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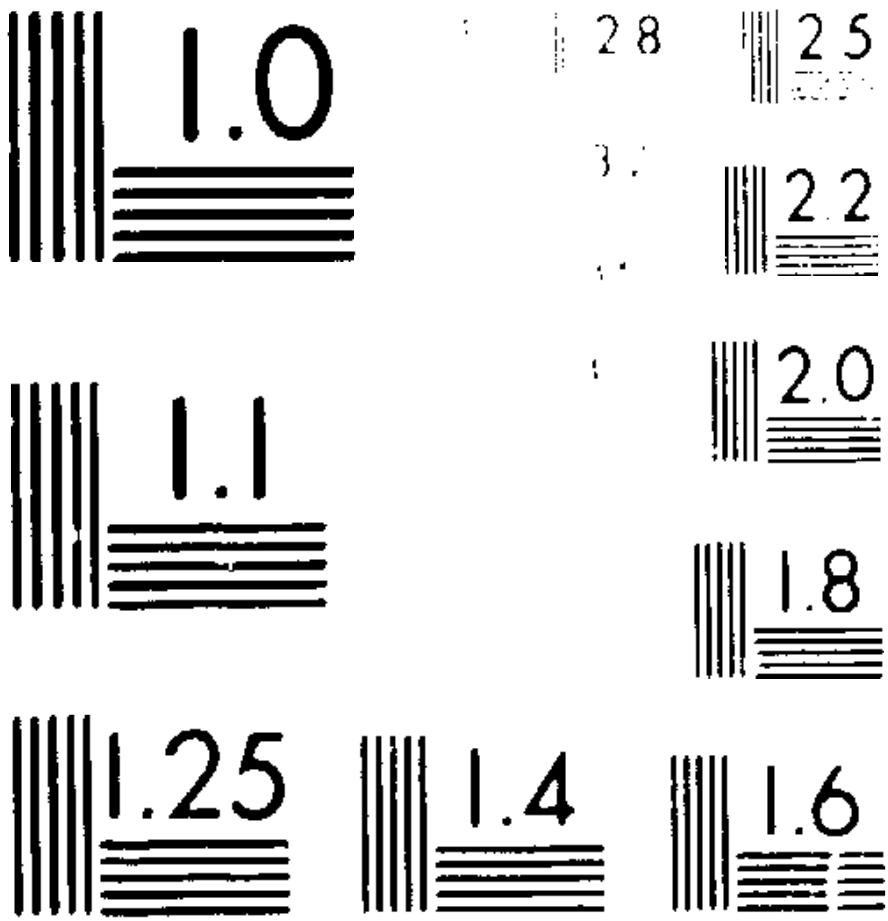
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THE STATE'S ROLE IN MODERNIZING AGRICULTURE AND DEVELOPING AGRO-INDUSTRIES IN BRAZIL *

presented by the

Government of Brazil

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THE STATE'S ROLE IN MODERNIZING AGRICULTURE AND DEVELOPING AGRO-INDUSTRIES IN BRAZIL

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PREFACE

In the formulation of Brazil's present economic policy a leading role has been assigned to agriculture. Agriculture can help to solve the majority of the problems faced today by Brazilian society. It may be mentioned briefly, that the agricultural sector is called upon to play a substantial part in curbing inflation by increasing the supply of basic foodstuffs; it also helps to create jobs by developing agricultural technology in such a way as to maximize the utilization of rural labour; and it represents an alternative source of energy by substituting products of vegetable origin, which have the advantage of being renewable, for traditional sources of energy. It is directly responsible for improving the nutrition of the Brazilian population. Lastly, it is an important factor contributing to equilibrium in the balance of payments through the diversification of exports and the production of substitutes for certain items which are imported on a large scale at a considerable cost in foreign currency.

Implementing a policy of the kind described necessarily involves an agro-industrial approach in order to enable the full economic potential of each product to be realized by the addition of value to basic commodities, thus making the country's over-all policy a viable one. The agro-industrial sector - by which we mean the sector responsible for the preservation and processing of agricultural products - has a similar role to play to that assigned to agriculture as a whole.

The task of this branch is to enable the greater supply generated by increases in agricultural production to be channelled to market outlets without the occurrence of losses which nullify the effects of higher output. Post-harvest physiology, packaging, storage and processing make up the agro-industrial technologies which help to raise agricultural production and thus indirectly to combat inflation.

The present background study aims principally at providing general information on the Government's action to modernize agriculture and develop agro-industries, and at outlining the main features of the stage which the process has now reached.

INTRODUCTION

The activities of the Federal Government designed to stimulate and promote Brazilian agriculture go back to the last century, when agricultural schools and research institutes were set up by imperial decree in the initial stages of Brazilian agricultural policy. The emphasis then was on broadening the agricultural horizon as a means of increasing the supply of subsistence items. This approach continued until the end of the 1940s, when industrialization became the fundamental goal of economic policy. Henceforth the Government was to concentrate all its efforts on industrializing the country, and attention and financial resources were thus diverted from agricultural activities.

Throughout this period agriculture played an important role in the Brazilian economy by subsidizing the development of the industrial sector, mainly as a provider of foreign currency for imports of capital equipment and as a source of industrial labour.

This situation altered in the 1960s as awareness grew of the function of agriculture and of the need to modernize it in order to speed the country's development. Raising the productivity of the land and labour factors and broadening the agricultural horizon became two key objectives.

Until the end of 1973 agricultural policy gave no priority to long-term investment and concentrated on two major areas: product pricing and the use of modern inputs.

