

THE BRAZILIAN SOYBEAN INDUSTRY

Rita T. Vieira and Gary W. Williams*

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* Dr. Vieira is Researcher, Public Policy Studies, Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA), Brazil and a post-doctoral student in the Department of Agricultural Economics, Texas A&M University. Dr. Williams is Professor and TAMRC Director, Department of Agricultural Economics, Texas A&M University, College Station, Texas 77843-2124.

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ABSTRACT: This study analyzes the structure of the Brazilian soybean industry with emphasis on government policies and the competitiveness of the sector. The role of Brazil in the world soybean market is outlined. The Brazilian soybean production and processing sectors are discussed. Brazilian government policies, including the provisions of MERCOSUR, and their effects on the competitiveness of the Brazilian soybean industry are considered. Implications for the future of the Brazilian soybean industry are suggested.

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EXECUTIVE SUMMARY

Over the last 25 years, the Brazilian soybean sector has been transformed into the greatest generator of foreign exchange in the country. Brazil has become the world's second largest producer of soybeans and the world's largest exporter of soymeal. Although the domestic soybean processing industry has been completely overhauled and modernized over that same period, government subsidies have led to a severe over-capitalization of the industry. Total annual processing capacity is now equal to nearly one and a half times the volume of the annual harvest while average capacity utilization is less than 50%.

Soybean oil demand has been the primary force behind the growth of the Brazilian soybean industry. Even so, the domestic livestock industry, particularly poultry, has also experienced growth leading to growing domestic use of soymeal. Although Brazil has enjoyed growing competitiveness in world soybean and product market, recent declines in the volume produced and exported have caused some concern over the future of soybeans in Brazil.

The establishment of MERCOSUR and changes in Brazilian government policies have thrown Brazilian soybean producers and processors into more direct competition with their counterparts in Argentina and Paraguay. The elimination of internal tariffs among member countries could shift the competitive advantage away from Brazil and result in growing imports of soybeans and products into Brazil from its MERCOSUR neighbors. The highly productive, fertile soils and favorable climate of Argentina has given Argentine producers a competitive edge over Brazilian producers in cost of production. Whereas the growth of Brazilian production has slowed, Argentine production appears to be picking up speed.

Brazil has also substantially eliminated policy measures that have tended to favor the agricultural sector. Brazilian agriculture now operates with fewer government subsidies but is strapped with a heavy tax burden which significantly affects the competitiveness of the soybean sector. Research indicates that Brazilian producers face higher costs of production and receive lower net average returns for their soybeans than Argentine and U.S. producers. Poor transportation infrastructure between new production areas and major ports, long hauling distances to ports, and high fuel costs have significantly increased the cost of Brazilian soybeans and products in world markets and constrained the expansion of soybean area in Brazil.

These problems have induced Brazilian producers to search for cost-reducing technologies and alternatives to soybeans in production. Research institutions in Brazil can play a vital role in this process. New, higher yielding soybean varieties are needed. Systems for more efficient use of inputs and management techniques to maximize profits must be devised. Analyses of production alternatives must be conducted. The public sector must also contribute to help rescue the soybean sector from declining competitiveness. A revision in tax policy to reduce the tax burden on soybean

producers is overdue. Direct investments in transportation and related infrastructure and incentives for private investment in infrastructure are critically needed. These and many more tasks must be accomplished if the future of the Brazilian soybean industry is to be as bright as its past.

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THE BRAZILIAN SOYBEAN INDUSTRY

Four countries, the United States, Brazil, China, and Argentina, account for 90% of the total world production of soybeans (Table 1). The United States has the distinction of being the leading producer while Brazil occupies second place. The soybean is the most important agricultural commodity produced in Brazil in terms of its contribution both to farm income in Brazil and to the country's Gross Domestic Product (GDP). Soybeans gained a dominant position in the Brazilian agricultural sector and in the overall economy over a relatively few years. From 1970/71 through 1994/95, Brazilian soybean production increased 12 fold, a dramatic growth that catapulted Brazil into second place among world soybean producers and the largest exporter of soymeal.

In recent years, however, the area planted to soybeans in Brazil has grown little. Between 1984/85 and 1994/95, Brazilian soybean area grew from 10.15 million hectares (ha.) to 11.51 million ha., an average annual increase of only 1%-2%. CONAB (Companhia Nacional de Abastecimento) estimates some decline in Brazilian production in coming years. CONAB estimated that the 1995/96 harvest amounted to only 22 millions tons due to a 10.7% reduction in the number of acres planted to soybeans. Primary obstacles to the continued rapid growth of Brazilian soybean production have included high export taxes, domestic input taxes, high shipping costs, and high domestic sales taxes in addition to poor infrastructure in the regions of newest soybean area expansion.

