# Chapter 2

## BACKGROUND OF THE CERRADOS AGRICULTURAL DEVELOPMENT

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The economic cooperation between Brazil and Japan is being carried out under several venues and plays a vital role in the economic development of both countries. Within this cooperation, large-scale development programs are also vital for the industrial development of Japan, giving support to the concerned industries and institutions of both countries through "National Projects" as well as providing intensive support to the private sector in order to strengthen the ties between Japan and Brazil. Both countries have been maintained contact for about 50 years (since 1951), when diplomatic relations between the two countries were resumed. Ever since, large-scale projects aiming at the development of 5 sectors (namely: metallurgy, cellulose, agriculture, aluminum and iron ore) have been carried out. The main development program in the agricultural sector is the "Japanese-Brazilian Cooperation Program for the Cerrados Development" (hereinafter called Prodecer).

This Chapter presents the general characteristics of the Cerrados region and covers the background of the Japanese-Brazilian project implementation for the Cerrados region agricultural development as related to the Brazilian economic and agricultural policies. Through these studies, the factors that have led both countries to start the large-scale Japanese-Brazilian economic cooperation project, Prodecer, are identified.

## 2.1 CHALLENGES AND BACKGROUND OF THE DEVELOPMENT OF CERRADOS IN BRAZIL

### 2.1.1 Cerrados – characteristics and regional distribution

Cerrados is basically concentrated in the large center-west region of Brazil, as shown in Figure 2.1.1, covering a total area of approximately 204 million hectares.

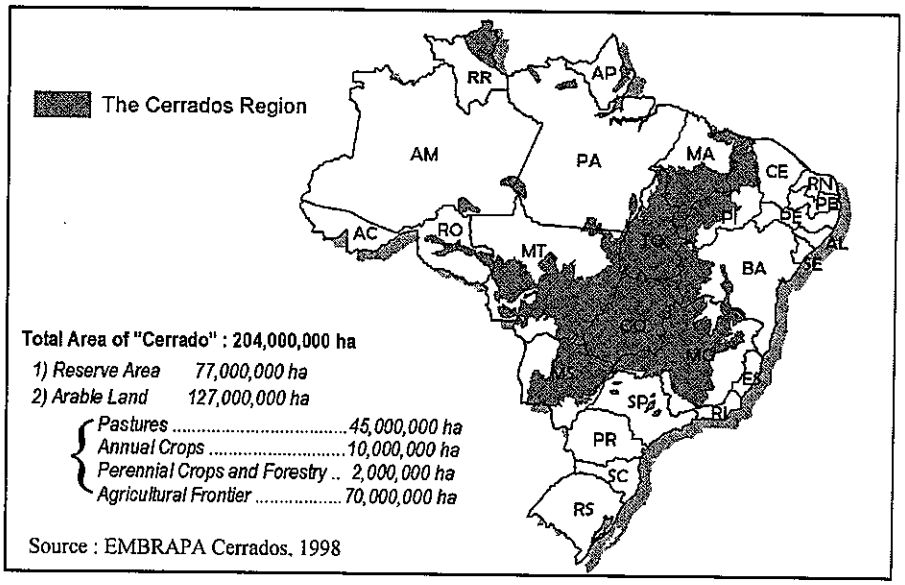



**Fig. 2.1.1** Cerrados area distribution

It's the area distribution by State is shown in the Table 2.1.1. The major concentration is in the State of Mato Grosso, representing 21% of the Cerrados total area, followed by the States of Minas Gerais and Goiás with 19% and 17%, respectively. The Brazilian Cerrados concentrates in these three States that jointly represent almost 60% of its total area.

***Table 2.1.1*** Cerrados area per federation unit and participation in the total

| Federation Unit | Cerrados Area (ha) | % | Participation in the national territory total area (%) |
|---|---|---|---|
| **1. SOUTHEAST** | | | |
| Minas Gerais (MG) | 384,366 | 18.80 | 4.52 |
| Sub-total | 384,366 | 18.80 | 4.52 |
| **2.CENTER-WEST** | | | |
| Goiás (GO) | 355,092 | 17.37 | 4.17 |
| Mato Grosso (MT) | 422,125 | 20.65 | 4.96 |
| Mato Grosso do Sul (MS) | 206,463 | 10.10 | 2.43 |
| Distrito Federal (DF) | 5,771 | 0.28 | 0.07 |
| Sub-total | 989,451 | 48.40 | 11.62 |
| **3. NORTHEAST** | | | |
| Maranhão (MA) | 140,702 | 6.88 | 1.65 |
| Bahia (BA) | 82,597 | 4.04 | 0.97 |
| Ceará (CE) | 2,356 | 0.12 | 0.03 |
| Piauí (PI) | 152,388 | 7.45 | 1.79 |
| Sub-total | 378,043 | 18.49 | 4.44 |
| **4. NORTH** | | | |
| Tocantins (TO) | 249,773 | 12.21 | 2.93 |
| Rondônia (RO) | 31,973 | 1.56 | 0.38 |
| Pará (PA) | 11,070 | 0.54 | 0.13 |
| Sub-total | 292,816 | 14.31 | 3.44 |
| **TOTAL (Cerrados)** | **2.044,676** | **100.00** | **24.02** |
| **BRAZIL** | **8.511,996** | | |

Source: *Sinopse preliminar do censo demográfico: Brasil*, Rio de Janeiro, FIBGE, v. 6, n.o. 1, 1991.

The word Cerrado originates from the Portuguese "cerradão" which means "something dense," being also the nomenclature of a vegetation type. However, Cerrados flora presents a very large diversity from region to region. In general, Cerrados vegetation is classified into 5 types: namely, (1) Cerradão, (2) Cerrado, (3) Campo Cerrado (Cerrado Field), (4) Campo Sujo (Dirty Field), and (5) Campo Limpo (Clean Field). This classification is based on the scale of trees, on their trunk diameter and on the diversified density, as shown in figure 2.1.2 (Note: in this figure, type-3 vegetation is included together with type-2).

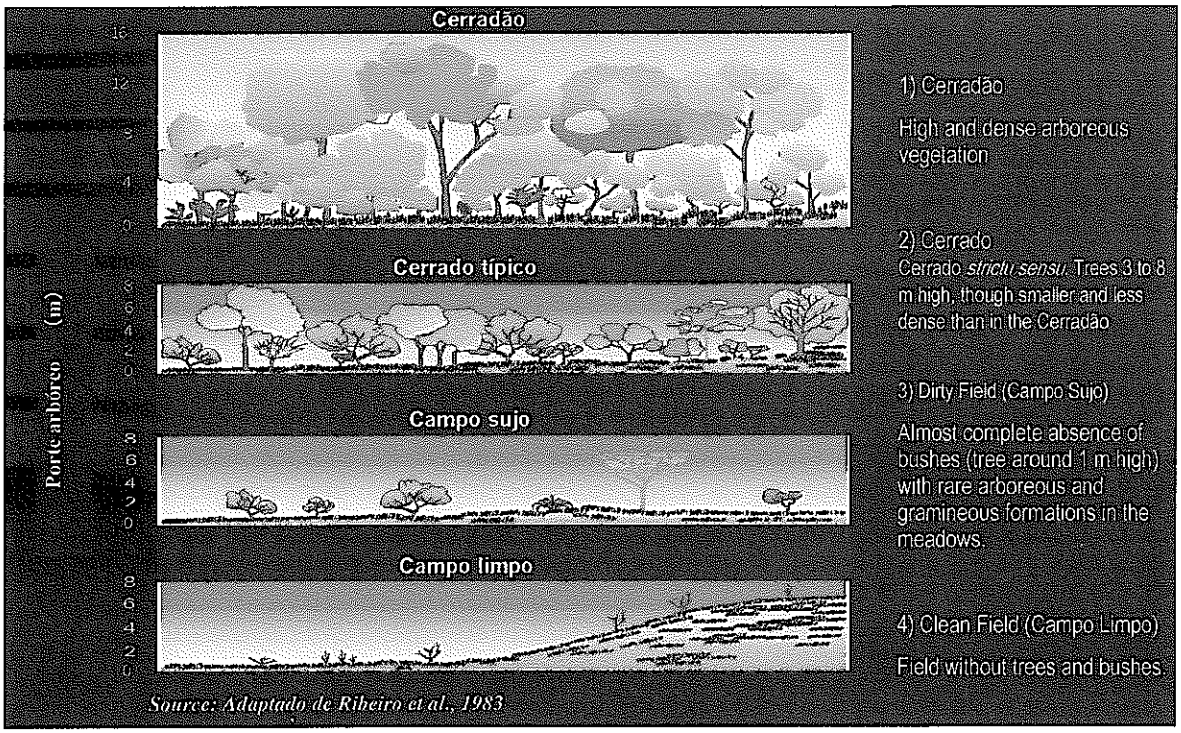



***Fig. 2.1.2*** Cerrados Classification by Vegetation Type

The predominant soil in the Cerrados is the Latosol that covers 43% of the total area as shown in Table 2.1.2. Despite this predominance, the region's soils are subdivided into various other types, but in general they lack chemical nutrients and contain high levels of acidity. However, each type of soil is different in terms of nutrient contents and acidity level which greatly influences the type of vegetation in the region.

***Table 2.1.2*** Occurrence of soil classes associated to the types of vegetation in the Cerrados

| Soil Classes | Occurrence (%) | Associated Natural Vegetation |
|---|---|---|
| **1. Latosols** | 43.1 | Cerradão – Dense Cerrado – Typical Cerrado |
| 2. Purple Latosols | 3.5 | Dry Semi-deciduous Woods - Cerradão |
| 3. Structured Purple Land | 1.7 | Dry Semi-deciduous Woods |
| 4. Podzolic | 15.0 | Dry Semi-deciduous Woods – Typical Cerrado |
| 5. Cambisol | 3.0 | Typical Cerrado – Thin Cerrado |
| 6. Litholic soils | 7.2 | Rupestrine Field – Rupestrine Cerrado |
| 7. Plinthsols | 8.9 | Humid Dirty Field – Cerrado Park |
| 8. Hydromorphic | 2.3 | Swampy plains - Buritizal |
| 9. Quartzose sand | 15.1 | Thin Cerrado – Typical Cerrado |
| 10.Others | 0.2 | Cerrados |
| Total | 100.0 | |

Source: EMBRAPA/CPAC

The mean annual precipitation in Cerrados varies between 600 and 2,000 mm, and this is characterized by two clearly defined seasons: the rainy season (between September and April during which 80% of the precipitation occurs) and the dry season (between

May and October). The mean annual temperature is between 18 and 23°C. Due to the Cerrados large area, the annual precipitation distribution differs very much from region to region as shown in Figure 2.1.3.