Three kinds of instruments were created to implement pricing policy: minimum prices for producers, special policies for particular products, and export incentives.

As far as the modernization policy was concerned, it involved an expansion of credit, incentives for mechanization and moves to increase the use of fertilizers, plant protection products and seeds of certified quality.

The dramatic change in the economic situation in Brazil and throughout the world at the end of 1973 ultimately affected agricultural policy in one way or another, not by altering its instruments or methods but by fundamentally

modifying its priorities. In regard to modern inputs, for example, an import substitution programme is under way, while in the price field there has been increased internal control and more export aids.

Furthermore, although the sugar industry arose concurrently with the colonization of Brazil, action by the Federal Government to integrate agriculture with the agro-industrial sector did not take place until the end of the 1960s, with the implementation of economic policy measures to stimulate the production of agricultural inputs and the processing of agricultural products.

It should be noted that the agro-industrial sector as envisaged for the purposes of the present report excludes industries manufacturing agricultural inputs such as fertilizers, plant protection products and equipment, etc., and is confined to the various processing industries which use agricultural products as their principal raw material. These industries cover the following items: wood, rubber, skins and hides, textiles (processing of animal and vegetable textile fibres), paper, foodstuffs, beverages, tobacco and chemicals (manufacture of animal and vegetable oils, fats and waxes). The paper will pay special attention to agro-industries producing foodstuffs, in view of their importance within the agro-industrial sector.

Government action to integrate agriculture and agro-industries has recently been concerned with minimizing losses and ensuring a regular flow of agricultural products to the domestic and export markets through integrated production, storage, processing, transport and marketing systems.

Furthermore, with the passage of time, the Government has simultaneously been responding to the requirements of the sectors providing the driving force for the national economy. Recently, in 1974, it embarked on a thorough overhaul of the public agricultural sector at both the federal and state levels with a view to adapting it to the objective of gradually transforming Brazilian agriculture into a dynamic modern sector capable of contributing more significantly to the expansion of internal wealth and to social well-being.

This process of overhaul has resulted in the creation of a system in which the central authorities provide over-all policy guidelines and indications, with direct links with the agencies responsible for

implementing the over-all policy at the agricultural production, supply and protection levels.

Action by government organs to develop agriculture and agro-industries at these levels has been directed towards co-ordinating and executing programmes dealing with: agricultural research and experimentation; pedology, climatology and meteorology; credit and incentives for agricultural forest and fisheries production; control of agricultural diseases and pests; agrarian organizations and co-operatives; technical assistance and rural extension; minimum prices and buffer stocks; market research; storage; marketing; research on food preservation and processing technology; and inspection and control of animal and vegetable products.

In conclusion, it should be noted that the Brazilian Enterprise for Agricultural Research (EMBRAPA) has sought to equip itself to foster and execute programmes in the areas of technology for agricultural product processing and energy for agriculture, since agricultural production technology cannct be divorced from product processing technology.

1. ACTION BY THE STATE TO MODERNIZE AGRICULTURE

1.1. Institutional and operational activities

The recent policy guidelines under which agriculture was assigned high priority from 1977 onwards have resulted in far-reaching changes in the organizational structure of the Ministry of Agriculture.

A substantial part of these changes were aimed at securing the necessary conditions for the Ministry to play an effective part in the country's socio-economic development.

Agricultural administration, in systems terms, is organized in such a way as to decentralize as efficiently as possible the execution of the activities that are within the Ministry's competence, namely those relating to agriculture, stock-raising, hunting and fishing; renewable natural resources; organization of rural life; financial incentives and credit; meteorology; research and experimentation; supervision and protection of animal and plant health; and standardization and inspection of animal and plant products and of consumption in agricultural activities.

To meet the needs arising in its fields of competence, the Ministry is actively assisted by a series of bodies linked to it and responsible for implementing its policies and providing solutions to the wide range of problems arising in Brazilian agriculture.

An idea of what this involves may be gained from the fact that in the period 1974-1979 the volume of financial resources allocated by the Ministry to the various bodies connected with it amounted to 52 billion cruzeiros, while the anticipated sum for 1980 is 57 billion cruzeiros.

The basic objects of these implementing bodies are briefly described below in order to give a clearer picture of their levels of activity.

Banco Nacional de Crédito Cooperativo S.A. (BNCC)

The primary function of BNCC is to promote all forms of co-operative activity, principally by means of credit aid. It is the body which manages the National Fund for Co-operatives and supervises the Social Welfare Fund and the Special Fund for Technical Assistance to Co-operatives.

Executive Board for the Cocoa Farming Programme (CEPLAC)

The Board manages the Fund for Economic and Rural Rehabilitation of Cocoa Farming. It is responsible for promoting and for improving economic and social conditions in cocoa farming, as well as for developing new centres of cocoa production in Brazil. Its range of activity is confined to the producing States, in proportion to the quantities which they export, and to any new cocoa production centres which are established in Brazil.

Brazilian Storage Company (CIBRAZEM)

The company participates directly in the formulation and execution of government procurement plans and programmes connected with the storage of agricultural and fisheries products. It engages in various activities and plays an important role as a regulating element in the market for these products.

Brazilian Foodstuffs Company (COBAL)

In addition to management of the Buffer Stock Establishment Fund, the company's activities include the implementation of the Federal Government's procurement plans and programmes for the production, processing and marketing of foodstuffs and for the assets required for these activities.