The organization of MERCOSUR (the Southern Cone Common Market) has given Argentina, Paraguay, and Uruguay preferential access to the Brazilian soybean market. Because Brazil is the world's second largest consumer of soybean oil and the largest consumer of soybean meal, MERCOSUR could transform South American and, therefore, world soybean markets. Of particular concern are the differences in soybean policies that exist among MERCOSUR member countries.

This study analyzes the structure of the Brazilian soybean industry with emphasis on government policies and the competitiveness of the sector. After reviewing the role of Brazil in the world soybean market, the Brazilian soybean production and processing sectors are discussed. The focus then turns to Brazilian government policies, including the provisions of MERCOSUR, and their effects on the competitiveness of the Brazilian soybean industry. Conclusions and implications for the future of the Brazilian soybean industry are offered at the end.

Brazil and the World Soybean Market

With world production on the order of 133 million metric tons (mt) in 1994, soybeans is the primary oilseed produced and processed in the world. While the United States dominates the world soybean market, three of the four other largest soybean producers in the world are members of MERCOSUR (Brazil, Argentina, and Paraguay) in South America. Even though Brazil is the largest soybean producer of the MERCOSUR countries, both Argentina and Paraguay have become important players in world soybean markets, helping to fill the void from the decline of China's influence in those markets (Table 2).

Between 1990 and 1994, Brazilian soybean exports grew more rapidly (177%) than those of soymeal and soyoil (Table 2). Nevertheless, Brazilian soymeal exports grew rapidly enough during that period (31.5%) to maintain their one-third share of world soymeal trade. Although the U.S. is the larger producer of soymeal, Brazil exports more soymeal due to the strong domestic demand for soymeal in the U.S. for use in animal feed rations. In recent years, Argentine soymeal exports have also grown as soybean production has increased and domestic use of soymeal has leveled off.

Brazil is currently the second largest consumer of both soymeal and soyoil in the world behind the United States (Table 2). Over the last 25 years, the Brazilian consumption of soymeal increased dramatically from 190 million mt to 4,250 million mt (USDA 1994). The primary factor behind this phenomenon has been the rapid growth of the Brazilian poultry industry. In Brazil, soymeal is the second most important ingredient by weight in poultry feed rations. Brazil has become the third largest exporter of chicken meat in the world.

In world soyoil markets, Brazil is the third largest exporter behind Argentina and the European Union (Table 2). Argentina now accounts for 30% of world soyoil exports by marketing almost all of the domestic production of soyoil.

The major soybean importing regions are the European Union, Japan, Korea, Taiwan, and Mexico (Table 3). Although at a distance disadvantage to all of those markets compared to the United States, Brazil has aggressively pursued soybean and soybean product export opportunities to all those regions.

Brazilian Soybean Production

Soybean production in Brazil experienced phenomenal growth over the last 25 years. Production grew from 2.1 million mt in 1970/71 to 25.9 million mt in 1994/95 (Table 4). Most of this growth in production has come from an increase in area planted to soybeans rather than higher yields from new technologies. Soybean area in Brazil jumped from 1.7 million ha. to 11.7 million ha. over the 1970/71 to 1995/95 period. Yields, on the other hand, did not quite double over the same period from 1.21 mt/ha to 2.22 mt/ha (table 4).

Factors responsible for the increase in Brazilian production include favorable international prices (especially during 1973/74), adequate political support (primarily in the 1970s and the early 1980s), some technical innovation (better varieties and the use of chemical inputs), private industry investments and government subsidies in processing facilities (most recently in central Brazil), efficiency in private sector marketing, government production subsidies and credit incentives, and a change in tastes and preferences in developed countries from the use of animal fats to vegetable oils. Over those 25 years, Brazil has experienced periods of slow or negative growth in production as a result of weather problems and inadequate or unstable political support, particularly in the years of 1978, 1982, 1986, 1990, and 1991.

The increase in average yields obtained in Brazil reflect the use of varieties adapted to local conditions, improvements in cultivation methods, and the use of more fertile, virgin soils.