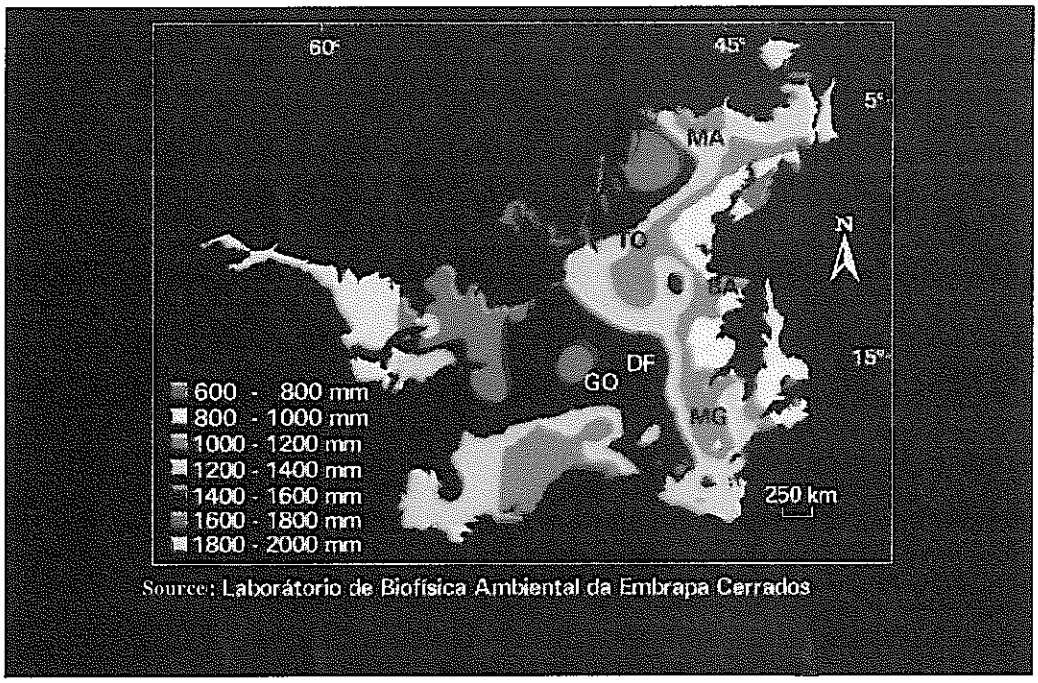



***Fig. 2.1.3*** Cerrados precipitation distribution

As for the profile of the Cerrados, 127 million ha are estimated to be arable land. 45 million ha are occupied with cultivated pastures, 10 million ha with annual crops, and 2 million ha with permanent and forest crops. Historically, approximately 57 million ha of the Cerrados total area were exploited for agricultural purposes, and it is estimated that there is a nonutilized potential at the agricultural frontiers representing approximately 70 million ha (EMBRAPA Cerrados, 1998).

### 2.1.2 Factors promoting the agricultural development of Cerrados

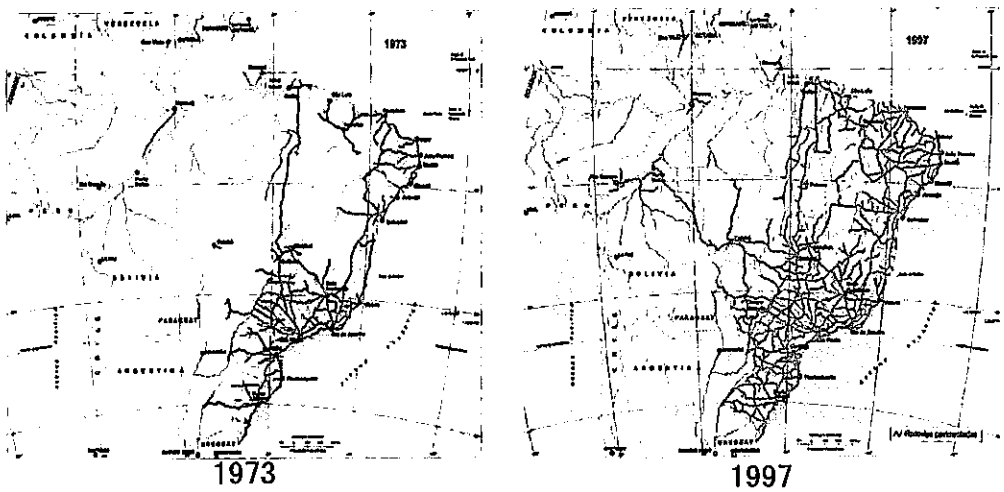
The agricultural development frontier in Brazil started in the Southern region and is migrating towards Cerrados. As a consequence, the Cerrados agricultural area, including pastures, has reached in the last 25 years approximately 57 million ha (1.5 times the area of Japan). More recently, the agricultural frontier is migrating at a very fast pace towards the Cerrados northern area, already within the Legal Amazon region. At present, it is starting to reach Roraima State Cerrados, located in the north hemisphere, close to the Equator.

As a conclusion of the study, the following are the main factors that promoted the Cerrados development process:

### (1) Progress in central region development promoted by the establishment of the country's capital in Brasilia

The socio-economic development in Brazil has been concentrated at the coastal region, along the Atlantic Ocean, since its discovery. In the beginning of the 60's, development was implemented at a fast pace, starting with the construction of highways in Rio de Janeiro, São Paulo and surroundings. In comparison to the coastal region along the Atlantic Ocean, the development of the center-west region of the country was clearly behind. The then President Juscelino Kubistcheck, who took office in 1956, decreed the change of the capital then located in Rio de Janeiro to Brasília, located in the middle of the country in the Cerrados region, based on the need of a more harmonious development of the nation.

In the period between the second half of the 60's and mid 70's, Brazil attained a remarkable economic growth rate, surpassing 10% per year, and this period was called the "Brazilian miracle." Within this context of high economic growth, large-scale projects were started such as the construction of the Transamazônica highway in 1970, in addition to projects that aimed to promote the development of the central region, stimulated by the implementation of the transport network as shown in Figure 2.1.4.




Source: *Atlas*, IBGE, 2000.

***Fig. 2.1.4*** Road system evolution

### (2) Changes in the export sector and increase of the international prices of grains

The Brazilian export sector suffered a dramatic change in the 70's due to a strong trend of higher prices for industrialized products, including the agro-industrial products. In the agricultural sector, efforts concentrated on the soybean production, considering the high leverage of its by-products in the domestic and export markets. The Cerrados region suddenly became the center of attention as an agricultural frontier for grain

production, especially soybean. In 1973, the implementation of an export prohibition on American soybean caused a huge increase of international grain prices, stimulating even greater soybean production.

As soybean production increased, multinational grain companies (Grain majors) also increased their activities, thus accelerating the Cerrados development process. These multinational companies operated everything from the purchase of soybean, through processing and commercialization, up to exporting. Since this period was characterized by great availability of financial resources, a large increase of production occurred which took the Cerrados soybean to international markets. Information about the multinational grain companies is described in detail in Chapter 5.

### (3) Growth of national industry

Until the 60's, industrial sector participation represented 25% of GDP and was concentrated in the production capacity of the transportation sector such as automobile industry and production of chemical fertilizers, among others. The agricultural development of Cerrados demanded high investment in production inputs such as agricultural machinery, fertilizers, soil correctives and agricultural pesticides. Considering that the transportation industry had already matured, it can be said that Brazil already had the basic structure for self-sufficiency in agricultural equipment and inputs. As a consequence, the availability of these necessary items for the agricultural production in the Cerrados (such as tractors, harvesters, large-scale irrigation equipment (pumps and sprinklers), and the stable supply of fertilizers and agricultural pesticides) led to the increase of the international competitiveness of grain exports which further stimulated the increase of the Brazilian agricultural production.

### (4) Adoption of the uniform price system for fuel

The production, import and refining of petroleum in Brazil was a State monopoly. From 1978 until 2000, a uniform price policy was maintained, at the retail level, for petroleum by-products (gasoline, diesel oil, etc.). In other words, distant consumers, those living in the Cerrados agricultural frontier regions, paid the same prices as urban center residents who lived near the refineries.

This was the basis of the Fund of Freight Uniform Prices (FUP) mechanism, i.e., to transfer financial gains from consumers near the refineries to the producers living in the Cerrados region (the average distance between the closest refinery to the soybean producing areas in Cerrados was about 1,500 km). The uniform price system for fuel brought significant benefits to producers and to the enhancement of Cerrados agriculture, with a highly mechanized production system.

#### (5) Migration of producers towards the cerrados region

A prerequisite of agricultural development of Cerrados was the adoption of a large-scale mechanized agricultural system. This was primarily conducted by producers who were used to handling agricultural machinery, and who came from the Southern region of the country where the agriculture was carried out in a highly mechanized fashion. The Southern region, where the agricultural development started in the beginning of the 19th century, had little space for expansion; thus the children and relatives of producers had to migrate towards the Cerrados in search of a new agricultural frontier. Apart from this, the opening of world markets in the 90's and the formation of regional economic blocks such as the MERCOSUL[1)] (Common Market of southern portion of South America) turned the strengthening of agricultural competitiveness into a critical objective, inducing small-scale producers from the South of the country to continue the migration towards the Cerrados region in search of economies of scale.

The "nikkei producers" (Japanese immigrants and their descendents) also took part in the agricultural development of the Cerrados region as well as its cooperatives.

### 2.1.3 Changes in Cerrados agricultural development programs and characteristics

The Cerrados agricultural development was promoted by the aforementioned factors as well as by the implementation of development programs such as the Plan of Guided Settlement of Alto Paranaíba (PADAP) and the Cerrados Development Program (POLOCENTRO). These programs were precursors of Cerrados agricultural development. After them, the Prodecer was launched in 1979. The characteristics of changes in the Cerrados agricultural development programs and their contents are presented below.

#### (1) From PADAP to POLOCENTRO

In 1973, the Plan of Guided Settlement of the Alto Paranaíba (PADAP) was carried out, oriented to a specific area of Cerrados including some municipalities, but centered in São Gotardo, in the Alto Paranaíba region in Minas Gerais. This was a pioneer program of guided settlement, with the main objective of producing grains, aiming at the intense development of Cerrados. Taking into consideration the execution of PADAP and the results obtained, the Brazilian government designed the Cerrados Development Program (POLOCENTRO) that was created through Legal Decree No. 75,320, started in 1975 and concluded in 1982.

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1) MERCOSUL is a Common market for the integration of the southern portion of South America, officially created in January 1995, and composed by four countries: Brazil, Argentine, Uruguay and Paraguay.

POLOCENTRO benefited a total area of 3.7 million ha, distributed among the States of Mato Grosso, Mato Grosso do Sul, Goiás and Minas Gerais, as shown in Figure 2.1.5. The land was used as follows: 1.8 million ha for crops (soybean, maize, wheat, rice, cotton), 1.2 million ha for pastures, and 700,000 ha for reforestation.

