make paper bags (double-lined bags for flour, Mate tea, etc.) which are printed with multiple colors. They currently have approximately 50 customers throughout Paraguay.

All the employees at this small-scale factory wear green short-sleeved uniforms with the company logo, which is considered to be a good practice. Another plus is that recycled paper from Brazil is used to make the double-lined craft-paper bags.

One factory imports craft-paper rolls from Brazil in order to manufacture craft-paper bags for cement using a simple-line production system. The bags are then shipped to the cement factory next door. The factory will need to tackle diversification of sales in the future.

Wood for paper production, construction materials and furniture-making all differ. In Paraguay, although permission to fell trees in the forests is difficult to obtain, felling goes on without much awareness about tree planting. In any case, afforestation takes time, and for construction and furniture production, wood from afforested areas is used in order to preserve natural forests. In order to make effective use of wood resources, the possibility of using kenaf (which has a pulp structure close to wood fiber despite being a grass) should be considered.

e) Chemical industry

The companies that manufacture chemical products such as pharmaceuticals, plastic, synthetic leather, workers' safety equipment, gases (carbon dioxide and chlorine), soap, and perfume fall under this category.

Table 51 Production Value of Chemical Products (Unit: US$)

	1990	1991	1992	1993	1994	1995	1996	1997
Chemical and Petroleum Products -Total	231,653	206,876	199,384	240,345	229,029	197,674	169,133	123,549
Medicine, Pesticides, etc.	16,630	18,203	16,841	45,924	45,295	46,217	41,325	44,594
Dyestuff , Soap	29,860	29,979	23,054	29,356	29,765	30,875	29,380	2,984
Petrochemical Products	159,384	131,145	129,951	108,097	108,217	79,483	59,440	33,898
Plastic Products	25,095	26,732	28,688	56,025	44,941	40,259	38,191	41,212

Source: BCP

We visited two companies—one large and one small. In the large company, business has been almost entirely supported by its own capital since 1995, and the factory has been constructed more or less in line with GMP (Good Manufacturing Practice). The factory has clean rooms for filling ampoules, as well as low-capacity tablet and capsule-filling machines, PTP packaging machines, conveyor lines, testing facilities, an animal experiment laboratory, and refrigerated storage facilities. It manufactures high value-added products.

This company has a medium to long-term plan; it has an overseas product license and is registered with the member and associate member countries of MERCOSUR, to which it exports its products. The company is currently preparing to qualify for the ISO9002 standard, and is also a distributor for companies from 4 countries including Hisamitsu Pharmaceutical Co., Inc. in Japan.

The small-sized factory is equipped with a pulverizing machine, mixing machine, and production and filling machines for suppositories, creams and ointments. It also has a special sterile room, which only 2 or 3 factories in Paraguay possess. This company adopts a management style unusual for a pharmaceutical company: it has no testing facilities or R&D (research & development) division; both of these costly operations are contracted out. This small company is facing difficulties in acquiring new pharmaceutical material, particularly new types, because of industrial property (patents).

One plastics factory manufactures film by processing imported polyethylene (pellets) using dissolution-extrusion molding (inflation method). The film is processed and sold for use as plastic bags in supermarkets, for instance. The factory also has a bag-making and printing machine, albeit one with limited production capacity. Thus, the factory is able to supply the domestic market, but it does not have the capacity to export. The synthetics factory that Mr. Sato visited manufactures attaché cases, gift items, address books, and diaries using imported plastic and metal fittings. Although there is an abundance of real leather in Paraguay, it is worth noting that synthetic leather products have a greater appeal to consumers because they are less expensive. The factory is very

small and products are marketed domestically. In addition, they have a retail outlet to display their products. These two factories are currently only selling domestically but appear to be sufficiently competitive.

The various gases produced are carbon dioxide (by fire extinguisher manufacturers), chlorine gas (by soap manufacturers), and propellant gas for sprays made by insecticide manufacturers. Most of the factories for these gases are small; they tend to use manual operation and have no safety measures.

The insecticide manufacturer carries out very stringent quality control such as total sampling inspection on their mosquito coils. This is probably a result of a contract to export extending material to Japanese manufacturers.

The soap industry consists not only of the largest factories producing cosmetic soap, but also companies that produce cosmetic soap from glycerin and companies that make soap as a by-product of oil and meat processing. The largest factories produce 42 % of the domestic market for packaged soap. Their manufacturing process is as follows: the bars of soap that come out of the large mixing and forming machines are wrapped by wrapping machines (which do not have high capacity), in what is called a batch production system. This system is sufficient at the moment, but there is a plan to change to a flowing system utilizing belt conveyors.

Industrial soap manufacturers use by-products of oil and fat as their raw material, and the working environment is poor. The production method is simple, and the products are shipped with virtually no quality inspection.

f) Ceramics industry

Non-metal minerals (ceramic) products include cement, pottery, porcelain, glass, bricks, and tiles.

