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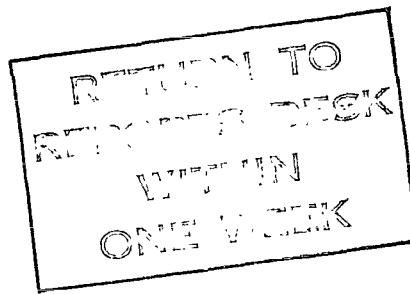
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Report No. 38-BR

THE ECONOMIC AND  
SOCIAL DEVELOPMENT  
OF  
BRAZIL  
(In eight volumes)

VOLUME III

LIST OF PROJECTS FOR EXTERNAL FINANCING

March 12, 1973

Latin America and the Caribbean Department

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## CURRENCY EQUIVALENT

Currency Unit: Cruzeiro. (Prior to May 15, 1970, the currency unit was called the "Cruzeiro Novo" or "New Cruzeiro", the adjective was dropped in May 1970, without any change involved.)

### Exchange Rates Effective December 15, 1972

Selling Rate: US\$1.00 = Cr\$6,215  
Buying Rate: US\$1.00 = Cr\$6,165

### Average Exchange Rates

|               |   |               |               |
|---------------|---|---------------|---------------|
| US\$1.00      | = | Cr\$4,594     | Cr\$5,285     |
| US\$1 million | = | Cr\$4,594,000 | Cr\$5,285,000 |
| Cr\$1 million | = | US\$217,675   | US\$189,215   |

This report is based on the findings of a mission  
to Brazil in August-September, 1972, composed of:

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## LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING

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SUMMARY TABLE: PROJECTS SUITABLE FOR EXTERNAL FINANCING

(In millions US\$)

|                            | Number<br>of<br>Projects | Total<br>Cost | Foreign<br>Exchange<br>Component | External Financing According to Anticipated Disbursement |       |         |         |         |         | External<br>Financing<br>As % of<br>Total Cost |      |
|----------------------------|--------------------------|---------------|----------------------------------|--|-------|---------|---------|---------|---------|--|------|
|                            |                          |               |                                  | Total  | 1972  | 1973    | 1974    | 1975    | 1976    | After<br>1975                                  |      |
| 1. Education               | 13                       | 539.2         | 70.0                             | 252.7  | -     | 46.5    | 70.7    | 72.4    | 40.6    | 22.5   | 46.9 |
| 2. Energy                  | 17                       | 5,155.0       | 894.0                            | 1,931.0  | 52.0  | 88.0    | 212.0   | 250.0   | 288.0   | 1,041.0  | 37.5 |
| 3. Transport               | 34                       | 4,416.0       | 795.0                            | 1,749.0  | 297.0 | 351.0   | 484.0   | 297.0   | 238.0   | 82.0   | 39.6 |
| 4. Telecommunications      | 13                       | 2,524.0       | 435.8                            | 1,093.3  | -     | 69.2    | 203.6   | 219.9   | 204.7   | 395.9  | 43.3 |
| 5. Water Supply and Sewage | 7                        | 549.1         | 76.3                             | 138.3  | -     | 35.2    | 41.4    | 48.2    | 8.5     | 5.0  | 25.2 |
| 6. Agriculture             | 19                       | 2,126.4       | 96.7                             | 950.2  | -     | 137.1   | 187.1   | 194.1   | 195.6   | 236.3  | 44.7 |
| 7. Export Corridors        | 36                       | 809.7         | n.a.                             | 486.7  | 30.0  | 180.0   | 126.8   | 59.5    | 70.0    | 20.4   | 60.1 |
| 8. Industry                | 57                       | 3,699.6       | 720.2                            | 1,395.2  | -     | 159.4   | 317.2   | 306.4   | 234.2   | 378.0  | 37.7 |
| 9. Miscellaneous           | 6                        | 153.0         | 35.5                             | 39.9   | -     | 14.5    | 14.5    | 10.9    | -       | -  | 26.1 |
| TOTAL                      | 202                      | 19,972.0      |                                  | 8,036.3  | 372.0 | 1,080.9 | 1,657.3 | 1,458.4 | 1,279.6 | 2,181.1  | 42.2 |



## INTRODUCTION

1. The list of 202 projects which appear to be suitable for external financing that is presented below was formulated on the basis of: (1) information provided by the Ministry of Planning (SUBIN); (2) the 1972-74 National Development Plan (PND); (3) information available in the World Bank and collected by various sector missions; (4) information obtained directly from executing agencies and State Governments. Projects which are included may be the object of direct investment outlays by public sector agencies, may receive financing from the public sector and thus be the object of indirect public sector investment or they may merely be sponsored by public sector entities.

2. However, the projects presented below do not represent the public sector investment program since they only represent projects considered as suitable for external financing. Moreover, the time span of those projects differs from sector to sector and many of them go well beyond 1974. Besides many delays in execution may occur modifying noticeably the actual composition of the public investment program. Also, in many cases the execution of the project or its priority may depend upon the results of ongoing and future studies and/or the availability of external assistance. Thus, no attempt should be made to reconcile precisely the project list with an aggregate projection of public sector investment.

3. By and large, external financing for the project, included in the list is expected to be committed during the 1972-74 period. To give some idea as to the probable timing the Brazilian source of information has been asked to classify the projects as follows:

Category a: Projects already under negotiation for external financing (including projects already signed in 1972).

Category b: Projects at an advanced stage of preparation such that presentation for external assistance can be expected in 1973.

Category c: Other projects.

4. Values are given in US dollars; the exchange rate applied is the one prevailing at the time of the project preparation; no provision has been made to reevaluate the cost of projects, which have been evaluated in the last few years. When the external financing requirement was not specified by the Brazilian source, it was computed arbitrarily as 40 percent of the total project cost. The foreign exchange component of the project has been evaluated by the Brazilian agencies; in some cases it includes the indirect foreign exchange component relative to domestically supplied goods and services.

5. The list presented below represents a total investment of US\$20 billion. The identified foreign exchange component reaches US\$3.1 billion -- however, it has not been evaluated for a number of projects -- the external assistance sought amounts to US\$8 billion. If all external assistance is forthcoming and is disbursed, as presently anticipated, such disbursements (presented in the summary table) will cover 67 percent of Brazil's requirements for gross medium and long term capital inflow during the period 1972-76 to achieve an 8.5 percent annual economic growth. The remainder of medium and long term capital would be forthcoming from loans already in the pipeline or loan to the private sector and/or direct investment for projects not included in that list.

## A. PROJECT DESCRIPTIONS

### 1. EDUCATION SECTOR

The Government's basic strategy in the field of education is to provide a qualified labor force able to meet the manpower requirement for economic growth. It is characterized by the campaign against illiteracy, the reform of the education system and the effort to develop and promote scientific research. Public sector expenditure for education has therefore been projected at an unprecedented level of 32,700 million cruzeiros over the period 1972-74 with a 1974 figure about 90 percent higher than in 1970.

The National Alphabetization Program (MOBRAL) aims at reducing the adult illiterates from about 8 million in 1970 to 2 million in 1974. This program addresses itself to the 15-35 year-old population.

The reform of the education system expands the first level of education from 4 to 8 years by combining in the same cycle, primary education and the first four years of secondary education. The target rates of scholarization have been fixed at respectively 95 percent and 80 percent for urban and rural communities. This would involve an increase of the student population from 16.3 million in 1970 to 22 million in 1974. This program is mainly the responsibility of municipalities and state governments who have to provide free education. The Federal Government participation only represents a small part of the total cost.

Secondary level education has also been affected by the reform. The new curriculum gives more emphasis to technical subjects to prepare more effectively students for professional life. It aims at providing qualified intermediate level labor force. The target is a doubling of the student population over the period 1970-74. State government and municipal budgets also are financing most of the cost of this program.

Higher education also is under reform. More emphasis is given to scientific and technical matters. To provide the appropriate teachers needed by the first and second degree education levels and the range of qualified technicians and professionals, short and long study cycles have been created. The target set in the national development plan is a 90 percent increase in student population between 1970 and 1974. The main part of the financial burden is supported by the federal budget.

Besides formal education the Government has set up an intensive professional training program for the present labor force. The objective is to train some 550,000 persons over 1972-74.

In addition, efforts are being made to promote and develop research activities through the installation of laboratories and post graduate centers.

The main part of the national development effort in education is financed by national resources, either federal or local. External assistance is only sought for a small part of it. Since they do not call for external financing, many interesting projects such as the National Book program, the "Ginasios Polivalentes", and the physical education program are not presented below.

### First Level Education

1.1 First Level Education in Jequitinhonha valley (Minas Gerais). The state of Minas Gerais seeks external assistance to support a project providing first level education facilities for 220,000 inhabitants of the Jequitinhonha valley (a remote area in the north of the state). The project consists in building 235,000 m<sup>2</sup> of classrooms and student orientation and testing laboratories, and purchasing furniture and equipment. Total project cost: US\$23 million. Foreign exchange component: undefined. External financing: US\$11 million. Probable commitment date: 1972 or early 1973. Estimated disbursement period: 1973-77.

1.2 National Program of Vocational Schools. Vocational education will be provided during the second half of the eight-year first level education cycle. This program is designed to:

- (a) provide intensive training courses for teachers of vocational education;
- (b) revise vocational education curricula;
- (c) establish experimental supplementary vocational education schools and materials; and
- (d) construct 276 new school buildings and renovate 30 existing installations.

Total cost: US\$46.7 million. Foreign exchange component: US\$2.3 million. External financing: US\$18.7 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

1.3 Minas Gerais TV Education Program. To install in Belo Horizonte a TV transmission center to broadcast educational programs over the 34 adjacent municipalities in a first stage, and to implement 36 receiving stations disseminated over the state in the second stage. This project aims at making the most efficient use of available teachers, at reducing the drop-out rate, mainly in the less developed areas and at disseminating basic education even in remote areas. It will also improve the efficiency of the education system by a more extensive use of audio-visual methods. Total project cost: US\$4.9 million. Foreign exchange component: US\$4.0 million. External financing: US\$4 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

1.4 Sao Paulo Teachers Training Program. This project aims at providing adequately trained teachers for the implementation of the reform of primary education in the state of Sao Paulo. It will provide training and upgrading to about 100,000 teachers during the period 1972-75. Total project cost: US\$15.0 million. Foreign exchange component: US\$0.5 million. External financing: US\$10 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

Second Level Education

1.5 Technical Education Facilities. This project considers construction, expansion, improvement, modernization and equipment of technical schools in the field of agriculture, industry and commerce over the national territory in order to improve the qualification of medium level technicians according to the requirement of economic development. Total cost: US\$63.8 million. Foreign exchange component: US\$8.7 million. External financing: US\$18.1 million. Possible lenders: IDB, Federal Republic of Germany. Probable commitment date: 1973. Estimated disbursement period: 1974-76.

Higher Education

1.6 University Campuses Phase I. This program is designed to construct university campuses for five priority universities in Rio Grande do Sul, Paraiba, Para, Minas Gerais and the federal district, chosen among the 32 universities supported by the federal budget. This program, considered to be essential to the higher education reform will include construction of classroom blocks, administrative buildings, laboratories as well as infrastructure work. The cost of the construction represents about 52 percent, the rest will represent equipment and scientific material. Total project cost: US\$67.5 million. Foreign exchange component: US\$8.5 million. External financing: US\$35 million. Probable commitment date: 1973. Estimated disbursement period: 1974-76.

1.7 University Campuses Phase II. Five other universities (Ceara, Maranhao, Goias, Rio Grande do Norte and Pernambuco) have been declared as second priority for construction of university campuses. Total project cost: US\$60 million. Foreign component: US\$15 million. External financing: US\$30 million. Probable commitment date: 1974. Estimated disbursement period: 1975-77.

1.8 Guanabara State University. Construction and procurement of equipment for the new State University of Rio. This includes construction of the campus facilities for 15,000 students and a bio-medical center. Total cost: US\$40 million. Foreign exchange component: to be determined. External financing: US\$20 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

1.9 Post-graduation Centers. This project aims to promote the systematic development of post-graduate education centers throughout the country. High level formation and training will be given to highly qualified personnel.

The project includes buildings' construction, purchasing of scientific and technical equipment as well as grants and fellowships to participants. Total cost: US\$64.3 million. Foreign exchange component: US\$7 million. External financing: US\$30 million. Possible lenders: USAID and IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

Science and Technology

1.10 Science and Technology Program Phase I. This program aims at developing technological and scientific research in Brazil. It consists of the construction and equipment of 15 laboratories. Total project cost: US\$60 million. Foreign exchange component: US\$9.0 million. External assistance: US\$30 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

1.11 Science and Technology Program Phase II. Further development and improvement of technological center and research laboratories in Brazil. Total cost: US\$30.0 million. Foreign exchange component: US\$5.0 million. External assistance: US\$15 million. Possible lenders: Suppliers' Credits from U.S.A., UK, France, Italy, Japan. Probable commitment date: 1974. Estimated disbursement period: 1974-76.

1.12 Minas Gerais Technological Center. The project consists of the construction and equipment of a center for technological research. This center will provide technical assistance to the industrial sector in the field of management and administration and disseminate the results of technological research. Total project cost: US\$14 million. Foreign exchange component: undefined. External financing: US\$5.9 million. Possible lenders: U.S.A., Germany, Italy. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

1.13 Sao Paulo Technological Program. The program aims at disseminating technological knowledge by modernizing the existing research centers of various universities, scientific institutes and commercial firms. This should involve mainly equipment purchase and construction of new facilities. Total project cost: US\$50 million. Foreign exchange component: US\$10 million. External financing: US\$25 million. Probable commitment date: 1973. Possible lenders: USAID, EXIMBANK. Estimated disbursement period: 1973-75.

## 2. ENERGY SECTOR

In Brazil, the Ministry of Mines and Energy has jurisdiction over all matters concerning energy delegating supervisory authority in this respect to various agencies. While the power sub-sector is regulated by the National Department of the Ministry of Mines and Energy (DNAEE), coal comes under the authority of the National Coal Council (CNC). For the oil and gas sub-sector the National Petroleum Council (CNP) is the supervisory body. Here, the federal government has a monopoly in oil drilling, transportation and refining which it carries out through PETROBRAS, a corporation of which it is the major shareholder. Nuclear energy is subordinated to the National Commission for Nuclear Energy (NEC). Contrary to power investments, investments in the oil, gas and nuclear sub-sectors are not completely covered by the following list of projects for various reasons including: lack of information, scarcity of projects and/or inappropriateness of external financing.

Investments in the power sub-sector are programmed and coordinated by ELETROBRAS, a mixed federal enterprise to which most of Brazil's generating and distributing enterprises are affiliated. The expected total investments, including generation, transmission and distribution, over the period 1971-75 amount to US\$5700 million as compared to US\$3300 million over the period 1966-70. The projected 12 percent rate of generating capacity growth roughly parallels the growth rate of electricity consumption. The foreign exchange component, estimated at 20 percent of the total investment figure will be matched over the five-year period by an approximately equal amount of external financing. Two-thirds of this financing, or US\$790 million are already committed.

The projects included in this program, totalling US\$5155 million, are those intended to meet the demands for power up to the end of the present decade. Although they conform with present ELETROBRAS planning they should be regarded as tentative in the sense that a study of the power market and required investment in the Southeast is presently being carried out by ELETROBRAS.

Noteworthy is the fact that most generation projects concern hydro rather than thermal plants. This reflects Brazil's natural endowment of low cost hydroelectric potential, abundantly available throughout the country and occurring alongside extreme scarcity of fossil fuels.

### Power: Hydroelectric generation and transmission

2.01 Itauba Hydro Plant (South). The concession for development of this 400 MW plant, to be located on the Jacui River in Rio Grande do Sul has been granted to Companhia Estadual de Energia Eletrica (CEEE). The plant will mainly serve the state of Rio Grande do Sul. Total cost: US\$130 million. Direct foreign procurement: US\$20 million. External financing: US\$50 million. Probable commitment date: 1973. Estimated disbursement period: 1974-78.

2.02 Itumbiara Hydroelectric Project (Southeast). This is a major storage development on the Paranaiba River for development of which the concession has been granted to Furnas Centrais Eletricas, S.A. (FURNAS). The plant will have an installed 2,080 MW (8 x 260 MW) generation capacity and the scheme would afford additional firm potential, through its water releases, to downstream power stations of CELG, CEMIG and CESP. It would thus meet demands of the Southeast region and its adjoining areas after 1978. An economic feasibility study has been completed. Engineering studies are in progress. The total cost, including transmission lines, has been estimated at US\$550 million and the external financing required is US\$224 million. Foreign exchange component: US\$235 million. Probable commitment date: 1973. Estimated disbursement period: 1973-81.

2.03 Agua Vermelha Hydroelectric Project (Southeast). The Agua Vermelha plant, with a planned capacity of 1,380 MW (6 x 230 MW), will be located in the lower course of the Rio Grande some 550 km from the Sao Paulo metropolitan area. The project will supply the Southeast power market from 1979. Total cost, including transmission lines, estimated at: US\$400 million. External financing: US\$165 million. Foreign exchange component: US\$165 million. Probable commitment date: 1973. Estimated disbursement period: 1974-81. Executing agency: Centrais Eletricas de Sao Paulo (CESP).

2.04 Santiago Hydroelectric Project (South). This is a storage project upstream of the Salto Osorio project, which is currently under construction. It comprises a dam and a 712 MW (4 x 178 MW) power station on the Iguacu River in the state of Parana and associated transmission facilities. A concession for development of the site has been recently granted to Centrais Eletricas do Sul do S.A. (ELETROSUL). The project would help meet the power demand in the southern region from 1980. Total estimated cost: US\$190 million. External financing: US\$70 million. Probable commitment date: 1974. Estimated disbursement period 1974-79.

2.05 Moxoto Hydroelectric Plant (Northeast). This new plant will have an initial capacity of 400 MW (4 x 100 MW) and will be located upstream from the existing Paulo Afonso plant on the Sao Francisco River. It will provide better regulation of the stream at Paulo Afonso. In conjunction with the Stage IV Paulo Afonso project (2.06) and the Sobradinho dam project to augment storage capacity for hydroplants on the Sao Francisco River (2.7), the Moxoto project will be essential for meeting Northeast region power demand by 1977. Power demand in this region is currently increasing at a fast rate. Economic feasibility studies have been completed and the consultant (SOFRELEC) is assisting with the engineering studies for the project. Inter-American Development Bank financing is envisaged. The total cost has been estimated at US\$202 million and external financing required is US\$60 million. Probable commitment date: 1972. Estimated disbursement period: 1973-76. The executing agency would be Companhia Hidro Eletrica do Sao Francisco (CHESF).

2.06 Paulo Afonso (IV) Hydroelectric Project (Northeast). This fourth stage of the Paulo Afonso hydroelectric complex consists of expansion of

the underground generation plant by 1,860 MW (6 x 310 MW) using the storage capacity of Sobradinho dam (2.07). This project is to be commissioned during 1976-1980. The economic feasibility study has been completed and CHESF is engaged in detailed engineering studies with the assistance of SOFRELEC. IBRD financing for the project is being considered. The estimated cost is US\$274 million for power generation alone and the external financing required is US\$70 million. Probable commitment date: 1973. Estimated disbursement period: 1974-80. The executing agency would be Companhia Hidro Eletrica do Sao Francisco (CHESF).