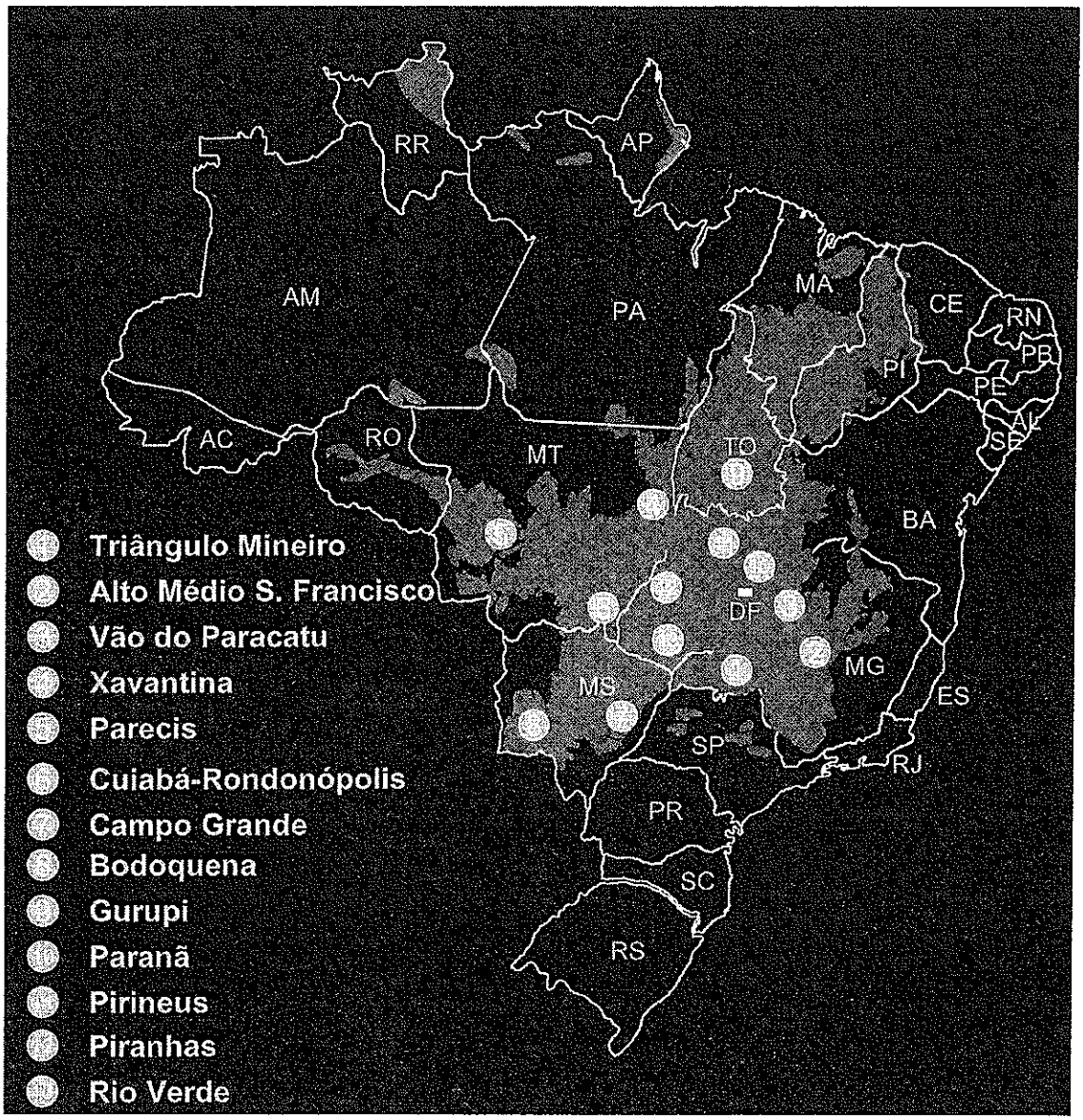



**Fig. 2.1.5** Distribution of the POLOCENTRO target-areas

The program budget was fixed at US$1.5 billion, out of which US$1 billion was used to provide credit with favorable interest rates.

The necessary resources for the implementation of infrastructure, such as roads, electrification, storehouses, analytical laboratories, among others, were provided by the

government as part of the program. The financing for the implementation of processing industries by the private sector (rural producers cooperatives, companies, agricultural producers) was also part of the program, as well as services for the supply of agricultural inputs. POLOCENTRO mainly benefited establishments with more than 1,000 ha (which absorbed 60% of program total resources), and thus promoted the ascent of large-scale producers and processors, which encouraged the development to be conducted under the leadership of large-scale farmers.

#### (2) From POLOCENTRO to Prodecer

The Japanese-Brazilian Cooperation Program for the Cerrados Development (Prodecer), which started in 1979 as a bilateral program (and is described in detail in Chapter 3) was conceived under the influence of these earlier programs. However, its development concept differs from that of POLOCENTRO in nature in at least the following two ways:

a) Although allowing the participation of large-scale agricultural companies in Phase 1, Prodecer has adopted a settlement system for medium-scale family producers.

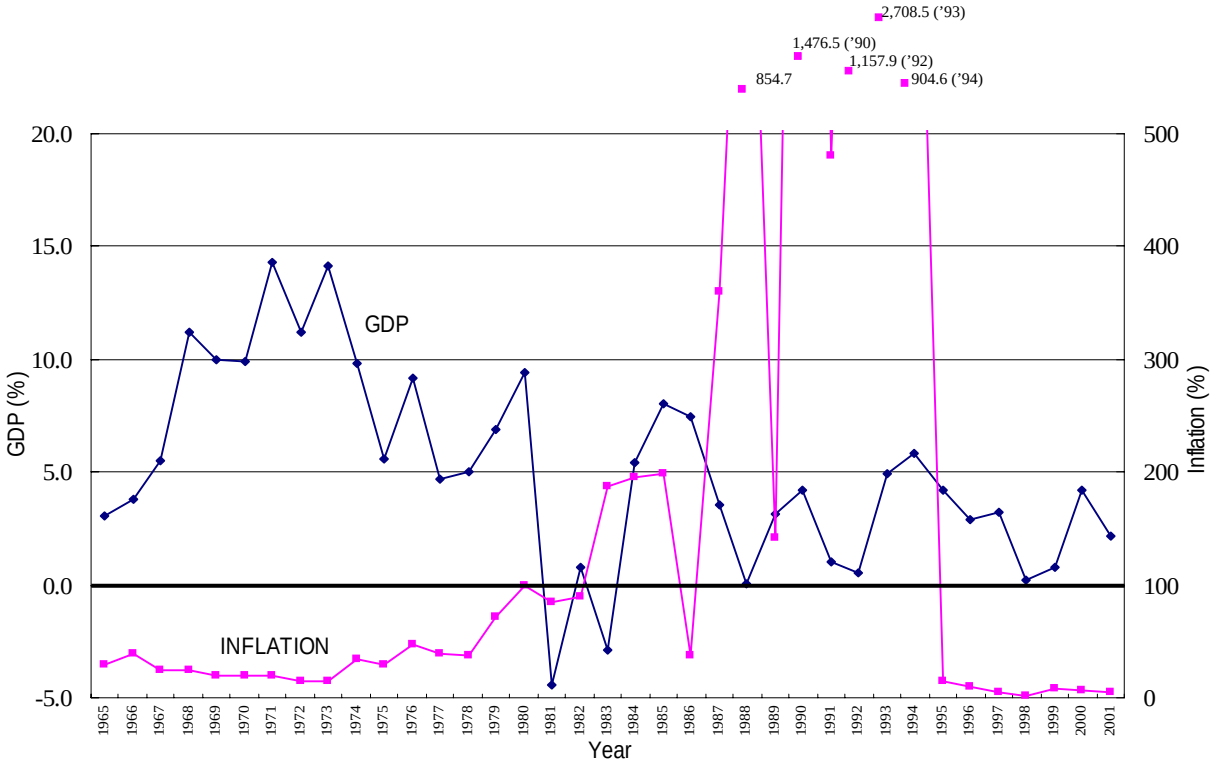
b) Since the beginning, the program demonstrated a great concern with the issue of environment, thus strictly obeying the legislation by maintaining preservation areas (individual and collective) in its planning.

### 2.1.4 Evolution of the economic development policies in Brazil

#### (1) Economic circumstances

##### 1) GDP growth rate and changes in inflation rates

Between the second half of the 60's and the first half of the 70's, Brazil recorded remarkable economic growth, reaching 2 digits, as shown in Figure 2.1.6. The high economic growth rate in this period was greatly due to the promotion of the following industrial sectors: metallurgical, automobiles and petrochemical. Foreign capital was used, and success was gradually attained in the process of adopting advanced technologies, according to the model based on industrialization via substitution of imports and emphasis in exports. Since the mid 70's, the economic growth rate suffered due to the petroleum crisis, and then started to decline. In the 80's, the external debt problem came to the surface, reducing the inflow of foreign resources, and causing an even higher decrease in the country's economic growth rate since at that time dependency on foreign resources was high.




Source: Elaborated using bibliographic material from IBGE, BACEN and FGV.

***Fig. 2.1.6*** GDP Growth Rate and Changes in the Rate of Inflation

In mid 80's, the positive benefits of exports to the USA lead to a brief recuperation of the national economy. However, the average GDP growth rate was around 2%, a significantly drop compared to the 7.5% in the 70's. The Brazilian economy in this period was highlighted by increases in the deficits of federal and state governments due to improper management of public resources as well as to excesses in executing official measures of assistance. Since 1990, the public deficits dropped; however, the inflation rate that was around 3% per month in the second half of the 70's, rose to 50% per month in mid 1994. The Brazilian balance of payments recorded a significant drop in the 80's.

To cope with these circumstances, the economic stabilization program called "Plano Real" was implemented in July 1994. With the Plano Real, thanks to its financial containment policy, the hyperinflation rate that reached 2,700% per year in 1993 was controlled, dropping to 7.2% in 1997. Since 1994, GDP showed a stable growth trend as consequence of the inflation control policy. In that year, the economic growth rate was 5.9%. However, due to the impact of the inflation control measures such as currency exchange policy and high interest rate policy, and due to the foreign economic circumstances (financial crises in Asian countries and Russia), the GDP growth rate suffered a decline, reaching negative 0.1% in 1998. The growth rate for 2001, according to IBGE, was estimated as 2.0%, while the inflation rate was estimated at around 6.5% per year.

### 2) Fluctuation of interest rates

Table 2.1.3 shows the fluctuation of interest rates since the mid 80's. As a consequence of inflation stagnation, the trend in interest rates in the recent years has reversed. However, the interest rate are being utilized as the main strategy to attain the economic stabilization (high interest rates policy for large loans and deposits through monetary control); hence interest rates continue to be fixed at high levels in order to stimulate deposits, even after the stabilization of inflation.

***Table 2.1.3*** Evolution of Annual Interest Rates (%/year)

| Year | Over/Selic* | TR | TJLP | TBF | Inflation Rate |
|---|---|---|---|---|---|
| 1986 | 66.54 | - | - | - | 36.7 |
| 1987 | 353.00 | - | - | - | 360.3 |
| 1988 | 1,057.69 | - | - | - | 854.7 |
| 1989 | 2,407.28 | - | - | - | 141.4 |
| 1990 | 1,153.22 | - | - | - | 1,476.5 |
| 1991 | 536.89 | 419.90 | - | - | 480.1 |
| 1992 | 1,549.24 | 1,171.00 | - | - | 1,157.9 |
| 1993 | 3,060.98 | 2,474.70 | - | - | 2,708.5 |
| 1994 | 302.64 | 277.79 | 42.02 | 287.90 | 904.6 |
| 1995 | 38.92 | 17.32 | 17.72 | 39.65 | 14.7 |
| 1996 | 23.94 | 10.98 | 11.02 | 22.84 | 9.3 |
| 1997 | 42.04 | 16.88 | 9.89 | 39.25 | 7.2 |
| 1998 | 31.24 | 9.29 | 18.06 | 29.90 | 1.7 |
| 1999 | 18.99 | 3.66 | 12.50 | 20.32 | 13.5 |

Source: Central Bank, 2000. Data from the *Conjuntura Econômica 2000.*
*: Special System of Liquidation and Custody

Among the interest rates shown in the above table, the rates applied in the Agricultural Credit System are based on: TR (Referential Interest Rates), TJLP (Long Term Interest Rates) and TBF (Financing Basic Rate). These actual interest rates, fixed at higher levels than the inflation, represent a negative factor for agricultural administration after the inflation rates stabilized in 1995.