Production Financing Board (CFP)

The task of the Production Financing Board is to programme and execute the guaranteed minimum prices policy formulated by the National Council on Supplies for the products of agricultural and extractive activities.

Brazilian Enterprise for Agricultural Research (EMBRAPA)

The function of this body is to plan, supervise, direct, monitor and directly or indirectly execute agricultural research activities in Brazil with a view to producing information and technology for use in developing the country's agriculture and agro-industries. In addition it supports other research institutions in its areas of activity at the state and/or regional levels.

Brazilian Enterprise for Technical Assistance and Rural Extension (EMBRATER)

EMBRATER's mission is to disseminate the technical, economic and social information required for rural development; in order to do this it collaborates with the competent organs of the Ministry of Agriculture in formulating and implementing national technical assistance and rural extension policies.

National Meteorological Institute (INEMET)

The functions of the Institute are to establish, maintain and operate the National Meteorological Network, including the part belonging to the international network, to carry out meteorological and climatological studies and surveys for application to agriculture and other activities, and to produce weather forecasts.

Brazilian Institute for Forest Development (IBDF)

The rational use and the protection and conservation of renewable natural resources are the responsibility of IBDF, whose task it is to formulate forest policy and to direct, co-ordinate and directly or indirectly take the steps required for the performance of its tasks.

National Institute for Agrarian Settlement and Reform (INCRA)

INCRA was set up to correct the country's agrarian structure and adapt it to the nation's economic and social development needs. It is the body responsible for promoting and implementing agrarian reform. It also administers the Liquidity Guarantee Fund for Agrarian Bonds and the National Fund for Agrarian Reform.

Superintendency for Fisheries Development (SUDEPE)

SUDEPE's objects are to formulate a national fisheries development programme and to promote its implementation by means of a series of statutory functions.

National Supplies Directorate (SUNAB)

This body is responsible for implementing national policy on supplies and undertakes research on supplies in terms of the market.

In addition to the above bodies, which are directly connected with the Ministry of Agriculture, Brazil possesses a large number of research and development institutions dealing with agricultural product processing technology. It has more than 50 institutions providing support for the agro-industrial sector.

Their activities are concentrated on foodstuffs (fruit, grains and cereals, vegetables, meat, milk and fish), in view of the importance of these articles reaching the domestic market on a regular basis and their significant role in Brazilian exports. Work also takes place in connexion with textile fibres, skins and hides, and wood.

The work covers a wide range of specialized fields: post-harvest physiology and storage; preservation of products by packaging, refrigeration, freezing and drying; processing; quality control; marketing; and dissemination of technology and technical assistance.

1.2. Manpower training

As far as education is concerned, teaching in agronomy takes place exclusively under State auspices and has a long tradition behind it; in its various specialized fields it is meeting the needs of the Brazilian agricultural and agro-industrial sector and has recently become more effective with the introduction of food engineering into university teaching.

Thus in 1979, for its various areas of research in the agricultural sciences, Brazil offered a total of 85 master's degree courses and 12 doctorate courses, while 7,113 students were taking bachelor's degree courses qualifying them for professional employment in the sectors in question.

1.3. Support for industries producing modern inputs

Fertilizers, plant protection products, mechanization and seeds are interdependent factors making up the panoply of resources available to the agricultural entrepreneurs who are gradually transforming our traditional subsistence agriculture into technology-based market agriculture.

In the modernization of agricultural production, the Brazilian development model has been based on a strategy for acquiring competitive capacity through a system of fiscal and financial incentives for higher production and for investment, marketing and technological change in agriculture, as well as through agricultural research programmes and promotion of the use of modern inputs.

This system was established to act as a catalyst for agricultural development through the increased and more efficient use of inputs capable of raising productivity.

1.3.1. Fertilizers

Government action to promote and foster the increased use of fertilizers dates from 1939, when the export of animal bones and phosphate fertilizers from Brazil was prohibited.

In 1941 the Government imposed controls on fertilizers and additives and in 1957 it regulated import duties. These measures indicate the direction it was taking in encouraging the use of fertilizers while simultaneously promoting and protecting enterprises established in Brazil.

Ten years later the Fund for Financial Incentives for Fertilizer and Mineral Additive Use (FUNFERTIL) was set up for a period of four years to increase the use of these products on farms by means of financial incentives to those farmers who had actually used fertilizers on their arable and grazing land and mineral additives in the feed of their dairy herds and poultry.

When FUNFERTIL came to an end the Special Fund for Agricultural Development (FUNDAG) was set up to replace it, in order to encourage exports of agricultural products, foster increased agricultural output and productivity and seek ways of dealing with bottlenecks which might arise in the marketing of agricultural products.

Additional stimuli for fertilizer use in the North-East Region were offered by PIN (the National Integration Programme) and PROTERRA (the Programme for Land Redistribution and Agro-Industrial Incentives in the North and North-East) in the form of incentives for agricultural productivity factors. It should be noted that the use of fertilizers and other technical inputs is encouraged financially by exempting the final borrowers from payment of interest on their loans.

The heavy external dependence on raw materials and intermediate products for the production of chemical fertilizers in the period 1950-1974 and the sharp rise in fertilizer prices on the international market in 1973-1974 led the Federal Government to launch the National Fertilizer and Agricultural Lime Programme (PNFCA) as part of its import substitution policy.

Initially designed to make the country self-sufficient by 1980, PNFCA immediately became the key factor in this sector. Since its establishment it has witnessed a transitional period characterized by fundamental changes in the various stages of the industry from intensified working of national deposits, through industrial processing, supply and distribution of raw materials, to final delivery to the farmer.