2.07 Sobradinho Dam (Northeast). This storage project on the Sao Francisco River will support both the existing Paulo Afonso complex and enable its fourth stage expansion. Inter-American Development Bank financing is envisaged. Total cost: US\$215 million. External financing: US\$70 million. Probable commitment date: 1973. Estimated disbursement period: 1973-78. Executing agency: Companhia Hidro Eletrica do Sao Francisco (CHESF).

2.08 Sete Quedas Hydroelectric Project. At the end of 1971, installed power generation capacity in Brazil was 12.6 million kw. Brazil's power market is expected to grow by 12 percent annually during the 1970s. About 85-90 percent of this would be in the Southeast and South regions. Schemes under construction and planning described above would meet requirements until 1980. ELETROBRAS has under study alternatives for energy development to meet the requirements of the 1980s. One alternative would be a series of thermal plants including thermo-nuclear facilities. Another alternative is the international development, with Paraguay, of the hydroelectric potential of the Parana River at the Sete Quedas falls. Here the river flows through a narrow canyon falling 100 m from the falls to Porto Mendes and a further 20 m from Porto Mendes to Foz do Iguacu. The generation potential in these stretches is around 6,500 MW at 100% load factor and could be utilized in South and Southeast Brazil within 4-5 years of commencement of operation. The economic feasibility of the Sete Quedas project in relation to all available alternatives is under study by Brazil and Paraguay. Considering the long lead time required by this project, financing would have to be committed by 1974 in order to meet the energy requirements of the early 1980s. Preliminary estimates indicate that the first stage investment cost would be about US\$2000 million. Promoting agencies: Centrais Eletricas Brasileira S.A. ELETROBRAS (BRAZIL) and Administracion Nacional de Electricidad - ANDE (PARAGUAY).

2.09 Couto de Magalhaes Hydro Plant. This 180 MW plant is to be located on the Araguaia River on the boundaries of Mato Grosso and Goias states. This project will serve Mato Grosso (mainly the Cuiaba area) and part of Goias. Total cost: US\$55 million. Foreign exchange component: US\$14 million. Probable commitment date: 1973-74. Estimated disbursement period: 1973-74 to 1979. Executing agency: unidentified.

2.10 Ilha Solteira transmission lines. The Ilha Solteira hydro plant is presently under construction in the Sao Paulo area. The second phase would include installing 460 kw transmission lines and constructing a series of substations with all the required equipment. Total cost: US\$160 million. External financing: US\$70 million, possibly from Inter-American Development Bank. Possible commitment date: 1973. Estimated disbursement period: 1974-76. Executing agency: Centrais Eletricas de Sao Paulo (CESP).

Power: Thermal generation

2.11 Sao Paulo Steam Plant (Southeast). This project, with a capacity of 600 MW, was considered as a possible means of providing additional power in the Sao Paulo area during 1974-75 prior to the completion of the 3,200 MW Ilha Solteira hydro plant which is scheduled for commissioning in 1974. The estimated cost is US\$110 million and the external financing required is US\$62 million. The scheme has not yet been authorized for construction. The need for this interim solution will be reviewed by ELETROBRAS in the context of preparation of an updated development plan for the Southeast region, by the end of December 1972.

2.12 Belo Horizonte Thermal Plant (Southeast). This scheme of installing a 360 MW thermal station at Belo Horizonte which was not included in the CANAMBRA energy plan, was proposed by Centrais Eletricas de Minas Gerais, S.A. (CEMIG) to meet interim shortages in Minas Gerais during 1976-77. This plant will use the waste gases of a PETROBRAS refinery and meet the power demand in these critical years. The estimated cost is US\$65 million and the external financing required is US\$45 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

2.13 Floating Gas Turbine Units for Power Emergencies (Northeast). This project is designed to meet emergency requirements for power in the Northeast and possibly Belem. Two non-self-propelled barges will be equipped with 130 MW of gas turbine generating capacity and stationed alternatively at the Bahia industrial center (Aratu), Recife, Fortaleza or Belem as requirements dictate. Feasibility studies are being undertaken by ELETROBRAS with the consulting assistance of EBASCO Services, Inc. Eximbank financing is envisaged. Total cost: US\$37.5 million. External financing: US\$30 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74. Executing agency: Centrais Eletricas Brasileiras, S.A. (ELETROBRAS).

2.14 Tapana - Belem Thermal Project (North). This 100 MW (2 x 50 MW) oil-fired steam turbine project will meet Belem area demand when obsolete diesel units are removed. The demand for power around Belem has been increasing at a 26.6 percent annual pace and modernization of the existing generating facilities is overdue. Total cost: US\$51 million. External financing: US\$25 million. Possible lender: KFW. Probable commitment date: 1972. Estimated disbursement period: 1973-77. Executing agencies: Centrais Eletricas do Para, S.A. (CELPA) and ELETROBRAS.

2.15 Manaus Thermal Project (North). Energy consumption in Manaus is expanding by 19.9 percent annually. 100 MW (2 x 50 MW) in oil-fired steam turbine generating capacity will be added by this project to the Manaus diesel generation system. Feasibility studies are nearing completion. Total cost: US\$20 million. External financing: US\$15 million, possibly from Eximbank. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agencies: Companhia de Eletricidade de Manaus (CEM) and ELETROBRAS.

Power: Distribution

2.16 Transmission and Distribution Project of Light, S.A. (Sao Paulo and Rio de Janeiro Metropolitan areas). This five-year project is designed to meet anticipated growth in the load carried by the transmission and distribution system of Light - Servicos de Eletricidade, S.A., which serves the Rio and Sao Paulo metropolitan areas. As of end-1971, Light had 3,265,000 connected customers in a service area of 16,400,000 total population. Projections indicate that by end-1976 the number of customers will be 4,400,000. Peak load is expected to grow from 2,950 MW in 1971 to approximately 6,000 MW in 1976.

In order to meet this load growth and to serve existing and new consumers in a satisfactory manner, it is estimated that it will be necessary to add to the company's electric system:

- 384 circuit km of 345/230 kv transmission;
- 253 circuit km of 132 kv transmission;
- 391 circuit km of 88 kv transmission;
- 3,280 MVA of 345/230 - 345/132 - 230/88 kv transformation;
- 1,723 MVA of 132-25/13.2/6 kv transformation;
- 2,026 MVA of 88-33/20/13.2 kv transformation;
- 2,812 MVA of overhead and underground distribution transformers.

A feasibility study is available. Financing is sought from both bilateral and multilateral sources. Total cost: US\$654 million. Foreign exchange component: US\$47 million. External financing: US\$152 million. Possible lenders: IBRD, Brascan International, Suppliers, Canadian Government. Probable commitment date: 1972. Estimated disbursement period: 1972-76. Executing agency: Light - Servicos de Eletricidade, S.A.

Gas

2.17 City Gas: SINGAS. A US\$2 million study has been commissioned jointly by the Planning Ministry (IPEA), the National Petroleum Council

(CNP) and the National Petroleum Company (PETROBRAS) to study the feasibility of increasing the provision of Brazil's main cities with combustible gas. It is expected that studies will be completed in 1974 and that the engineering design and construction of a first project could start in 1975 and be completed in 1979. Investments would cover design, procurement and installation costs of the generation unit, auxiliary units, distribution network and storage systems. Total cost: US\$41 million. Foreign exchange component: unidentified. External financing: US\$9 million. Estimated commitment date: 1975. Estimated disbursement period: 1975-79. Executing agency: undefined.

### 3. TRANSPORTATION SECTOR

Most of Brazil's important transport investments are under the responsibility of the Ministry of Transport which approves and coordinates the investment plans formulated by the various modal executing agencies under it. In October 1965, to assist it in formulating transport master plans, the Ministry established an Executive Group for Transport Policy Integration (GEIPOT) which was initially responsible for conducting the Brazil Transport Survey; upon completion of the studies, the group was transformed into a permanent advisory agency.

According to the National Development Plan (PND), approximately US\$3500 million will be invested in the transportation sector during the 1972-76 period by the Federal Government and US\$2200 million by the states and municipalities. While the overall objective in this sector remains one of minimizing transport costs, the emphasis is now on increasing the efficiency of the whole transport system through a better integration and a modernization of its components.

Many of the projects listed below were actually identified and recommended by the Transport Survey, and they have a sound economic justification. Other high priority projects in areas that were not covered by the Survey, such as urban and rural transportation and aviation are also included. Finally, this list presents a few projects with an uncertain economic justification; included are both very advanced projects for which funds have already been committed or future projects which have not yet been studied. The total cost of all projects amounts to US\$4416 million.

Transport projects directly related to the Export Corridors Program as formulated by the Central Bank working group have been listed under a separate heading (Ch. 7) and, therefore, do not appear below.

#### Highways

In the highway subsector, the principal executing agency is the National Highway Department (DNER) which coordinates the work of the State Highway Departments (DERs). It is estimated that DNER will spend on average US\$260 million per year during the three-year period 1972-74 for constructing and paving the federal network; the DERs will spend about US\$300 million per year on their state networks. In most cases, selection of either federal or state roads is based on the recommendations of the Transport Survey and of the updated Master Highway Plan. The third and fourth, fifth and sixth Highway Programs listed below include highways that were so selected and which are or may be eligible for a World Bank loan. The cost of a given program generally includes the cost of detailed engineering studies for highways to be built in the succeeding one and that of feasibility studies for highways to be built in the program following the succeeding one. Some state highways presented by the state of Sao Paulo are also listed -- although they are not in DNER's investment plan -- because of the state's large degree of financial autonomy.

The rural roads program sponsored and partly financed by the National Economic Development Bank (BNDE) deserves a special mention as it is a forerunner in a field much neglected thus far.

Road accesses to large cities are presented separately in the urban transportation subsector because of their more complex environment.

3.1     Feeder Road Program. This is the first important project of feeder road construction in Brazil. It covers construction and/or improvement of about 7,500 km of municipal and state roads with high agricultural benefits in the Northeast and Center-West part of the country. All roads to be built in a given state will be selected by the National Economic Development Bank (BNDE) according to economic priority, among a list provided by the State Highway Departments (DER) or a Special State Agency (Consorcio Rodoviario). Total cost: US\$85 million. Foreign exchange component: undefined. External financing: US\$25 million (USAID). Commitment date: 1972. Estimated disbursement period: 1972-74. Sponsor and coordinator: BNDE. Executing agencies: DERs and Consorcios Rodoviarios.

3.2     Ubatuba-Cubatao (BR 101). This is the 220 km easternmost section of the coastal highway linking Sao Paulo to Rio de Janeiro. This road, which also provides an alternative to the existing route along BR 116, will primarily serve the development of tourism activities along the coast. Total cost: US\$110 million. Foreign exchange component: US\$15 million. External financing: US\$54 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Departamento Nacional de Estradas de Rodagem (DNER).

3.3     Third and Fourth DNER Highway Programs. These projects consist of constructing and paving a total of 2,530 km of highways in 13 states. They also include consulting services for economic feasibility and engineering studies, and the formation of DNER's new training center. Total cost: US\$350 million. Foreign exchange component: US\$41 million. External financing: US\$140 million (IBRD). Commitment date: 1972. Disbursement period: 1972-75. Executing agency: DNER.

3.4     Fifth DNER Highways Program. This program calls for construction and/or improvement and/or pavement of some 1,630 km of roads as well as feasibility and engineering studies. Total cost: US\$260 million. Foreign exchange component: US\$35 million. External financing: US\$104 million. Possible lender: IBRD. Probable commitment date: 1973. Estimated disbursement period: 1973-77. Executing agency: DNER.

3.5     Sixth DNER Highways Program. This program calls for the construction and/or improvement and/or pavement of some 2,600 km of roads as well as feasibility and engineering studies. Total cost: US\$280 million. Foreign exchange component: US\$38 million. External financing: US\$112 million. Possible lender: IBRD. Probable commitment date: 1974. Estimated disbursement period: 1975-78. Executing agency: DNER.

3.6 Maringa-Rolandia Direct Highway Link. The project consists of constructing and paving a 60 km highway section between the two growing cities of Maringa and Rolandia (Parana), reducing the present distance by 45 percent. It will also divert part of the heavy traffic (15,000 vehicles per day) on the existing sections around Apucarana. Total cost: US\$10 million. External financing: US\$4 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74. Executing agency: DNER and DER-Parana.

Sao Paulo State Highways

3.7 Sao Paulo - Campinas. This is a 90 km long section of the North Expressway, linking Sao Paulo to one of its fastest growing satellites. It is also a section of the export route for the agricultural produce of the Sao Paulo and Mato Grosso hinterland. Total cost: US\$89 million. Foreign exchange component: US\$5 million. External financing: US\$25 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

3.8 Sao Paulo-Santos Expressway (Immigrants Tollway). An existing highway (Via Anchieta) is inadequate for the rapidly growing flow of traffic between the Sao Paulo industrial metropolis and Santos, the country's premiere port under expansion. This project has been designated to supplement the existing highway. A highway development company (DERSA) is executing it and will be responsible for the operation of the tollway.

Construction has already started; by 1974 the first lanes of the roadway will be constructed and by 1979 the project will be completed. Total cost: US\$350 million. Foreign exchange component: US\$10 million. External financing: US\$115 million out of which US\$65 million had already been committed in 1972 or before (commercial banks). Probable commitment and disbursement date for the remaining US\$50 million: 1974.

3.9 Sao Paulo-Mogi das Cruzes Expressway. This 35 km highway will connect the Sao Paulo Beltway with the eastern industrial region of the greater Sao Paulo metropolitan area. This road, which also carries agricultural goods to Sao Paulo, will eventually be extended to the industrial port of Sao Sebastiao. Final engineering studies are underway. Total cost: US\$45 million. Foreign exchange component: unidentified. External financing: US\$25 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

3.10 Mogi das Cruzes-Salesopolis. Together with 3.9 above this will constitute one of the three segments of the connection between Sao Paulo and the port of Sao Sebastiao. Total cost: US\$14 million. External financing: US\$5 million. Commitment date: 1974. Estimated disbursement period: 1974-77.

3.11 Western Highways. These are two North-South roads totalling 460 km and linking transversally several spokes of Sao Paulo state's radial highway grid. Total cost: US\$42 million. Foreign exchange component: unidentified. External financing: US\$13 million. Commitment date: 1974.

Disbursement period: 1974-77. All these projects will be executed by the Sao Paulo State Highway Department.

#### Railways

The two major railway executing agencies, the Federal Railway Network (RFFSA) and the Sao Paulo State Railways (FEPASA), are both in the process of formulating their detailed investment plans aiming at financial viability in four to five years. Although these programs are yet not finalized, they are listed here in their preliminary form with their major expenditure items, including a lumped investment figure for new lines or variants construction. Certain items are likely to be revised, in particular the amount for new line and variant construction in view of the Export Corridor Program which was formulated separately and does not appear below. There is therefore no line-by-line breakdown since priorities among them are not yet fully ascertained.

#### RFFSA Investment Program

3.12 RFFSA has prepared with the help of consultants a preliminary five-year investment program covering the period 1972-76, which could enable RFFSA to eliminate its operating deficit. This program calls for a total expenditure of about US\$1000 million equivalent, of which the foreign exchange component would be about US\$250 million. It would include:

- a) Infrastructure and track renewal: Total cost: US\$120 million. Foreign exchange component: US\$12 million.
- b) Shops, equipment and materials for track maintenance: Total cost: US\$31 million. Foreign exchange component: US\$13 million.
- c) Fixed installations: stations, traction, signalling and telecommunications. Total cost: US\$28 million. Foreign exchange component: US\$5 million.
- d) Variants and new lines: Total cost: US\$92 million. Foreign exchange component: US\$3 million.
- e) Rolling stock renewal and procurement: Total cost: US\$508 million. Foreign exchange component: US\$171 million.
- f) Shops, equipment and spare parts for rolling stock maintenance Total cost: US\$24 million. Foreign exchange component: US\$9 million.
- g) Technical assistance: Total cost: US\$5 million. Foreign exchange component: US\$4 million.

It is estimated that, to implement such a program, the external financing needed is US\$360 million for the five-year period of 1972-76.

3.13 FEPASA Investment Program. At the request of the Sao Paulo State, FEPASA has prepared a three-year emergency investment plan aimed at reducing its operating deficit by rationalizing and improving the operations of the recently merged railway companies. FEPASA has also appointed consultants to prepare a five-year investment plan aiming at financial viability for FEPASA by 1976. This plan is not yet finalized and the reference here is to the three-year one. Total investment cost for the three-year period 1973-75 amounts to US\$160 million, of which the foreign exchange component is estimated at US\$34 million:

- a) US\$7 million for track rehabilitation.
- b) US\$42 million for procurement and renewal of rolling stock.
- c) US\$68 million for construction of spurs, variants and the conclusion of works underway.
- d) US\$31 million for the improvement of suburban services.

#### Ports

The port subsector will not have a comprehensive investment program until after an overall port study is completed in about one year's time. In the meantime, investments are being made in the bigger ports in order to meet the overall traffic increases. The National Department of Ports and Navigable Waterways (DNPVN) is both the planning and the executing agency. Projects directly related to the Export Corridors Program in Rio Grande, Parana, Santos and Vitoria are listed in a separate section (Ch.7). Total investments for the three-year period 1972-74 are expected to average US\$100 million annually.

3.14 Purchase of Cranes. The project consists of the purchase of six floating cranes for the ports of Manaus, Belem, Recife, Santos, Paranagua and Rio Grande. The total cost is US\$12 million and suppliers' credits, for a corresponding amount, are being negotiated with Germany and Hungary. Estimated disbursement period: 1973-75. Executing agency: Departamento Nacional de Portos e Vias Navegaveis (DNPVN).

3.15 A Wheat Silo for the Port of Santos. The existing capacity for wheat storage is to be increased by 20,000 tons. This requires the extension of the existing right bank wheat silo and/or the building of a new one. Total cost: US\$14 million. Foreign exchange component: US\$1 million. External financing: US\$10 million. (Probably from a line of credit as part of the wheat agreement with Canada). Probable commitment date: 1973. Estimated disbursement period: 1973-74. Executing agency: DNPVN.

3.16 Port of Recife. This project for reconstructing and expanding the existing facilities consists of the construction of a new quay wall, a petroleum terminal, warehouses with all the necessary infrastructure and the purchase of handling equipment. Total cost: US\$26 million. Foreign

exchange component: undefined. External financing: US\$10 million. Probable commitment date: 1973. Possible lender: IBRD. Estimated disbursement: 1973-76. Executing agency: DNPVN and the Recife Port Authority.

3.17 Port of Manaus. This port needs expansion in order to meet the growth of imports into the Manaus free trade zone. A feasibility study of the project was completed in 1970 but needs to be updated. The project comprises construction of a floating berth and sheds and the installation of handling equipment. Total cost: US\$8 million. External financing: US\$4 million. Probable commitment date: 1974. Estimated disbursement period: 1975-76. Executing agency: DNPVN and SUFRAMA (Manaus Free Trade Zone Superintendency).

3.18 The Port of Santa Cruz. This project presented by the State of Guanabara, consists of pier construction and equipment plus the dredging of a 20 km channel from the MBR iron ore terminal to Santa Cruz in Sepetiba Bay. Port depth would be 18 meters. This represents but one possible alternative to further developing the port of Rio which cannot be dredged deeper than 12 meters and suffers from lack of space on shore. Other alternatives would be to expand the existing port installing at Angra dos Reis or the iron ore terminal. Final decision should await the result of the 1973 port study. Total cost: US\$30 million. Foreign exchange component: unidentified. External financing: US\$12 million. Probable commitment date: 1973. Disbursement period: 1973-75.