### (2) Profile of major economic policies

The macroeconomic policy adopted by the Brazilian government can be understood through the analysis of economic programs implemented since the mid 80's when the economic circumstances reflected great imbalances. During the 13 years between 1986 and 1999, Brazil went through 5 changes in the national currency: namely: Cruzado, Cruzado Novo, Cruzeiro, Cruzeiro Real, and Real. The country also went through 8 major changes in the economic clearance policy as summarized in the table below. These repeated changes in economic policy show the level of imbalance which the Brazilian economy was going through in that period.

| Economic Policy | Main Contents |
|---|---|
| 1. Cruzado Plan<br>(Feb/1986)<br><br>Change of the monetary unit:<br>Cruzeiro to Cruzado | • Attempt to contain the inflation through the freezing of prices and salaries, as well as the exchange rate.<br>• Despite the freezing of prices and the adoption of an expansionary financial and fiscal policy, the price freezing for inflation control did not last long.<br>• The failure of the Plan at the end of 1986 allowed inflation to resurge. |
| 2. Bresser Plan<br>(Jul/1987) | • This plan was implemented when the inflation reached 26% per month, with the freezing of prices and salaries for 90 days.<br>• The huge public deficit was recognized as the primary cause of the inflation, and thus measures for the control of the public debt was implemented. |
| 3. Summer Plan<br>(Jan/1989)<br><br>Change of monetary unit:<br>Cruzado to Cruzado Novo | • Also known as New Cruzado Plan, this plan aimed at the freezing of prices and salaries together with the public spending containment measures and use of a nominal exchange rate.<br>• The government that had lost the control over the public expenses and bore the load of the public debt service, depended on the short-term and high interest rates National Treasury Bonds in order to control the hyperinflation.<br>• The inflation in March 1990 reached 81.3% per month, showing the failure of the Plan after 1 year. |
| 4.Collor Plan I<br>(Mar/1990)<br><br>Change of monetary unit:<br>Cruzado Novo to Cruzeiro | • This plan involved the freezing of prices and the confiscation of banking deposits. The measures adopted were: control of inflation by means of valorization of the national currency, opening of the economy, internationalization, opening of the market, opening to imports, modernization of industry, and privatization<br>• The inflation control measures failed. However, as a consequence of market internationalization, the volume of imports temporarily increased due to the reduction of the customs fees and to the end of the imports volume restriction.<br>• The exchange rate surpassed US$1.00 = Cz$80.00 with a devaluation of almost 50%.<br>• These measures caused a great impact on the rural producers, especially on those with production oriented towards export. |
| 5. Collor Plan II<br>(Feb/1991) | • This plan involved several structural measures, based on the financial policy and on price freezing, similar to the other plans.<br>• As for financial policy, it consisted mainly of the reduction of federal organizations, reduction of personnel, administrative reform and privatization of state owned companies.<br>• After a temporary truce, in December 1991 the inflation rates went back to levels of over 22% per month due to the release of price freezes and relative prices adjustments, among others. |
| 6. Emergency Economic Measure<br>(Jun/1993)<br>Change of the monetary unit:<br>Cruzeiro to Cruzeiro Real | • This measure corresponds to the first phase of the Real Plan. The Emergency Social Fund (FSE) was created in order to try to reduce the public deficit through the reduction of public expenses and introduction of privatization incentives.<br>• An agreement concerning the foreign debt was signed with the IMF (International Monetary Fund). |

| Economic Policy | Main Contents |
|---|---|
| 7. Economic Stabilization Program (Jul/1993) | • This corresponds to the second phase of the Real Plan prior to is formal adoption , and mainly consists of financial stabilization measures for the State and reduction of the public deficit.<br>• The URV (Referential Unit of Value) was introduced, and the adjustment of price differences among various sectors of industry was tried based on each month's inflation rate. |
| 8. Real Plan (Jul/1994)<br><br>Change of monetary unit: Cruzeiro Real to Real | • The former economic plans ended up accelerating inflation which was mainly caused by the public deficit and by the prices adjustment system based on the economy indexation; thus started the Real Plan.<br>• The Real Plan went through the aforementioned 2 phases until taking the shape of the present Plan. At the beginning in July 1994, the national currency was changed into “Real”.<br>• The main measures of the Plan were as follows: a) Control of the inflation, linking the Real, the new national currency, to the American dollar (R$1.00 = US$1.00); b) Control of consumption and increase of the cash deposit reserve through a high interest rate policy; c) More incentives for opening of markets; d) Fixing of public charges; e) Creation of the Fund of Amortization of National Treasury Bonds; f) Free negotiation of salaries.<br>• This economic plan focused on financial policy, but at the same time, other measures such as administrative reform, restructuring of the public sector, incentives to privatization, concessions in the public sector and tributary reform were also carried out.<br>• The inflation control measure was promoted with emphasis on the price stabilization through gradual import of basic products such as foodstuff.<br>• This plan is considered successful in comparison with the former plans in terms of inflation control and in terms of the level of attainment of its objectives. |

### 2.1.5 Transformations in agricultural development policy and characteristics

#### (1) Agricultural development process

Since the very beginning of the 20th century, the Brazilian agricultural policy basically searched for a mechanism to allow an efficient execution of agricultural credit. In order to attain this objective, the financial sector of Brazil Bank was created in the 30’s, followed by the creation of a credit cooperatives system; thus government policy aimed at the promotion of agriculture. However, the agricultural credit system created at that time was strongly influenced by the world economy and hindered the expansion of long-term agricultural credit. This situation remains until now, forcing the agricultural sector to face the present stage of market opening without appropriate mechanisms of financial support.

Brazilian agricultural policies connected to the aforementioned macro-economic measures are roughly classified into three phases as follows:

① Phase of traditional agriculture（1965 ~1984）

1) This phase started with the restructuring of the Minimum Prices Guarantee Policy (PGPM) for agricultural products and with the creation of the National System of Rural Credit (SNCR). At the same time, the incentive policy for export of industrialized products was adopted following the oil crisis in 1973, with an increase in exports of industrialized products, metallurgical products, automobiles and petrochemical products, and with the consequent diversification of industrial parks oriented towards exports. There was a noticeable change in agricultural exports centering on natural products, such as coffee. Later, these products were substituted by processed products, predominantly soybeans.
2) In this phase, an attempt was made to increase grain production as well as providing incentives to agro-industry through changes in the industrial policy. Since mid 70's, the government transferred a large amount of financial resources in the form of rural credit subsidy (agricultural financing) mainly oriented to the Cerrados region in order to expand the agricultural frontier.
3) In 1981, comparing the percent of the export value of agricultural products with the total export value, by product type, it can be noticed that the participation of non-industrialized products was reduced to 17%, while the participation of industrialized products, mainly soybean by-products, rose to 30%.

② Phase of agriculture modernization (1985~1994)

1) This phase also known as the Agriculture Transition Phase started in 1985 with the federal government decision to eliminate the subsidy of agricultural credit by means of economic indexing. This phase was also highlighted by the regulation of various stabilization plans and by more intense utilization of the PGPM (Minimum Prices Guarantee Policy), in order to subsidize agricultural transport costs.
2) With the repeated decline in value of the American dollar from the second half of the 80's on, export oriented rural producers, such as soybean producers, started to face a period of great difficulty.
3) In this phase, awareness concerning environmental issues arose.

③ Phase of sustainable agriculture (1995~)

1) This phase corresponds to the Real Plan period when market opening was intensively promoted.
2) In addition, the Brazilian government presented some proposals and policies aiming at solving the rural indebtedness problem. As part of this policy, financing and securitization mechanisms were adopted according to the economic conditions of rural producers.
3) In this phase, environmental variables started to become fundamental factors in decision making of agricultural policies, and also in the calculation of economic feasibility of agricultural development projects.

### (2) Changes in the Brazilian agriculture[1)]

The studies on the background of the Cerrados development, in regard to the agricultural development policies process, are reviewed below.

1) This is section is described referring to Nobuaki Hamaguchi thesis, vol.No1,No.2,pp175-179, AICAF, 1988.

Table 2.1.4 shows the list of main exports between mid 60's and first half of the 80's, by product. In mid 60's, the agricultural products (including natural, semi-processed and processed products) contributed with 85% of the total value of exports, with predominance of natural products such as coffee, cotton, maize and cacao in grains. In the 80's, the participation of agricultural products among exports continued to be significant, although it fell below 50% of the total. There was a remarkable growth by non-agricultural processed products over agricultural products *in natura* (non processed) , the former surpassing the latter in the list of exports. Thus, the Brazilian export sector went through great change in the 70's, as industrialized products, including agro-industrial ones, grew among the exports.

***Table 2.1.4*** List of Exports of Main Products (1964-1982) in million US$

| Year | 1964-68 | 1973 | 1976 | 1978 | 1981 | 1982 |
|---|---|---|---|---|---|---|
| Total Exports Value | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Agricultural Exports Value | 85.0 | 76.1 | 66.7 | 59.1 | 47.0 | 42.2 |
| - Non processed products | 72.5 | 50.5 | 41.1 | 29.9 | 17.9 | 17.5 |
| - Agro-industrial products | 12.5 | 25.6 | 25.6 | 29.2 | 29.1 | 24.5 |
| - Semi-processed products | 9.1 | 15.6 | 14.5 | 15.0 | 14.5 | 11.3 |
| - Processed products | 3.4 | 10.0 | 11.1 | 14.2 | 14.6 | 13.4 |
| Mineral Origin Raw Material | 7.6 | 9.4 | 11.0 | 8.6 | 11.1 | 12.0 |
| Non-agricultural Industrial Products | 7.4 | 14.5 | 22.2 | 32.2 | 26.1 | 26.9 |
| Others | | | | | 14.7 | 15.9 |
| Total of Exports | 1,660 | 6,199 | 10,128 | 12,659 | 23,293 | 20,175 |

Source: Economic Development and Cultural Change, vol. 36, no.1, Oct 87
Nobuaki Hamaguchi thesis, vol.No1,No.2,pp175-179, AICAF, 1988.

Table 2.1.5 presents the evolution of the main agricultural production volume and cultivated area, by decade, emphasizing the average annual growth rate. According to the table, soybean production and cultivated area show astonishing growth, on average over 20% per year. Soybean cultivation started in the country's southern area in the 40's, in the Rio Grande do Sul state, and in Paraná state starting in the 70's, as substitution for coffee, and through a mechanized production system subsidized by rural credit. Afterwards, due to the advance of Cerrados agricultural development, soybean cultivation area increased even more. The increase of soybean production is closely related to the growth of agro-industry, which is mentioned in detail in Chapter 5. Orange production also presented a significant increase due to the growth of the processing industry, which stimulated the increase of the orange juice concentrate in the export list.