1.3.1.1. National consumption

The steady rise in the consumption of agricultural fertilizers in Brazil from 1950 onwards demonstrates the important role they have assumed in the nation's economy, not only through their beneficial effect on agricultural productivity but also because of the industrial complex needed for their production.

In the period 1950-1978 the increase in consumption in terms of the macronutrients nitrogen (N), phosphorus (P_2O_5) and potassium (K_2O) was some 3,000 per cent. In 1978 the total NPK consumption was 3.1 million tonnes.

In the last 10 years the heavy increase in consumption has been met entirely from imported nutrients, but commercial working of the only known potash-rich deposit (Carmopolis-SE) is to begin in 1983.

1.3.1.2. National production

Brazilian fertilizer production remained constant throughout the 1950s. In the 1960s soluble phosphate output alone showed a slight increase and averaged 98,440 tonnes of P_2O_5 in the period 1960-1969, while nitrogenous

fertilizers were not a marked feature until the 1970s. The production of nitrogenous fertilizers was no more than 10,760 tonnes in 1960-1969 but rose to 277,000 tonnes in 1978. In that year phosphate fertilizer output was 1.1 million tonnes of P_2O_5 (an increase of 24.5 per cent per annum for 1968-1978), representing 77.2 per cent of internal consumption. The achievement of such a percentage share by local products would be really significant if each of the substances involved in the production of soluble phosphate fertilizers was locally produced. However, nearly all the sulphur and phosphoric acid which are essential for their manufacture are imported.

1.3.2. Plant protection products

The policy instruments employed to spread the use of plant protection products and encourage development of their production locally have generally been the same measures as employed to promote the use and domestic production of fertilizers.

The Brazilian production of plant health products is relatively new and up to 1958 only the insecticides BHC, Parathion and DDT were being produced, while it should be mentioned that fungicides only began to be produced in Brazil in 1967 and that herbicides began to figure as a local product in 1973.

Brazil's enormous dependence on foreign imports and know-how made it necessary for the Government to take steps to reduce it, inasmuch as there was an increase in imports of about 548 per cent in the period 1964-1974; they represented 78 per cent of consumption and required the expenditure of about $US 140 million for the purchase of plant protection products in 1975.

In that year, in order to minimize the loss of foreign exchange, the National Programme of Agricultural Pesticides (PNDA) was established, which set production goals and prescribed the financial resources for projects aimed at supplying half the national consumption by 1980 through domestic production.

Brazilian government policy, in an effort to reduce dependence on foreign sources, has exempted local industries from import duties on formulated products, raw materials and reactive agents, as well as from

the compulsory deposit of the turnover tax (ICM) and tax on industrialized products (IPI) for the purchase of products, machinery and equipment for the construction and enlargement of new factories.

As a result of the strategy adopted, consumption in 1978 already increased by 13 per cent over 1977, and 46 per cent of the total national consumption of 88,529 tonnes was produced in the country, of which 49 per cent represented insecticides, 37 per cent fungicides and 14 per cent herbicides.

In recent years there has been a steady upward trend in the Brazilian consumer market for plant protection products. During the period 1970-1974, consumption increased by 155 per cent, rising from 39,469 to 100,674 tonnes. There were drops in 1975 and 1976, which were made up for in the following year, with consumption reaching the figure of 78,357 tonnes, of which 33.5 per cent was of national production. Out of the consumption for 1977, insecticides accounted for 33,846 tonnes, fungicides for 24,584 tonnes and herbicides for 19,926 tonnes, of which 30 per cent, 48 per cent, and 22 per cent respectively were produced in Brazil.

Special mention should be made of herbicides, the use of which has been showing high rates of growth in recent years, due mainly to their increased use in commercial crops, together with the cultivation of larger areas.

Lastly, it should be observed that the gradual increase in the share of national products in the domestic market for plant protection products will result in annual savings of foreign exchange estimated at $US 94 million from 1980.

1.3.3. Agricultural machinery

The modernization of agriculture through the use of agricultural machinery was begun in Brazil in the 1920s, with the importation of 1,706 farm tractors.

Although imports continued up to 1974, the national tractor industry was established in 1960.

Up to and during the 1960s, the Brazilian market for farm tractors was very small and did not offer encouraging prospects, due, among other

things, to the limited growth of agricultural production, especially in large farms requiring mechanization, and to the absence of loans for farmers.

The vigorous increase in the planting of soya beans and wheat, as well as the expansion of other crops, the tax incentives granted by the Government to manufacturers (exemption from IPI and ICH) and the loans granted to farmers by the Bank of Brazil (Banco do Brasil) at reduced interest rates or free of interest, culminating in the National Plan for Farm Mechanization in 1967, helped to bring about far-reaching changes in the purchaser market after 1970. Its effects made themselves felt, mainly after 1972, on the domestic supply of tractors (see table I), for which growth rates remained high until 1975 and were no longer accompanied by problems concerning the supply of parts, especially in 1973 and 1974. After 1975, tractor production was stimulated by the new facilities granted by the Bank of Brazil for the purchase of farm machinery.

Beginning in 1972, Brazil made a stronger showing in the international market for four-wheel tractors by exporting 188 machines. By 1979, sales already amounted to 7,263 tractors.