Table 52 Production Volume of Ceramic Products （Unit: US$）

	1990	1991	1992	1993	1994	1995	1996	1997
Total Non-ferrous products	65,975	68,905	100,742	103,566	97,790	139,542	138,399	13,462
Pottery, Porcelain	268	155	194	94	60	76	75	76
Glass	9,354	8,299	10,501	6,221	3,596	4,611	4,054	281
Cement, Brick, Tile, etc.	56,353	60,451	90,047	97,251	88,345	104,696	129,315	122,027

Source: BCP

The ceramic industry in Paraguay consists of relatively simple products where clay and water are added and fired in a kiln to make ornaments and souvenirs, as well as construction materials such as cement, bricks, and tiles. The higher the firing temperature, the smaller the volume of production tends to be. The majority of factories are small to size. As a result of deficiencies in the production method, or insufficient drying, about 10 % of the products are rejected due to cracking or chipping during storage. This percentage rises to about 15 % by the time of shipping.

These are local industries using domestic raw materials, and the products are exported. Even if high-class tiles were imported, this would not affect production because of the price difference.

We did not visit a cement factory, but hope to report on one in our next report.

g) Metal (iron and steel) processing industry

The amount of production of metal products, machinery, and equipment, and others (including iron and steel) is shown in terms of monetary value in Table 53.

Table 53 Production Value of Metal, Machinery and Equipment, and other Industries (Unit: US$)

	1990	1991	1992	1993	1994	1995	1996	1997
Metal Products Total	18,857	19,154	16,057	12,616	11,331	12,153	11,238	10,290
Iron and Steel Products	13,770	14,910	12,296	8,839	9,159	9,965	9,083	8,158
Non-ferrous Metals	5,086	4,244	3,761	3,777	2,172	2,188	2,155	2,132
Machinery and Equipment Total	44,166	46,106	44,009	34,592	21,496	22,414	22,060	21,110
Steel plate, Metal Utensils	21,817	24,145	21,173	16,974	9,853	10,290	10,084	9,600
Electrical Machinery	1,617	1,793	1,716	808	573	597	590	567
Agricultural Machinery, Transport Vehicles	17,950	17,255	17,200	13,729	9,250	9,634	9,517	9,145
Other Manufacturing Industry	100,836	9,616	8,637	7,921	6,122	5,774	5,813	5,701

Source: BCP

The only factory in Paraguay that manufactures iron products (like wire and reinforcing bars used in construction) was privatized in line with the law enacted in 1997. The company imports its raw material (iron ore) from Brazil and its secondary material (coal) from as far afield as Africa and China. Only charcoal is produced domestically. However, the factory's current operating rate is as low 40 %.

Export products to Argentina and Brazil are produced in accordance with the USA SAE (Society American Engineering) standard. In addition, effort is currently being made to achieve the

ISO9002 standard by the year 2000. Apart from the main products, lime for improving the soil, as well as by-products— oxygen and nitrogen gases—are sold.

In the processed iron products sector, we visited a factory that builds barges used to transport grain and minerals. This factory can build two barges, each with a capacity of 1,500-2,000 tons, in about one month. The pre-cut steel for the barges is transported overland from an affiliate. Plans are to carry out that part of the operation at the factory in the future, as well as building a dockyard for repairs. The crude material is imported from Brazil, and one month's worth of stock (i.e. for two barges) is kept on a continuous system. The barges are built in accordance with the HYDROVIA standards. The company has no competitors at present, and because its products are essential for transporting cargo by river, its operation is stable.

Another metal-processing company manufactures aluminum products, such as sash window frames for the construction industry, as well as kitchenware, including kettles, pans, pots, and water pitchers. Its factory looks rather disorganized, but it is able to produce manually products of fairly good quality. It even employs special techniques like that of spinning lathes, which are used by only two companies in Paraguay. Some of the aluminum sashes are recycled (85 % yield, 5 tons per month). The company is competitive, and if production continues to increase, it will be able to handle exporting. Finally, a good sales strategy for kitchenware, which is a semi-manual operation, would be to emphasize the quality of the handcrafted product.

The metal machine industry in Paraguay differs from that in other larger South American countries such as Brazil, Argentina, Venezuela, or Peru, insofar as it produces few capital goods and consumer goods. The demand comes from the agricultural and agro-processing industries (e.g., oil pressing, sugar refining, alcohol production), production equipment and transport vehicles (passenger and river transport) for the energy industry, and the like. In other words, they produce sturdy equipment used for the production of metal machinery, products for other sectors, other machinery, parts, and storage facilities for the service industry. These are, more specifically, as follows:

Barges, air-conditioning equipment, cranes, mobile facilities, parts for hydro-electric power plants, liquid storage tanks (water, fuel, oil, etc.), parts and tools for agricultural, farming and forestry machinery (metal silos, dairy production machinery, agricultural machinery, and others), soldering equipment, replacement parts for industrial machinery (beverages, food, boxes and paper, graphs, the construction industry, oil refineries, cotton gins, timber drying, woodworking, ceramics, sugar refining, flour milling, meat processing, sugar, alcohol and gas extraction, carbonation, plastic, small grain distilling equipment, etc.), power transmission goods (cables, wire, metal pylons), and others.

The machine facilities that support the domestic industry are an important market for the metal processing sector—barges in particular, because of the frequent use of rivers for transportation. This industry is essential for the development of Paraguay's major industries in the future.