3.19 The Ports of Rio Grande, Paranagua, Santos and Vitoria. Projects for improving the handling, storing and loading of grain are listed in Ch.7 (Export Corridors Program).

#### Shipping

The National Merchant Marine Superintendency (SUNAMAM) promotes investment in shipping. Projects listed below are for modernizing the fleet used in inland waterway systems with a view to turn these into more effective carriers of agricultural products. Clearly, these projects do not reflect the total investment program of SUNAMAM -- estimated at US\$200 million annually for the three-year period 1972-74 -- which aims at expanding and modernizing the Brazilian ocean-going and coastwise merchant fleet. Shipbuilding projects are not included here because they are locally financed and/or external financing has already been provided.

3.20 Naval Repair, Empresa de Reparos Navais Costeira, S.A.. This project will make "Costeira, S.A." the largest ship repair yard of the Southern Hemisphere. The engineering studies for the rehabilitation and extension of the existing installations are underway. Total cost: US\$39 million. Foreign exchange component and external financing: US\$15 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74. Executing agency: Costeira, S.A.

3.21 River Transport, Companhia de Navegacao do Sao Francisco (CNSF). This company has its headquarters in Pirapora, Minas Gerais, and its shipping lines cover the Sao Francisco Basin. On the basis of studies undertaken by GEIPOT, SUNAMAM has recommended the acquisition of tugboats and flatboats to form systems of integrated convoys. Better river transport facilities for low value agricultural goods could enhance the development of the Sao Francisco area for which the Government has designed the PROVALE special program (see Ch.6; in this program, funds are provided to improve the conditions of river navigation on the Sao Francisco River). Total cost: US\$7.6 million. External financing: US\$3.6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74. Executing agency: CNSF.

3.22 River Transport, Servicio de Navegacao da Bacia do Prata (SNBP). This company has its headquarters in Corumba, Mato Grosso, and its shipping lines cover the Prata Basin. The project contemplates renovation of the equipment to carry agricultural products from northern Mato Grosso to markets in the South. The acquisition of tugboats and flatboats has been recommended. Total cost: US\$6 million. External financing: US\$3 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: SNBP.

3.23 River Transport in the Amazon Region. The highway system now under construction will provide a land access to regions that were not accessible before or only accessible by river transport. Development in these areas will increase the transport needs for low value bulk commodities. To provide a better integration of the land and river transports, SUNAMAM recommends the enlargement and modernization of the river fleet. This project consists of acquiring 3 tugboats and 26 flatboats. Total cost: US\$4 million. External financing: US\$2 million. Probable commitment date: 1974. Estimated disbursement period: 1975-76. Executing agency: SUNAMAM .

#### Airport

All investments in airport and aircraft are under the responsibility of the Ministry of Aviation. Constructing or extending international airports in Rio de Janeiro and Sao Paulo now have high priority and require much external assistance.

3.24 Galeao Airport Extension. The Galeao Airport in Rio de Janeiro is to be the principal international airport in Brazil. The project consists in its first phase of building a new runway as well as new passenger and freight terminals so that the airport will be able to handle jumbo jets and, later on, supersonic aircraft. Total cost: US\$171 million. Foreign exchange component: US\$25 million. External financing: US\$95 million. (Eximbank and German commercial bank.) Probable commitment date: 1972. Disbursement period: 1972-74. (US\$20 million was already disbursed before 1972.) Executing agency: Ministry of Aviation.

3.25      DACTA Traffic Control System. This project is to provide modern traffic control systems in the triangle Sao Paulo, Rio de Janeiro and Brasilia. It includes the installation of a radar network to cover the area and the purchase of the corresponding equipment. Total cost: US\$72 million. Foreign exchange component: US\$55 million. External financing: US\$72 million (French suppliers' credit and loan). Commitment date: 1972. Estimated disbursement period: 1973-76. Executing agency: Ministry of Aviation.

3.26      Cumbica Airport; Sao Paulo. The fast growing needs for international transport in the state of Sao Paulo will no longer be met by the existing airport located 80 km from the center of the capital city. The alternative is either to expand the existing facilities and at the same time improve the land connection between the city and the airport or to build a new airport some 20 km from downtown Sao Paulo at the site of an existing military airport (Cumbica). This project corresponds to the second alternative and covers a first construction stage. Total cost: US\$60 million. Foreign exchange component: US\$8 million. External financing: US\$30 million. Probable commitment date: 1974. Estimated disbursement period: 1974-76. Executing agency: Ministry of Aviation.

3.27      Manaus International Airport. This project is to enable the existing Manaus airport to handle international traffic. The project includes the construction of a new runway and passenger terminal, and the installation of the required air control system. Total cost: US\$60 million. Foreign exchange component: US\$15 million. External financing: US\$25 million. Probable commitment date: 1972. Disbursement period: 1972-74. Executing agency: Ministry of Aviation.

#### Urban Transport

Urban transportation problems are becoming increasingly important in Brazil's big cities and deserve special treatment. Studies have been done or are in progress in Sao Paulo, Rio de Janeiro, Recife, Curitiba, Salvador and Belo Horizonte and some specific projects, such as the Rio de Janeiro and Sao Paulo subways, are already underway. However, in most cases, there is still a lack of institutions with the ability and the responsibility to tackle this problem in all its aspects and, thus, serve as effective channels for external aid.

#### Urban Development

##### Rio de Janeiro

3.28      Rio d'Ouro Highway (Linha Verde). This road would provide a 15' km link between Tijuca in the Central City and the perimetral highway. This link would provide a much needed alternative to the grossly overburdened Avenida Brazil. Total cost: US\$30 million. Foreign exchange component: unidentified. External financing: US\$15 million. Disbursement period: 1973-74. Executing agency: Guanabara State.

3.29 Northern Access to Rio de Janeiro (BR 153). This 30 km long section of the Rio - Belo Horizonte highway would be upgraded from 4-lane to 6-lane to accommodate very heavy suburban traffic. Economic feasibility studies have been done and detailed engineering studies are underway. Total cost: US\$45 million. Foreign exchange component: US\$7 million. External financing: US\$18 million. Disbursement period: 1974-77. Executing agency: DNER.

3.30 Subway. The subway system will eventually comprise 64 km. A first section from Tijuca to Ipanema along the coast will be 20 km long and have 22 stations. This project comprises the expropriation, construction and equipment required to operate the subway on the 9 km subsection Botafogo - Estacao de Sa. Total cost: US\$160 million. Foreign exchange component: US\$25 million. External financing: US\$65 million. Probable commitment date: 1972. Estimated disbursement period: 1972-75. Executing agency: Companhia Metropolitana do Rio de Janeiro.

Sao Paulo

3.31 Sao Paulo Beltway. This project calls for the construction of a 68.5 km long circumferential highway around the city of Sao Paulo. The first stage of the project includes several sections in the South. Detailed engineering is underway. Total cost: US\$180 million. Foreign exchange component: US\$8 million. External financing: US\$60 million. Probable commitment date: 1973. Estimated disbursement date: 1973-76. Executing agency: Sao Paulo State Highway Department.

3.32 Subway. In order to cope with the increasing problem of traffic congestion in the city of Sao Paulo, the construction of a subway system has been initiated. The total system as presently envisaged could encompass 67 km and would require a 10-year construction period. As of now the first 8 km of the 18 km long North-South line have been completed. Test runs are underway on part of this line which is scheduled for completion by 1974. Total cost of this first line: US\$500 million with a cost to-date estimated at US\$300 million. The total amount of external assistance needed amounts to US\$160-170 million of which US\$110 million have already been committed (Eximbank and commercial banks). Disbursement period: 1972-74. Executing agency: City of Sao Paulo.

Curitiba

3.33 Integrated Transport System. Since 1965, on the request of the City Council, the Research and Planning Institute of Curitiba has conducted studies to define an integrated urban transport system. This system which is being implemented principally consists of (a) a three-way corridor with the central way for slow traffic and two lateral ways for fast traffic; (b) a rapid bus transit system using a special corridor lane; and (c) passenger and freight terminals. Total cost: US\$21 million. Foreign exchange component: unidentified. External financing: US\$13 million. Estimated disbursement period: 1973-76. Executing agency: Prefeitura Municipal de Curitiba.

Belo Horizonte

3.34      Vale dos Arrudas Urban Corridor. This project would take advantage of an existing river which flows across the city from east to west. Once canalized and covered up, the river bed could be used to locate new sewerage and mass transport facilities along a 20 km long urban corridor. This would considerably improve transport in one of Brazil's fast growing cities. Feasibility studies are to be completed in September 1973. Total cost: US\$175 million. Foreign exchange component: US\$30 million. External financing: US\$108 million. Possible lender: IDB. Probable commitment date: 1974. Estimated disbursement period: 1974-77. Executing agency: Superintendencia do Desenvolvimento da Capital (SUDECAP).

#### 4. TELECOMMUNICATIONS

The lack of adequate telecommunication network has been a limiting factor for Brazil's economic development. At present the average telephone density is extremely low: 2.1 per hundred inhabitants. The Government is determined to remove this constraint. A mixed enterprise (TELEBRAS) has been created with responsibility for the reorganization of the telecommunication services. This will entail progressive disappearance and absorption by state telephone companies of some 800 private companies scattered over the territory. Their uneconomic size and obsolete equipment makes them unable to meet present and future requirements. The National Development Plan contemplates for the period 1972-74 an overall telecommunications investment of US\$600 million. Sector rationalization, combined with tariff increases and federal funds, will finance this program for integrating and expanding the present telecommunication network for both internal and international communications. This will be achieved by developing the telephone and telex network, implementing a microwave system and reorganizing the postal services. Although included in this program, implementation of most of the projects listed below will extend beyond 1974.

4.1 EMBRATEL Telecommunications System Extension (Phase II). This project contemplates the second phase of the extension of the basic telecommunication network to satisfy the demand forecasted for 1980. The capacity of all communications trunks (in sight, tropodiffusion and shortwaves) will be increased by expanding transmission and switchboard equipment. Economic feasibility and engineering studies are underway. Implementation will start in 1974. Total project cost: US\$215 million. Foreign exchange component: US\$42.3 million. External financing: US\$42.3 million. Probable commitment date: 1974. Estimated disbursement period: 1975-77. Executing agency: EMBRATEL.

4.2 National Telegraphic Network. The existing telegraphic network will be expanded and modernized to serve about 2,400 cities all over Brazil. This includes modernization of transmitting and receiving stations in order to integrate the radiotelegraphic network with the shortwave radio telephonic network. Economic feasibility and engineering studies have been completed in 1972. Total project cost: US\$18.4 million. Foreign exchange component and external financing: US\$16.6 million. Probable commitment date: 1973. Possible lender: Suppliers' credit from Holland, France, USA, or Germany. Estimated disbursement period: 1973-77. Executing agency: EMBRATEL.

4.3 Brazil/Caribbean Submarine Cable. The project envisages installing a 640-channel submarine cable between Brazil and the Caribbean to create an alternative communication channel with the United States presently reached by satellite only. Economic feasibility and engineering studies are underway and will be completed by the end of 1972. Total project cost: US\$15 million. Foreign exchange component: US\$14 million. External financing: US\$14 million. Probable commitment date: 1973. Estimated disbursement period: 1974-77. Executing agency: EMBRATEL.

4.4     Alternative Communication Channels. The project aims at implementing various microwave links connected to the national basic telecommunication grid. This will alleviate some of the already overburdened centers and meet requirements forecasted for the period 1975-80. It will also improve the reliability of the overall system by providing alternative communication channels in case of disruption. Engineering studies are underway. Total project cost: US\$53.4 million. Foreign exchange component: US\$11.7 million. External financing: US\$11.7 million. Probable commitment date: 1973. Estimated disbursement period: 1974-77.

4.5     Data Transmission Grid (Phase I). EMBRATEL will be responsible for installing a data teleprocessing center connected to the telephone and telex networks. In a first stage, two switchboard centers will be installed in Rio de Janeiro and Sao Paulo. Economic feasibility and engineering studies are underway to be completed in early 1973. Total project cost: US\$4.0 million. Foreign exchange component and external financing: US\$3.0 million. Possible lender: Suppliers' credit. Probable commitment date: 1973. Estimated disbursement period: 1974-75.

4.6     Automatic Exchange for Message Retransmission (SICRAM). Implementing an automatic repeater center for incoming cables from abroad will contribute to the general improvement of the telegraphic system by speeding up one step in the transmission. Economic feasibility studies have been completed in 1970. Engineering studies should be completed by the end of 1972. Total project cost: US\$6.5 million. Foreign exchange component: US\$5.2 million. External financing: US\$5.2 million. Possible lender: Suppliers' credit. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: EMBRATEL.

4.7     International Telephone Switching Exchange Center. This project will construct in Rio de Janeiro a telephone center for international communications. This semi-electronically operated switching exchange center will be connected to 800 international trunk lines, 600 national trunk lines and equipped with 300 CLR junction lines, 300 DDI junction lines and automatic toll ticketing equipment. Engineering studies will be completed by middle 1973. Total project cost: US\$6.1 million. Foreign exchange component and external financing: US\$6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-77.

4.8     Second Antenna for Land Transmission. By installing a second antenna the project will improve the reliability of international communications as well as increase transmission capacity. Engineering studies will be completed in early 1973. Total project cost: US\$4.0 million. Foreign exchange component and external financing: US\$3.5 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

4.9     International Telex Computerized Center. With the forecasted increase of national telex communications the present Rio de Janeiro terminal will be saturated by 1975. Therefore, a new telex terminal for

international messages will have to be installed, using the most up-to-date equipment of the 13ARS type to work with C-type signals of the CCITT. The terminal will have a 12-waiting positions device. Engineering studies will start in 1973 and be completed by the end of the year. Total project cost: US\$3.1 million. Foreign exchange component and external financing: US\$3.0 million. Probable commitment date: 1974. Estimated disbursement period: 1974-76. Executing agency: EMBRATEL.

4.10 State Telephone Network Expansion I. The Government has set up a target to install 12 million telephones in the next ten years. Four states have programs ending in 1976 for their telephone network extension: Guanabara, Sao Paulo, Minas Gerais and Espirito Santo. Total project cost: US\$1062 million. Foreign exchange component: US\$159 million. External financing: US\$318 million. Possible lenders: Japan Suppliers' credit. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: TELEBRAS.

4.11 State Telephone Network Expansion II. Sixteen other states have programs for telephone network expansion (Rio Grande do Sul, Santa Catarina, Parana, Sergipe, Alagoas, Pernambuco, Paraiba, Rio Grande do Norte, Ceara, Maranhao, Piaui, Para, Amazonas, Mato Grosso, Goias, Bahia and the Federal District) over the 1973-80 period. Total project cost: US\$1061 million. Foreign exchange component: US\$157 million. External financing: US\$629 million. Probable commitment date: 1974. Estimated disbursement period: 1974-80. Executing agency: TELEBRAS.

4.12 Telecommunication Control Center. DENTEL has received responsibility for controlling and monitoring radio transmissions. The project will install identification stations with goniometric equipment for broadcasting control and frequencies allocation. Total project cost: US\$10 million. Foreign exchange component and external financing: US\$8 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

4.13 Improvement of Postal Services. Improving and reorganizing the postage service will require building an address sorting center and also purchasing appropriate equipment as well as trucks and delivery vehicles. Total cost: US\$66 million. Foreign exchange component: US\$6.5 million. External financing: US\$33 million. Probable commitment date: 1973. Possible lenders: USAID, Germany. Estimated disbursement period: 1974-76.

## 5. WATER AND SEWERAGE

The National Housing Bank (BNH) is responsible for the implementation of the National Water and Sewerage development program. It coordinates state government plans and contributes to the financing of their projects. BNH has signed a number of contracts with state governments for potable water distribution and sewerage programs. Those contracts are for a three-year period and BNH agreed to participate in their financing on the following basis: if the state government finances 37.5 percent of the total project cost and the municipality another 25 percent, BNH will finance the remaining 37.5 percent.

Since signature of those contracts, however, the Plano Nacional de Saneamento (PLANASA) was formulated which complements and in some cases supersedes these contracts. The target set up in the plan is to provide water to at least 80 percent of the urban population by 1980. Water distribution is considered of higher priority than sewage and therefore sewage projects will only be executed in areas where the water distribution system already exists. A number of states have subscribed to PLANASA and negotiations are underway to integrate the existing three-year contracts into PLANASA. This should be quite attractive for the states, since BNH will share equally (50-50) with the state the financial responsibility. The following states have already signed the PLANASA convention:

A. PLANASA

| States         | Target | Number of Municipalities Beneficiating | Planned Investment In thousand of Cruzeiros |
|----------------|--------|--|---|
| Bahia          | 1975   | 336                                    | 538,920                                     |
| Maranhao       | 1975   | 129                                    | 118,265                                     |
| Santa Catarina | 1975   | 197                                    | 194,766                                     |
| Pernambuco     | 1975   | 164                                    | 400,174                                     |
| Sergipe        | 1974   | 74                                     | 45,111                                      |
| Piaui          | 1980   | 114                                    | 91,092                                      |
| Alagoas        | 1975   | 94                                     | 90,439                                      |
| Espirito Santo | 1975   | 53                                     | 102,605                                     |
| R. G. do Norte | 1980   | 150                                    | 130,915                                     |
| Ceara          | 1980   | 142                                    | 461,492                                     |
| Parana         | 1977   | 288                                    | 639,851                                     |
| Amazonas       | 1975   | 144                                    | 24,362                                      |
| Rio de Janeiro | 1975   | 63                                     | 489,928                                     |
| Para           | 1980   | 83                                     | 86,236                                      |
| Goias          | 1980   | <u>221</u>                             | <u>216,786</u>                              |
| <u>TOTAL</u>   |        | <u>2,152</u>                           | <u>3,631,153</u>                            |

B. In addition the following three year contracts are still effective for:

WATER SUPPLY

| State             | Number of Cities | Planned Investment<br>Thousands of<br>Cruzeiros |
|-------------------|------------------|---|
| Sao Paulo         | 84               | 1,455,058                                       |
| Minas Gerais      | 35               | 144,636   |
| Distrito Federal  | 1                | 120,005   |
| Acre              | 4                | 4,150   |
| Rio Grande do Sul | 86               | 224,349   |
| Guanabara         | 1                | 238,338   |
| Mato Grosso       | <u>12</u>        | <u>50,064</u>                                   |
| <u>TOTAL</u>      | 223              | 2,236,600                                       |

SEWERAGE

| State        | Number of Cities | Planned Investment<br>Thousands of<br>Cruzeiros |
|--------------|------------------|---|
| Sao Paulo    | 112              | 1,473,263                                       |
| Guanabara    | 1                | 65,056  |
| Bahia        | 1                | 95,308  |
| Para         | <u>1</u>         | <u>28,111</u>                                   |
| <u>TOTAL</u> | <u>115</u>       | <u>1,661,738</u>                                |

Combined together those 3 programs will cost about US\$1.5 billion over the period 1970-80. Two loans already committed (US\$11.7 million from USAID and US\$30 million from IDB) will finance a small part of this over all program. Specific projects are being developed within the PLANASA framework. The following are identified:

5.1 Bahia Water Supply. This project aims at expanding and improving the Bahia water system to supply Bahia's population needs forecasted for 1980. Economic feasibility and engineering studies are being completed. Total project cost: US\$84.7 million. Foreign exchange component: undefined. External financing: US\$30 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

5.2 Sao Paulo Water Supply - Distribution Network. The project contemplates increasing by one-third the number of households connected to the water distribution system in the Sao Paulo Metropolitan area. This would involve installing about 2,800 km of water pipes and the necessary pumping stations. Total project cost: US\$52.2 million. Foreign exchange component: not defined. External financing: US\$15 million in addition to a loan already committed by IBRD. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: COMASP.