In launching new models, the domestic manufacturers are turning their attention to tractors with 4 x 4 traction. According to the estimate of ANFAVEA - based on the government programmes for stimulating the large-scale planting and cultivation of various crops and considering, on the other hand, that in countries similar to Brazil about 7 per cent of all tractors sold have 4 x 4 traction and are of high power (above 140 hp) - it is considered that the potential average annual demand for this type of equipment is 2,500 units. Several manufacturers are taking into account the possibility that in a few years Brazil will become the biggest world market for this type of tractor.

Table I. Tractor production, 1970-1979 - Brazil

Year	Annual production of 4-wheel tractors	
	Units (in thousands)	Index
1970	14.1	100
1971	22.1	157
1972	29.1	207
1973	37.2	264
1974	43.8	311
1975	56.9	404
1976	63.2	449
1977	53.0	376
1978	48.7	345
1979	55.2	391

Source: SNPA - ANFAVEA.

As for 4 x 2 tractors, the recent trend towards greater production of heavy-duty tractors (more than 65 hp) is expected to increase in the next few years. It is also considered that there will be an increased production of mini-tractors, with relatively less of the present light and medium line.

With respect to harvesters, which represent a specialized branch, Brazilian industry has made notable progress in the last few years with regard to the harvesting of grains and cereals, especially rice, soya beans and wheat, crops which have shown a greater trend towards mechanization.

The progress in question can be discerned in our gradual success in eliminating the need for imports, so that by 1975 only 24 per cent of the machines sold in the country were of foreign origin. After that, national production came into balance with internal demand and became stabilized around the figure of 6,200 machines in the period 1976-1979.

At the present time, the farm machinery industry is well developed in Brazil, and is able to meet the demand for most of the types used for the different agricultural tasks, whether using mechanical or animal traction.

1.3.4. Certified seeds

The efficient use of improved seeds has not only benefited the physical productivity of crops but has also ensured the better utilization of expensive inputs and of farm machinery and equipment.

In Brazil, as in other countries, the Government is responsible for most of the work of developing the seed programme.

The Secretariat of Agriculture of the Sate of São Paulo has been looking after the production, improvement and distribution of seeds since 1927, or for more than 50 years, through the Agronomical Institute of Campinas (IAC), which has achieved highly significant results with various crops, including, in particular, cotton, coffee, sugar-cane, maize, fruits and vegetables.

The National Seed Programme has developed satisfactorily since then, and at the present time, in addition to government assistance, it relies on the valuable and essential contribution of private enterprise, in research work and in co-operation in the production of basic material or the production and distribution of certified and inspected seeds.

The following table shows the volume of national seed production in 1974/75 and 1977/78.

Table II. Brazilian seed production during the period from 1974/75 to 1977/78, in tonnes.

Item	Periods considered			
	74/75	75/76	76/77	77/78
Soya bean	474 000	452 160	548 570	700 850
Wheat	255 000	354 000	340 020	385 520
Rice	108 500	119 160	85 930	126 160
Maize	105 000	112 620	127 540	108 690

Source: ABRASEM.

In terms of seed requirements for the 1978/79 harvest - with reference only to cotton, ground-nuts, rice, white potatoes, beans, maize, soya and

wheat - Brazilian estimates indicated a shortfall of two million tonnes, in spite of the fact that production had amounted to 1.3 million tonnes.

With the exception of wheat and soya, improved seeds are used by farmers only to a small extent.

In an attempt to bring about changes in the situation described above, the Brazilian Enterprise for Agricultural Research (EMBRAPA) has been participating since 1975, in accordance with government policy for the sector, in the production, beneficiation, storage and distribution of basic seeds through its Basic Seed Production Service (SPSB), which was established mainly to help increase national agricultural productivity by using the results of the genetic improvement of various crops, a task carried out by the other units of the Enterprise.

2. STATE ACTION IN THE INTEGRATION OF AGRICULTURE AND INDUSTRY

2.1. Financial support for the agro-industrial sector

Up to the middle of the 1960s, government policy did not place any special emphasis on support for agricultural-industrial integration, although it was possible to note some sporadic efforts towards such support, as, for example, the establishment in 1937 of the Agricultural and Industrial Credit Department (CREAI) of the Bank of Brazil, which allocated resources for developing the sector.

With the establishment of the National Financial System and the Central Bank of Brazil at the end of 1964 the country began actively to devote financial resources to assisting these priority activities in the various parts of Brazil.

Having in mind small and medium-sized enterprises, the Government supported programmes to encourage the establishment of industrial poles close to farming areas, in an effort to make use of raw materials at lower cost.

The following factors might also be mentioned in connexion with financial support to encourage the establishment of agro-industries: the existence of various development banks at the state and regional level

which channel resources to the expansion of activities situated in their area of work (among others, the Banco da Amazônia S.A. (BASA), the Banco do Nordeste Brasileiro (BNB), and the Development Bank of the State of São Paulo (BADESP)); the National Rural Credit System, created in 1965, which, working through a number of institutions, participates in activities supported by agricultural credit, some of which benefits agro-industry; the adoption of tax incentives to support the establishment of industries situated in less developed regions, and, lastly, the opening of international markets for industrially processed products, thus significantly changing the pattern of Brazilian exports.

Along with the above factors, mention should be made of the emergence of specific programmes to support the development of Brazilian agro-industry by giving more encouragement to businessmen to make the necessary investments for establishing agro-industries, the risks involved in the undertaking being reduced by the subsidization of interest rates under these programmes and the extension of the periods for the repayment of loans.