EMBRAPA (Brazilian National Corporation for Agricultural Research) in the Brazilian Ministry of Agriculture and Rural Development has played a significant role in the development of technological innovations that have lowered costs of production and encouraged the expansion of output. Such improvements in productivity not only helped maintain the competitiveness of the traditional soybean production regions in the southern states but also helped make production in Central Brazil viable. Despite some increase in average yield, however, Brazilian soybean productivity is still below that of the United States (2.79 tons/ha) and Argentina (2.3 tons/ha) (USDA 1994).

Soybean cultivation in Brazil occurs in two distinct regions: (1) the traditional region of the South and Southeast which encompasses the states of Rio Grande do Sul, Paraná, Santa Catarina, and São Paulo and (2) the Central Brazil expansion region comprised of the states of Mato Grosso do Sul, Mato Grosso, Goiás, the Distrito Federal, Minas Gerais, Bahia, and Maranhão. Until the mid-1970s, both the area in cultivation and production were almost completely dominated by the traditional regions of the South and Southeast (Table 5). Since that time, however, the growth in area and production has been much stronger in the Central Brazil region.

Soybean area expansion in the traditional region was characterized by the conversion of pasture land and other crop areas to soybeans. In the states of Rio Grande do Sul, Paraná, and São Paulo, soybeans were even substituted for corn. In those three states, 14% of the soybean area expansion was on former pasture lands, especially in Rio Grande do Sul where this stimulated the growth of feeding cattle in feedlots in the state. In Sao Paulo, cotton and rice areas were two other important sources of land for soybean area expansion while coffee maintained its importance in Paraná and wheat in Rio Grande do Sul (Williams). The growing profitability of soybeans relative to most other productive enterprises and supporting government policy explains most of the incentive to convert crop and pasture land to soybeans in this region.

Expansion of soybean cultivation into the Central Brazil region began in the late 1970s and currently represents 45% of the soybean area in Brazil (Table 5). Most of the soybean area expansion in recent years has taken place in the Central West region of Brazil. The growth in Brazilian production in recent years corresponds directly to the expansion of soybean production into this region. The traditional region of the South and Southeast has made only limited contributions to the growth of the soybean area cultivated in Brazil in recent years.

The principal soybean producing states in 1994/95 were Rio Grande do Sul, Mato Grosso, Paraná, Mato Grosso do Sul, and Goiás (Table 6). The highest yields were attained in Paraná and Mato Grosso and demonstrate that Brazil is capable of further major increases in soybean production with adequate profitability to encourage investments in inputs and technology.

Brazilian Soybean Processing

Brazil is the second largest processor of soybeans in the world. Despite the fact that the average rate of soymeal extraction is 78% compared to 19% for soyoil in Brazil, soyoil is considered the

primary output. Soyoil reportedly accounts for about 98% of the total value of the soybeans processed in Brazil (Burnquist). Soymeal is more of a by-product of soyoil extraction.

The volume of soybeans processed in Brazil began to grow rapidly in about 1960. The volume of soybeans processed reached 1 million mt in 1970, 4 million mt in 1974, and 105 million mt in 1994 (Pereira, 1995). The Brazilian oilseed processing industry has the capacity to process 125,040 mt of oilseeds of various types per day (Table 7). About 87% of this capacity is used exclusively for soybeans (Burnquist).

The extraction and refining of vegetable oils was initially concentrated in the state of São Paulo and has since relocated to other regions. The southern states of Rio Grande do Sul, Goiás, Paraná, and Santa Catarina account for 62% of the country's total oil extraction capacity. Just as production is moving to Brazil's Central region, however, so too is the processing industry. Whereas the initial establishment of the processing industry in the southern areas was motivated by a need to serve the main consumer markets in Brazil, the growing relocation of the industry to the Central region is motivated by a need to guarantee an abundant supply of the raw material and the relatively lower cost of transporting soybean products compared to soybeans long distances over poor roads.

Currently, there are 25 soybean processing plants in the Central Brazil region, with 7 in Goiás, 1 in the Distrito Federal, 5 in Mato Grosso, 7 in Mato Grosso do Sul, 3 in Minas Gerais, and 2 in Bahia. Together, these plants have a processing capacity of 26,200 ton per day and operate with the most modern technologies available. According to ABIOVE (the Brazilian Association of Vegetable Oil Industries), there was only one oilseed processing plant in the Central-West region which has been relocated to Uberlandia, Mato Grosso. This plant which was used to process cottonseed was later transformed into a soybean processing facility. The 1992 harvest in Central Brazil was enough to fill 23% of Brazil's soybean processing capacity.