Incidentally, ferro-alloys are also said to be produced using the country's abundant electric power, but no survey has been done on this yet, although we hope to include it in our next report.

h) Other industries

Other industries that do not fall into the above categories include a manufacturer of fire extinguishers and protective goods (helmets, goggles, gas masks, and luminous paint). These products are manufactured by assembling imported components, such as hoses, cylinders and cylinder valves as well as the internal filler chemicals. The factory is prepared with pressure-measuring instruments, carbon dioxide gas storage facilities, filling facilities, and ambulances (in case of emergency). They also use a VCR for general demonstrations, and there is security equipment linked to the police and fire stations through a computer network and at which an operator is always on duty. Employees are given both general training and on-the-job training.

The last company is a bedding and mattress manufacturer. This company imports the raw material, polyurethane foam resin, from Germany and Argentina and makes bed mattresses by creating foam in its own factory. In addition, it makes mattress springs using steel wire imported from the U.K. and Spain. The spring manufacturing machine is an unmanned robot with a tempering machine installed next to it. Furthermore, when the foaming polyurethane is covered with a dyeing cloth, the entire process, including the quilting of the fabric, is computer-controlled by an automated machine in the company's own factory. Incidentally, the company also manufactures pillowcases, and production of bedding has been increasing in recent years. Although negotiations on exporting to Brazil were postponed due to the monetary crisis, exports are being sent to Uruguay. If the road transport situation improves, then exports will increase further. According to the staff, mattresses with springs are more comfortable and longer lasting, so sales are increasing worldwide. The factory itself is tidy and well equipped, and the machines are well maintained. However, the lack of high quality manpower, high interest rates, and insufficient government support in investment for development were raised as issues. The company expressed interest in conducting exchanges with Japanese management and engineers in the same industry, and in obtaining information on new Japanese products. This kind of positive management attitude will help them to achieve further exports in the future.

2) Management issues

This part of the report deals with the problems faced by the companies and associations that we visited.

Paraguay's manufacturing industries—with the exception of meat and dairy processing, pharmaceutical industry, spinning industry, bedding and mattress manufacturing, and steel manufacturing, are generally small scale, lack modern facilities, and not very competitive. On the other hand, the aforementioned companies, like those in spinning and weaving and steel that have no competition in Paraguay, have good facilities and efficient management, thus achieving good results. However, the impression gained from the rest of the industry is that the management of production, materials, stock, safety, quality control, etc., is not wholly satisfactory.

The management feels that the present situation is unsatisfactory in such aspects as government attitude, the financial system, consumer trends (buying cheap goods), and competition from cheap goods produced by other domestic manufacturers or imported from neighboring countries. For these reasons, they find it difficult to draw up medium to long-term plans or carry out adequate market research.

For instance, the price of Paraguayan leather products is higher than that from China, Korea, or India. Furthermore, the rate of operation in the industry is generally low at around 40-50 %, due to insufficient working capital. It is difficult to borrow money in the current situation of high interest rates, and even equipment funds are insufficient so that facilities are generally outdated. The industry also tends to lack appropriate technology and labor. There is also insufficient market research and development.

On the other hand, other companies are able to export as well as meet domestic demand. Among these managers, some actively seek to introduce the latest technology through technical tie-ups or exchanges with similar industries in advanced nations such as Japan. For example, there are companies in the pharmaceutical and spinning and weaving sectors that are working at conforming with the ISO9000 standards and at differentiating their products from those of other companies. There is also a meat processing company trying to get a Hilton contract and a farm to raise cattle with higher milk yields through cooperation with a Japanese veterinary surgeon.

Judging from the scale of industry and the quality of the workforce, productivity, management performance, and the rate of operation of factories in Paraguay are, generally speaking, noticeably poor. Recently, exports have also suffered from Brazil's economic crisis.

It is often said that Paraguayan labor is cheap, but the problems concerning the quality (skills) of the workforce are related to the country’s education system and in-company training.

Though blessed with abundant electric power, there are frequent blackouts, and many factories have been forced to install power generators.

Importing raw materials requires a lead-time between order placement and delivery, so the factories are compelled to hold a certain amount of stock, which puts pressure on working capital.

The high interest rate on borrowing from city banks since last year is having an adverse effect on companies in terms of capital investments and working capital for purchasing raw materials. Also, funds for the development of the industrial and agricultural sectors are not being utilized sufficiently. There is no doubt that these factors are a burden on export companies.

Businessmen in Paraguay (owners, management, and employees) fall into the following two categories: i) those who complain to the government without working hard themselves, and ii) those who work hard to devise ingenious solutions to problems. Taking account of the conditions described, the problems faced by the industry are outlined below.

a) Production control

The purpose of production control in a company is to make high-quality products quickly and at low cost. The management should always be aware of three aspects: Q (Quality Up), D (Delivery on Time), and C (Cost Down), and make sure its employees understand its aims. The company must acquire the so-called 4Ms—Money, Materials, Machinery, and Manpower—and use them effectively.

Therefore, business management includes efforts in evaluating product planning (based on market surveys in line with technological ability), designing, preparing for production, keeping records of production, and manufacturing and sales. The profit it has generated must be invested in facilities in preparation for the next production cycle.