5.3 Sao Paulo Water Supply Main Duct Line. The project will install 214 km of large diameter water lines and some 30 water reservoirs. The first stage of the project is supposed to be completed by 1975. Total project cost US\$225.2 million. Foreign exchange component (Phase I): US\$40 million. External financing (Phase I): US\$37 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: COMASP.

5.4 Rio de Janeiro Water Supply. The project contemplates expanding and improving the main Rio de Janeiro water line. Total project cost: US\$30 million. Foreign exchange component: US\$7 million. External assistance: US\$10 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: CEDAG.

5.5 Belo Horizonte Sewage Disposal Project. The proposed project will supplement the Belo Horizonte (Minas Gerais) water supply project currently under implementation with the assistance of IDB loan. By 1976 the project will extend sewerage services to about 2 million municipal residents. The consulting firm PLANIDRO - Engenheiros Consultores Ltda., has completed the feasibility and engineering studies. Total cost: US\$32 million. Foreign exchange component: US\$5 million. External financing: US\$16 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: Departamento Municipal de Aguas e Esgotos de Belo Horizonte.

5.6 Sao Paulo Sewage System. This project contemplates constructing 85 km of interceptors along the rivers crossing the Sao Paulo area. A plant to treat polluted water and industrial wastes also will be constructed. Further extension of the system will only be done after completion of a general survey of the Sao Paulo sewage problem. Total project cost: US\$104 million. Foreign exchange component: US\$14 million. External financing:

US\$20 million additional to a loan extended by IBRD in 1971. Probable commitment date: 1973. Estimated disbursement period: 1973-77.

5.7 Water Supply and Sewage Disposal in Eight Industrial Parks of Minas Gerais. With a view to promoting dispersion of industries and population, the Minas Gerais State Government is developing eight industrial parks. These will be located at Ipatinga, Juiz de Fora (Benfica), Monte Carlos, Pirapora, Santa Luzia, Sete Lagoas, Uberaba and Uberlandia. Each park will have facilities for water, sewage disposal and power. A state enterprise, Companhia Mineira de Aguas e Esgotos (COMAG), will develop the water supply and sewage disposal facilities on commercial lines. Economic feasibility and engineering studies have been completed by PLANIDRO, HIDROSERVICE and BRASCONSULT. Total cost: US\$21 million. Foreign exchange component: US\$10.3 million. External financing: US\$10.3 million. Probable commitment date: 1974. Estimated disbursement period: 1974-75. Executing agency: COMAG.

## 6. AGRICULTURE

For the period 1972-74, the growth target in agriculture has been fixed at 7 percent a year. In the Center and Southern part of the country the main government objective is to improve productivity and make external economies available so as to improve the competitive position of agricultural exports. An Export Corridor Program has been formulated for this purpose (see section 7). In the Northern part of the country the government launched several regional development programs to provide more employment facilities, promote land redistribution and irrigation projects and to stimulate non-traditional agriculture and agro-based industries.

Overall emphasis is given to technological improvements at the farm level as well as in storing, transporting and processing agricultural products: increased use of fertilizers and pesticides is encouraged; research in agriculture is being developed, especially concerning improved seeds; extension services are being expanded. The Export Corridors Program aims mainly at providing infrastructure for the transport and export marketing of agricultural products. It also aims to develop agro-based industries to increase the value of the exported products.

Although not entirely projectized, and, with external financing requirements not yet entirely defined, the four Government regional rural development programs - PIN, PROTERRA, PROVALE and PRODOESTE - are presented below, together with identified projects either included in or relevant to these programs. In addition, a number of other agricultural projects not related to these regional programs are described in the last part of this section.

A. PIN: Programa de Integracao Nacional. This program broadly aims at speeding up the development of the Northeast and integrating the Amazon region into the national economy. It covers in totality or in part the following states: Maranhao, Goias, Para, Amazonas, Mato Grosso, Acre, Rondonia, Piaui, Ceara, Rio Grande do Norte, Paraiba, Pernambuco, Alagoas, Sergipe, Bahia and Minas Gerais. Three major objectives have been defined:

- (i) Construction of two major penetration highways: the Transamazonica and the Cuiaba-Santarem Highway.
- (ii) Colonization and population settlement over an area of 10 kilometers situated on both sides along those two roads.
- (iii) Implementation of the Northeast irrigation plan, of which the first stage should cover about 40,000 square kilometers.

In addition, the PIN includes various subprograms:

- (a) The Operation Oswaldo Cruz for malaria eradication;
- (b) the development of urban settlements at Picos, Imperatriz, Maraba, Altamira, Itaituba, Santarem and Humaita;
- (c) the Radam project for the mapping and resource surveying of about 3 million km<sup>2</sup> in the Amazon region;
- (d) the construction of a new airport in Manaus.

The pluriannual budget for 1972-74 allocates US\$520 million cruzeiros to the PIN program of which about 37 percent will be allocated for the construction of highways, 23 percent for the colonization program and 30 percent for the Northeast irrigation program (including transfers to PROVALE and PROTERRA). The remaining 10 percent will be allocated to miscellaneous projects.

Although they are not all financed entirely out of the PIN funds, the following projects are included here since they contribute to the same broad development goals.

6.1 Maranhao (Alto Turi) Colonization. The project seeks to develop about 500,000 ha of cultivable land between Ze Doca (Maranhao) and Parua (Para) along the new Sao Luis-Belem Highway (BR 316). About 5,000 families will be settled in the area, with land titles and the minimum necessary governmental support by way of roads, extension services, housing and educational, medical and marketing facilities. All-weather access to the Belem and Sao Luis markets would make the project attractive. The project will also serve as a laboratory to design the most efficient future settlement projects for the region and for applied research in dry farming. Total cost: US\$12.6 million. A loan has been signed with IBRD on July 1972 for US\$6.7 million. Foreign exchange component: US\$2 million. Estimated disbursement period 1973-78. Executing agency: Superintendencia de Desenvolvimento do Nordeste (SUDENE).

6.2 Colonization/Road Development in West Maranhao. The Maranhao State Government has prepared a land settlement project for the western part of the state, south of the Alto Turi project. The project consists essentially of two highways connecting the Sao Luis region with the Belem-Brasilia Highway and a minimum amount of infrastructure to facilitate settlement. Total cost: US\$61 million (of which US\$27.5 million will be for roads and US\$35.5 million for land acquisition, urbanization, health, education, storage, marketing, etc.). Foreign exchange component: US\$6 million. External financing: US\$20 million. Probable commitment date: 1973. Disbursement period: 1973-76. Executing agency: The State Government of Maranhao.

6.3 Colonization in the Amazon Basin (Altamira). The Government is constructing two (East-West and North-South) important penetration highways, opening hitherto inaccessible areas in the Amazon region. The Ministry of Agriculture through the National Institute for Colonization and Land Reform (INCRA) is developing a colonization project for an area along the East-West Amazon highway near Altamira, where about 50,000 families would be settled in the project's first stage. The majority of the settlers will come from the Northeast and the project will fit in with the overall objective of expanding employment opportunities for Northeasterners. Total cost (first phase): US\$135 million. Foreign exchange component: US\$10 million. External financing: US\$60 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: Instituto Nacional de Colonizacao e Reforma Agraria (INCRA).

6.4 Santarem-Itaituba Colonization Scheme. South of Belterra, along the first section of the Cuiaba-Santarem highway, INCRA is responsible for developing a colonization project. About 7,000 families will be settled with land titles, roadways, infrastructure and social equipment. Some 4,300 square kilometers will be assigned for food crops and livestock. Additionally, the project covers forest exploitation and reforestation in the surrounding area. A research center will be built in Belterra from which technical assistance and extension services will be provided. Economic feasibility and engineering studies are underway. Total project cost: US\$42 million (about US\$10 million for the Research Center). Foreign exchange component: undefined. External assistance: US\$23 million. Possible lender: IBRD. Probable commitment date: 1974. Disbursement period: 1976-78. Executing agency: INCRA.

6.5 Northeast Irrigation Program. The Executive Group on Irrigation for Agricultural Development (GEIDA) has prepared a national irrigation plan which includes some 56 irrigation projects scattered over the Northeast including the Sao Francisco Valley. Among that list some 13 projects have been attached higher priority and 7 are already under execution. The total area (56 projects) considered for irrigation covers some 189,000 ha. The 56 projects represent an investment of 3.2 billion cruzeiros (about US\$535 million) over the period 1971-80. Foreign exchange component: undefined. External financing: US\$240 million. Possible lenders: IDB-IBRD. Government agencies (DNOS, DNDSCS, SUBALE) are responsible for execution of the projects.

6.6 Northeast Integrated Agricultural Development. This project integrates land redistribution, land development and irrigation activities at eight sites: Aires de Souza, Forquilha, Curu, Banabuiu, Baixo Jaguaribe, Baixo Acu, Moxoto, Itapicuru. Total project cost: US\$130.8 million. Foreign exchange component: undefined. External financing: US\$30 million. Possible lender IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: Ministry of Agriculture.

B. PROTERRA: Programa de Redistribuicao de Terra e de Estimulo a Agro-Industria do Norte e Nordeste. The basic purpose of this program is to redistribute land to peasants and small farmers. It also aims at improving working conditions in agriculture and at developing agro-based industries in the SUDAM (Superintendencia de Desenvolvimento da Amazonia) and SUDENE (Superintendencia de Desenvolvimento do Nordeste) regions.

The land redistribution objective will be achieved through purchasing or expropriating land to be resold to small farmers. Credits for initial settling or for enlarging properties too small for economic exploitation will be granted to small and medium farmers. PROTERRA will also finance agro-industry projects (including the sugar industry) and the acquisition of modern inputs for agriculture. Expansion of research activities and extension services also are included.

The budget of PROTERRA has been fixed at about US\$670 million for the period 1972-76. Of this, about half will come from the 1973-74 Pluriannual Federal Budget. In addition, the program will be allocated 20 percent of accruals from the fiscal incentive (Art. 34/18) system for the Northeast. Additional financial transfers from PIN have also been scheduled.

The program will be developed through a series of projects under preparation. The following ones have been tentatively identified:

6.7 Agro-Industry-Northeast. This project contemplates creating in the Northeast agro-based industries for processing tropical fruits and other indigenous products.

Economic feasibility studies and engineering studies will be carried out by a consultant firm (ITAL) and completed in 1973. Total project cost: US\$80 million. Foreign exchange component: undefined. External assistance: US\$40 million. Probable commitment date: 1974. Estimated disbursement period: 1974-77. Executing agency: Ministry of Agriculture.

6.8 Agricultural Research Project. To permit more flexibility in research administration, the Ministry of Agriculture contemplates transforming the "Departamento Nacional de Pesquisa Agropecuaria" (DNPEA) into a semi-public agency able to mobilize private financial resources. The agency will be responsible for promoting, developing, supporting and coordinating agricultural research. Total project cost: US\$142 million. Foreign exchange component: US\$12 million. External financing: US\$60 million. Possible lender: IBRD. Probable commitment date: 1973. Estimated disbursement period: 1973-77.

6.9 Reorganization of Northeast Sugar Industry. The Ministry of Industry and Commerce has adopted a program to improve the per ha and per raw material unit productivity of Northeast cane and sugar production,

respectively, up to the levels presently being achieved in the Center-South. The aim is not to increase overall sugar production but to improve the productivity of the Northeast sugar industry to the point where it may be reasonably profitable at fair wage rates and a consumer price equal to that of Center-South sugar. The means adopted for achieving these goals are:

- (i) modification of the legal regime which formerly assigned in perpetuity cane and sugar quotas to individual producers and to states regardless of efficiency;
- (ii) the creation of special financing facilities for producers who will:
  - (a) merge sugar mills;
  - (b) integrate cane production and milling;
  - (c) relocate cane and sugar production activities; and/or
  - (d) re-equip mills;
- (iii) the adoption of a new pricing policy whereby Northeast millers are forced to reduce their prices to the Center-South level (i.e., by 15 percent) with the help of a subsidy which is financed from the Sugar Export Fund (i.e., the difference between U.S. quota export prices and the internal price) and which will gradually be reduced to nil over a 6-year period; and,
- (iv) the allocation of PROTERRA funds to finance the reoccupation of cane and mill workers left in surplus by productivity improvements.

That part of the program dealing with the reorganization of the mills is regarded as suitable for external financing. Total cost: US\$120 million. Foreign exchange component: US\$20 million. External financing: US\$50 million. Probable commitment date: 1973. Estimated disbursement period: 1973-78. Executing agency: Instituto de Acucar e do Alcool (IAA).

C. PROVALE: Special Program for the Sao Francisco Valley Development. This integrated program covering the Southern part of the Northeast "Drought Polygon" has many objectives:

- (a) Design and construction of a road network.
- (b) Agricultural Development and promotion of agro-based industries.
- (c) Development of urban centers (including sewage and irrigation).

- (d) Colonization and reforestation program.
- (e) Construction of watergates at the Sobradinho dam for navigation and irrigation purposes.
- (f) Improvement of Sao Francisco river navigation and renewal of the fleet.

Total Brazilian resources allocated to this program for the 1972-74 period amount to US\$140 million. Funds come from budget appropriations and transfers from PIN and PROTERRA. Many projects are being developed in the context of this program; however, detailed information on external financing requirements is not yet available.

D. PRODOESTE: Programa de Desenvolvimento do Centro-Oeste. This program covers the southern part of the states of Mato Grosso, Goias and the Federal District. It mainly includes:

- (a) Constructing a basic road network and a feeder road system.
- (b) Installation of storage facilities -- silos, warehouses, and cold storage installations.
- (c) Water supply and sewerage facilities.
- (d) River stream adjustments and land recuperation.

Total budget allocated amounts to US\$110 million for the period 1972-74.

E. Agricultural Projects not Incorporated in Regional Development Programs.

6.10 Flood Control Program. In the context of its flood control projects for Rio de Janeiro, Itajai Valley, Recife, Porto Alegre and Canoas. DNOS, the federal flood control agency, also expects to recuperate land for cultivation. Economic feasibility and engineering studies have been completed. Total project cost: US\$185 million. Foreign exchange component: US\$20 million. External financing: US\$98.5 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: DNOS.

6.11 Camaqua - Multipurpose Hydraulic Resources Project. The project near the Lagoa dos Patos in Rio Grande do Sul, would permit a considerable improvement in rice and animal production on some 157,000 ha of land. Diversion of water of the Rio Camaqua and provision of adequate drainage would enable rice-improved pasture rotation in this area. The project

would also provide flood control and power generation (63MW). The project was prepared by Tahal-Sondotechnica-INTECSA and is planned for a 10-year period. Estimated total cost: US\$50 million, (includes US\$11 million for electric energy). Foreign exchange component: US\$10 million. External financing: US\$43 million. Probable commitment date: 1973. Estimated disbursement period: 1973-81. Executing agency: Departamento de Obras de Saneamento (DNOS).

6.12 Soil Conservation and Intensive Agriculture Project of Minas Gerais. The State Government proposes to launch an intensive soil conservation program in the agricultural areas of the state with a view to increasing productivity. For the purpose of project planning the state has been subdivided into eight regions and investment is proposed in keeping with the human resources, technical possibilities and market potential of each region. About 9 million ha of the 47 million ha of presently cropped area in these eight regions will benefit from the program over a 10-year period. Total cost: US\$91 million. Foreign exchange component: US\$10 million. External financing: US\$45 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: The State Government of Minas Gerais (Department of Agriculture).

6.13 Livestock I (Stage II of IDB-Assisted Project). The project aims to increase meat production and improve quality. Involved are the acquisition of breeding stock, the promotion of artificial insemination, the improvement of pasture land and the modernization of marketing facilities. Economic feasibility studies are under completion. Total project cost: US\$100 million. Foreign exchange component: US\$3 million. External financing: US\$25 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1974-78. Executing agency: CONDEPE.

6.14 Livestock II (Stage III of IBRD-Assisted Project). This would constitute the third extension of a livestock development credit being implemented by the Central Bank through its livestock development agency CONDEPE. This credit line finances fences and building construction, as well as the seeds and fertilizers needed to improve pastures. Total project costs: US\$153 million. Foreign exchange component: US\$3 million. External financing: US\$94 million. Possible lender: IBRD. Probable commitment date: 1974. Estimated disbursement period: 1974-77. Executing agency: CONDEPE.

6.15 Improved Seeds. The project will develop improved seeds for rice, cotton, potatoes, peanuts, soya, beans, corn and wheat for the Southeastern part of the country. Total project cost: US\$25 million. Foreign exchange component: US\$5 million. External financing: US\$10 million signed with IDB in June 1972. Estimated disbursement: 1972-74. Executing agency: MINAGRI.

6.16 Foot and Mouth Disease Eradication. This project is the second phase of a nationwide campaign. All animals older than four months are to be vaccinated. Total project cost: US\$67 million. Foreign exchange component: US\$10 million. External financing: US\$15 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: CONDEPE.

6.17 Agricultural Development for Export Crops in Minas Gerais. This project would provide adequate credit in support of cotton, corn and soya production for export. It has been assumed that by 1975 the state's total exportable surplus in these crops will reach 900 thousand tons, the target set up in the Export Corridor Program. A credit line of about US\$99 million would be required to finance the technical inputs (fertilizer, seeds, pesticides, etc.) required to attain this level of exports. Studies are underway in the State Development Council. External financing: US\$50 million. Foreign exchange component: unidentified. Estimated commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Secretary of Agriculture and Banco de Desenvolvimento de Minas Gerais (BDMG).

6.18 Terminal Markets. The construction of terminal markets is planned at the following major consumption centers: Niteroi-Sao Goncalo, Porto Alegre, Curitiba, Rio de Janeiro, Belo Horizonte, Goiania and Brasilia. The food supply of those centers will be improved by providing better and larger storage facilities. At the same time it is hoped that market modernization will reduce the cost of handling agricultural products.

Feasibility studies are already completed for Rio, Niteroi, and Belo Horizonte. Total project cost: US\$68 million. Foreign exchange component: US\$1.3 million. External financing: US\$25 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-76. Executing agency: Grupo Executivo de Modernizacao do Sistema de Abastecimento - CEMAB.

6.19 Fishing Terminal. The project aims at rationalizing and developing fishing activity. It includes setting up a system of incentives for ship construction, installing repair facilities, and providing credits for fishing enterprises. The project also will provide technical training to fishermen. Total project cost: US\$30 million. Foreign exchange component: US\$5 million. External financing: US\$15 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: SUDEPE.

## 7. THE EXPORT CORRIDORS PROGRAM

The Brazilian Government has embarked on a program aimed at dramatically promoting the exports of both bulk and processed agricultural products through the ports of Rio Grande (Rio Grande do Sul), Paranagua (Parana), Santos (Sao Paulo), Vitoria (Espirito Santo). For bulk cereals, and oil crops the target would be to export an additional seven million tons of soybeans, corn, sorghum and pellets by the late 1970's. For processed products, there are various projects under study, especially to develop meat and citrus juice exports. A coordinating group has been set up at the federal level, chaired by a representative of the Central Bank and including representatives of the Ministries of Finance, Planning, Industry and Commerce, Agriculture and Transport and of the National Monetary Council. At the state level, working groups involving representatives of the various State Secretaries and of the State Development Banks help in identifying and defining local projects.