***Table 2.1.5*** Evolution of Main Agricultural Production (growth rate: annual average)

| Items/Year | Production | | | | Cultivated Area | | | |
|---|---|---|---|---|---|---|---|---|
| | 1950-80 | 1950-60 | 1961-70 | 1971-80 | 1950-80 | 1950-60 | 1961-70 | 1971-80 |
| Exports | | | | | | | | |
| - Soybean | 20.76 | 9.80 | 17.88 | 18.61 | 20.27 | 11.91 | 17.09 | 17.49 |
| - Orange | 7.27 | 3.33 | 6.13 | 11.81 | 7.12 | 3.90 | 5.46 | 8.79 |
| - Sugar cane | 4.57 | 5.58 | 3.22 | 6.95 | 3.44 | 4.74 | 2.32 | 4.51 |
| - Tobacco | 4.20 | 3.64 | 4.15 | 6.80 | 2.29 | 3.02 | 1.19 | 4.13 |
| - Cacao | 2.52 | 3.01 | 3.60 | 5.59 | 1.76 | 0.62 | 2.61 | -2.21 |
| - Coffee | 1.92 | 12.78 | -9.10 | -3.09 | 1.14 | 5.75 | -0.95 | 0.37 |
| - Cotton | 1.71 | 1.98 | 0.75 | -4.79 | -2.03 | 5.48 | -7.73 | -0.10 |
| Domestic Market | | | | | | | | |
| - Wheat | 5.62 | 2.23 | 11.83 | 6.86 | 5.03 | 6.16 | 6.87 | 5.63 |
| - Maize | 4.14 | 3.58 | 4.80 | 2.60 | 4.08 | 4.19 | 4.33 | 3.07 |
| - Rice | 3.81 | 4.01 | 2.84 | 2.73 | 3.32 | 3.32 | 3.78 | 1.86 |
| - Cassava | 2.88 | 3.54 | 5.46 | -2.20 | 3.29 | 3.44 | 3.91 | 1.30 |
| - Feijão bean | 2.18 | 3.08 | 3.48 | -2.70 | 2.99 | 3.24 | 4.29 | 0.20 |

Source: Economic Development and Cultural Change, vol. 36, no.1, Oct 87
Nobuaki Hamaguchi thesis, vol.No1,No.2,pp175-179, AICAF,1988.

Wheat was the only product oriented to the domestic market that showed a strong growth trend. Traditionally, Brazil was always very dependent on wheat imports and did not have conditions for self-sufficiency. Since the second half of the 60's, with the adoption of the industrialization model involving substitution of imports, together with the measure for foodstuff import substitution, the Brazilian government granted subsidies to wheat producers aiming at stimulating their production. One of the factors that has contributed to production expansion was the conclusion that wheat is cultivatable as a rotation crop with soybean.

As observed above, crops related to agro-industrial products, such as soybean and oranges, are exports oriented while the crops that received official subsidies, such as wheat, showed a remarkable production increase in the 70's. On the other hand, the products originally export oriented, such as coffee and cotton, as well as those oriented to the domestic market, such as rice, cassava and feijão bean, showed a production drop in this period, creating contradictory conditions which led to the import of foodstuff.

### (3) Agricultural policy in the 70's that led to cerrados development

The petroleum crisis in the 70's impacted Brazil, with the consequent raise in prices, culminating with the country's negative balance of payments. Then, the government started to stimulate industrial production oriented to the international market, through subsidies for the export of industrialized products that had been protected by tariffs and other barriers and which had been oriented to the domestic market. As for agricultural products, their industrialization was promoted within the national territory, through the creation and formation of the agro-industry aiming at the export of products with higher added value. As a consequence, the export of natural agricultural products, now used as

raw material for industrialization, started to be restricted by the government through measures such as export quotas, among others.

***Table 2.1.6*** Tariffs and Subsidies System on Exports of Agricultural Products and By-Products (1975)

| Products | Subsidies level(+)/Tariffs level(-) |
|---|---|
| 1. I*n* natura (raw material) | -13% |
| 2. Semi-industrialized | |
| Leather | - |
| Wood | +9.2% |
| Refined sugar | +10.4% |
| Soybean bran, wheat flour | +10.5% |
| By-products of fruits and legumes | +23.8% |
| Animal / vegetal fat | +25.1% |
| 3. Industrialized | |
| Rubber by-products | +29.4% |
| Shoes | +30.6% |
| Furniture | +30.9% |
| Leather by-products | +31.0% |
| By-products of animal meat and fish | +31.6% |
| Paper/cellulose | +36.9% |
| Products with cotton fiber | +45~50% |

Source: *Quantificação dos Incentivos às Exportações, Estudo* FUCECEX, Pastore A.C, 1978
Nobuaki Hamaguchi thesis, vol.No1,No.2,pp175-179, AICAF,1988.

Table 2.1.6 presents the tariffs and subsidies system on the export of agricultural products and by-products in 1975. As seen in the Table, the sum of tariffs, such as the Tax on Circulation of Products (ICM), Tax on Industrialized Products (IPI), added with the subsidies, totaled a net tariff of 13% on the export of *in natura* agricultural products. On the other hand, the export of processed agricultural products which used to receive subsidies, had the subsidy amount increase proportionally to the product industrialization level.

The prices of agricultural products in the domestic market were always fixed below international price. levels Consequently, the agricultural sector was always in the disadvantageous position of offering both the raw material to the industrial sector and food to the domestic market at low prices. In order to adjust this imbalance, the main measure adopted by the government was the increase of subsidies for rural credit to encourage production increases. This government guideline was based on the thesis that “the factors which have led to the delay in the agricultural sector modernization were the lack of infrastructure and lack of resources for the acquisition of production goods and capital goods”, as published in 1974 in the “National Plan of Development – PND II”. The three guidelines presented as the strategy for agricultural development were as follows:

1) Expansion of the agricultural frontier in Cerrados
2) Incentives for the expansion of grain production
3) Mechanization of the agricultural production and increase of production inputs inflow (fertilizers, agricultural pesticides)

For strategies 1) and 2), expand the agricultural frontier and increase of grain production in the Cerrados region, the government decided to implement infrastructure projects with its own resources, to carry out special programs and projects, to expand agricultural technological research, and to implement a mechanism for rural extension and diffusion of obtained results. As for the resources for mechanization and acquisition of fertilizers, in strategy 3), public investment was made available as well as financing from private financing institutions.

On the other hand, for the expansion of grain production in the Cerrados region, predominantly soybean, specific measures were adopted such as the National System of Rural Credit (SNCR) and the Minimum Prices Guarantee Policy (PGPM). Both systems went through changes in 1965 aiming at the expansion of grain production and started to become integrates in the mid 70's as the strategy for development within the National Plan of Development, when there was a significant increase of subsidies for rural credit. Apart from this, in 1975, the Center of Cerrados Agricultural Research – CPAC – was created as part of the EMBRAPA (Brazilian Company of Agricultural Research) system, with the objective of carrying out research about the Cerrados, thus strengthening the research in this field. At the same time, the Brazilian Company of Technical Assistance and Rural Extension (EMBRATER) was created in order to coordinate and to strengthen technical assistance and rural extension activities.

Among the aforementioned measures, the most remarkable was increase of rural financing starting in mid 70's, as shown in Table 2.1.7. At that time, the rural credit had a low interest rate (15%), which was especially advantageous since the inflation rate was high (50~80%). Hence, the actual interest rate ended up as negative, and thus had the characteristics of an agricultural subsidy. Since the late 70's, the available resources reached levels that made the maintenance of the rural credit in those levels impossible, thus starting the decline process.

***Table 2.1.7*** Increase of Rural Credit (1971~1981) in Cr$1 million, at 1980 prices

| Year | Bank of Brazil | Private Banks | Total | Agricultural Production Value | Total Rural Credit / Agricultural Production x 100 (%) |
|---|---|---|---|---|---|
| 1971 | 157.396 | 90.473 | 247.869 | 424.945 | 58,3 |
| 1972 | 188.500 | 106.471 | 294.971 | 463.106 | 63,7 |
| 1973 | 239.926 | 139.378 | 379.304 | 582.783 | 65,1 |
| 1974 | 313.439 | 168.954 | 482.393 | 671.605 | 71,8 |
| 1975 | 447.200 | 208.215 | 655.415 | 703.429 | 93,2 |
| 1976 | 508.976 | 225.410 | 734.386 | 780.735 | 94,1 |
| 1977 | 551.506 | 204.598 | 756.104 | 940.883 | 80,4 |
| 1978 | 548.785 | 187.093 | 735.878 | 918.594 | 80,1 |
| 1979 | 545.752 | 152.156 | 697.908 | 985.661 | 70,8 |
| 1980 | 480.018 | 134.418 | 614.436 | 1.085.324 | 56,6 |
| 1981 | 385.458 | 117.306 | 502.764 | 1.159.126 | 43,3 |

Source: Graham, D. H. et al., *Thirty years of Agricultural Growth in Brazil*, 1987

### (4) Agricultural policy since the 80's

The evolution of the main agricultural policies measures since the 80's is presented below. These measures included agricultural credit and insurance, the Minimum Prices Guarantee Policy (PGPM), as well as the government guidelines for the agricultural development.

#### 1) Policy of rural credit

[Increase of rural producer debt]

The agricultural financing system in Brazil started in 1965 when the National System of Rural Credit – SNCR – was created, and until 1973, actual interest rates were kept low, around negative 2.3%. As mentioned before, since the rural credit interest rate was fixed, the rise in the rate of inflation had the effect of credit which started to play the role of an official subsidy. Afterwards, with the expansion in the volume of these subsidies, there was a loss of investment efficiency. Thus the Brazilian government reduced the rural credit since 1980, eliminating, in 1985, the negative interest rate rural credits, also making a reform in the system so that the rural credit interest rates were added with the inflation rate. Little by little, the producers started to feel the burden of these taxes.

Apart from these factors, there was also a sudden raise in prices for agricultural production inputs. The prices of basic products such as food were maintained due to the Real Plan; the hyperinflated value of the Real caused prices of agricultural export products to drop. Rural producers started to suffer due to the raise of production costs on one side and reduction of their agricultural revenue on the other side. Especially since 1990, when the interest rate for agricultural credit started to be fixed above the price level, the number of indebted producers increased.

Furthermore, with the harsh reduction of rural credit supply, as part of the inflation control policy, rural producers started to look for resources with high interest rates. The elimination of subsidies on transport fuel caused a harsh increase in production costs. Besides that, the inclusion of the agricultural sector in the free competition mechanism generated a distortion between the production cost and the selling price, also causing an increase in producer debts. The greatest impact was on the large-scale producers who needed large funding for production. Table 2.1.8 shows the volume of rural debt according to the classification of the borrower.

***Table 2.1.8*** Rural Debts According to Borrower Classification (1999, May)

| Range of debt (R$) | Number of Borrowers | % | Total value of the debt (in R$1,000) | % |
|---|---|---|---|---|
| 1 – 10.000 | 513,658 | 73.21 | 1,413,440.00 | 5.89 |
| 10,001 – 50,000 | 134,774 | 19.21 | 3,848,580.00 | 16.03 |
| 50,001 – 200,000 | 38,446 | 5.48 | 4,992,170.00 | 20.79 |
| 200,001 – 500,000 | 10,530 | 1.5 | 3,487,240.00 | 14.52 |
| 500,001 –1,000,000 | 2,072 | 0.30 | 1,376,010.00 | 5.73 |
| Over 1 million | 2,178 | 0.31 | 8,892,200.00 | 37.04 |
| Total | 701,658 | 100 | 24,009,640.00 | 100 |

Source: Bank of Brazil, Situation in May 1999.

[Securitization]

The producer-borrower who neglects the payment of one installment starts to suffer even higher difficulties due to incurring high interest rates, and this becomes an impediment to ask for new banking credit. As a result, the borrower has to depend on money-lenders and “green soybean” agents, in which are a deficient administration process. The Brazilian government decreed, in 1994, with Central Bank Resolution No. 2102 , through which interest rates started to be applied according to a producers classification: i.e., for mini-producers, fixed interest rates; for medium-scale producers, 50% of TR plus actual interest rate of 6%; for other producers, TR plus 11% of interest rate. In 1996, the contracts with an indebtedness level of up to R$200,000 were securitized, as a measure to reduce the indebtedness level.