The capacity of the Brazilian processing industry doubled between 1977 and 1982 through financing which came almost exclusively from BNDES (the National Economic and Social Development Bank)(Burnquist). An overly optimistic estimate of demand and production expansion in Brazil led to a serious over-capitalization of the Brazilian processing industry under this policy. The average capacity of soybean processing plants in Brazil is currently about 105,000 mt/day. An average of 53,000 mt/day are crushed for 11 months resulting in idle capacity of 49.5%. Nevertheless, two-thirds of the processing plants in Brazil are less than 10 years old and are among the most modern processing facilities in the world.

The largest modern processing park in Brazil located in Ponta Grossa, Paraná has seen little use. The Ponta Grossa facilities which used to process soybeans coming from Mato Grosso, Mato Grosso do Sul, and Goiás are now having to compete for local supplies with local processing plants and exporters. Also, an industrial park located in the more remote regions of Rio Grande do Sul has found itself practically isolated from the rest of the country. Likewise, the plants constructed in the Northeast have not processed a large volume of soybeans since they are located in more remote regions (Pereira).

The low level of utilized capacity and the wide spatial distribution of processing plants in Brazil has relieved any processing capacity constraint to growth in production that may have existed in former years. Given the reported total installed daily processing capacity of 125,040 mt (Table 7) and assuming 300 days of operation per year, the annual processing capacity would be 37.5 million mt, nearly one and a half times the level of the record 1994/95 soybean harvest in Brazil. While the large existing, modern excess capacity provides support for significant further expansion of soybean production in Brazil, the idle capacity is also a growing financial burden, particularly in Paraná and Rio Grande do Sul. Most government subsidies and policies that fostered the growth in Brazilian processing capacity have been substantially reduced.

Brazilian Agricultural Policies

Brazilian government subsidies and other forms of incentives and assistance have played a key role in the growth and development of the Brazilian soybean industry. The agricultural modernization drive of the 1960s and 1970s in Brazil was largely the result of an aggressive Government agricultural credit incentive program during that period. Soybean producers received a large part of those transfer payments which helped propel Brazil into becoming the world's second largest soybean producer.

During the 1970s, Brazilian agricultural modernization policies supported expansion of soybean production in Brazil through both cost of production and investment subsidies and government farm price guarantees. Producers were encouraged to use government credit programs to purchase critical production inputs such as lime, seed, machinery, and chemicals. A devaluation of the Brazilian cruzeiro between 1979 and 1981 also provided an incentive to Brazilian exports of soybeans and products (Burnquist).

During the 1980s, however, economic policy changes imposed by the International Monetary Fund (IMF) forced fundamental changes in Brazilian agricultural policy. The first half of the decade was marked by government interventions through farm price guarantees and export controls. Agricultural credit subsidies were eliminated but the consequent agricultural credit crisis had only a minor impact on soybean output. The second half of the decade was characterized by progress in reducing government intervention. Beginning in 1985, exports were completely free of quantity controls such as contingency quotas and export.

Following large Government soybean acquisitions in the Central West region of Brazil in 1985/1986, the Brazilian soybean sector has decreasingly participated in the government price support policies. The private sector has become the major source of production and commercialization credit in the Brazilian soybean industry. Private industries and exporters have transferred large amounts of resources in the form of credit to the Brazilian soybean sector. Farmers entered into credit contracts with exporters and processors before the harvest at agreed on prices and exchange rates.

During the early 1990s, a number of negative factors impacted the Brazilian soybean industry. At the same time that national farm price guarantees were removed and price support programs were

regionalized, international prices of soybeans and products declined, the availability of agricultural credit waned, and the cruzeiro became increasingly overvalued. Consequently, Brazilian soybean production dropped from 23.6 million mt in 1988/89 to only 15.7 million mt in 1990/1991.

In July of 1994, a new macroeconomic plan to deal with the economic crisis facing the country was introduced. The “Real Plan” tied a sharp reduction in government expenditures to the introduction of a new currency (the Real) which was linked closely to the U.S. dollar. Budget constraints led to sharp cuts in Government policy interventions in agriculture with further cuts likely to come in the near future.