Production control covers work management, schedule control (i.e. ensuring that actual manufacturing meets the planned delivery date), stock and cost management, purchasing (including parts), and volume and quality control. Control of target costs and production results also forms part of this. Apart from these, manpower training, devising inspection methods for facilities and equipment as well as methods for dealing with malfunctions, and providing guidance on observing operating standards are all part of production control. Furthermore, the 4-step cycle of Plan, Do, Check, and Act has to be observed in carrying them out.

The majority of Paraguayan companies do not carry out sufficient production control, even when taking into account the various adverse conditions. Understandably, achieving the same results as more advanced nations is difficult, but a company must continue to improve if it wishes to continue its business.

It is difficult to predict the future, but management should draw up plans for production for at least 3 years, as well as a profit plan for capital investments.

b) Safety operation

Managing safety operation is also part of production control.

There are many danger spots in Paraguay's factories. Here are some of the numerous examples: no rails on stairways; slippery, uneven, or pot-holed floors; uncovered revolving parts of machinery, such as belts; lack of emergency stop buttons on most machines; uncovered steam pipes (to maintain the temperature or prevent damage from collision); unnecessary items or protrusions around the machines; improperly-stacked raw materials and products (in danger of collapsing) in warehouses; a large amount of dust and rubbish; workers operating where there is a danger of gas poisoning; and dangerous operations such as carrying heavy objects. Ventilation is bad, and because of the hot weather, many operators do not wear shirts and some do not wear any protective gear. In some factories, there is a danger of injury through burns or hands trapped in machinery. Little thought is given to using sanitation equipment or wearing protective gear.

The management says that there have been no industrial accidents so far, but the possibility of an accident occurring is looming. If the accident were to involve injury, it would not only be a loss to that person and his or her family, but also a great loss to the company.

In order to prevent accidents in the workplace, there is an urgent need to implement countermeasures in a planned and comprehensive manner to promote the health and safety of workers in the factories and to provide a comfortable working environment. It is also necessary to educate workers about day-to-day safety operations including hazard awareness training so that workers themselves can identify danger spots and voluntarily devise safety measures.

The workers need to understand the importance of safety and sanitation, so that they will be careful not to become accident victims themselves.

Operating in bare feet or without protective gear in a timber factory is dangerous, and improvement here is a matter of urgency. In the tanning factory, workers must observe safety

measures for the prevention of operating mistakes in mixing chemicals or in handling during the dyeing process. Hazardous areas should be better lit.

c) Quality control

Some companies in areas such as spinning and apparel, pharmaceuticals, and insecticides carry out quality control with the aim of conforming to the ISO9000 standards. On the other hand, there is insufficient checking of the ingredients, contents, and amounts. Many factories are not even sure of the lot size or composition of the product. No clear records are kept on production or inspections.

Because quality control is not rigorous, there are many defective products, and it is doubtful whether companies give much thought to client or consumer satisfaction with their products.

Public relations on the continuing use and handling of products, as well as customer service activities are currently insufficient.

In Paraguay, there are no standards like JIS for the manufacturing industry, but users do not seem too concerned about this either. However, in the international market, it is essential for Paraguay to think about product design that is consistent with international standards and about creating credible inspection standards.

It is advisable to start gradually from things that can be achieved, such as checking and analyzing the frequency of defective products and their causes, making improvements when faults occur, and carrying out sampled or total inspections.

Ultimately, the aim should be that at every stage of corporate activity, including market survey, R&D, production planning, design, preparing for production, procurement, subcontracting, manufacturing, inspections, sales, and after-sales service, that every member of the company, from management down to each operator, should participate in total quality control (TQC) more effectively.

d) Marketing

From interviews with related companies, it was felt that management and key persons in charge were lacking in marketing expertise. Apart from a few exceptions, the companies surveyed face tough competition domestically and overseas from both large and small companies in the same industry. Because of this, it is hoped that new standardized products will be produced.

Marketing includes not only the development of new products, but also deciding the brand and price, selecting the sales channel, conducting advertising and sales promotion, and distributing the product, i.e. covering production, sales, consumption, and use. Market research is one of the important functions of marketing, and includes surveys concerning the merchandise, market, and consumer behavior. An important survey is on products and customer behavior—such as how consumers are accepting the product and what improvements are needed (this includes improvement of the product itself and improvements in the sales method, which covers advertising and PR: public relations). In addition, a general market survey, indicating how much of the product could sell in Paraguay, and a consumer trends survey (such as buying cheap goods rather than expensive ones or choosing quality over price) are required.

e) Pollution control

Practically nothing is done in this area: in the disposal of industrial waste, not even primary treatment is carried out at the factory. Most companies do not carry out any analysis of their waste, nor quantify the waste; they merely dispose of it or let it enter the municipal sewage system.

Only some of the meat and cottonseed oil factories manufacture soap from non-edible oils and fats.

It is particularly important for the tanning factories to treat their effluent because the tanning process, even today, requires the use of chromium. It is of some concern that groundwater is being polluted. Urgent measures must be taken to create a closed waste system to prevent chromium-contaminated effluent from escaping from the factory.