In August 1972, the Central Bank group presented a document outlining the investment program for the four export corridors based on the ports cited above. This program calls for a total investment of about US\$810 million to finance mainly transport and storage infrastructure. A US\$125 million project for developing agro-industry and a US\$13.5 million provision for technical assistance to farmers are also included. However, the needs for technical inputs (fertilizer, farm machinery, seeds, etc.) necessary to attain the program objectives have not yet been worked out in detail and are not considered here. This is why some specific projects for agricultural development are listed in the agriculture section (Ch.6) rather than here, although they are also to promote agricultural exports. Also at this writing, the scope and content of the agro-industry project had not yet been fully defined. Thus, the following list, drawn from the Central Bank document, is still preliminary and subject to change. As a matter of fact, the transportation part of the program has already been slightly revised by GEIPOT after the visit of an official Japanese technical mission on August-September 1972. No changes have been made to the following list to reflect those modifications since no definitive program has yet been transmitted to the Bank. The main executing agencies are:

- (i) for the railways projects: DNEF (Departamento Nacional de Estradas de Ferro) and RFFSA (Rede Ferroviaria, S.A.);
- (ii) for the port projects: DNPVN (Departamento Nacional de Portos e Vias Navegaveis);
- (iii) for the intermediate storage: CIBRAZEM (Companhia Brasileira de Armazenagem).

Projects are listed here according to their priority. Priority "1" projects totalling US\$495 million, out of which US\$328 million is expected to accrue from external sources, are to be concluded in March

1974; Priority "2" projects need longer lead time and are only to be concluded in 1975-76; Priority "3" projects are expected to have no effect on exports up to 1974. Priority "2" and "3" projects altogether amount to US\$315 million.

As the original rationale for this program was to diversify agricultural exports so as to reduce dependence on coffee the International Coffee Organization (ICO) in March, 1972 made available US\$2 million from the Coffee Diversification Fund for the preparatory work including technical and marketing studies. The studies contracted to various consultants are now underway and ICO has been requested to contribute US\$40 million in the first priority program.

Five subprograms are identified out of which four concern the export corridors in the states<sup>1/</sup> of Minas Gerais/Espirito Santo, Sao Paulo, Parana, Rio Grande do Sul, and one regroups all projects that are not as yet specifically located.

#### First priority projects

##### Minas Gerais/Espirito Santo Corridor

7.1 Construction of silos to provide approximately 100,000 tons of static storage capacity distributed in the five most productive areas of influence of the corridor. Total cost: US\$3.5 million.

7.2 New railway alignment between Belo Horizonte and Costa Lacerda. This 84 km-long new section would link more efficiently the hinterland railway network of Minas Gerais and Goias to the modern Companhia Vale Rio Doce (CVRD) railroad which goes from Costa Lacerda to the port of Vitoria/Tubarao and transports export bound iron ore. Agricultural products for export from the Center/West of Minas Gerais and Southern Goias could then also be shipped by rail to the port at a lower cost taking advantage of the excess capacity on the CVRD line. The total cost is estimated at US\$27 million with a 30 percent foreign exchange component.

7.3 Cold storage installations on the left side of the Port of Vitoria with an initial static capacity of 8,000 tons. The project, to be located at the present general cargo berth would also include a rapid loading system with its accessories. Total cost: US\$2 million.

7.4 Technical assistance for farmers in the three states of Minas Gerais, Espirito Santo and Goias. The Ministry of Agriculture plans to increase the extension service in those three states. Total cost: US\$3.75 million.

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1/ The area of influence of these four corridors also includes the Southern part of Mato Grosso and Goias and the Western part of Santa Catarina.

Sao Paulo Corridor

7.5 Construction of silos with a total capacity of about 150,000 tons distributed in the main producing areas. Total cost: US\$5 million.

7.6 Construction of a new rack rail on the Cubatão/Alto do Serra stretch of the Santos-Jundiaí line. A new rack railroad with electric traction is now being implemented to replace the cable traction which limited considerably overall capacity. This project would consist of putting in a second rack rail on a second line, thus quadrupling the present capacity. The total cost is estimated at US\$20 million with a 50 percent foreign exchange component.

7.7 Construction of a railway connection between Mauá and Jurubatuba. This 33 km-long railway section completing the rail link around São Paulo would connect the Sorocabana line of the FEPASA system with the Santos-Jundiaí line of the RFFSA system and thus provide for an alternative way of shipping grain and other products to the port of Santos. Total cost: US\$12.5 million with a 30 percent foreign exchange component.

7.8 Cold storage installation for meat and fruit juices on the right side of the port of Santos, with a static capacity of 30,000 tons. Total cost: US\$12 million.

7.9 Grain loading facilities on the right side of the Port of Santos. This would include all the equipment needed to receive, reclaim and ship-load bulk cereals to be stored in two warehouses presently under construction. This project was prepared and will be financed by a Japanese consortium, Ishikawajima-Harima Heavy Industries Co., Ltd./C. Itoh and Co., Ltd./The Doi-Ichi Kanhyo Bank, Ltd. Total cost: US\$17.8 million.

7.10 Technical assistance for farmers in the two states of Mato Grosso and São Paulo. The Ministry of Agriculture plans to increase the extension services in those states. Total cost: US\$3.25 million.

Parana Corridor

7.11 Construction of silos with a total static capacity of about 150,000 tons in the five most productive areas. Total cost: US\$5 million.

7.12 Construction of the railway connection Itapeva-Ponta Grossa. This is a section of the Southern Trunk Railway line which links the São Paulo industrial area to the southern states. It was first conceived to transport wheat from Rio Grande do Sul to the São Paulo mills but it could also offer an alternative outlet for the Paraná products through the port of Santos.

The 210 km-long section is already being constructed with available local resources amounting to about US\$11.6 million. The total cost is estimated at US\$45 million with a 33 percent foreign exchange component.

7.13 Rehabilitation of existing lines. A new alignment on the Curitiba-Engenheiro-Bley section as well as rehabilitation works on Paranagua-Curitiba section are contemplated in order to increase railway participation in the transport of bulk cereals up to about 50 percent of the total (that is, 2 million tons annually) by 1975-76. Total cost: US\$20 million with a 15 percent foreign exchange component.

7.14 Grain loading facilities in the port of Paranagua including the construction of two 35,000-ton warehouses and a railroad terminal. This project has been studied and will be mostly financed by the Japanese consortium cited above (7.9). Total cost: US\$12.8 million.

7.15 The construction of a 100,000-ton silo in the Port of Paranagua. Total cost: US\$20 million.

7.16 Technical assistance for farmers in the state of Parana. As for the other states, this project aims at improving the extension services. Total cost: US\$2.5 million.

#### Rio Grande do Sul Corridor

7.17 Construction of silos with a total static capacity of about 150,000 tons in the main producing areas. Total cost: US\$5 million.

7.18 Cold storage installations for the port of Rio Grande with a static capacity of 10,000 tons. This project is prepared and financed by the Japanese consortium as for projects 7.9 and 7.14. Total cost: US\$8.3 million.

7.19 Grain loading facilities for the port of Rio Grande, including, as in the Santos case, all the equipment needed to receive, transport and shipload bulk cereals. This project also is financed by the Japanese consortium. Total cost: US\$16.5 million.

#### Other projects

7.20 Railway rolling stock. For the period 1972-74 it has been estimated that 2700 grain cars, 100 refrigerated cars and 200 locomotives will be needed. Fifty percent could be manufactured domestically and the other fifty percent imported. Total cost: US\$105 million.

7.21 Dredging and civil engineering works in the ports of Rio Grande, Parana and Santos. A dredging program (14 m. for Santos and Rio Grande; 12 m. for Paranagua) is already underway, which should allow access to higher capacity ships. The project is carried out by DNPVN at a cost of US\$14.8 million.

7.22 Agro Industry. This project aims principally at promoting the exports of frozen beef, citrus juice, soybean cakes and pellets, by developing adequate processing, storage and transport facilities in the

Center-South export corridor states. In addition, miscellaneous sub-projects directed to internal consumers may also be considered. They include dairies, fruit and vegetable canneries, and castor bean oil extraction plants. Feasibility studies are being done. Most of the sub-projects would be implemented by manufacturers and exporters who will get credit from the State Development Banks. Total cost: US\$125 million, of which US\$50 million may be financed by an IBRD loan and US\$50 million by the Central Bank.

7.23 Installation or extension of agricultural demonstration plots with all the required equipment and support. Total cost: US\$4 million.

7.24 Food technology. Up to US\$2 million would be used to support the National Food Technology Research Plan in the states of Minas Gerais, Espirito Santo, Sao Paulo and Parana.

7.25 Program preparation. US\$2 million has been provided by the International Coffee Organization to finance:

(i) Technical studies and coordination operations of the Central Bank (US\$.2 million).

(ii) International Market Research Studies (US\$.3 million).

(iii) Engineering management consultants for the development of port projects (US\$1 million).

(iv) Other expenditures (US\$.5 million).

#### Second priority projects

##### Minas Gerais/Espirito Santo Corridor

7.26 Railway rehabilitation on the sections Belo Horizonte-Goiandira and Ibia-Uberaba. The track will be renewed and signalling and telecommunications equipment will be replaced in order to increase the presently limited traffic capacity on these links in the hinterland of Minas Gerais. Total cost: US\$12.5 million of which the foreign exchange component represents 15 percent.

7.27 Port of Vitoria extension with the construction of a new 530 m.-long berth (Capuava) with a 12 m. water depth. This project would also include constructing silos and a loading terminal for steel products (fines). Total cost: US\$24.5 million.

7.28 Port of Vitoria silo for storing about 30,000 tons of corn and other cereals, with the necessary loading and unloading equipment. Total cost: US\$6 million.

Sao Paulo Corridor

7.29     Port of Santos grain silo for storing about 100,000 tons of bulk cereals. Studies need to be done to define the location and the capacity. Total cost: US\$20 million.

Rio Grande do Sul Corridor

7.30     Railway equipment renewal on various sections of the state network. Total cost: US\$23.5 million, of which the foreign exchange component would represent 15 percent.

7.31     New railway alignment on the 157 km-long sections Inhatium/Sao Gabriel/Hulha Negra. The present traffic capacity is very limited on this line connecting the interior of the state to the port of Rio Grande, because both the alignment and the infrastructure are very poor on the above sections. Total cost: US\$42 million with a 30 percent foreign exchange component.

7.32     Port of Rio Grande grain silo for storing 60 to 100,000 tons of bulk cereals, next to the present COTRÍJUI silo. Total cost: US\$15 million.

Other projects

7.33     Railway rolling stock. It is estimated that after the period 1972-74 there will be an additional need for 800 grain cars, 100 refrigerated cars and 200 locomotives. Total cost: US\$72.5 million.

Third priority projects

Minas Gerais/Espirito Santo Corridor

7.34     Railway realignment on the 180 km-long sections Tobati-Bambui and Goiandira-Pires do Rio. Total cost: US\$58 million with a 30 percent foreign exchange component.

Sao Paulo Corridor

7.35     Railway connection Samarita-Piacaguera. This link will replace the end section of the Sorocabana line leading to the port of Santos (right side) and will connect instead with both the Santos-Jundiai line and the future left bank rail access. This left bank access to serve a corn silo and a fertilizer terminal is being financed by an IBRD loan. Total cost: US\$37 million.

7.36     Port of Santos warehouses to provide additional storage space for general cargo. Total cost: US\$4 million.

## 8. INDUSTRY

The Brazilian Government's industrial development strategy concentrates on increasing the competitive position of domestic industry by lowering production costs and improving the quality of output. Special emphasis is given to export promotion; import substitution also remains a main objective. Special attention is given to the capital goods industry, since expansion of this sector is crucial to achieving the targeted rate of economic growth without jeopardizing the balance of payment situation with an unmanageable import bill.

The Government's freedom of action differs among industrial sectors. In the basic sectors (steel, petroleum, petrochemical, mining) where enterprises are either state owned companies or mixed enterprises with Government majority participation, the Government has complete control of investments. In other sectors, the Government influences investment through fiscal incentives and credit facilities made available upon review by the National Council of Industrial Development.

Technological development will complement the industrialization effort. A number of technology research centers are to be established during the 1972-74 period (see project list under education). In addition, government strategy implies better utilization of human resources. This is one of the focal points of the educational reform at both the primary and secondary levels.

For the period 1972-74, total publicly supported investment in industry is projected to amount to US\$5 billion. The sectors of major effort will be steel (US\$1.3 billion), chemical and petrochemical (US\$0.9 billion), electric and mechanical industry (US\$1.3 billion), nondurable consumer goods (US\$0.7 billion) and cement (US\$0.2 billion). However, this is not entirely reflected by the following project list which only considers projects suitable for external financing.

### Pulp and Paper

8.1 Wood Chips. The Companhia Vale do Rio Doce (CVRD) has undertaken a program aimed at planting some 350,000 hectares of eucalyptus trees in the states of Minas Gerais and Espirito Santo. Supporting railway, highway and deep-sea port facilities specially equipped for handling and shipping of chips would have to be developed. This should permit the production and export of 6 million tons of green eucalyptus chips or 1.5 million tons of pulp. Some 20,000 jobs will be created in one of the poorest regions of Brazil. Chips exported to Europe and Japan should generate annual exchange earnings of about US\$90 million. Feasibility studies were completed in 1970 by CVRD with SERETE, S.A. Engenharia assistance. Engineering studies will be started in 1973. Total project cost: US\$210 million. Foreign exchange component: US\$35 million. External financing: US\$60 million. Probable commitment date: 1973. Estimated disbursement period: 1975-79.

8.2 Pulp Mill - Minas Gerais. The project calls for installation of a 750 tons/day capacity bleached pulp mill. The raw material will be eucalyptus from existing forests or from future CVRD plantations. Besides creating 500 jobs in Ipatinga where the mill will be located, the project will contribute about US\$40 million to export earnings annually. Economic feasibility studies were completed in April 1971 with the assistance of Jose Carlos Leone e Associados as consultants. Engineering studies should be completed by 1974. Total project cost: US\$85 million. Foreign exchange component: US\$25 million. External financing: US\$25 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.3 Pulp and Paper Mill - Espirito Santo. This project also will utilize CVRD eucalyptus. The project aims at exporting 1,000 tons of eucalyptus bleached pulp a year mainly to Japan. It is located in the north of Espirito Santo. It will create about 600 jobs and contribute US\$50 million to export earnings annually. Economic feasibility studies were completed in October 1970 with the assistance of Jose Carlos Leone e Associados as consultants. Engineering studies should be undertaken in 1974. Total project cost: US\$120 million. Foreign exchange component and external financing: US\$50 million. Probable commitment date: 1974. Estimated disbursement period: 1974-78. Japanese equity participation is likely.

8.4 Pulp and Paper Mill - Sao Paulo. Cia. Suzano de Papel e Celulose plans to install a 500 tons/day short fiber cellulose mill and facilities for paper manufacture. Annual foreign exchange saving is estimated at US\$11 million. An economic feasibility study was completed in 1971. An engineering study is underway. Consulting firm: Leone. Total cost: US\$55 million. External financing: US\$6 million. Foreign exchange component: US\$13.5 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.5 Pulp Mill - Minas Gerais. This project is distinct from that described above (8.2) in that -- inter alia -- it is promoted by INDI rather than the CVRD and would produce for the domestic market rather than export. The initial phase would include installation of a 500 tons/day kraft pulp mill. A later stage (not included in costs quoted here) would add facilities for paper and cardboard manufacture. No feasibility study is yet under way. Total cost: US\$50.6 million. External financing and foreign exchange component: US\$14.3 million. Probable commitment date: 1974. Estimated disbursement period: 1974-76.

#### Petrochemical and Chemicals

8.6 Bahia Petrochemical Complex. The project would install a petrochemical complex near Salvador in the state of Bahia. The first stage (already partly being implemented) deals with the production of aromatic intermediates (cyclohexane, phthalic anhydride) utilizing inputs imported

from São Paulo. The second stage (1973-77) calls for the construction of a basic feedstock plant (ethylene and propylene) using natural gas from Bahia and Sergipe and naphtha. Downstream industries for polyester fibers, household plastics, detergents and acrylic glass will also be installed. Economic feasibility studies have been completed by Japanese and French (French Petroleum Institute) consultants but are held in confidence by the Government. Total project cost is estimated at about US\$600 million (US\$120 million for the feedstock plant alone). No estimate of the foreign exchange component is yet available. External financing requirements will be around US\$240 million. Preliminary plans indicate that the complex will be operational by late 1977. Executing agency: Petroquisa.

8.7      Methanol-Metanor, Ltd. This project contemplates construction in the industrial center of Aratu (State of Bahia) of a new factory producing 50,000 tons/year of methanol extracted from gas. This project will be integrated into the Bahia petrochemical and chemical complex. Economic feasibility studies were completed in 1970. Engineering studies should be completed before the end of 1972. Applications have been filed with BNDE for domestic credit. Total project cost: US\$8.9 million. Foreign exchange component: US\$3.2 million. External financing: US\$2.1 million. Possible lenders: Japanese suppliers' credit agency. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.8      Petroquisa-Bahia Ammonia Plant. The project would install a 1,000 TPD ammonia/urea plant in the state of Bahia using natural gas from that state and from the state of Sergipe. Included in the project is construction of a pipeline from the plant to the port of Aratu as well as installation of port storage facilities. Output will be used mainly as fertilizer. The new plant will be integrated with the existing COPEP plant. Economic feasibility studies conducted by BNDE and SUDENE will be completed in 1973. when engineering studies are to be undertaken. Applications for domestic financing have been made to the National Bank for Economic Development. Total project cost: US\$65.5 million. Foreign exchange component: US\$16.4 million. External financing: US\$12.4 million. Possible lender: IDB. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Petroquisa.

8.9      Nitriflex - ABS Resins. Two plants will be constructed: one to produce 7,500 tons/year (TPY) of ABS resins, the other to produce 10,000 tons/year (TPY) of nitrate rubbers and latices, cord dipping latices, carboxylated latices and paint resins. Economic feasibility studies will be completed by the end of 1972 and engineering studies in 1973. Application for domestic financing has been made with BNDE. Total project cost: US\$17.4 million. Foreign exchange component: US\$4.7 million. External financing: US\$7.0 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74. Sponsoring agency: BNDE.

8.10     DMT for Polyester Fibers. Petroquisa envisages building a plant to produce 45,000 TPY of dimethyl-terefthalate intermediates. This plant,

part of the Bahia petrochemical complex, will be located in Camacari. The production of DMT will serve as an input for the domestic polyester industry, substituting for imports. Total project cost: US\$35 million. Foreign exchange component: undefined. External assistance: US\$14 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.11 Petroquisa - Copralactama. Petroquisa contemplates building as part of the Bahia petrochemical complex a plant to produce copralactama using benzene as an input. This plant will have a production capacity of 35,000 TPY. Economic feasibility studies will be completed in 1973. Total project cost: US\$45 million. Foreign exchange component: undefined. External financing: US\$18 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.12 FISIBA, Ltd. Synthetic Fibers. The Companhia Fibras Synteticas da Bahia would install a unit for producing 24,000 TPY of acrilonitrilic monomer. This unit would be integrated with a 4,000 TPY fiber production unit to be operational at the end of 1973. A second fiber production unit would become operational at the end of 1974. This project would utilize ammonia and propane both of which also will be produced in Bahia. Economic feasibility studies will be completed by the end of 1972 and engineering studies will be undertaken thereafter. Applications have been made with BNDE for domestic financing. Total project cost: US\$24.1 million. Foreign exchange component: US\$9.2 million. External financing: US\$7 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.13 Toluenediisocianate-Dupont. The Companhia Isocianatos do Brasil, Ltd. will produce this intermediate product using ammonia, sulfuric acid and natural gas produced in Bahia. Annual production is estimated at 22,700 tons in volume and US\$17 million in value. The project will be a joint venture involving Petroquisa, Banco da Bahia and Dupont de Nemours, the latter supplying the technical process. The economic feasibility studies have been completed and engineering studies are under way. Application has been made with BNDE for domestic credit guarantees. Total project cost: US\$43 million. Foreign exchange component: US\$11.3 million. External financing: US\$12.9 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.14 Defluorinated Phosphate - INDI. The State of Minas Gerais Industrial Development Agency (INDI) is sponsoring a series of projects of which one would produce 10,000 tons/year of defluorinated phosphate. Total cost: US\$1.8 million. External financing: US\$0.5 million. Estimated foreign exchange component: US\$0.5 million. Probable commitment date: 1973. Estimated disbursement period: 1976.