The establishment of MERCOSUR during the 1990s significantly increased the competitive pressures faced by the Brazilian soybean industries from the soybean industries of Argentina and Paraguay, the Brazilian industry’s major competitors in South America¹. Although Brazil is the largest soybean producer among MERCOSUR countries, soybean yields are much higher in Argentina. In 1994, soybeans yields were 2.30 mt/ha in Argentina but 2.11mt/ha in Brazil, 1.72 mt/ha in Paraguay, and 1.54 mt/ha in Uruguay (USDA 1994). For soybeans and many other agricultural commodities, the cost of production in Argentina is lower than in Brazil because of the highly fertile land and good climatic conditions in the Argentine Pampas region (Stulp). Consequently, with the establishment of zero tariffs among MERCOSUR countries, Brazilian producers are now competing with inflows of soybeans from Argentina and Paraguay, primarily in the inter-harvest period to keep Brazilian processing capacity occupied. The zero tariff has also led to increases in Brazilian soyoil imports from Argentina in recent years as Brazilian domestic oil consumption has grown (Pereira).

The current guaranteed price program is similar to that used in previous decades which involves federal government acquisitions (AGF) of soybeans and producer loans from the federal government (EGF). The EGF program provides short-run storage financing to farmers, allowing them to delay marketing their soybeans after harvest until prices improve. The program helps smooth out soybean marketings in Brazil, stabilizes markets, and reduces seasonal price fluctuations. Under the AGF program, the government buys surplus production at the established floor price.

Brazilian Soybean Taxes

Even though the subsidization of Brazilian agriculture today is at its lowest historical level, the taxation of the agricultural sector is at perhaps its highest. The Brazilian agricultural sector has been characterized as one of the most heavily taxed agricultural sectors in the world (Licio). High domestic taxes have contributed significantly to a decline in the competitiveness of Brazilian soybean and soybean products in the national and international markets.

Two types of taxes (direct and indirect) are currently imposed on the Brazilian agriculture sector for both the outputs produced and the inputs used. Direct taxes include the rural territorial tax (ITR)

¹ See Vieira and Williams for more details on MERCOSUR and its effects on the agricultural sectors of member countries.

and an income tax (IR). On the list of indirect taxes are the ICMS (a tax on operations relating to the distribution of goods and services), the CONFINS (Contributions for Financing Social Security) and the PIS (Social Integration Program tax) all of which are charged on the total value of each operation.

Indirect taxes alone amount to more than 20% of the total value of agricultural production in Brazil (Licio). The national tax load is estimated to be between 16% and 17% of the Gross Domestic Product. Direct taxes account for a relatively low proportion of the national tax load. According to recent research by Fochezatto and Mattuela, the total tax load on soybean producers is an estimated 21% of the total costs of production (Table 8). The cost of the high use of inputs in Brazilian soybean production is made worse by the taxes imposed on their use.

The ICMS stands out as the most important tax on agricultural output in Brazil. This tax differentiates between primary and processed agricultural products. The agricultural sector pays a disproportionately higher amount of taxes in comparison to the manufacturing sector. One important objective of the structure of the ICMS for soybeans is to provide a disincentive to export soybeans and an incentive to export the value-added soybean products. A 13% ICMS tax is levied on exports of soybean while soymeal and soyoil taxes are 11.1% and 8%, respectively. At the same time, the ICMS interstate sales tax of 12% is lower than the export tax. For soymeal and soyoil, the ICMS interstate sales tax is 9% and 12%, respectively. Thus, the tax structure favors domestic sales of soybeans but exports of soybean products, particularly soybean oil. For intrastate sales, the tax levied depends on the distance over which the product is transported.

In comparison, domestic and export sales taxes on soymeal and soyoil in Argentina are minuscule and, by law, the U.S. cannot levy taxes on exports. In 1992, the soybean sales tax in Argentina dropped from 6% to 3.5% and a formerly required contribution to the National Institute for Agriculture Technology was eliminated. Argentina also eliminated the fuel tax and adjusted the "Reintegro" or fuel rebate policies (Burnquist). The combination of Brazilian and Argentine taxes has provided Argentina with an advantage in the export of soymeal over Brazil.

Brazilian Production Costs and Competitiveness

Data compiled by CONAB indicate that Brazilian soybean production costs are 29% higher than those of Argentina (Table 9). The lower costs for Argentina generally reflect highly productive soils and favorable weather conditions that permit a lower use of chemicals and other inputs. Input costs generally represent more than 30% of the total cost of Brazilian soybean production.

A study by ABIOVE compares the international competitiveness of soybeans produced in Brazil, Argentina, and the U.S. (Marques). Starting with the same hypothetical f.o.b. international price of soybeans in all three countries, internal costs were subtracted to arrive at a measure of the net income to producers over costs per metric ton of soybeans (Table 10). The study concludes that U.S. soybeans are more competitive in world markets. The study finds that U.S. soybean producers receive 93.5% of the international price on average while Argentine producers receive 91%, and Brazilian producers only 69%.