Enforcement of an environmental law recently resulted in the closing down of a factory. This has had a definite effect on the leather industry, as it would not be able to operate unless it comes up with measures to treat chromium. Although we have no specific information on the degree of contamination of groundwater, rivers, and lakes, it is clear that efforts must be made to provide treatment even at a minimum level, such as recycling, separating solids, and providing effluent storage reservoirs and purification facilities on company premises.

3) Export potential

As stated above, Paraguay needs to promote exports in order to overcome its current economic

difficulties and achieve development. Promoting exports and building up foreign currency will create capital investment funds for further increased production, and government revenue will also increase, thereby generating an upturn in the economic cycle.

The export promoting industries are: i) the textile industry; ii) the leather industry; and iii) the woodwork industry; all of which can procure raw materials domestically in abundance and at competitive prices. In the digest edition of "Paraguay—Creating Comparative Advantage," Klaus Esser also suggests that emphasis should be placed on those areas that use natural resources to encourage exporting, by selecting specific companies within those areas as key model companies. The number of companies that are registered as export companies in the general industrial sector are as follows: wood and woodworking (103); textiles (72); and metal machinery, plastics, and construction materials (77).

When MERCOSUR free trade is established, if the importation of inexpensive materials from members and associate members at their domestic prices is possible, then other industries (such as chemicals, iron and steel, and metalworking) that currently import their raw materials will be able to improve productivity. Consequently, they will gain the possibility of achieving production and corporate structures that are robust enough for the export market. Another possibility worth considering is for the processing industry to use the wage differences along the borders.

The worldwide trend in exports shows that competitiveness can be achieved not by one individual company, but rather through cooperation with other companies. In this aspect, the formation of organizations such as cooperative associations for both manufacturing and exports is desirable. In order to promote exports, an organizational framework that facilitates corporate activities is necessary. The government should lend positive support to those measures that promote exporting. For instance, when small to medium-sized companies are planning to export, they currently require considerable expense and approximately one month to register the preliminary plans with the Ministry of Industry and Commerce (MIC), arrange a loan from the Industrial Development Fund (FDI) and conduct the guarantee procedure. It is important to simplify these processes.

Training for exportation is needed in Paraguay, and support for both material and human resources that contribute to enabling Paraguay's comparative advantage is important.

a) Textile industry

Paraguay exported 53,000 tons of cotton fabric in 1997 worth US$97,965,000. This represents a greater than 40 % loss in both volume and dollar amount when compared to 1996, when 129,000

tons worth US$216,502,000 were exported. Even if we take into account factors such as the poor harvest in 1997 brought on by bad weather, changes in agricultural policy, and the effects of continuous cropping, when compared with the early 1990s, there has still been a steady decline in exports. Additionally, more than 80 percent of raw cotton exports are sent to Brazil.

The cotton fabric manufactured domestically comprises only 5-7 % of Paraguay's total production. The textile industry has been developed over the last 40 years under protective policies, during which time it has produced twisted yarn, cloth, and apparel, which all sport basic quality and added value. The major export destinations, volume, and dollar amounts of cotton originating from Paraguay between 1992 and 1997 are shown in the Tables 54-55.

Table 54 Cotton: Major Destination Countries and Volume of Exports（Unit: ton）

	1992	1993	1994	1995	1996	1997
G.Total	185,135	138,735	115,051	149,854	128,550	53,279
Brazil	—	—	89,885	78,688	95,249	45,490
Argentina	7,835	9,510	8,154	11,949	10,400	1,378
France	2,266	59	11	139	0	0
Italy	2,959	12	130	1,391	1,478	64
Portugal	6,922	98	23	863	406	0
Uruguay	6,514	2,818	2,469	5,011	3,222	2,911

Table 55 Cotton: Major Destination Countries and Amount of Exports（Unit: US$1,000）

	1992	1993	1994	1995	1996	1997
G.Total	209,415	164,909	170,874	196,038	216,502	97,056
Brazil	—	—	133,372	153,352	159,428	78,978
Argentina	10,302	12,199	10,767	25,211	20,130	7,507
France	2,801	213	26	270	0	0
Italy	4,217	58	691	4,327	2,739	246
Portugal	6,741	103	56	1,680	663	0
Uruguay	6,327	3,417	3,922	1,059	5,268	4,436

Source: CADEP Report

Tables 56- 57 shows the export volume and dollar amounts for the major types of cotton fabric.

Table 56 Export Volume of Textile Products（Unit: ton）

	1992	1993	1994	1995	1996	1997
G.Total	185,135	138,735	115,051	149,854	128,550	53,279
Type－4	102,132	86,404	54,284	92,179	51,733	27,359
Type－5	36,798	17,709	26,573	20,470	39,179	13,605

Table 57 Export Value of Textile Products（Unit: US$1,000）

	1992	1993	1994	1995	1996	1997
G.Total	209,415	164,909	170,874	196,038	216,502	97,056
Type－4	114,348	101,976	84,454	183,738	82,046	42,941
Type－5	4,052	20,408	43,383	41,271	64,889	22,934

Source: CADEP Report

Types 4 and 5 in the Tables indicate different degrees of processing; the categories are Types 1 to 8.