In 1995, when the grain harvest recorded an increase of 6.7% in relation to the previous year, reaching 81.1 million tons, there was a reversion to the situation caused by producer debt, which was one of the factors that led the agricultural sector to a serious crisis in that year. At that time, besides the food production surplus, there was also an increase in import volumes. Apart from the raise of interest rates, other factors also contributed to this situation such as the currency valuation and drop in efficiency of the PGPM (Minimum Prices Guarantee Policy). There was a significant drop of 25.8% in the agricultural revenue. This phenomenon was remarkable for products such as feijão

bean (summer harvest), soybean and maize. Even facing such a situation, the government did not do much, considering that while the agricultural sector was bearing most of the resulting losses, the debt problem was becoming even more serious.

In order to promote the "Real Plan", measures were necessary to stabilize the production of the 1995/96 harvest, and measures were studied to solve the agricultural debt accumulated until 1995. Consequently, "securitization" was launched to benefit producers with debts up to R$200,000, as mentioned before. To implement this measure, approximately R$10 billion was made available on the assumption that 80% of the borrowers would apply for it. The deadline for the debt negotiation was extended until July 1996. Until that date, 182,000 producers negotiated their debts, which corresponded to contracts totaling R$6.8 billion, out of which 147,000 producers actually had their contracts renegotiated. Out of the securitized sum, R$5.2 billion was related to contracts with the Bank of Brazil, and the rest was related to contracts with private banks. The sum of securitized debt by the Bank of Brazil is shown in Table 2.1.9.

***Table 2.1.9*** Debts Securitized by the Bank of Brazil (1999)

| Debt Range (R$) | Number of Borrowers | % | Total Value of the Debt (in R$1,000) | % |
|---|---|---|---|---|
| 1-10,000 | 52,547 | 47.54 | 238,940.00 | 23.63 |
| 10,001-50,000 | 44,547 | 30.45 | 1,076,560.00 | 15.82 |
| 50,001-200,000 | 24,268 | 16.54 | 2,516,860.00 | 36.99 |
| 200,001-500,000 | 7,586 | 5.9 | 1.904.410.00 | 27.99 |
| 500,001-1,000,00 | 162 | 0.11 | 108,780.00 | 1.60 |
| >1,000,000 | 172 | 0.12 | 958,960.00 | 14.09 |
| Total | 146,292 | 100 | 6,804,530.00 | 100 |

Source: Bank of Brazil, 1995

### 2) System of agricultural insurance (Program of Agricultural Activity Guarantee – PROAGRO)

Agricultural insurance is carried out through the SNCR (National System of Rural Credit). Since the second half of the 70's, the Brazilian government has adopted measures to render assistance to rural producers through the implementation of the Program of Agricultural Activity Guarantee (PROAGRO), which is an agricultural insurance system, and the Minimum Prices Guarantee Policy (PGPM). The agricultural insurance system was created in 1974, with the objective of protecting the rural producers from occasional harvest losses caused by drought or by natural disasters, and was reformed in 1995. The indemnification value corresponds to the financing value, within the agricultural administration cost, and is used to repay the financing to the bank so that the producer does not directly receive the insurance value.

The insurance value in force in 1998 was still higher than the financing value, being

fixed at 7.0% for soybean and maize, and 12% for rice and feijão bean, thus becoming one of the reasons for the increase of production cost. At present, EMBRAPA is designing the agro-climatic zoning of several regions in the country, in such a way that the insurance value can be reduced for the crops planted according to this zoning.

### 3) Minimum Prices Guarantee Policy (PGPM)

The Minimum Prices Guarantee Policy – PGPM – is based on the estimated cost of the cultivation year production, calculated by CONAB (National Company of Supply). PGPM has the objective to assure a minimum price for the agricultural products, their stable production and the assurance of supply. PGPM is operated through the AGF (Acquisitions of the Federal Government) and the EGF (Loans of the Federal Government). AGF is utilized when the market price is lower than the fixed minimum price, and the government directly purchases the products that are then stored in warehouses. EGF is the instrument used to assure to the producers the repayment of the bank financing when the prices of agricultural products show a decreasing trend, though there is a future projection of price raises.

As for price policy, measures were tried aiming at the prices stability at the producers level using instruments such as AGF and EGF/COV (Loans of the Federal Government with Selling Option). In the period 1996/97, the search for price stability was tried by adopting measures such as PEP (Prize for Product Marketing). The agricultural policies implemented in recent years are represented by measures such as financing of production costs, securitization of the rural producers debts, opening the procurement of foreign resources, operation of CPR and PEP (this last one being a measure aiming at the improvement of the commercialization mechanism).

### 4) Guidelines for the agricultural development by the present government

In 1995, MERCOSUL was created with the fundamental participation of Brazil that is at present also studying its participation in the FTAA (Free Trade American Area) expected to be installed in 2005. In parallel, Brazil has pressure to implement structural reforms in the agricultural sector, aiming at the improvement of productivity, and also in order to adapt to the current trends of market opening and globalization. Under these circumstances, the agricultural strategy promoted by the Brazilian government, starting in 1990, is based on three points: a) reduction of official intervention and introduction of marketing principles; b) strengthening of international competitiveness and incentives to export; c) subsidy to mini-producers and subsistence-producers.

The basic guidelines for the agricultural sector devised by the present government are presented in the Pluri-annual Plan – PPA. The Brazilian agricultural sector follows the political targets defined by two ministries: Ministry of Agriculture, Livestock and

Supply, and the Ministry of Agrarian Development. The main political targets devised by both ministries are as follows:

① Ministry of Agriculture, Livestock and Supply: Incentive to the Agribusiness and Strengthening of Competitiveness:

- Introduction and expansion of new financial instruments for the agricultural sector, in order to give support to production and commercialization as well as aiming at the reduction of financial risks for producers.
- Relationship of the productive and agro-industrial sectors in order to strengthen the agricultural sector competitiveness, as well as to render assistance in terms of technological modernization of agricultural production.
- Improvement of the agricultural sector profitability. Improvement of the sanitary control system.

② Ministry of Agrarian Development: Promotion of Integrated Rural Development

- Incentive and support to the agribusiness at the family agriculture level.
- Promotion of Agrarian Reform.
- Support to the autonomous development of Agrarian Reform settlement areas.
- Concession of incentives aiming at support and increase of competitiveness by small-scale agribusiness.

Besides these economic measures, the structural improvement of the agricultural sector is expected to be attained through the promotion of agricultural research, mainly conducted by EMBRAPA.

### (5) Evolution of the grains production in face of the agricultural policies

#### 1) Evolution of areas for agricultural use

Figure 2.1.7 shows the evolution of agricultural areas (cultivated areas, fallow areas, pastures, forest areas) in Brazil, in the period between 1970 and 1995. In 1995, the agricultural area totaled approximately 354 million ha (41% of the national territory). In the period between 1970 and 1985, the agricultural area rapidly expanded, followed by a retraction trend. Among the agricultural areas, the annual crops and cultivated pastures are increasing without interruption since 1985. In the 20 years of the period between 1975 and 1995, when Cerrados agricultural development programs were intensified, the annual crops area increased 2.2 times, from 15.32 million ha to 34.25 million ha. The same happened to the cultivated pastures area that showed a growth of 2.5 times in the same period, while natural pastures area (extensive livestock husbandry) and fallow land showed a retraction of 50% and 60%, respectively.

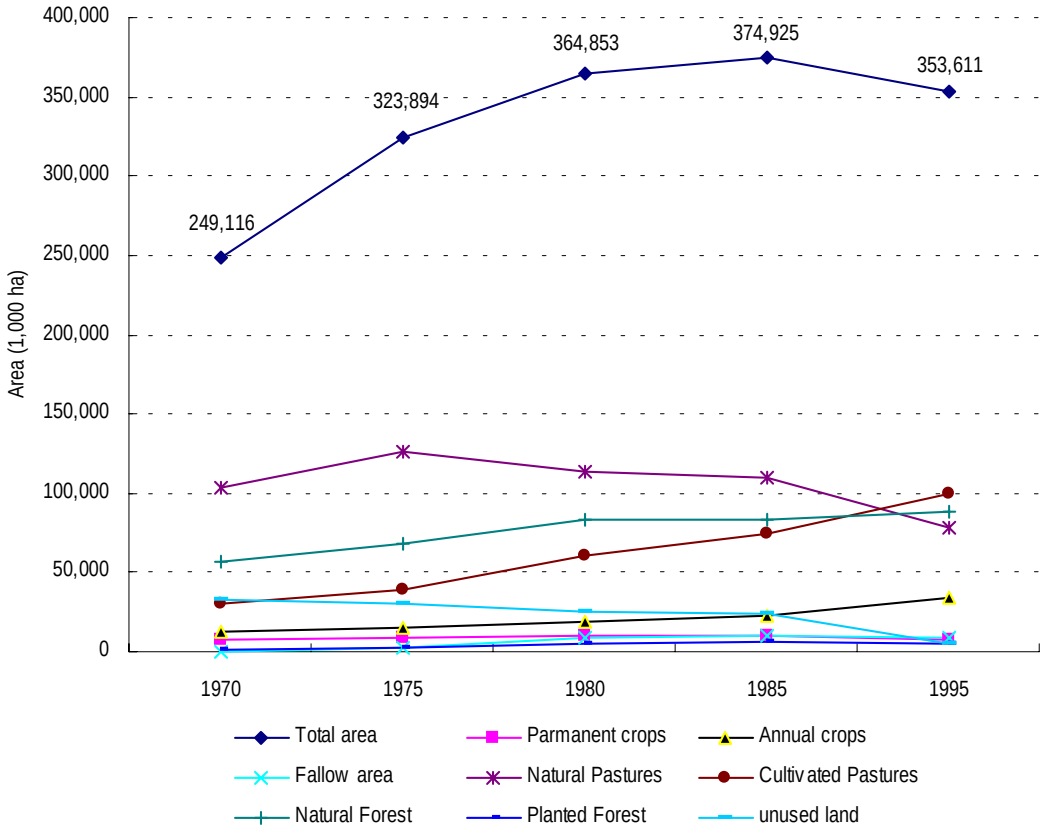
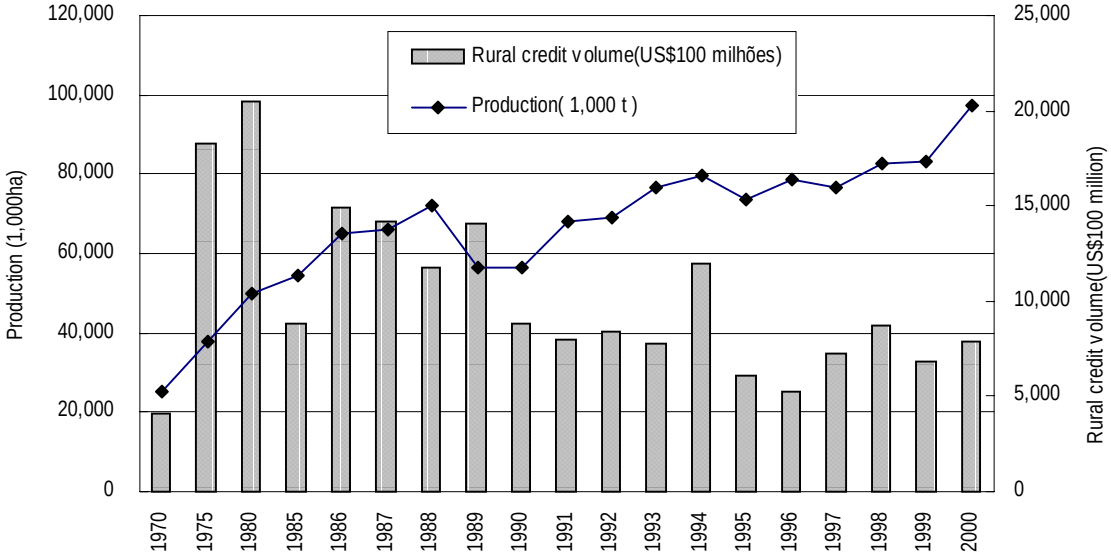



***Fig. 2.1.7*** Evolution of the Agricultural Areas in Brazil

### 2) Evolution of grain production

Figure 2.1.8 shows the relationship among rural credit volume, grain production volume (soybean, maize, wheat, etc.) and cultivated area, in the period from 1970 to 2000. Grains production had a remarkable increase since the second half of the 70's. In the 25 years between 1975 and 2000, there was a significant increase of grain production by more than 150%, the volume increasing from 38.5 to 97.25 million tons. There was an expansion of the grain cultivated area from 29.6 to 38.5 million ha in the same period.