8.15 Sodium Tripoly-Phosphate - INDI. A plant with production capacity of 30,000 TPY of sodium tripoly-phosphate (to be used in detergent formulations) is contemplated. The location of the plant will be close to Araxa,

in Minas Gerais. Total cost: US\$6.8 million. Foreign exchange component and external financing: US\$2.1 million. Probable commitment date: 1973. Estimated disbursement period: 1976.

8.16 Citric Acid - INDI. A plant would be installed to produce crystalline citric monohydrate, suitable for food and pharmaceutical applications. A plant having a capacity of 3,000 TPY is proposed and would employ the submerged fermentation process. The preferred location for this project is Bocaiuva, Minas Gerais, which would provide a dependable source of raw materials (molasses, sulfuric acid and lime) and have the advantage of the fiscal incentives granted by SUDENE. Total cost: US\$6.1 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.17 Phosphoric and Sulfuric Acid - Santa Catarina. Industria Carboquimica Catarinense, S.A. (ICC) plans to produce 300,000 tons/year of sulfuric acid and 110,000 tons/year of dikephosphoric acid ( $P_2O_5$ ). This plant located in Imbituba will use wastes resulting from the transformation of local soft coal into metallurgical and steam coals. This project will have the advantages of using a local by-product instead of imported sulphur and of reducing pollution. Total cost: US\$34 million. Foreign exchange component: unidentified. External financing: US\$9 million. Probable commitment date: 1973. Disbursement period: 1973-75. Executing agency: ICC.

8.18 Soda Ash. The state-owned Companhia Nacional de Alcalis is considering a project in Sergipe for the production of soda ash (barila) using lime and rock salt available nearby. The plant's production capacity of 400,000 TPY will permit it both to satisfy domestic demand and to export. Total project cost: US\$80 million. Foreign exchange component: undetermined. External financing: US\$32 million. Possible lenders: Japan or Japanese participation. Probable commitment date: 1973. Disbursement period: 1973-77.

8.19 CCC Coloidal Carbon Company. The Companhia de Carbonos Coloidais (CCC) would expand its carbon black plant located in Candeias-Bahia from a present capacity of 23,000 TPY to 43,000 TPY in the first phase and 76,000 TPY in the second. Production will be entirely absorbed by the domestic tire industry. Applications for domestic credit have been filed with BNDE. Phase I project cost: US\$4.5 million. Foreign exchange component: US\$0.9 million. External financing: US\$1.8 million. Probable commitment date: 1974. Estimated disbursement period: 1974-75.

8.20 Petrocoque, Ltd. The project will produce coke by calcinating petroleum refinery residuals. The plant will be installed in Cubatao (state of Sao Paulo) close to the "Presidente Bernardes" refinery. Expected annual production is about 120,000 tons. Main application will be for the aluminium industry, iron alloys and batteries. The project should be completed by the end of 1974. Economic feasibility and engineering studies were completed by BNDE in 1972. Total project cost: US\$5.3 million. Foreign exchange component: US\$0.5 million. External financing: US\$2.1 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.21     SALGEMA - Caustic Soda and Chlorine. SALGEMA, Industrias Quimicas will install a plant at Maceio (Alagoas State in Northeast Brazil) to produce 250,000 and 220,000 TPY, respectively, of caustic soda and chlorine from locally extracted rock salt. Production, valued at almost US\$30 million, will contribute to import substitution. Economic feasibility and engineering studies were completed in 1972. Applications for domestic credit have been submitted to BNDE. SUDENE is sponsoring the project. Total project cost: US\$83 million. Foreign exchange component: US\$14 million. Possible lender: Eximbank. External financing: US\$14 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.22     NOVA DU FIL Film Company. "NOVA DU FIL - Companhia Brasileira de Filmes" will install in Resende (state of Rio de Janeiro) a factory producing 3,200,000 m<sup>2</sup> of x-ray film per year. Production is planned to start by 1975. Economic feasibility and engineering studies were completed in 1972. Application for domestic credit has been submitted to BNDE. Total project cost: US\$17.3 million. Foreign exchange component: US\$7.2 million. External financing: US\$5.5 million. Possible lender: Japanese suppliers' credit agency. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.23     Tires - Companhia Pneus Tropical. The Companhia Pneus Tropical is planning to install at Feira de Santana, in the Bahia area, a factory to produce tires, tubes and "camel back". The factory will satisfy part of the expanding domestic demand. Economic feasibility and engineering studies are completed and applications for domestic credit have been made with BNDE. SUDENE is sponsoring the project. Total project cost: US\$25 million. Foreign exchange component: US\$8 million. External assistance: US\$8 million. Foreign financing presently discussed with U.S. Banks. Probable commitment date: 1972 or early 1973. Estimated disbursement period: 1973-75.

#### Steel

8.24     USIBA - Bahia Steel. The project envisages expanding an existing plant and adding to it a continuous rolling mill to produce 300,000 TPY of laminated product, rods, wire rods and light shapes. The project is subject to CONSIDER's approval. Total project cost: US\$42.1 million. Foreign exchange component and external financing: US\$9.0 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.25     Mendes Junior Steel Plant. A new integrated steel work with a production capacity of 300,000 TPY of liquid steel will be installed. Production is supposed to start by 1974 with 150,000 tons of finished product. Total production targets are 100,000 tons of iron bars, 50,000 tons of ingots and light shapes, 100,000 tons of wire rod, and 50,000 tons of laminated product to be exported. The company intends to install a SL/RN direct reduction unit. Sponsor: The project is subject to CONSIDER's approval. Economic feasibility study has been completed by Technometal. The engineering studies are underway. Total project cost: US\$40.0 million. Foreign exchange component: US\$12 million. External financing: US\$3.0 million.

Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.26 COSIM Mogi das Cruzes Steel Plant. The project will expand the Mogi das Cruzes Steel company which produces light and medium laminates and seamless pipe. A continuous casting unit with a capacity of 300,000 TPY, a sintering unit, and a new 300,000 ton rolling mill will be installed. The project is subject to CONSIDER's approval. Economic feasibility studies and engineering studies are underway by COBRAPI. Total project cost: US\$45.3 million. Foreign exchange: US\$10.9 million. External financing: US\$9.2 million. Probable commitment date: 1973. Estimated disbursement period: 1974-75.

8.27 Guaira, Ltd. Steel Plant. Guaira, Ltd. will install in Antonina (state of Parana) a new integrated steel plant with a yearly production capacity of 130,000 tons of crude steel. A blast furnace and steel workshop will be installed for continuous casting as will a continuous rolling mill to produce steel bar and wire rod. Storage and handling equipment will also have to be installed. The project is subject to CONSIDER's approval; IMPLANTI has completed a pre-feasibility study; economic feasibility and engineering studies are underway. Total project cost: US\$31.6 million. Foreign exchange component: undefined. External financing: US\$15 million. Probable commitment date: 1974. Estimated disbursement period: 1974-77.

8.28 COFAVI non-Flat Finished Products. The Companhia Ferro e Aco de Vitoria plans to increase its production of non-flat finished products to 300,000 TPY. The project will involve expansion of the rolling mill installation of a direct reduction unit. The project is subject to CONSIDER's approval. Both economic feasibility and engineering studies have been completed by Technometal. Total project cost: US\$54.4 million. Foreign exchange component: US\$16.3 million. External financing: US\$12.6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.29 Anhangueira Steel, Ltd. The project will produce 300,000 TPY of special steel ingots. SKF, the Industrial Trading and Development Company, and Yutchoff Nungshute Sterkrade AG-HH are responsible for the economic feasibility and engineering studies. The project is subject to CONSIDER's approval. Total project cost: US\$30.1 million. Foreign exchange component: US\$9.7 million. External financing: US\$7.4 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.30 CBUM - Semi-Finished and Non-Flat Steel Products. The Companhia Brasileira de Usinas Metalurgicas will expand its present plant to 250,000 TPY capacity. This will involve building a new sintering plant, and installing a new charcoal blast furnace and all necessary services. Preliminary economic feasibility studies have been completed by COMPET and have been revised by Otto Wolff/Neunkircher. The project is subject to CONSIDER's approval. Total project cost: US\$32.3 million. Foreign exchange component: US\$13.1 million. External financing: US\$11.2 million. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.31 ACESITA, Ltd. Special Steel. The expansion program of Acos Especiais Itabira S.A. envisages output of steels not presently produced in Brazil such as stainless steel sheets and silicone steel sheets of oriented grains. The feasibility studies have been completed by Davy Construction Company, Ltd. The project is subject to CONSIDER's approval. Total project cost: US\$156.1 million. Foreign exchange component: US\$62.2 million. External financing: US\$62.2 million. Probable commitment date: 1973. Estimated disbursement period: 1973-77.

8.32 COSIGUA Non-Flat Products Phase II. Phase II expansion of the Companhia Siderurgica da Guanabara will increase its steel production to 750,000 TPY of non-flat products using scrap iron and iron sponge as raw materials. The project is subject to CONSIDER's approval. Total project cost: US\$77.9 million. Foreign exchange component: US\$15.7 million. External financing: US\$13.3 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.33 Iron Ore Pelletizing Plant. The Industrial Development Instituto of Minas Gerais (INDI) is recommending a pelletizing plant using both iron ore fines and lime available in Minas Gerais. The project could be located either in Joaquim Murtinho or in Igarape. The plant, using the DRAVOLURGI process, would have a production capacity of 3 million TPY. Feasibility studies were completed by INDI in March 1972 with the assistance of Arthur D. Little, Inc. as consultants. Total project cost: US\$40.4 million. Foreign exchange component: US\$12.0 million. External assistance: US\$12 million. Probable commitment date: 1973. Estimated disbursement period: 1974-77.

8.34 Iron Ore Pellet Plant (PELFA). The project envisages installation of a 2.5 million ton pellet plant. Total cost: US\$68.2 million. Foreign exchange component: undefined. External financing: US\$68.2 million (probably from equity-participation and Kreditanstalt). Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.35 Sponge Iron - INDI. INDI supports a project to install in Minas Gerais a direct reduction plant to produce 495,000 TPY of sponge iron for the National Steel Industry. The Itabira-Ipatinga location will be excellent with nearby availability of iron ore and low cost electric power. The project will contribute to filling Brazil scrap steel gap, estimated at 700,000 tons by 1975. Total project cost: US\$23 million. Probable commitment date: 1973. Disbursement period: 1973-76.

8.36 A Ferro-Manganese and Silicomanganese Plant. The plant would have an annual processing capacity of 17,560 tons of ferro-manganese and 4,170 tons of ferro-manganese silicate. Total cost: US\$3.5 million. Foreign exchange component and external financing: US\$1.2 million. Location: Minas Gerais. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.37 A Ferro-Silicon and Elemental Silicon Plant. The plant would have a production capacity of 12,730 TPY of ferro-silicon and 3,000 TPY of elemental silicon. Sponsor: INDI. Total cost: US\$4.9 million. External financing: US\$2.1 million. Foreign exchange component: US\$2.1 million. Location: Minas Gerais. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.38 Foundry Tupy, Ltd. Tupy, Ltd. is expanding the capacity of its foundry located in Joinville (Santa Catarina). Production also will be diversified to include cast iron, connection boxes and parts for the automobile industry. Technometal is responsible for the completion of economic feasibility and engineering studies. Total project cost: US\$27.5 million. Foreign exchange component: undefined. The National Bank for Economic Development (BNDE) is considering financing. External financing: US\$11 million. Probable commitment date: 1972 or early 1973. Estimated disbursement period: 1973-76.

8.39 Minas Gerais Foundry Shop. A new foundry would be installed in Minas Gerais using the billet output of Mannesman steel. The plant should produce 25,000 TPY of grey cast iron, 1,000 tons of modular iron and 5,000 tons of cast steel. Economic feasibility studies were completed in 1972 with the assistance of Arthur D. Little, Inc. Total project cost: US\$9 million. Foreign exchange component: undefined. External financing: US\$3.6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.40 Forge Shop in Minas Gerais. The project would install in the vicinity of Belo Horizonte a forge, manufacturing by 1975, 10,000 TPY of finished products valued at US\$11 million. The plant would employ about 400 workers and would use as inputs billets produced by the Mannesman steel. Economic feasibility studies were completed by Arthur D. Little, Inc. in June 1972. Sponsor: INDI. Total project cost: US\$10.7 million. Foreign exchange component: US\$2 million. External financing: US\$2 million. Probable commitment date: 1973. Estimated disbursement period: 1973-77.

#### Mining and Ore Processing

8.41 CPRM Potassium/Magnesium. Companhia de Pesquisas de Recursos Minerais (CPRM), the Government prospecting agency, has located extensive deposits of potassium and magnesium salts in Carmopolis (state of Sergipe) and at the end of 1972 expects to accept bids for their exploitation. The successful bidder will be guaranteed a privileged position on the Brazilian market; about US\$15 million in potassium and manganese salts now are imported annually by the fertilizer and automobile industries. Petroquisa probably will participate in the new company. Total project cost: US\$80 million. Foreign exchange component: undefined. External financing: US\$32 million. Probable commitment date: 1973-74. Estimated disbursement period: 1974-78.

8.42 Caraiba Copper Mining. Brazil's Pignatari Group owns large copper deposits located in the state of Bahia. This project envisages the installation of mining and processing facilities for exploiting them. Production of electrolytic copper will be around 70,000 TPY (US\$60 million). Feasibility studies are being completed and engineering studies are getting under way. Delays have been caused by difficulties in arriving at agreement with the Pignatari Group as to the nature of the enterprise which will operate these facilities. Total project cost: US\$125 million. Foreign exchange component and external financing: US\$35 million. Probable commitment date: 1973-74. Estimated disbursement period: 1974-73.

8.43 Iron Ore - Carajas. The project to exploit these deposits will be implemented by CVRD, the Companhia Vale do Rio Doce, in a joint venture with the Companhia Meridional de Mineracao, a subsidiary of U.S. Steel. The Serra dos Carajas deposits are located in the state of Para, 560 km southwest of Belem. The mining site has been selected. Studies are underway as to the transport route for exports. Two main alternatives are under consideration: one is to build a railway from Carajas to Sao Luiz (state of Maranhao) or to a point near Belem, the other is to use river transport along the Tocantins up to a deep sea port (Espadarte) located near Belem (Para). Mineral prospection through December 1971 already had proved more than 10 million tons of reserve. Detailed economic feasibility studies have been undertaken by VALUEC and should be completed early in 1974. Total project cost: US\$700 million. Foreign exchange component: US\$260 million. External financing: US\$340 million. Probable commitment date: 1974. Estimated disbursement period: 1974-78.

8.44 Nickel Extraction Project. BAMINCO contemplates the installation of a plant to produce 30,000 TPY of nickel from deposit located in Barro Alto (Goiás). Proven reserves are large enough to support a plan of economic scale. Studies for a pilot plant to be started by 1972 are complete. Final feasibility studies are underway. This project will probably be a joint venture combining consumer induction and government participation. Total project cost: US\$250 million. Foreign exchange component: undefined. External financing: US\$100 million. Probable commitment date: 1974-75. Estimated disbursement period: 1975-79.

8.45 Iron Ore - FABER. FERTECO plans to increase its iron production from 1.5 million tons to 4 million tons in 1974 in its FABRICA mining site (Minas Gerais). This will allow FERTECO, a private mining company, to meet its export contract with foreign shareholders. Total project cost: US\$17 million to be financed mostly by the shareholders. Probable commitment date: 1973. Estimated disbursement period: 1973-74.

#### Non-Ferrous Metal and Metallurgy

8.46 Aluminum Extruder - Minas Gerais. ALCOMINAS will develop with INDI sponsorship an aluminum extrusion plant in the Pocos de Caldas area of Minas Gerais. The plant will produce 4,000 TPY of extruded aluminum

using cerro bauxite and CEMIG electricity. Feasibility studies were completed by INDI in June 1972. Total project cost: US\$2.8 million. Foreign exchange component and external financing: US\$0.5 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.47 Companhia Brazileira de Alumino. The purpose of the project is to expand the production capacity of a plant located in Sao Paulo. Output for domestic consumption will include aluminum ingots, flat and non-flat aluminum products. Technometal is completing the economic feasibility and engineering studies. Total project cost: US\$25 million. Foreign exchange component: undefined. External financing US\$10 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.48 Zinc - Companhia Mineira de Metais. The Companhia Mineira de Metais located in Sao Paulo intends to diversify into zinc metallurgy and refinery. Ingots and zinc plates will be produced for domestic consumption. Technometal is completing the economic feasibility and engineering studies. Application has been made for financing by the National Bank for Economic Development (BNDE). Total project cost: US\$21.7 million. Foreign exchange component: undefined. External financing: US\$9 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.49 Precision Screws - INDI. Contemplated is manufacture of precision screws and bolts by conventional automatic thread rolling and cutting operations, complemented by a series of heat treatments. Production will total 3,000 TPY. A central location in Belo Horizonte is recommended. Creation of 515 jobs. Sponsor: INDI. Total project cost: US\$7.3 million. Foreign exchange component: US\$1 million. External financing: US\$1 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.50 Aluminum and Copper Conductors - INDI. Envisaged is production of 6,000 TPY of copper conductors and 5,000 TPY of aluminum cable. Generation of 507 jobs. This project will be implemented by Ternocanada. Sponsor: INDI. Economic feasibility studies were completed in 1970 with the assistance of Arthur D. Little, Inc. Total project cost: US\$9.1 million. External financing: US\$1.4 million. Foreign exchange component: US\$2.9 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.51 Electrolytic Zinc - INDI. The project will produce electrolytic zinc slabs. A 20,000 TPY plant is contemplated. The proposed location is Pirapora, Minas Gerais. Sponsor: INDI. Total project cost: US\$13.9 million. Foreign exchange component: US\$1 million. External financing: US\$1.0 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.52 Transistor Plant - INDI. This plant would manufacture encapsulated metal silicon transistors of various types. Production of 3 million transistors/year is envisaged. Sponsor: INDI and SUDENE. Total project cost: US\$2.3 million. Foreign exchange component: US\$0.6 million. External financing: US\$0.6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

Building Materials

8.53 Portland Cement. The project would install in Cantagalo (state of Rio de Janeiro) a cement plant with a production capacity of 800,000 TPY. Economic feasibility studies were completed by BNDE in 1971. Engineering studies are under completion. Applications for domestic credit have been submitted to BNDE. Total project cost: US\$51.8 million. Foreign exchange component: US\$14 million. External financing: US\$18.7 million. Possible lender: Worms Bank, Eximbank and Deutsche Bank. Probable commitment date: 1973. Estimated disbursement period: 1974-75.