The main anti-competitive factor for Brazilian soybeans is the taxes levied on the export sales of soybeans. Relatively high transportation and shipping costs also constitute barriers to the international competitiveness of Brazilian soybeans. The movement of soybean production to the interior Central West region in Brazil has increased the distance between production areas and shipping ports considerably. According to ABIOVE, a processor located in Cuiabá, Mato Grosso can incur freight costs of up to US\$50/mt to transfer soymeal to the closest ports located at Vitória, Santos, or Paranaguá. Once the soymeal arrives at the port, fees of US\$8-\$10/mt are added to the costs. Port services are expensive in Brazil primarily because of the unionization of port workers and government taxes. Without a rail system to link many interior production areas to ports, producers and processors must transport their products on trucks over the often precarious roads. The high cost of diesel fuel and the long distances over poor roads substantially increases the cost of transporting soybeans and soybean products to shipping points for export in Brazil. The transportation problems in Brazil are aggravated by the control over trucking and other transport services by only few firms.

Summary and Conclusions

Over the last 25 years, the Brazilian soybean sector has been transformed into the greatest generator of foreign exchange in the country. Brazil has become the world's second largest producer of soybeans and the world's largest exporter of soymeal. Although the domestic soybean processing industry has been completely overhauled and modernized over that same period, government subsidies have led to a severe over-capitalization of the industry. Total annual processing capacity is now equal to nearly one and a half times the volume of the annual harvest while average capacity utilization is less than 50%.

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Table 1. World: Soybean Production by Major Producer, 1970-1994

Year	U.S.	Brazil	China	Argentina	Others	World
	----- 1,000 mt -----					
1970	30,675	2,077	8,710	59	2,757	44,278
1971	32,009	3,666	8,610	78	2,838	47,201
1972	34,581	5,012	6,450	272	2,888	49,203
1973	42,118	7,876	8,370	496	3,550	62,410
1974	33,102	9,892	7,470	485	3,707	54,656
1975	42,130	11,227	7,240	695	4,334	65,635
1976	35,070	12,513	6,640	1,400	3,852	59,475
1977	48,097	9,541	7,260	2,700	4,640	72,238
1978	50,854	10,240	7,565	3,700	5,169	77,528
1979	61,525	15,156	7,460	3,600	5,805	93,546
1980	48,921	15,200	7,940	3,500	5,472	81,033
1981	54,135	12,835	9,325	4,150	5,751	86,196
1982	59,610	14,750	9,030	4,200	5,981	93,571
1983	44,518	15,541	9,760	7,000	6,367	93,186
1984	50,644	18,278	9,695	6,750	7,768	93,135
1985	57,127	14,100	10,509	7,300	8,008	97,044
1986	52,868	17,300	11,614	7,000	9,329	98,111
1987	52,746	18,020	12,184	9,700	10,880	103,530
1988	42,153	23,600	11,645	6,500	12,160	96,058
1989	52,354	20,340	10,227	10,750	13,698	107,369
1990	52,416	15,750	11,000	11,500	13,471	104,137
1991	54,065	19,300	9,710	11,150	13,155	107,380
1992	59,545	22,500	10,300	11,350	13,413	117,108
1993	50,857	25,059	15,310	11,700	14,236	116,603
1994	68,652	25,934	13,800	12,400	14,080	132,932

Source: USDA (1994) and CONAB

Table 2. World: Soybean and Soybean Product Exports by Major Exporter, 1990-1994

Country	1990	1991	1992	1993	1994
	----- 1,000 mt -----				
Soybeans					
USA	15,159	18,615	20,943	16,032	21,364
Brazil	1,645	3,826	4,184	5,370	4,550
Argentina	4,127	3,050	2,274	3,001	3,000
Paraguay	1,030	830	1,250	1,200	1,300
China	1,288	1,090	300	1,100	500
Others	955	844	819	1,218	1,552
Total	24,204	28,255	29,770	27,921	32,266
Soymeal					
USA	4,961	6,300	5,653	4,859	5,352
Brazil	7,414	8,136	9,004	10,643	9,750
Argentina	6,294	6,330	6,835	6,734	6,910
EU	3,732	3,968	3,964	3,660	3,979
China	2,250	1,400	400	800	500
Others	2,155	1,978	2,834	3,025	3,025
Total	26,806	28,112	28,690	29,721	29,516
Soyoil					
USA	354	747	644	694	839
Brazil	410	710	771	1,887	985
Argentina	1,260	1,295	1,409	1,414	1,455
EU	1,172	1,424	1,099	1,047	1,186
Others	320	330	357	95	433
Total	3,516	4,506	4,280	5,137	4,898