Source: http://www.estadao.com.br/safra/safra.htm and IBGE data about production

***Fig. 2.1.8*** Evolution of the Relationship among Rural Credit Value, Grain Production Volume and Cultivated Area

Observing in detail the growth rates of the main products in this period, especially grain production, there was a remarkable growth of 220% in soybean, from 9,89 to 31.37 million tons, while the cultivated area increased 127%, from 5.82 to 13.26 million ha. As for maize, for the same period, the production increased from 16.33 to 31.64 tons, a growth of 90%, while the cultivated area expanded in 20%, from 10.8 to 12.8 million ha. On the other hand, the cultivated area of wheat was reduced, from 2.9 million ha in 1975 to 1.5 million ha in 2000, while production was also reduced from 1.78 to 1.53 million tons.

Analyzing the above data, it can be seen that the expansion of soybean production since 1975 had a strong influence on the increases of the annual crop area and of the grain production volume. The increase of the agricultural production volume, based on the soybean production through the development of agricultural areas not previously exploited in Cerrados, was an important contribution for these circumstances. Soybean productivity that was in 1970 around 1.2 tons/ha on average, increased to 2.3 tons/ha in the harvest of 1999/2000. The productivity increase in the last 5 years (1995-2000) was 21%, attaining 30-35% in the Center-West, North and Northeast regions. This increase is greatly due to the results obtained through research and development work, as well as due to the diffusion of soybean varieties adapted to the cultivation conditions of several regions in the country, especially in the Cerrados region, as mentioned in detail in Chapter 4. In recent years, due to the increase of the production cost together with the environmental concerns, the expansion of agricultural areas became more complex, and the increase of productivity has became a fundamental factor to attain the production

increase.

On the other hand, as shown in Figure 2.1.8, the rural credit granted to producers by the government is being reduced in large scale, since the second half of the 80's; however, grain production volume continues to increase. Although there was a reduction of official financing for production costs, these resources are being assured to the producers by means of the "green soybean" system by multinational grain companies.

The USA, that competes with Brazil for the position of the main soybean producer, is supported by a governmental subsidy system that totaled US$2 billion or US$2.00/60kg in 2000, showing the high level of protectionism in that country. In the USA, when the international price is lower than the financing value, the difference is transferred to the producers. This aspect is mentioned in Chapter 5. The Brazilian soybean producers are forced to compete with North American producers who are backed by all sorts of protection mechanisms, despite the difficulties in Brazil.

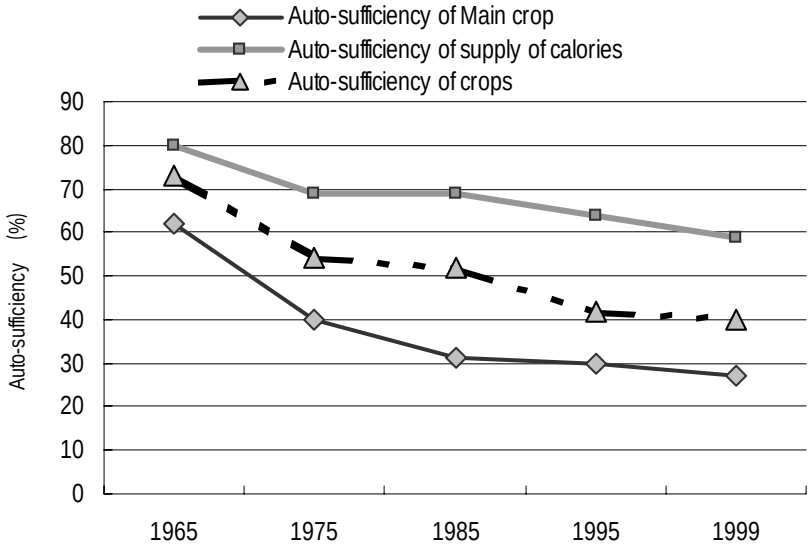
## 2.2 BACKGROUND OF JAPANESE COOPERATION FOR CERRADOS AGRICULTURAL DEVELOPMENT WITH EMPHASIS ON THE IMPACT CAUSED BY INTERNATIONAL MARKET TRENDS

### 2.2.1 Factors that promoted the Japanese participation in cerrados agricultural development

Since the 70's, the cooperation for agricultural development carried out with Japanese government ODA resources started to concentrate, in Brazil, in the Cerrados region. As for the background and the conditioning factors, these shall be analyzed when the studies on the impact of price fluctuations of agricultural products in the international market are conducted.

#### (1) Impact of agricultural products price rises and oscillations

The data showing the evolution of food self-sufficiency level in Japan is shown in Figure 2.2.1. According to this data, there was a significant drop in the food self-sufficiency level in Japan in the period from 1965 to 1975. In the following years, this declining trend continued, and the self-sufficiency level reached 27% for rice and approximately 40% in terms of total supply of calories.




Source: Official document on food, agriculture, rural, 2000. Ministry of Agriculture, Forestry and Fishery,JAPAN

***Fig. 2.2.1*** Evolution of Food Self-Sufficiency Level in Japan

The drastic reduction of the food self-sufficiency level in Japan resulted in a higher dependency on food imports. In the 60's and 70's, the increase of this dependency caused great concern to the Japanese people, in particular when associated with the uncontrollable increase of international prices for agricultural products. This fact emerged in 1973, when agricultural products were purchased on a large-scale by part of the former Soviet Union due to its harvest failure caused by unfavorable climatic conditions, resulting in a retraction by 15% in their food production in comparison with the previous year. Furthermore, due to the low prices in the international market, the former Soviet Union imported 15 million tons of wheat, a volume never ever negotiated in the history of that country. At that time, the main food exporting country was the USA, with a stock of food of more than 25 million tons. After this large-scale import carried out by Soviet Union, the North American stock was reduced to less than 10 million tons at the end of 1973/74.

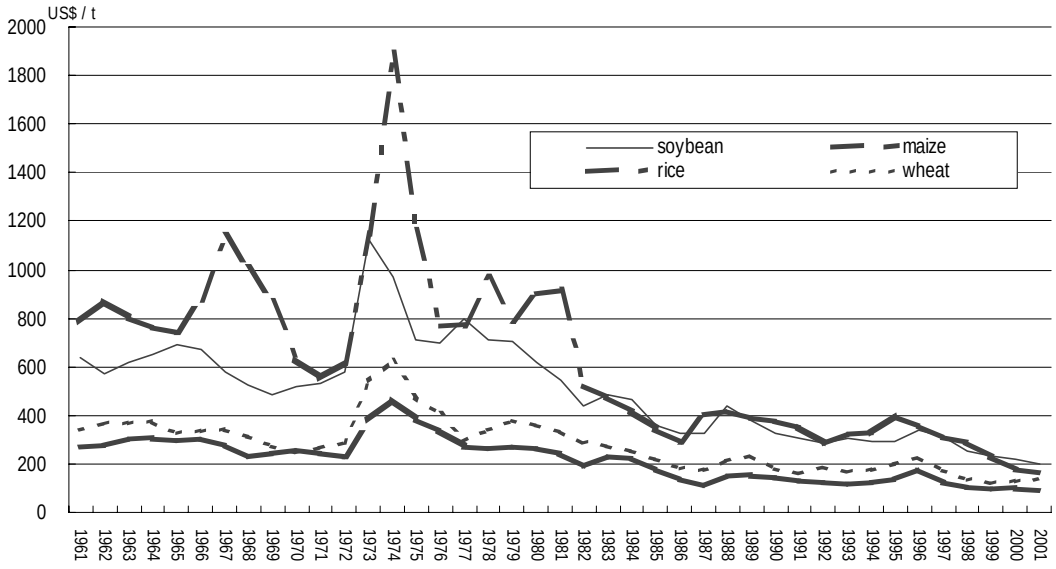
On the other hand, there was an international trend of agricultural production decline, not only of wheat, but also of maize and rice. The soybean stock was also drastically reduced due to the stagnation of USA production. Apart from this, OPEC multiplied by almost four times the petroleum price, previously negotiated at less than US$3.00/barrel, and then raised to US$11.00/barrel. This generalized imbalance in the supply/demand relationship resulted in the rise of international prices, not only of agricultural products and by-products, but of all other products. Under these circumstances, the rise of international prices of agricultural products became a concern, not only due to the possibility of lack of food, but also for stressing that the food supply

assurance was an important issue, at the international level.

Under such circumstances, Japan which strongly depended on food imports and also expected that its dependency level would increase, realized that the international market stabilization was a theme to be urgently dealt with. At that time, the issue of worldwide lack of food was faced with deep concern especially in the Japanese domestic market.

Figure 2.2.2 shows the actual price oscillations (old prices updated to present values) of main grains over the last 40 years. In the 60's and 70's, there were uncontrollable price oscillations, completely different from recent times. Due to the low revenue level, the international prices at that time would correspond in terms of actual prices to something like 3 to 4 times higher than now. Furthermore, these prices which were already high increased even more, reaching two to three times the values in the 70's.

The present international prices, in actual values, have reached lower historical levels. Nowadays, a raise of 20% to 30% is viewed with great concern. It is easily imagined how restless people at that time must have felt facing the rise of agricultural prices.




Data source:

| | |
|---|---|
| IMF: | *International Financial Statistics Yearbook*, 1999 |
| USDA: | *WASDE report*. WASDE-364, 12/07/00. USDA data was collected, since 1986, in the case of the USA, and since 1999, for the other countries. |
| Remark 1: | Rice: Bangkok, 5% *broken, milled*. Wheat: No.1, *Hard Red*, US Gulf. Maize: *Yellow* No.2, Chicago. Soybean: US (Rotterdam) |
| Remark 2: | The actual product was calculated based on the (100) North American Consumer Price Index (IPC) of 2000. |

***Fig. 2.2.2*** Oscillation of Actual Prices of Main Grains and Soybean over the Last 40 Years

### (2) Need to diversify import sources

There was a remarkable increase of food imports by Japan since the 60's, and in the beginning of the 70's, this reached 5 million tons of wheat, 8 million tons of maize and 3.5 million tons of soybean. However, the source of these imports was the USA alone. As a consequence, the measure adopted by the Americans in 1973, prohibiting the export of soybean, even for a short time, caused an uncontrollable rise of soybean by-products and other food prices in the Japanese market. This was enough to make the Japanese people feel very restless facing an imminent crisis caused by the lack of food. In order to free the Japanese people from this restless feeling, new sources were searched in the short run, while for the long run new international cooperation programs were promoted aiming at agricultural development in countries with large territorial extensions.