The annual growth rate of the worldwide cotton market from the year 2000 is estimated to be around 2 %. A price increase is unlikely due to competition with synthetic fibers. The international market price is mostly dominated by trends in prices among the large producing countries. Such major producers as USA and China adopt policies that protect their producers from price fluctuations in the international market

The government's protective policy towards the industry will continue, and as it is one of Paraguay's traditional industries, it is hoped that it will develop to contribute to the export trade.

b) Leather industry

Paraguay's leather goods are currently exported as semi-finished products (finished tanned leather) to USA, Central and South American countries, Europe, and Hong Kong.

The inner half of the leather is used for apparel such as leather jackets and shoes, while the harder exterior half is used for handbags, small items, and shoes. Paraguay exports tanned leather as a semi-finished product rather than finished goods that have more added value.

Table 58 Export Value of Semi-finished and Finished Leather Products (Unit: US$1,000)

	1994	1995	1996	1997
Semi-Finished	61,807	56,087	38,560	39,277
Finished	4,072	2,618	4,207	3,398

The average Paraguayan exports of finished leather products to the world between 1991 and 1995 amounted to US$3,509,000. Tables 59 -60 show the volume and amount of exports from Paraguay by export destination.

Table 59 Leather: Major Destination Countries and Export Volume (Unit: ton）

	1992	1993	1994	1995	1996	1997
G. Total	8,121	13,456	11,760	11,737	10,477	11,408
U.S.A.	—	1,508	1,464	1,906	2,403	2,027
France	—	—	432	434	253	297
Netherlands	200	172	280	131	335	245
Italy	911	834	1,962	1,724	2,679	3,002
Uruguay	1	20	16	786	1,898	1,369

Table 60 Leather: Major Destination Countries and Export Value（Unit: US$1,000）

	1992	1993	1994	1995	1996	1997
G. Total	37,060	52,986	58,458	56,731	39,474	41,540
U.S.A.	—	15,858	11,633	7,273	6,345	6,409
France	—	—	6,726	15,277	3,829	4,476
Netherlands	1,787	1,760	2,931	990	2,028	2,078
Italy	5,939	5,409	8,228	9,160	7,982	7,983
Uruguay	11	280	190	3,979	10,922	9,235

Source: CADEP Report

The results of the 1995 MIC survey showed that 70-75 % of sales of leather were overseas. There is a long history of trade between Paraguayan companies and foreign buyers. The leather industry regularly holds international exhibitions that attract sellers, buyers, and producers of tanned leather, and related machinery, so there is a constant exchange of the latest information. In the long run, Paraguay should try to improve its design and acquire the level of technology required to reach a greater degree of processing.

Although it is not an activity of the leather industry as a group, there is a plan to hold an event to introduce Paraguay's leather goods to neighboring countries such as Columbia, Ecuador, and Venezuela, similar to the PR activities organized by PROPARAGUAY.

c) Woodwork industry

The main overseas markets for woodwork products are USA, European countries, Argentina, and Brazil.

Tables 61-64 show the main destination countries and their volume, broken down by timber products and woodwork products.

Table 61 Timber Product: Major Destination Countries and Export Volume（Unit: ton）

	1992	1993	1994	1995	1996	1997
G.Total	228,866	199,567	186,691	244,563	316,693	320,773
Argentina	44,302	45,835	55,886	47,051	53,629	68,821
Brazil	159,378	131,057	110,198	167,744	232,788	224,068
U.S.A.	2,699	5,745	3,704	4,831	2,893	946

Source: CADEP Report

Table 62 Timber Product : Major Destination Countries and Export Value （Unit: US$1,000）

	1992	1993	1994	1995	1996	1997
G.Total	22,654	23,151	25,530	32,192	34,128	38,036
Argentina	8,557	8,774	11,430	10,296	11,578	14,195
Brazil	8,589	9,470	8,876	13,001	14,074	13,961
U.S.A.	335	763	505	1,204	442	248

Source: CADEP Report

Table 63 Wood Processed Product: Major Destination Countries and Export Volume（Unit: ton）

	1992	1993	1994	1995	1996	1997
G.Total	76,884	93,004	110,533	109,673	112,430	123,901
Argentina	22,157	27,670	32,5501	25,862	30,368	32,288
Brazil	17,961	17,840	19,250	21,264	23,428	19,885
U.S.A.	—	—	28,561	24,521	20,394	24,335

Source: CADEP Report

Table 64 Wood Processed Product: Major Destination Countries and Export Value (Unit: US$1,000）

	1992	1993	1994	1995	1996	1997
G.Total	30,588	40,676	53,166	57,283	59,890	62,686
Argentina	9,227	12,777	17,541	13,932	16,468	17,148
Brazil	3,982	3,701	4,216	4,835	6,042	4,783
U.S.A.	—	—	12,806	12,034	11,374	11,779

Source: CADEP Report

The breakdown of the volume of exports of timber products from Paraguay in 1997 was 21 % to Argentina and 76 % to Brazil; for woodwork products, 26 % went to for Argentina and 16 % went to Brazil. Other export destinations include USA, Netherlands, various European countries, and Uruguay.