Among the specific government programmes referred to in the preceding paragraph, the following have been noteworthy since the beginning of the 1970s: the Programme of Financial Assistance to Agro-Industry and the Input Manufacturing Industry (PAFAI), with resources for the period 1972-1975 of 540.7 million cruzeiros (at 1975 prices); the Agro-industrial Project of the Export Channels Programme (COREX/PAGRI) with resources of $US 551.6 million for the period 1974-1978; the Programme for Agro-industrial Development in the North-East, with resources of 800 million cruzeiros for the period 1975-1977 (at 1975 prices) and with 300 million cruzeiros earmarked for 1980, and the Programme for Agro-industrial Development in the Centre-West Region, with a total investment of $US 125 million.

The interest taken by the Government in the agro-industrial sector has also led to its participation in the establishment of indirect lines of credit, in particular the rediscount operations of the Central Bank, which have helped greatly in making available working capital; this is the case, for example, with rediscounting for exportable manufactures, which in December 1979 amounted to 38,398 million cruzeiros.

Besides the programmes already mentioned, institutions such as the Bank of Brazil, the National Bank for Economic Development and the Central Bank have some other credit lines of real importance for the small and medium industrial enterprises which make use of the products of agriculture, forestry, fisheries and related branches, with respect to both working capital and fixed capital.

Special mention should be made of the following:

- FUNDECE: Fund for the Democratization of Business Capital, established in 1964 to supplement the working capital of enterprises and to help democratize their capital. It is co-ordinated with the Central Bank of Brazil and in 1978 possessed resources of approximately 348.1 million cruzeiros.

- FUNDEPRA: Fund for Developing the Industrialization of Agricultural and Fishery Products, established in 1968 for the establishment, expansion and modernization of industries by covering costs in cruzeiros and dollars. Co-ordinated by the Bank of Brazil.

- PRODESAR: Project for Developing Warehousing Organization, working with the Bank of Brazil's own resources and also financing from the World Bank. Established in 1970, its purpose is to defray the costs of fixed investments for the installation, enlargement, renewal or purchase of storage equipment and silos for storing and/or processing rice, beans, maize and wheat.

- Resumption of the FIBEP Programme: established in 1972 and co-ordinated by the Central Bank of Brazil, it finances modern input industries and other kinds of agro-industries, including co-operatives. In 1977, it possessed resources of 350.6 million cruzeiros, while expecting a total of 500 million cruzeiros for 1980.

- FIPEME: Programme for the Financing of Small and Medium-Scale Enterprises. Established in 1965, it finances the expansion or relocation of industries, with a view to stimulating the economic development of the country and reducing sectoral and regional differences, especially by encouraging increased productivity and exports.

What is evident in all these programmes is the direct intention to support small and medium industrial enterprises as a form of regional

penetration, while seeking more benefits for agricultural activity. That is because some characteristic aspects of enterprises of this size are advantageous for a country with limited capital like Brazil: a greater use of intensive capital, a greater use of intensive labour (manpower), less sophisticated technology and proximity to the agricultural producing centres.

In encouraging agro-industrial activity, what is being looked for is precisely a point of reasonable development, without prejudice to local cultural conditions, but with a view to improving the quality of life in these communities as far as possible.

2.2. The importance of the agro-industrial sector in Brazil

Having defined the role which the State is playing in promoting the modernization of agriculture and having briefly described the technical means by which Brazil has tried to overcome the obstacles to the development of its national agricultural sector, we shall attempt to outline the present situation of agro-industry in Brazil.

Agro-industry occupies a prominent position in Brazil, representing the most important segment of the industrial sector by reason of its socio-economic significance; it is also the branch which reaches farthest into the interior of the country and the one which is most widely distributed throughout the territory of Brazil.

In 1974, as shown in table III, 21 per cent of employed personnel (730,000 persons), 37 per cent of all establishments and 23 per cent of the total value of the production of Brazilian manufacturing industry were concentrated in this segment. It should also be emphasized that in that year agro-industries accounted for 27.9 per cent of the gross national product. In this context, food-processing agro-industry is particularly important, with 56 5 per cent of employed personnel and 66.6 per cent of total agro-industrial production. As early as 1977, according to data of the Ministry of Finance, agro-industries accounted for 52.6 per cent of the tax on industrialized products collected.

The trends in buying and selling in the domestic and foreign markets also show that the agro-industrial sector occupies an important position

Table III. Indicators for the agro-industrial sector in 1974

	Number of establishments	Capital investment (millions of cruzeiros)	Employed personnel as of 30/6/74	Value of production (millions of cruzeiros)	Value of processing (millions of cruzeiros)
Wood	6 025	1 149	162 433	13 054	6 618
Paper, cardboard	241	560	38 364	8 076	3 632
Natural rubber	53	31	3 405	1 145	204
Leather preparation	371	132	21 181	2 145	795
Natural textiles	619	172	20 464	6 492	1 647
Food products	17 885	4 745	412 000	83 058	22 228
Beverages	1 381	797	51 710	6 903	3 727
Tobacco	103	139	19 739	3 838	2 273
Total for agro-industry	26 678	7 725	729 376	124 711	41 124
Total for industry	72 360	37 050	3 460 081	533 595	214 759
Agro-industries/total for industry	37%	21%	21%	23%	19%

Source: Brazilian Institute of Geography and Statistics (IBGE) - Anuario Estatístico 1978.

Note: Data refer to establishments with 5 or more employees and/or with a production value equal to or more than 640 times the highest minimum wage in force in that year.

in relation to manufacturing industry as a whole, and one which is characterized by a lesser dependence on imported inputs per cruzeiro-unit of production.