8.54 Cement SOIECOM. The Sociedade de Empredimentos Industriais Comerciais e Mineracao, Ltd. considers locating in Minas Gerais a cement plant with a production capacity of one million TPY. Economic feasibility studies were completed in 1971 and applications for domestic financing have been filed with BNDE. Total project cost: US\$60.6 million. Foreign exchange component: US\$14.1 million. External financing: US\$14.4 million. Possible lender: suppliers' credits (Germany, Switzerland). Probable commitment date: 1973. Estimated disbursement period: 1973-74.

8.55 Ceramic Pipe Plant. INDI is sponsoring a plant to produce ceramic pipe with an annual capacity of 30,000 tons. The plant will satisfy only partly PLANASA requirements of 60,000 tons/year to provide water to 65 million people and sewage to 40 million people in the next ten years. Economic feasibility studies were completed in March 1972 with Arthur D. Little, Inc. assistance. Total project cost: US\$2.4 million. Foreign exchange component and external financing: US\$0.6 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

8.56 Floor Tiles - INDI. The project envisages production of 800,000 m<sup>2</sup> of ceramic floor tiles for the building industry. Total cost: US\$3.0 million. Foreign exchange component: undefined. External financing: US\$0.8 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75.

8.57 Sheet Glass - INDI. Planned is production of sheet glass at the rate of 70 tons/day (25,550 tons/year). Total project cost: US\$7.4 million. Foreign exchange component: US\$1.0 million. External financing: US\$1.0 million. Probable commitment date: 1973. Estimated disbursement period: 1973-76.

## 9. MISCELLANEOUS

### Health

9.1 Expansion of Sao Paulo Public Health Service. This project involves the construction of 61 health centers (3,700 beds) in the state of Sao Paulo. Total project cost: US\$50.8 million. Foreign exchange component: US\$7 million. External financing: US\$10 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Sao Paulo State Government.

9.2 Santa Catarina Health Program. The project calls for construction of new hospital facilities and expansion of existing ones. Total project cost: US\$11.6 million. Foreign exchange component: US\$4.5 million. External assistance: US\$4.4 million. Possible lender: KFW. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Santa Catarina State Government.

### Regional and Urban Development

9.3 Vale do Ribeira Integrated Development Plan. This is an infrastructural project associated with the installation of two cement factories in this sector of the greater Sao Paulo metropolitan area. It would include constructing a 72 km railway spur, 200 m berthing facilities at Cananeia, 850 km of feeder and main roads and the installation of water supply and sewage facilities in twenty localities. Also included is the design of a tourism master plan for Cananeia. Total cost: US\$34 million. Foreign exchange component and external financing: US\$7.5 million. Possible lender: KFW. Commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: SUDELPA (Superintendencia do Desenvolvimento do Litoral Paulista).

9.4 Industrial District of Curitiba: This project would enhance the industrial activity of Curitiba, a city where the tertiary sector presently predominates. It would install basic infrastructure (road, telecommunications, power, water and sewage) so as to accommodate medium- and small-size industries processing local raw materials. Studies undertaken by the Research and Urban Planning Institute of Curitiba (IPPUC) are to be completed in 1973. Total cost: US\$41 million. Foreign exchange component and external assistance needed: US\$12 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Prefeitura Municipal de Curitiba.

9.5 Regional Park: Iguacu. This is a multi-purpose conservation project for a 24-km<sup>2</sup> area extending from Curitiba southward to Sao Jose dos Pinhais. It would provide for treatment and pollution control of surface waters within an overall regional sewage disposal program, as well as for the infrastructure and forestation works required to develop a future recreational and tourist area. Studies are underway by IPPUC (see above project)

with the assistance of SERETE, S.A. Engenharia. Total cost: US\$6 million. External financing: US\$3 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Prefeitura Municipal de Curitiba.

Mapping

9.6 Cartographical Equipment. This project would provide for the equipment needed to map an area of 750,000 km<sup>2</sup> in the SUDENE and SUDAM regions. Total project cost: US\$9 million. Foreign exchange component: US\$4.5 million. External financing: US\$3 million. Probable commitment date: 1973. Estimated disbursement period: 1973-75. Executing agency: Instituto Brasileiro de Geographia e Economica (IBGE).

Table 1: LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - EDUCATION SECTOR  
 (In million of US\$)

|   | Executing Agency | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disbursement Period | Status of Project |
|---|------------------|----------------------|----------------------------|---------------------------|--------------------------|---------------------|-------------------|
| <u>First Level Education</u>                      |                  |                      |                            |                           |                          |                     |                   |
| 1.1 First Level Education in Jequitinhonha Valley | MG/CODEVALE      | 23.0                 | -                          | 11.0                      | 1973                     | 1973-77             | b                 |
| 1.2 National Program of Vocational Schools        | MEC              | 46.7                 | 2.3                        | 18.7                      | 1973                     | 1973-75             | a                 |
| 1.3 Minas Gerais TV Education Program             | MG               | 4.9                  | 4.0                        | 4.0                       | 1973                     | 1973-74             | b                 |
| 1.4 Sao Paulo Teachers Training Program           | SP               | 15.0                 | 0.5                        | 10.0                      | 1973                     | 1973-74             | b                 |
| <u>Second Level Education</u>                     |                  |                      |                            |                           |                          |                     |                   |
| 1.5 Technical Education Facilities                | MEC              | 63.8                 | 8.7                        | 18.1                      | 1973                     | 1974-76             | a                 |
| <u>Higher Education</u>                           |                  |                      |                            |                           |                          |                     |                   |
| 1.6 University Campuses I                         | MEC              | 67.5                 | 8.5                        | 35.0                      | 1973                     | 1974-76             | a                 |
| 1.7 University Campuses II                        | MEC              | 60.0                 | 15.0                       | 30.0                      | 1974                     | 1975-77             | b                 |
| 1.8 Guanabara State University                    | GUANABARA        | 40.0                 | -                          | 20.0                      | 1973                     | 1973-76             | a                 |
| 1.9 Post Graduation Center                        | MEC              | 64.3                 | 7.0                        | 30.0                      | 1973                     | 1973-76             | a                 |
| <u>Science and Technology</u>                     |                  |                      |                            |                           |                          |                     |                   |
| 1.10 Science and Technology I                     | FINEPE/MINIPLAN  | 60.0                 | 9.0                        | 30.0                      | 1973                     | 1973-75             | a                 |
| 1.11 Science and Technology II                    | FINEPE/MINIPLAN  | 30.0                 | 5.0                        | 15.0                      | 1974                     | 1974-76             | a                 |
| 1.12 Minas Gerais Technological Center            | CETEC/MG         | 14.0                 | -                          | 5.9                       | 1973                     | 1973-76             | b                 |
| 1.13 Sao Paulo Technological Program              | SP               | 50.0                 | 10.0                       | 25.0                      | 1973                     | 1973-75             | a                 |
| <u>TOTAL</u>                                      |                  | <u>539.2</u>         | <u>70.0</u>                | <u>252.7</u>              |                          |                     |                   |

Table 2: LIST OF PROJECTS FOR EXTERNAL FINANCING - ENERGY SECTOR

(In millions of US\$)

|       | Executing Agency/<br>Sponsor        | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disburse-<br>ment Period | Status of Project |
|-------|-------------------------------------|----------------------|----------------------------|---------------------------|--------------------------|--------------------------|-------------------|
| 2.1   | Itauba Hydro Plant                  | CEEE                 | 130                        | 20                        | 50                       | 1973                     | 1974-78           |
| 2.2   | Itumbiara Hydroelectric Project     | FURNAS               | 550                        | 235                       | 224                      | 1973                     | 1973-81           |
| 2.3   | Aqua Vermelha Hydroelectric Project | CESP                 | 400                        | 165                       | 165                      | 1973                     | 1974-81           |
| 2.4   | Santiago Hydroelectric Project      | ELETROSUL            | 190                        | 23                        | 70                       | 1974                     | 1974-79           |
| 2.5   | Moxoto Hydroelectric Plant          | CHESF                | 202                        | 72                        | 60                       | 1972                     | 1973-76           |
| 2.6   | Paulo Afonso Hydroelectric Project  | CHESF                | 274                        | 80                        | 70                       | 1973                     | 1974-80           |
| 2.7   | Sobradinho Dam                      | CHESF                | 215                        | 71                        | 70                       | 1973                     | 1973-78           |
| 2.8   | Sete Quedas Hydroelectric Project   | ELETROBRAS/ANDE      | 2000                       | n.a.                      | 800                      | 1974                     | 1975-82           |
| 2.9   | Couto de Magalhaes Hydro Plant      | n.a.                 | 55                         | 14                        | 14                       | 1973/74                  | 1973/4-79         |
| 2.10  | Ilha Solteira Transmission Lines    | CESP                 | 160                        | n.a.                      | 70                       | 1973                     | 1974-76           |
| 2.11  | Sao Paulo Steam Plant               | CESP                 | 110                        | 62                        | 62                       | 1973                     | 1973-78           |
| 2.12  | Belo Horizonte Thermal Plant        | CEMIG                | 65                         | 45                        | 45                       | 1973                     | 1973-76           |
| 2.13  | Floating Gas Turbine Units          | ELETROBRAS           | 38                         | 30                        | 30                       | 1973                     | 1973-74           |
| 2.14  | Tapana-Belem Thermal Plant          | CEPA/ELETROBRAS      | 51                         | 15                        | 25                       | 1972                     | 1973-77           |
| 2.15  | Manaus Thermal Project              | CEM/ELETROBRAS       | 20                         | 15                        | 15                       | 1973                     | 1973-75           |
| 2.16  | Distribution of Light, S.A.         | Light, S.A.          | 654                        | 47                        | 152                      | 1972                     | 1972-76           |
| 2.17  | City Gas                            | undefined            | 41                         | n.a.                      | 9                        | 1975                     | 1975-79           |
| TOTAL |                                     | 5155                 | 894                        | 1931                      |                          |                          |                   |

Table 3 LIST OF PROJECTS FOR EXTERNAL FINANCING - TRANSPORT SECTOR

(In millions of US\$)

|   | Executing Agency                     | Estimated Total Cost | Foreign Exchange Component | External Financing Sought     | Probable Commitment Date | Disbursement Period | Status of Project |
|---|--------------------------------------|----------------------|----------------------------|-------------------------------|--------------------------|---------------------|-------------------|
| <u>Highways</u>   |                                      |                      |                            |                               |                          |                     |                   |
| 3.1 Feeder Road Program                                 | BNDE                                 | 85                   | n.a.                       | 25                            | 1972                     | 1972-74             | a                 |
| 3.2 Ubatuba-Cubatão                                     | DNER                                 | 110                  | 15                         | 54                            | 1973                     | 1973-75             | b                 |
| 3.3 Third and Fourth Highways Programs                  | DNER                                 | 350                  | 41                         | 140                           | 1972                     | 1972-75             | a                 |
| 3.4 Fifth Highway Program                               | DNER                                 | 260                  | 35                         | 104                           | 1973                     | 1973-77             | b                 |
| 3.5 Sixth Highways Program                              | DNER                                 | 280                  | 38                         | 112                           | 1974                     | 1975-78             | c                 |
| 3.6 Maringá Rolândia Direct Highway Link                | DNER/DER-Paraná                      | 10                   | n.a.                       | 4                             | 1973                     | 1973-74             | b                 |
| <u>Sao Paulo State Highways</u>                         |                                      |                      |                            |                               |                          |                     |                   |
| 3.7 Sao Paulo - Campinas                                | DER-Sao Paulo                        | 89                   | 5                          | 25                            | 1973                     | 1973-75             | b                 |
| 3.8 Sao Paulo - Santos Expressway                       | DERSA                                | 350                  | 10                         | 115                           | 1974 <sup>1/</sup>       | 1974-75             | b                 |
| 3.9 Sao Paulo - Mogi das Cruzes                         | DER-Sao Paulo                        | 45                   | n.a.                       | 25                            | 1973                     | 1973-76             | b                 |
| 3.10 Mogi das Cruzes - Salesópolis                      | DER-Sao Paulo                        | 14                   | n.a.                       | 5                             | 1974                     | 1974-77             | c                 |
| 3.11 Western Highways                                   | DER-Sao Paulo                        | 42                   | n.a.                       | 13                            | 1974                     | 1974-77             | c                 |
| Sub-Total   |                                      | 1,635                | 144                        | 622                           |                          |                     |                   |
| <u>Railways</u>   |                                      |                      |                            |                               |                          |                     |                   |
| 3.12 RFFSA Investment Program                           | RFFSA                                | 1,000                | 250                        | 360                           | 1973                     | 1973-76             | b                 |
| 3.13 FEPASA Investment Program                          | FEPASA                               | 160                  | 34                         | 34                            | 1973                     | 1973-75             | b                 |
| Sub-Total   |                                      | 1,160                | 284                        | 394                           |                          |                     |                   |
| <u>Ports</u>  |                                      |                      |                            |                               |                          |                     |                   |
| 3.14 Purchase of Cranes                                 | DNPVN                                | 12                   | 12                         | 12                            | 1973                     | 1973-75             | a                 |
| 3.15 Wheat Silo for the Port of Santos                  | DNPVN                                | 14                   | 1                          | 10                            | 1973                     | 1973-74             | a                 |
| 3.16 Port of Recife                                     | DNPVN                                | 26                   | n.a.                       | 10                            | 1973                     | 1973-76             | a                 |
| 3.17 Port of Manaus                                     | DNPVN/SUPRAMA                        | 8                    | n.a.                       | 4                             | 1974                     | 1975-76             | c                 |
| 3.18 Port of Santa Cruz                                 | Guanabara State                      | 30                   | n.a.                       | 12                            | 1973                     | 1973-75             | b                 |
| 3.19 Ports of Rio Grande, Paranaguá, Santos and Vitoria | DNPVN                                | —                    | —                          | (See Export Corridor Program) |                          |                     |                   |
| Sub-Total   |                                      | 90                   | 13                         | 48                            |                          |                     |                   |
| <u>Shipping</u>   |                                      |                      |                            |                               |                          |                     |                   |
| 3.20 Naval Repair, ENASA                                | Costeira, SA                         | 39                   | 15                         | 15                            | 1973                     | 1973-74             | b                 |
| 3.21 River Transport - San Francisco River              | CNSP                                 | 8                    | n.a.                       | 4                             | 1973                     | 1973-74             | b                 |
| 3.22 River Transport - Bacia do Prata                   | SNBP                                 | 6                    | n.a.                       | 3                             | 1973                     | 1973-75             | b                 |
| 3.23 River Transport in the Amazon Region               | SUWAMAM                              | 4                    | n.a.                       | 2                             | 1974                     | 1975-76             | c                 |
| Sub-Total   |                                      | 57                   | 15                         | 24                            |                          |                     |                   |
| <u>Airports</u>   |                                      |                      |                            |                               |                          |                     |                   |
| 3.24 Galeao Airport Extension                           | Ministry of Aviation                 | 171                  | 25                         | 95                            | 1972 <sup>2/</sup>       | 1972-74             | a                 |
| 3.25 DACTA Traffic Control System                       | Ministry of Aviation                 | 72                   | 55                         | 72                            | 1972                     | 1973-76             | a                 |
| 3.26 Cumbica Airport - Sao Paulo                        | Ministry of Aviation                 | 60                   | 8                          | 30                            | 1974                     | 1974-76             | c                 |
| 3.27 Manaus International Airport                       | Ministry of Aviation                 | 60                   | 15                         | 25                            | 1972                     | 1972-74             | a                 |
| Sub-Total   |                                      | 363                  | 103                        | 222                           |                          |                     |                   |
| <u>Urban Transport</u>                                  |                                      |                      |                            |                               |                          |                     |                   |
| 3.28 Rio de Janeiro                                     | Guanabara State                      | 30                   | n.a.                       | 15                            | 1973                     | 1973-74             | b                 |
| 3.29 Rio 3 <sup>rd</sup> Avenue Highway                 | DNER                                 | 45                   | 7                          | 18                            | 1973                     | 1974-77             | b                 |
| 3.30 Northern Access to Rio de Janeiro                  | Cia. Metropolitana<br>Rio de Janeiro | 160                  | 25                         | 65                            | 1972                     | 1972-75             | a                 |
| <u>Sao Paulo</u>  |                                      |                      |                            |                               |                          |                     |                   |
| 3.31 Belford Roxo                                       | DER - Sao Paulo                      | 180                  | 8                          | 60                            | 1973                     | 1973-76             | b                 |
| 3.32 Subways  | City of Sao Paulo                    | 500                  | 166                        | 160                           | 1973 <sup>1/</sup>       | 1973-74             | b                 |
| <u>Curitiba</u>   |                                      |                      |                            |                               |                          |                     |                   |
| 3.33 Integrated Transport System                        | Prefeitura Municipal                 | 21                   | n.a.                       | 13                            | 1973                     | 1973-76             | b                 |
| <u>Vale do Pará</u>                                     |                                      |                      |                            |                               |                          |                     |                   |
| 3.34 Vale do Araguaia Urban Corridor                    | UDI-CP                               | 175                  | 30                         | 100                           |                          |                     |                   |
| Sub-Total   |                                      | 1,113                | 230                        | 139                           |                          |                     |                   |
| TOTAL   |                                      | 4,116                | 795                        | 1,705                         |                          |                     |                   |

1/ US\$65 million have already been committed. US\$50 million, remain to be found.

2/ Out of US\$ 95 million, 20 were already committed before 1972.

3/ Out of US\$ 160 million, 110 have already been committed.