Source: USDA (1994)

Table 3. World: Soybean Imports by Major Importing Country, 1990-1994

Country	1990	1991	1992	1993	1994
	----- 1,000 mt -----				
	--				
EU	12,797	13,775	14,809	13,049	14,868
Japan	4,375	4,672	4,866	4,855	4,800
Korea	929	1,330	1,131	1,200	1,325
Taiwan	2,208	2,453	2,391	2,300	2,400
Mexico	1,376	2,100	2,136	2,150	2,400
Others	4,260	4,944	4,274	5,693	5,518
Total	25,945	29,274	29,607	29,247	31,311

Source: USDA (1994)

Table 4. Brazil: Soybean Area, Yield, and Production, 1970/71-1994/95

Year	Area Harvested	Average Yield	Production	Annual Growth of Production
	1,000 ha	kg/ha	1,000 mt	%
1970/71	1,716	1.21	2,077	-
1971/72	2,840	1.29	3,666	76.5
1972/73	3,615	1.39	5,012	36.7
1973/74	5,143	1.53	7,876	57.2
1974/75	5,824	1.70	9,892	25.6
1975/76	6,417	1.75	11,227	13.5
1976/77	7,070	1.77	12,513	11.5
1977/78	7,778	1.23	9,534	-23.8
1978/79	8,255	1.24	10,236	7.4
1979/80	8,769	1.73	15,153	48.0
1980/81	8,501	1.79	15,200	0.3
1981/82	8,202	1.56	12,835	-15.6
1982/83	8,136	1.81	14,750	14.9
1983/84	9,421	1.50	15,541	5.4
1984/85	10,153	1.80	18,278	17.6
1985/86	9,450	1.49	14,100	-22.9
1986/87	9,270	1.87	17,300	22.7
1987/88	10,550	1.71	18,020	4.2
1988/89	9,750	1.94	23,600	31.0
1989/90	11,550	1.76	20,340	-13.8
1990/91	9,750	1.62	15,750	-22.6
1991/92	9,700	1.99	19,300	22.5
1992/93	10,717	2.15	23,042	19.4
1993/94	11,502	2.17	25,059	8.8
1994/95	11,679	2.22	25,934	3.5

Source: USDA (1994), CONAB - 1992, 1993, and 1994

Table 5. Brazil: Soybean Area Harvested by State, 1976/77-1994/95

Year	Paraná	Rio Grande do Sul	Santa Catarina	São Paulo	Mato Grosso	Mato Grosso do Sul	Goiás	Minas Gerais	Bahia
	----- 1,000 ha -----								
1976/77	2,200	3,490	351	445	310	0	68	85	0
1977/78	2,349	3,754	409	559	6	494	97	112	0
1978/79	2,350	3,950	480	548	19	573	128	103	0
1979/80	2,420	3,987	520	560	70	792	247	150	2
1980/81	2,359	3,849	510	543	128	812	294	190	2
1981/82	2,197	3,603	484	516	195	832	320	228	1
1982/83	2,050	3,567	415	470	317	940	370	258	5
1983/84	2,200	3,567	436	480	467	1,074	571	310	28
1984/85	2,170	3,637	432	494	795	1,307	690	431	63
1985/86	2,140	3,261	406	476	909	1,234	621	430	107
1986/87	1,776	3,160	360	462	1,100	1,184	540	415	170
1987/88	2,149	3,476	413	512	1,375	1,231	730	498	228
1988/89	2,406	3,684	434	594	1,708	1,300	990	595	385
1989/90	2,286	3,577	390	582	1,503	1,209	940	583	366
1990/91	1,966	3,269	300	500	1,100	1,013	790	472	278
1991/92	1,797	2,970	249	463	1,452	969	820	456	330
1992/93	2,000	3,100	281	532	1,713	1,066	984	552	380
1993/94	2,110	3,162	278	575	1,996	1,109	1,90	579	434
1994/95	2,200	3,009	204	540	2,280	1,045	1,126	604	471