The total amount of timber exported in 1997 was US$62,686,000. The breakdown of this is 51 % for flooring and 36 % for processed products. The processed wood products exported include laminated products used in construction, such as flooring and wall coverings. There is little furniture exported.

Table 65 Export Volume of Major Timber Products and Wood Processed Products (Unit: ton）

	1992	1993	1994	1995	1996	1997
Boards, Planks	171,830	159,037	163,281	124,439	182,533	119,104
Bars	13,655	7,048	217	9,816	34,827	2,755
Furniture	1,623	2,307	638	812	1,348	2,265
Flooring	28,218	28,646	35,170	39,260	39,827	51,300
Wall Boards	15,453	22,244	42,010	34,742	38,447	44,798

Table 66 Export Value of Major Timber Products and Wood Processed Products (Unit: US$1,000)

	1992	1993	1994	1995	1996	1997
Boards, Planks	19,667	20,208	22,928	17,456	23,063	20,738
Bars	1,021	401	48	1,157	2,030	496
Furniture	290	506	162	546	829	1,451
Flooring	17,292	18,237	23,046	28,761	28,033	32,210
Wall Boards	4,297	8,745	18,821	15,261	20,084	22,588

Source: CADEP Report

It will be important for Paraguay to put as much effort as possible into exporting products that are closer to finished goods (with higher added value), rather than just unprocessed timber. Vital tasks for Paraguay are the conservation of its natural forests and afforestation, as well as the export of processed wood products and paper products such as cartons. The selection of trees suited to afforestation has been carried out, and a special project team has been set up and is in action, so we will leave this task to them.

d) Other industries

In the metal processing industry, Brazil was the largest importer of iron and steel products, but that changed as a result of last year's economic crisis, and the industry has been exporting to Argentina, Bolivia, and Uruguay instead. Currently, exports to Chile are being negotiated.

Ferro-alloys will be dealt with in the next report.

Products from the aluminum factory, which include handmade metal containers for household use, seemed to be well made. If sufficient quantities can be produced, these could also be exported.

According to the chief of ORMIC (MIC regional office) in Itapúa, inexpensive construction materials (ceramic products such as bricks and tiles) made in Paraguay are "exported" to Argentina on an individual level (by peddlers). Apparently, Argentina has set a high assessment price to prevent exports. The importer must pay IVA (value added tax), which is based on that high assessment, to the detriment of the Paraguayan exporter. This leads to the suspicion that although on the surface MERCOSUR has no influence in this area, there is an invisible barrier against Paraguay's products. The companies in this industry are currently small, but the raw materials are domestic, and if high-quality durable products can be made, the prospects are good.

Paraguay has abundant supplies of limestone from which it can produce cement. Depending on the amount of production and future measures, cement could become one of Paraguay's exports. Because cement is heavy, the main means of transportation at present is by river, so there is a small

problem in terms of transport. However, this problem will be resolved if the infrastructure is improved. The cement industry was not included in this survey, but will be dealt with in the next report.

Exports of cement according to the CADEP report are shown in Table 67.

Table 67 Value of Cement Exported (Unit: US$)

	1992	1993	1994	1995	1996	1997
Cement	631	376	898	1,374	678	309

CADEP Report

Essential oils and herbs are special to Paraguay and seem to be ideal exports. The volume of production is currently low, but they have a long history. In 1997, this industry accounted for 0.5 % of GDP, and 2.6 % of the total export amount, US$23,000,000. The San Pedro agricultural cooperative has begun exporting 1,000-3,000 tons of dried herbs since 1990. The drying technology comes from Germany, and essential oils are exported to USA (28 %), Brazil (20 %), France and the Netherlands (11 %). 72 % of Paraguay's essential oils comes from the Palo Santo, and among the rest, there is a considerable amount of citrus oils.

The volume and dollar amounts of exports of essential oils are as follows: 864 tons/ US$13,388,000 in 1996 and 845 tons/US$12,756,000 in 1997. 43 % of total exports of essential oils were mint, while 39 % were Petit Grain.

The cultivation area and volume of production of sour orange and mint are shown in Tables 68 - 69.

Table 68 Cultivated Area and Volume of Sour Orange and Mint

	Sour Orange		Mint		
	Cultivated Area（Ha）	Volume of Production (T/Ha)	Cultivated Area (Ha)	Volume of Production (T／Ha)	Yield (Kg／Ha)
1995／1996	10,823	191,072	13,836	52,483	3,800
1996／1997	10,803	185,263	13,836	52,577	3,790
1997／1998	10,791	185,046	13,754	52,390	3,809

MAG／DCEA Statistics at Synthesis 1997,1998

Table 69 Export Volume of Quebracho（Unit: ton）

	1992	1993	1994	1995	1996	1997
Extracted Liquid Volume	4,7904	3,896	7,264	4,333	10	0

Source: CADEP Report

Herbs have traditionally been used for medicinal purposes (dating back to before Colonial times), but trade in herbs is relatively new. In 1998, roughly 5,200 tons—worth about

US$345,607—were exported as medicinal herbs.