On the other hand, until mid 70's, the Brazilian economic growth was evolving in a stable manner, as already mentioned. However, considering its relatively low demographic density in relation to the large territorial extension, agricultural development was seen as an opportune and important program. Thus, the financial and technical assistance offered by Japan, already considered as an economic power and a big food importer, was widely expected. Cerrados development would give Brazil a new perspective for the future and an opportunity to develop the central region of the country, besides allowing the development of new agricultural frontiers and opening new horizons for the country's future.

## 2.2.2 Importance of soybean introduction as a main crop

Soybean is the main crop in the Cerrados region. It is also the main crop in Prodecer. Soybean is an extremely important product in Japan, being used as raw material for the soybean cheese (*tofu*), soybean paste (*miso*) and soybean sauce (*shoyu*), although its use as food represents no more than one fourth (25%) of the total consumption. The remaining three fourths are used in the production of edible oils. In world terms, 90% of total soybean production is used for the production of edible oils. The soybean bran, after undergoing squeezing for the extraction of oil, is partially used as a raw material for the production of soybean sauce or as a protein supplement, though most of it is used as animal roughage.

Worldwide, maize is the agricultural product most used for animal feed. Its world production reaches 600 million tons, out of which approximately 450 million tons are used for that purpose. Besides maize, part of the world wheat production (100 million tons out of 600 million tons) is also used for animal feed. On the other hand, as a consequence of the increase of soybean production in the last few years, the soybean bran production has also significantly increased, reaching 120 million tons, raising it to

an outstanding position together with the wheat as an important source for animal feed.

The utilization of grains for animal feed conflicts with its use for human consumption. This is because the more the demand for animal feed, the more the imbalance between supply and demand of grains, causing their prices to rise, also reflecting on the prices for human consumption. Under such circumstances, the increase of soybean bran supply as consequence of the increase of soybean production contributes to the general balance between the supply and demand of grains used for animal feed, playing an important role for the balance between supply and demand of wheat and maize. Thus, soybean production increase directly and indirectly contributes for the stabilization between supply and demand of grains in general.

### 2.2.3 Agricultural development projects through ODA (Official Development Assistance) from the Japanese government

In the 70's, when the process of agricultural development in the Cerrados region was intensified, a "new era of the Japanese-Brazilian relationship" was established, and economic cooperation between the two countries reached its golden period. The basic concept that guided the cooperation between both countries at that time was "reciprocity:" i.e., Japan, that lacks natural resources, and Brazil, abundant with these resources, but lacking fundamental financial and technological resources for the economic development, would complement each other. Based on this concept, Japanese-Brazilian commerce expanded with the arrival of several Japanese companies in Brazil and with the increase of loans from Japanese private banks.

Table 2.2.1 summarizes the chronological and systematic evolution of the main socio-economic policies and agricultural development policies in Brazil, as mentioned in sub-section 2.1 of this chapter. In this Table, the objectives of the international assistance organizations as well as the results obtained through cooperation projects for agricultural development, those to Brazil and coming from Japan's ODA (Official Development Assistance) are shown.

The cooperation through ODA is classified into two categories: Technical Cooperation[1)] and Financial Cooperation[2)]. In the Technical Cooperation category (the main types being Project-Type Technical Cooperation, Study for Development, Investment and Financing for Development), by 2001, 18 projects were already carried out for Brazil.

1) The technical cooperation carried out by the Japanese government is executed mainly by JICA (*Japan International Cooperation Agency*) and consists of the following categories: Project-Type Technical Cooperation, Training in Japan, Study for Development, Investment and Financing for Development. On the other hand, the Brazilian Cooperation Agency (ABC) is the organization that coordinates cooperation and assistance activities in Brazil.

2) Among the Financial Cooperation categories, those carried out in the form of *"grant aid"* are carried out by the Japanese Bank for International Cooperation (JBIC, formerly OECF).

Out of this total, seven projects were implemented as cooperation for the agricultural development of the Cerrados region. As for the Financial Cooperation category, so far 4 projects oriented to the agricultural sector were carried out, with Japanese currency loans totaling 52.1 billion yen. Out of this, 3 projects are related to the implementation of infrastructure for the agricultural production system of Cerrados, with budgets corresponding to 72% of the total financing value.

Table 2.2.1 shows that since the 70's, the Japanese ODA Cooperation for Agricultural Development tended to concentrate in technical and financial cooperation directly and indirectly related to Prodecer. More recently, there was an increase of environment related cooperation programs, including forestry research which meets the demand for the international assistance themes.

The systematic structure of Japanese-Brazilian Cooperation Programs for the Agricultural Development of Cerrados region is described in chapters 3 and 4, and is represented as follows:

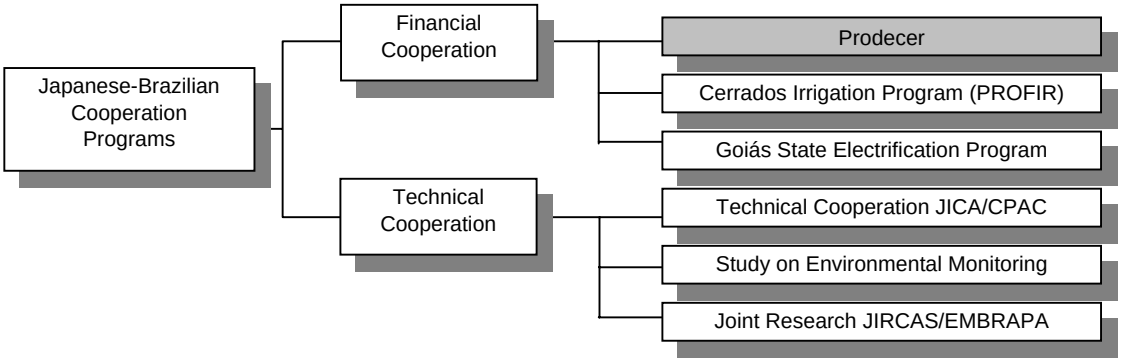


***Table 2.2.1*** Economic Circumstances and Trends of the International Assistance in View of the Evolution of the Main Brazilian Development Policies and the Cooperation for Agricultural Development with Japanese ODA Resources.

| | Economic Circumstances | Main Economic Plans and Policies | Projects of Cooperation for Agricultural Development with the Japanese Government ODA resources | | | |
|---|---|---|---|---|---|---|
| | | | Technical Cooperation (JICA) | | | Financial Cooperation (JBIC) |
| | | | Project/type Cooperation | Study for Development | Invest. and Financ. for Development | Financial Coop. as " Grant Aid" |
| 60's | - Development of irrigated rice varieties and high productivity wheat and promotion of the large-scale irrigated agriculture program through the "Green Revolution". | -'60 Capital moves from Rio de Janeiro to Brasília<br>-'67 Proclaiming of the New Constitution strengthening the authority of the Central Government | | | | |
| 70's | - 1st Petroleum Crisis ('73)<br>- Food supply crisis and famine caused by the petroleum crisis.<br>- Increase of the number of programs to enhance the grains production.<br>- 2nd Petroleum Crisis ('75) | '73 Start of PADAP<br>'75 Start of POLOCENTRO<br>'76 Visit of Pres. Geisel to Japan. Release of the joint communication (Geisel Plan) about the promotion of Japanese-Brazilian economic cooperation programs, such as Cerrados Development, Aluminium of Amazon, Tubarão Metallurgical Co. | '75 Program of Agricultural Development of Vale do Ribeira (until '84)<br>'77 Program of Research Cooperation about Cerrados Agriculture (Phase I) (until '85)<br>'79 Research about Silviculture in São Paulo State (until '86) | | '79 PRODECER (Pilot-Project Phase I) (until 82) | |
| First half of the 80's | - Accumulated debt, low growth rate<br>- Economic crisis for the destitute groups of the population<br>- Environmental pollution<br>- Appearance of agricultural development programs suitable to market oriented economy. | | | | | |
| Second half of the 80's | - Start of the indebtedness crisis of the Central and South American countries.<br>- Environmental pollution<br>- Promotion of Integrated Assistance Programs suitable to market oriented economy. | '85 Adoption of PROAGRO and PGPM<br>'86 Cruzado Plan: Freezing of prices, salaries and exchange rate; end of credit restriction aiming at the inflation control.<br>'88 Adoption of ICMS<br>'89 Summer Plan - Adoption of fixed exchange rate and freezing of prices and salaries, together with financial containment measures. | '85 Program of Research Cooperation about the Cerrados agriculture (Phase II) (until '92)<br>'87 Research about Greenery (until '94) | | '85 PRODECER (Pilot-Plan, Phase II) (until '90) | '85 PRODECER (Expansion Plan) (until '90)<br>'89 Jaíba Irrigation Program<br>'89 Program of Goiás State Rural Electrification |
| 90's | - Environmental pollution<br>- Increase of projects oriented to the Assistance of the Socially Opressed (WID, Gender)<br>- Financial crisis of the Donor Countries<br>- Higher emphasis on the programs of sustainable agriculture development.<br>- '94 Creation of MERCOSUL<br>- Creation of WTO (World Trade Organization) | '90 Collor Plan - Freezing of prices and bank deposits; inflation control through currency devaluation; opening and internationalization of economy, opening of market, release of importation; policy of cooperation, modernization, privatization.<br>'91 Collor Plan II - Freezing of prices; implementation of structural reform.<br>'94 Real Plan - Attempts to improve the Federal budget through the reduction of the public deficit, etc.<br>'95 Maintenance of the Real Plan<br>'95 Securitization (Law nº 9.138 of the Central Bank) | '93 Research about Forest Resources Conservation and Environment (until '98)<br>'94 Technical-Scientific Support for the Sustainable Development of Cerrados emphasizing the Management and Conservation of Natural Resources (until '99)<br>'94 Research Cooperation about Agriculture in the Amazon (until 2004)<br>'94 Technological Development for the Sustainable Agriculture in Eastern Amazon (until 2004).<br>'95 Forestry Research of Amazon I, II (until 2004)<br>'96 Research on Greenery for Small-scale Producers in the South of Brazil (until 2001) | '95 Study on Aquatic Resources in the Amazon Basin<br>'96 Study for the Integrated Development Plan of the Agricultural Sector in Tocantins State.<br>'99 Study for the Agricultural Development Plan of the Tocantins State Northern Region. | '92 Research on the Cerrados Environmental Monitoring (until '99)<br>'95 PRODECER (Pilot-Plan, Phase III) (until '01) | '91 Cerrados Irrigation Program (PROFIR) |
| Decade of 2000 | | | | '00 Study for the Recuperation Plan of Degraded Areas in Pará State.<br>'00 Study for the Development of the Agricultural Sector in the Amazon State. | | |

Note: —— Line is a project executed in the Cerrado area.