In 1976, in fact, while purchases by agro-industries in the domestic market amounted to 114.7 billion cruzeiros, or 18.4 per cent of total purchases by manufacturing industries, agro-industries were buying products in the foreign market to the value of 4.1 billion cruzeiros, corresponding to 6.1 per cent of the purchases of the industrial sector. As regards sales to the various industrial branches, the share of agro-industries in the domestic market was 16.5 per cent and their share in sales to the international market was 35.8 per cent. In 1979, agro-industrial products sold abroad accounted for 42.4 per cent of the total value of Brazilian exports.

.3. The internal structure of the agro-industrial sector

The internal structure of the Brazilian agro-industrial sector is characterized by strong concentration in the food products industry, which, together with the beverages industry and the wood-processing industry, is responsible for 94.8 per cent of the number of establishments, 86.6 per cent of capital investment, 79.9 per cent of employed personnel, 82.6 per cent of the value of production and 79.3 per cent of the value added in the sector. As can be seen in table IV, branches other than those mentioned above do not occupy an important position from the point of view of the national economy.

Table IV. Internal structure of the agro-industrial sector

	Establish-ments	Capital invest-ment	Employed personnel as of 30/6/74	Value of produc-tion	Value of industrial processing
Food products	67.0	61.4	50.5	66.6	54.1
Wood	22.6	14.9	22.3	10.5	16.1
Paper, cardboard	0.9	7.3	5.2	6.3	8.8
Beverages	5.2	10.3	7.1	5.5	9.1
Natural textiles	2.3	2.2	2.8	5.2	4.0
Tobacco	0.4	1.8	2.7	3.1	5.5
Leather preparation	1.4	1.7	2.9	1.7	1.9
Natural rubber	0.2	0.4	0.5	0.9	0.5
Total for agro-industry	100.0	100.0	100.0	100.0	100.0

Source: IBGE - Anuario Estatístico 1978.

Another characteristic of this sector is the strong predominance of small and medium agro-industrial units, which account for more than 80 per cent of the establishments in the majority of the subdivisions of this industry and which, except as regards tobacco and textiles, account for more than 20 per cent of the personnel employed in every branch of industrial activity.

It is worth noting that the great majority of small enterprises are virtually untouched by the process of technological development; they consist of small, so-called "backyard" factories, which work with a small number of employees and in most cases use the most rudimentary production processes.

For the big enterprises, the problems that face small and medium-sized firms either do not exist or else are circumvented; having capital and guarantees to offer for expansion and modernization projects, and being efficiently managed, they have strengthened their position, capturing increasing shares of the market and promoting the technological development of the sector.

The fast progress observed in recent years has, basically, been possible because of the activities of the big enterprises, the level of technology used and constant investment in increased productivity.

We are faced, therefore, with the existence of a modern sector, consisting mostly of large enterprises with considerable dynamism and a high level of technological development, but representing a minority numerically, and a group consisting of the majority of enterprises (small and medium) which remain on the margin of this development.

2.4. Available technology

Technological research aimed at the utilization of farm products as industrial raw material can increase their relative value when the results of such research are applied to each phase in the processing of these products. The additional income obtained in this way is distributed among all the sectors involved in production and services, with favourable repercussions on the socio-economic system.

Among the various industries in the agro-industrial sector, the food industry is noteworthy for having adopted relatively modern technology in industrial processing, as, for example, in the case of orange juice, soluble coffee and certain meat products. Although other products require less sophisticated manufacturing processes, Brazil has been able to compete in the international market with the above-mentioned products, mainly because of emphasis on quality and the maintenance of price levels (the policy of government export incentives), as well as because of the comparative advantages offered by certain agricultural products.

Notwithstanding the factors which inhibit the introduction of processed food products, the Brazilian food industry is showing dynamism in the launching of new products.

Beginning in 1970, some frozen products were introduced in the market, such as frozen fruit juices, frozen meals and frozen fish fillets. In 1975, some firms, using "individual quick freezing" and "flow-freeze" processes, began to produce frozen fruits and vegetables, aimed primarily at the foreign market. A novelty in the market was the production of frozen eggs as an

intermediate product used by the baking, ice cream and confectionery industry. One of the most traditional industries, the dairy industry, came into prominence at the beginning of the 1970s with the production of fruit-flavoured yoghurt and new kinds of frozen cheese and milk. This led to competition between the firms active in this sector and to the appearance of a number of new brands.

The dairy industry has also introduced long-life milk, which represents an innovation in the processing and packaging of this product. This innovation has been well received, in view of the highly seasonal nature of the production of fresh milk in Brazil.

As a possible alternative product to milk, which can also be considered from the point of view of a nutritional supplement, the Brazilian market now has at its disposal a protein soya bean extract, thanks to research and development work supported by the Government.

National programmes for supplementing the diet of school children, pregnant mothers and workers have led to the production of such foods as breads, biscuits and macaroni enriched with fat-free soya flour and powdered milk mixed with enriched flours.

Dehydrated products for immediate consumption, such as soups and broths, offer one of the choices open to the consumer especially in big urban centres where people do not have much time to prepare food.

There has been a growing demand for dehydrated soups in Brazil in recent years, and other dehydrated products have also been found in the Brazilian market, such as potato purée, powdered onions and dried mushrooms.

The increasing supply in the national market of soya beans, which are being grown more and more, has led to a rapid increase in the consumption of soya oil, which is now free from the odour and taste which could not be eliminated by former processes. Using soya beans as a raw material, national industries are producing, among other things, vegetable meat, powdered protein extract and toasted flours and grains.