Source: CONAB, IBE - 1994/95

Table 6. Brazil: Soybean Production by State, 1994/95

States	Area Harvested	Production	Average Yield
	1,000 ha	1,000 mt	kg/ha
Rio Grande do Sul	3,008.6	5,848.0	1,945
Mato Grosso	2,280.4	5,685.5	2,493
Paraná	2,199.7	5,624.4	2,557
Mato Grosso do Sul	1,044.8	2,283.5	2,188
Goiás	1,126.4	2,146.7	1,914
Minas Gerais	604.5	1,199.7	1,995
Bahia	470.6	1,165.0	2,157
São Paulo	540.0	1,072.9	2,280
Santa Catarina	204.5	444.1	2,177
Maranhão	87.7	162.4	1,852
Distrito Federal	43.8	86.1	1,965
Tocantins	20.1	36.2	1,809

Source: IBE

Table 7. Brazil: Oilseed Crushing Capacity by State, 1992

States	Installed Capacity	Share
	mt/day	%
Rio Grande do Sul	37,590	30.06
Paraná	34,300	27.43
São Paulo	17,330	13.86
Goiás	8,300	6.64
Mato Grosso do Sul	7,400	5.92
Santa Catarina	6,370	5.09
Mato Grosso	5,150	4.12
Minas Gerais	3,900	3.12
Bahia	2,000	1.60
Maranhao	1,000	0.80
Distrito Federal	900	0.72
Pernambuco	600	0.48
Rio de Janeiro	200	0.16
Total	125,040	100.00

Source: Burnquist.

Table 8. Rio Grande de Sul, Brazil: Soybean Production Costs and Taxes, 1994

Production Cost	Costs without Taxes	Taxes	Costs with Taxes
	----- US\$/mt -----		
Variable Costs	99.14	26.47	125.61
labor	16.56	1.44	18.00
seeds	12.97	0.70	13.67
fertilizer, pesticides	30.64	4.53	35.17
fuel	7.36	3.81	11.17
machinery maintenance	11.27	8.90	20.17
transport	3.52	0.81	4.33
cleaning and drying	1.32	0.18	1.50
financial costs	7.21	0.62	7.83
insurance and Funrural	8.29	5.48	13.77
Fixed Costs	47.07	13.28	60.34
labor	9.00	-	9.00
depreciation	21.27	9.07	30.34
machinery maintenance	1.26	0.24	1.50
financial cost	7.21	3.29	10.50
tax(ITR)	-	0.01	0.01
others	8.32	0.67	8.99
Total Cost	146.00	39.75	185.95

Source: Fochezatto and Mattuella

Table 9. Brazil, Argentina, and the U.S.: Soybean Production Costs, 1990/91

Specification	Brazil	Argentina	U.S.
	----- US\$/mt -----		
Variable Costs			
Seeds	12.44	13.89	13.73
Fertilizer and Pesticides	44.12	10.35	33.10
Mechanization	37.69	19.88	23.48
Labor	5.29	12.09	6.48 ^a
Drying/Misc.	9.81	-	0.17
Insurance	6.35	11.40	18.27 ^b
Interest	11.73	9.24	14.70 ^c
Subtotal	127.44	76.86	109.93
Fixed Costs			
Depreciation	29.57	12.72	17.27 ^d
Maintenance of fixed capital	4.86	13.78	20.56 ^e
General Farm Overhead	-	-	11.42
Subtotal	34.43	26.50	49.25
Total Operational Costs	161.87	103.36	159.18
Land Rent	14.09	33.16	54.93
Total Costs	175.96	136.52	214.11

^a Paid labor only.

^b Includes taxes.

^c Interest on operating loans and real estate.

^d Operating capital and nonland capital.

^e Capital replacement.

Source: CONAB, USDA (1992)

Table 10. Brazil, U.S., and Argentina: Hypothetical Calculation of Net Average Returns to Producers

Item	Brazil	U.S.		Argentina
	----- US\$/mt -----			
1. Soybean Price (FOB)	250	250		250
2. Freight	30	15		14
3. Shipping cost	9	3		5
4. Tax	40	0		4
5. Net income (1-(2+3+4))	171	232		227
6. Production Cost	175	185 ^a	214 ^b	137
7. Producer benefits (5-6)	-4	47	18	90
8. Net Income as a % of Price (5/1)	68.40	92.80		90.80
9. Shipping Cost as % of Price (3/1)	3.60	0.48		2.00
10. Tax as a % of Price (4/1)	16.00	0.0		1.60

^a As used by ABIOVE.

^b As reported by USDA (1992).

Source: ABIOVE as cited by Marques.