The annual production volume of medicinal herbs is shown as follows.

Table 70 Firms of Medicine Herbs and Volume and Value of Exports

FIRM'S NAME	Export Volume(Kg)	Export Value (US$)
ISAO OHIRA ALMASEN	1,000	3,500
JAMES ALLE MAY	18,950	58,569
NATURIT DE DANIEL F. TROCHE	13,700	29,850
ISAO OHIRA	100,000	205,000
AGROMAQUINAS DEL ESTE	501,000	25,500
OTROS	33,000	10,000
Total	667,650	332,419

Source: General Customs Office, 1998

Table 71 Production Capacity of Herbs

FIRM'S NAME	Volume	FIRM'S NAME	Volume
IMEXWORLD	20 Ton	LAB.SANTA MARGARITA	300,000 Units
JAMES ALLEN MAY	1.4Ton	INDEXWORD	8 Ton
LAB.BENAVENTE	3,048,000 Units	PHOENIX AGRICULTURE	1,440 Ton

Source: CADEP Reports

The herb manufacturers and production volume are shown in Table 71.

Apart from medicinal herbs, there are other herbs like tea, guarana, wheat germ, and stevia, but there are few statistics on these. Added to cosmetics, hair-care products, and toiletries, whereby their characteristics as herbal additives are emphasized, they have good export potential not limited to use as only medicinal herbs.

2.1.3 Export competitiveness by product

(1) Changes of export/import amount and competitive index by item

In 2.1.1 and 2.1.2, we have analyzed the production and export of Paraguay's main products. In this chapter, we analyze exports and imports trends of all products in order to identify comparative advantages and the direction of industrialization of Paraguay.

Table 72 shows export/import amounts by item and the item's competitive index (hereinafter referred to as CI) for 1995 and 1999. This table is based on customs clearance statistics. CI is represented in the form (export amount －import amount) / (export amount ＋ import amount). When there is export alone without import, the CI is 1. When there is import and no export, it equals to －1. If exports are equal to imports, the CI would be 0. CI shows evident export

competitiveness according to the past trading. It does not necessarily mean potential export competitiveness.

Table 72 Export Competitiviness by Article by the Middle Classification

unit:US$

Description	1995			1999			Difference in CI
	Export	Import	Competitive Index:	Export	Import	Competitive Index	1999 -1995
Animals; animal products	68,157,256	86,901,505	-0.121	66,171,476	20,417,955	0.528	0.649
Vegetable products	202,161,635	36,593,227	0.693	374,385,217	61,889,697	0.716	0.023
Animal or vegetable fats & oils	62,628,923	2,396,901	0.926	50,845,341	9,354,665	0.689	-0.237
Prepared foodstuffs; beverages, spirits & vinegar	61,233,156	291,068,284	-0.652	70,099,451	169,353,420	-0.415	0.238
Tobacco	6,388,252	193,388,592	-0.936	21,190,808	160,021,468	-0.766	0.170
Mineral products	4,267,299	492,165,448	-0.983	2,190,710	518,236,100	-0.992	-0.009
Products of the chemical or allied industries	24,203,971	266,850,627	-0.834	17,923,531	287,215,022	-0.883	-0.049
Plastic & Rubbers	4,763,286	142,677,372	-0.935	4,713,592	122,726,476	-0.926	0.009
Raw hides & skins, leather, furs	54,641,703	14,586,075	0.579	35,518,650	9,346,810	0.583	0.005
Wood & articles of wood, cork, manufactures of straw	90,639,642	1,503,887	0.967	81,679,912	2,669,610	0.937	-0.031
Pulp of wood or of other fibrous cellousic material	5,065,390	94,829,949	-0.899	4,611,358	85,022,056	-0.897	0.001
Textiles & textile articles	310,247,245	112,392,138	0.468	94,785,929	66,511,587	0.175	-0.293
Footwear, headgear, umbrellas, walking-sticks	877,698	71,090,033	-0.976	3,222,749	25,124,850	-0.773	0.203
Pearls, precious stone precious metal	0	2,557,317	-1.000	17,696	552,212	-0.938	0.062
Base metals & articles of base metal	13,448,237	146,829,980	-0.832	8,136,760	101,751,223	-0.852	-0.020
Machinery & mechanical appliances; electrical equipment	6,491,428	1,177,081,484	-0.989	6,194,819	495,516,191	-0.975	0.014
Vehicles, aircraft, vessels	7,761,267	22,351,708	-0.485	974,800	62,790,999	-0.969	-0.485
Optical, photographic, measuring, precision, medical instruments; clock & watches; musical instruments	98,650	81,160,055	-0.998	814,381	64,926,040	-0.975	0.022
Others	899,687	201,787,629	-0.991	1,798,251	95,908,221	-0.963	0.028

Source：OCIT

Figure 18 shows the changes of CI between 1999 and 1995 in matrix form. The 1st quadrant shows items with rising export competitiveness. The 2nd quadrant represents items that have little export competitiveness, but their competitiveness is rising. The 3rd quadrant contains items with little competitiveness, which is declining. The 4th quadrant includes items that have competitiveness but it is declining.