2.5. Exports from the agro-industrial sector

Up to the last few years, Demerara sugar was the leading agro-industrial product in Brazilian exports. Sugar exports had been reaching fairly high

annual growth rates, especially up to 1975, due to the scarcity of supplies in the international market. After 1976 it was overtaken by soya bean cake, which alone accounted for 22 per cent of exports from the agro-industrial sector.

During the last decade, there was also a change in the pattern of industrialized food exports, with an increased proportion of "finished" goods and greater product diversification, and these products continued to play an important part in the national economy.

According to the statistics of CACEX (Export Trade Department of the Bank of Brazil) for 1971 to 1979, agro-industrial products accounted for more than one third of the total value of Brazilian exports, while in 1979 42.4 per cent of them were concentrated in food products, which in that same year accounted for 69.5 per cent of exports from the sector and 29.5 per cent of all Brazilian exports (table V).

The other branches of national agro-industry are experiencing extraordinary growth rates in the value of their exports; although not on a par with the food sector in terms of absolute values, exports of leather and footwear and of tobacco increased by 769.4 per cent and 665.7 per cent respectively during the period 1971-1979.

Table V. Exports of agro-industrial products - Brazil 1971-1979
(Thousands of US dollars FOB)

Products by sector	1971 1/	1972 1/	1973 1/	1974 1/	1975 1/	1976 1/	1977 1/	1978 2/	1979 2/
Products and by-products of food-processing agro-industry	542 918	946 621	1 590 596	2 433 893	2 331 920	2 214 700	3 219 193	4 225 180	4 492 843
Demerara sugar	146 555	314 147	454 863	978 300	769 902	152 472	276 530	195 909	247 004
Residues and waste from food industries; Animal feed	116 272	189 017	470 657	346 617	507 009	851 812	1 222 130	1 258 783	1 136 320
Inedible molasses	8 608	13 523	31 047	58 803	45 536	40 990	46 287	33 704	45 645
Sugars and confectionery products	6 945	90 105	106 365	348 668	340 189	165 233	196 345	395 903	432 694
Prepared meats, crustaceans and molluscs	58 214	63 168	83 464	100 539	80 492	130 440	136 162	110 777	141 691
Fruit and vegetable juices	1 044	2 150	3 971	3 663	1 420	1 327	2 817	13 650	17 054
Citric fruit juices	35 858	41 499	63 622	61 605	84 385	103 069	177 683	332 638	296 145
Cocoa and preparations thereof	30 185	40 909	59 788	128 127	106 524	138 297	338 391	277 961	328 507
Soluble coffee	49 734	69 945	99 966	116 045	79 790	225 539	325 808	348 203	425 356
Animal and vegetable fat, oil and wax	78 752	111 480	194 349	235 076	267 248	360 275	449 988	514 636	593 416
Milled flour	3 268	2 314	6 069	10 315	4 019	1 640	2 691	5 231	2 524
Preserved palm cabbage **	4 194	5 049	3 539	10 300	9 073	13 442	16 893		
Miscellaneous food preparations	255	288	664	828	2 364	1 648	1 811	367 078	449 021
Alcoholic beverages and vinegar	1 780	3 057	8 937	25 351	20 740	12 635	6 764	8 668	36 992
Preparations based on cereals, starch flour and pastry products	262	586	610	3 487	3 065	4 114	2 956	2 175	5 876
Preparations made from vegetables, fruits or other plants or parts thereof	992	1 384	2 685	6 164	10 164	11 767	15 964	359 84	331 295
Other agro-industrial products	489 794	692 451	1 073 232	1 202 552	1 126 109	1 150 048	1 383 371	1 441 691	1 966 513
Leather and footwear	66 997	131 225	174 229	202 400	268 471	350 500	328 767	420 654	630 582
Woods and wood manufactures	114 689	120 123	188 948	185 183	140 844	136 398	157 737	180 449	279 346
Textiles and natural fibres *	225 588	353 481	591 340	628 122	454 699	387 464	503 960	409 316	645 450
Tobacco and tobacco products	38 718	49 459	62 414	103 425	148 689	168 514	194 192	249 320	296 476
Other products	43 802	38 163	56 301	83 422	113 406	107 172	198 715	181 952	144 659
TOTAL FOR AGRO-INDUSTRY	1 032 712	1 639 072	2 663 828	3 636 445	3 458 029	3 364 748	4 602 564	5 666 881	6 459 356
TOTAL BRAZILIAN EXPORTS	2 903 856	3 991 211	6 199 200	7 950 996	8 669 444	10 128 303	12 120 175	12 658 944	15 244 177
Share in value of exports									
Agro-industry/total for Brazil	35.6%	41.0%	43.0%	45.7%	39.9%	33.2%	38.0%	44.8%	42.4%
Food industry/total for Brazil	18.7%	23.7%	25.6%	30.6%	26.9%	21.9%	26.6%	33.4%	29.5%
Food industry/total for agro-industry	52.6%	57.7%	59.7%	66.9%	67.4%	65.8%	69.9%	74.5%	69.5%

Source: 1/ Brasil Comercio Exterior - Exportação 1971-77, vol. 1, Banco do Brasil S/A - CACEX.

2/ Exportação Brasileira Análise Estatística Comparativa - janeiro/dezembro 1979/78, Banco do Brasil S/A - CACEX.

* It should be noted that some exported textiles are made with varying proportions of natural and synthetic fibres which are not specified in the source used.

** Values not specified in the source for the years 1978 and 1979.

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