Table 41 LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - TELECOMMUNICATION SECTOR

(In million of US\$)

|              | Executing Agency                                       | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disbursement Period | Status of Project |   |
|--------------|--|----------------------|----------------------------|---------------------------|--------------------------|---------------------|-------------------|---|
| 4.1          | Embratel Telecommunication System Extension (II)       | EMBRATEL             | 215.0                      | 42.3                      | 42.3                     | 1974                | 1975-77           | c |
| 4.2          | National Telegraphic Network                           | EMBRATEL             | 18.4                       | 16.6                      | 16.6                     | 1973                | 1973-77           | b |
| 4.3          | Brazil Caribbean Submarine Cable                       | EMBRATEL             | 15.0                       | 14.0                      | 14.0                     | 1973                | 1974-77           | b |
| 4.4          | Alternative Communication Channels                     | EMBRATEL             | 53.4                       | 11.7                      | 11.7                     | 1973                | 1974-77           |   |
| 4.5          | Data Transmission Grid (Phase I)                       | EMBRATEL             | 4.0                        | 3.0                       | 3.0                      | 1973                | 1974-75           | b |
| 4.6          | Automatic Exchange for Message Retransmission (SICRAM) | EMBRATEL             | 6.5                        | 5.2                       | 5.2                      | 1973                | 1973-76           | a |
| 4.7          | International Telephone Switching Exchange Center      | EMBRATEL             | 6.1                        | 6.0                       | 6.0                      | 1973                | 1973-77           | b |
| 4.8          | Second Antenna for Land Transmission                   | EMBRATEL             | 4.0                        | 3.5                       | 3.5                      | 1973                | 1973-75           | b |
| 4.9          | International Telex Computerized Center                | EMBRATEL             | 3.1                        | 3.0                       | 3.0                      | 1974                | 1974-76           | c |
| 4.10         | State Telephone Network Expansion I                    | TELEBRAS             | 1,062.0                    | 159.0                     | 318.0                    | 1973                | 1973-76           | b |
| 4.11         | State Telephone Network Expansion II                   | TELEBRAS             | 1,061.0                    | 157.0                     | 629.0                    | 1974                | 1974-80           | b |
| 4.12         | Telecommunication Control Center                       | DENTEL               | 10.0                       | 8.0                       | 8.0                      | 1973                | 1973-75           | b |
| 4.13         | Improvement of Postal Services                         | MIC                  | 66.0                       | 6.5                       | 33.0                     | 1973                | 1974-76           | b |
| <b>TOTAL</b> |  | <b>2,524.0</b>       | <b>435.8</b>               | <b>1,093.3</b>            |                          |                     |                   |   |

Table 5: LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - WATER AND SEWAGE

(In million of US\$)

|  | Executing Agency | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disbursement Period | Status of Project |
|--|------------------|----------------------|----------------------------|---------------------------|--------------------------|---------------------|-------------------|
| 5.1 Bahia Water Supply   | BNH              | 84.7                 | -                          | 30.0                      | 1973                     | 1973-75             | a                 |
| 5.2 Sao Paulo Water Supply Distribution Network                        | BNH/SAEC         | 52.2                 | -                          | 15.0                      | 1973                     | 1973-75             | b                 |
| 5.3 Sao Paulo Water Supply Main Duct Line                              | BNH/COMASP       | 225.2                | 40.0                       | 37.0                      | 1973                     | 1973-75             | b                 |
| 5.4 Rio de Janeiro Water Supply  | BNH/CEDAG        | 30.0                 | 7.0                        | 10.0                      | 1973                     | 1973-75             | a                 |
| 5.5 Belo Horizonte Sewage Disposable Project                           | BNH/DMAE         | 32.0                 | 5.0                        | 16.0                      | 1973                     | 1973-76             | b                 |
| 5.6 Sao Paulo Sewage System  | BNH/SANESP       | 104.0                | 14.0                       | 20.0                      | 1973                     | 1973-77             | c                 |
| 5.7 Water Supply and Sewage Disposal in Eight District of Minas Gerais | COMAG            | 21.0                 | 10.3                       | 10.3                      | 1974                     | 1974-75             | c                 |
| <u>TOTAL</u>   |                  | <u>549.1</u>         | <u>76.3</u>                | <u>138.3</u>              |                          |                     |                   |

Table 6: LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - AGRICULTURE SECTOR

(In million of US\$)

|   | Executing Agency  | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disbursement Period | Status of Project |
|---|-------------------|----------------------|----------------------------|---------------------------|--------------------------|---------------------|-------------------|
| <b>PIN</b>  |                   |                      |                            |                           |                          |                     |                   |
| 6.1 Maranhao (Alto Turi Colonization)                             | SUDENE            | 12.6                 | 2.0                        | 6.7                       | 1972                     | 1973-78             | a                 |
| 6.2 Colonization Road in West Maranhao                            | STATE OF MARANHAO | 61.0                 | 6.0                        | 20.0                      | 1973                     | 1973-76             | c                 |
| 6.3 Colonization Altamira   | INCRA             | 135.0                | 10.0                       | 60.0                      | 1973                     | 1973-76             | b                 |
| 6.4 Santarem Itaituba   | INCRA             | 42.0                 | -                          | 23.0                      | 1974                     | 1974-78             | c                 |
| 6.5 Northeast Irrigation Program                                  | GEIDA             | 535.0                | -                          | 240.0                     | 1973                     | 1973-80             | b                 |
| 6.6 Northeast Integrated Agricultural Development                 | SUDENE/DVCAS      | 130.8                | -                          | 30.0                      | 1973                     | 1973-76             | a                 |
| <b>PROTERRA</b>   |                   |                      |                            |                           |                          |                     |                   |
| 6.7 Agro-Industry Northeast                                       | IPEA/MINAGRI      | 80.0                 | -                          | 40.0                      | 1974                     | 1974-77             | b                 |
| 6.8 Agricultural Research Project                                 | DNPEA             | 142.0                | 12.0                       | 60.0                      | 1973                     | 1973-77             | c                 |
| 6.9 Reorganization of Northeast Sugar Industry                    | IAA               | 120.0                | 20.0                       | 50.0                      | 1973                     | 1973-78             | b                 |
| <b>Other Projects</b>   |                   |                      |                            |                           |                          |                     |                   |
| 6.10 Flood Control Program  | DNOS              | 185.0                | 20.0                       | 98.5                      | 1973                     | 1973-76             |                   |
| 6.11 Camaqua - Multipurpose Hydraulic Resources Projects          | DNOS              | 50.0                 | 10.0                       | 43.0                      | 1973                     | 1973-81             | b                 |
| 6.12 Soil Conservation in Minas Gerais                            | MG                | 91.0                 | 10.0                       | 45.0                      | 1973                     | 1973-76             | c                 |
| 6.13 Livestock I  | CONDEPE           | 100.0                | 3.0                        | 25.0                      | 1973                     | 1974-78             | b                 |
| 6.14 Livestock II   | CONDEPE           | 153.0                | 3.0                        | 94.0                      | 1974                     | 1974-77             | b                 |
| 6.15 Improved Seeds   | PLANASEM/MINAGRI  | 25.0                 | 5.0                        | 10.0                      | 1972                     | 1972-74             | a                 |
| 6.16 Foot and Mouth Disease Eradication                           | CONDEPE/MINAGRI   | 67.0                 | 10.0                       | 15.0                      | 1973                     | 1973-76             | a                 |
| 6.17 Agricultural Development for Export Crops<br>in Minas Gerais | BDMG              | 99.0                 | -                          | 50.0                      | 1973                     | 1973-75             | b                 |
| 6.18 Terminal Market  | GEMAB             | 68.0                 | 1.3                        | 25.0                      | 1973                     | 1973-76             | a                 |
| 5.19 Fishing Terminal   | MINAGRI/SUDEPE    | 30.0                 | 5.0                        | 15.0                      | 1973                     | 1973-75             | b                 |
| <b>TOTAL</b>  |                   | <b>2,126.4</b>       | <b>96.7</b>                | <b>950.2</b>              |                          |                     |                   |

**Table 7 - LIST OF PROJECTS FOR EXTERNAL FINANCING - THE EXPORT CORRIDOR PROGRAM<sup>1/</sup>**  
 (In millions of US\$)

|  | Executing Agency        | Estimated Total Cost | Foreign Exchange Component | External Financing Sought <sup>2/</sup> /Commitment Date | Probable Disbursement Period | Status  |
|--|-------------------------|----------------------|----------------------------|--|------------------------------|---------|
| <b>First Priority Projects</b>                         |                         |                      |                            |  |                              |         |
| <u>Minas Gerais/Espirito Santo Corridor</u>            |                         |                      |                            |  |                              |         |
| 7.1 Construction of Silos                              | CIBRAZEM                | 3.5                  | n.a.                       | 3.5  | 1973                         | 1973-74 |
| 7.2 New Railway Alignment-Belo Horizonte/Costa Lacerda | DNEF/RFFSA              | 27.0                 | 5.0                        | 23.0   | 1973                         | 1973-74 |
| 7.3 Cold Storage Installation (Vitoria)                | DNPVN                   | 2.0                  | n.a.                       | 1.7  | 1973                         | 1973-74 |
| 7.4 Technical Assistance to Farmers                    | Ministry of Agriculture | <u>3.8</u>           | --                         | --   | --                           | -       |
| Sub-Total  |                         | 36.3                 |                            | 28.2   |                              |         |
| <u>Sao Paulo Corridor</u>                              |                         |                      |                            |  |                              |         |
| 7.5 Construction of Silos                              | CIBRAZEM                | 5.0                  | n.a.                       | 5.0  | 1973                         | 1973-74 |
| 7.6 New Rack Rail on the Sao Paulo/Santos Line         | DNEF/RFFSA              | 20.0                 | 10.0                       | 18.0   | 1973                         | 1973-74 |
| 7.7 Railway Connection MAIA-JURUBATUBA                 | DNEF/RFFSA              | 12.5                 | 3.7                        | 11.0   | 1973                         | 1973-74 |
| 7.8 Cold Storage Installations (Santos)                | DNPVN                   | 12.0                 | n.a.                       | 9.7  | 1973                         | 1973-74 |
| 7.9 Grain Loading Facilities (Santos)                  | DNPVN                   | 17.8                 | n.a.                       | 15.8   | 1972                         | 1972-73 |
| 7.10 Technical Assistance to Farmers                   | Ministry of Agriculture | <u>3.3</u>           | --                         | --   | --                           | -       |
| Sub-Total  |                         | 70.6                 |                            | 59.5   |                              |         |
| <u>Parana Corridor</u>                                 |                         |                      |                            |  |                              |         |
| 7.11 Construction of Silos                             | CIBRAZEM                | 5.0                  | n.a.                       | 5.0  | 1973                         | 1973-74 |
| 7.12 Railroad Itapeva-Ponta Grossa                     | DNEF/RFFSA              | 45.0                 | 15.0                       | 28.9   | 1973                         | 1973-74 |
| 7.13 Rehabilitation of Existing Lines                  | DNEF/RFFSA              | 20.0                 | 3.0                        | 10.0   | 1973                         | 1973-74 |
| 7.14 Grain Loading Facilities (Paranagua)              | DNPVN                   | 12.8                 | n.a.                       | 11.4   | 1972                         | 1972-73 |
| 7.15 Port Silo   | DNPVN                   | 20.0                 | n.a.                       | 18.0   | 1973                         | 1973-74 |
| 7.16 Technical Assistance to Farmers                   | Ministry of Agriculture | <u>2.5</u>           | --                         | --   | --                           | -       |
| Sub-Total  |                         | 105.3                |                            | 73.3   |                              |         |
| <u>Rio Grande do Sul Corridor</u>                      |                         |                      |                            |  |                              |         |
| 7.17 Construction of Silos                             | CIBRAZEM                | 5.0                  | n.a.                       | 5.0  | 1973                         | 1973-74 |
| 7.18 Cold Storage Installations (Rio Grande)           | DNPVN                   | 8.3                  | n.a.                       | 8.3  | 1972                         | 1972-73 |
| 7.19 Grain Loading Facilities (Rio Grande)             | DNPVN                   | <u>16.5</u>          | n.a.                       | <u>16.5</u>  | 1972                         | 1972-73 |
| Sub-Total  |                         | 29.8                 |                            | 29.8   |                              |         |
| <u>Other Projects</u>                                  |                         |                      |                            |  |                              |         |
| 7.20 Railway Rolling Stock                             | DNEF/RFFSA              | 104.9                | 53.0                       | 88.2   | 1973                         | 1973-74 |
| 7.21 Dredging and Port Civil Engineering Works         | DNPVN                   | 14.8                 | n.a.                       | --   | --                           | -       |
| 7.22 Agro-industry                                     | Central Bank            | 125.0                | n.a.                       | 50.0   | 1973                         | 1973-74 |
| 7.23 Demonstration Plots                               | Ministry of Agriculture | 4.0                  | n.a.                       | --   | --                           | -       |
| 7.24 Food Technology                                   | Ministry of Agriculture | 2.0                  | n.a.                       | --   | --                           | -       |
| 7.25 Program Preparation                               | Central Bank            | <u>2.0</u>           | n.a.                       | --   | --                           | -       |
| Sub-Total  |                         | 252.7                |                            | 138.2  |                              |         |
| TOTAL  |                         | <u>494.7</u>         |                            | <u>329.0</u>   |                              |         |
| <b>Second Priority Projects</b>                        |                         |                      |                            |  |                              |         |
| <u>Minas Gerais</u>                                    |                         |                      |                            |  |                              |         |
| 7.26 Railway Rehabilitation                            | DNEF/RFFSA              | 12.5                 | 1.9                        | 6.3  | 1974                         | 1974-76 |
| 7.27 Port of Vitoria Extension                         | DNPVN                   | 24.5                 | n.a.                       | 12.3   | 1974                         | 1974-76 |
| 7.28 Port of Vitoria Silo                              | DNPVN                   | <u>6.0</u>           | n.a.                       | <u>3.0</u>   | 1974                         | 1974-76 |
| Sub-Total  |                         | 43.0                 |                            | 21.6   |                              |         |
| <u>Sao Paulo</u>                                       |                         |                      |                            |  |                              |         |
| 7.29 Port of Santos Grain Silo                         | DNPVN                   | 20.0                 | n.a.                       | 10.0   | 1974                         | 1974-76 |
| <u>Rio Grande do Sul</u>                               |                         |                      |                            |  |                              |         |
| 7.30 Railway Equipment Renewal                         | DNEF/RFFSA              | 23.5                 | 3.5                        | 11.8   | 1974                         | 1974-76 |
| 7.31 New Railway Alignment                             | DNEF/RFFSA              | 42.0                 | 12.6                       | 21.0   | 1974                         | 1974-76 |
| 7.32 Port of Rio Grande Grain Silo                     | DNPVN                   | <u>15.0</u>          | n.a.                       | <u>7.5</u>   | 1974                         | 1974-76 |
| Sub-Total  |                         | 80.5                 |                            | 40.3   |                              |         |
| <u>Other Projects</u>                                  |                         |                      |                            |  |                              |         |
| 7.33 Railway Rolling Stock                             | DNEF/RFFSA              | 72.5                 | n.a.                       | 36.3   | 1974                         | 1974-76 |
| TOTAL  |                         | <u>216.0</u>         |                            | <u>108.2</u>   |                              |         |
| <b>Third Priority Projects</b>                         |                         |                      |                            |  |                              |         |
| <u>Minas Gerais</u>                                    |                         |                      |                            |  |                              |         |
| 7.34 Railway Realignment                               | DNEF/RFFSA              | 58.0                 | 17.4                       | 29.0   | 1975                         | 1975-77 |
| <u>Sao Paulo</u>                                       |                         |                      |                            |  |                              |         |
| 7.35 Railway Connection - Samarita/Piacaguera          | DNEF/RFFSA              | 37.0                 | n.a.                       | 18.5   | 1975                         | 1975-77 |
| 7.36 Port of Santos Warehouses                         | DNPVN                   | <u>4.0</u>           | n.a.                       | <u>2.0</u>   | 1975                         | 1975-77 |
| Sub-Total  |                         | 41.0                 |                            | 20.5   |                              |         |
| TOTAL  |                         | <u>99.0</u>          |                            | <u>49.5</u>  |                              |         |
| <b>GRAND TOTAL</b>                                     |                         | <b>809.7</b>         |                            | <b>486.7</b>   |                              |         |

<sup>1/</sup> As of August 1972. The list of projects has since been slightly revised in its content and priorities.

<sup>2/</sup> This has not yet been identified for the second and third priority projects. We assumed that 50 percent of external financing would be sought.

Table 8: LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - INDUSTRY SECTOR  
(in million of US\$)

|  | Executing Agency         | Estimated Total Cost | Foreign Exchange Component | External Financing Sought | Probable Commitment Date | Disbursement Period | Status of Project |
|--|--------------------------|----------------------|----------------------------|---------------------------|--------------------------|---------------------|-------------------|
| <b>Pulp and Paper</b>  |                          |                      |                            |                           |                          |                     |                   |
| 8.1 Wood Chips   | CVRD                     | 210.0                | 35.0                       | 60.0                      | 1973                     | 1973-74             | a                 |
| 8.2 Pulp Mill - Minas Gerais                                     | CVRD                     | 85.0                 | 25.0                       | 25.0                      | 1973                     | 1973-75             | b                 |
| 8.3 Pulp and Paper Mill - Espírito Santo                         | CVRD                     | 120.0                | 50.0                       | 50.0                      | 1974                     | 1974-78             | c                 |
| 8.4 Pulp and Paper Mill - São Paulo                              | Cia. Suzano de Papel IND | 55.0                 | 6.0                        | 13.5                      | 1973                     | 1973-75             | b                 |
| 8.5 Pulp Mill - Minas Gerais                                     |                          | 50.6                 | 14.3                       | 14.3                      | 1974                     | 1974-76             | d                 |
| <b>Petrochemical and Chemicals</b>                               |                          |                      |                            |                           |                          |                     |                   |
| 8.6 Bahia Petrochemical Complex                                  | PETROQUISA               | 600.0                | -                          | 240.0                     | 1973                     | 1973-77             | e                 |
| 8.7 Methanol-Metanol Ltd.  | BNDL                     | 8.9                  | 3.2                        | 2.1                       | 1973                     | 1973-75             | b                 |
| 8.8 PETROQUISA - Bahia Ammonium Plant                            | PETROQUISA/PETROBRAS     | 65.5                 | 16.4                       | 12.4                      | 1973                     | 1973-74             | b                 |
| 8.9 Nitroflex - ABS Brains                                       | BNDL                     | 17.4                 | 4.7                        | 7.0                       | 1973                     | 1973-74             | c                 |
| 8.10 DTF for Polyester Fibers                                    | PETROQUISA               | 35.0                 | -                          | 14.0                      | 1973                     | 1973-75             | c                 |
| 8.11 PETROQUISA - Copralactama                                   | PETROQUISA               | 45.0                 | -                          | 18.0                      | 1973                     | 1973-75             | b                 |
| 8.12 Fliba Ltd. - Synthetic Fibers                               | BNDL                     | 24.1                 | 9.2                        | 7.0                       | 1973                     | 1973-75             | b                 |
| 8.13 Toluidinedisocyanate - Dupont                               | IND/PRIV                 | 43.0                 | 11.3                       | 12.9                      | 1973                     | 1973-75             | b                 |
| 8.14 Defluorinated Phosphate                                     | IND/PRIV                 | 1.8                  | 0.5                        | 0.5                       | 1973                     | 1976                | c                 |
| 8.15 Sodium Triclophosphate                                      | IND/PRIV                 | 6.8                  | 2.1                        | 2.1                       | 1973                     | 1976                | c                 |
| 8.16 Citric Acid   | IND/PRIV                 | 6.1                  | 3.1                        | 3.1                       | 1973                     | 1973-74             | b                 |
| 8.17 Phosphoric and Sulphuric Acid                               | ICC                      | 34.0                 | -                          | 9.0                       | 1973                     | 1973-75             | b                 |
| 8.18 Soda Ash  | CNA                      | 80.0                 | -                          | 31.0                      | 1973                     | 1973-77             | b                 |
| 8.19 CCC Colofona Carbon Company                                 | COC/BNDE                 | 4.5                  | 0.9                        | 1.8                       | 1974                     | 1974-75             | c                 |
| 8.20 Petroquico Ltd.   | BNDL                     | 5.3                  | 0.5                        | 2.1                       | 1973                     | 1973-74             | b                 |
| 8.21 Salvema - Caustic Soda and Chlorine                         | SUDENE/SALGEMA           | 83.0                 | 14.0                       | 14.0                      | 1973                     | 1973-75             | a                 |
| 8.22 Nova do F1 - Filho Company                                  | BNDL/Nova da F1          | 17.3                 | 7.2                        | 5.5                       | 1973                     | 1973-74             | b                 |
| 8.23 Tires - Companhia de Pneus Tropical                         | SUDENE                   | 25.0                 | 8.0                        | 8.0                       | 1972                     | 1973-75             | a                 |
| <b>Steel</b>   |                          |                      |                            |                           |                          |                     |                   |
| 8.24 USIMIN - Bahia Steel  | CONSIDER                 | 42.1                 | 9.0                        | 9.0                       | 1973                     | 1973-75             | b                 |
| 8.25 Mendes Junior Steel Plant                                   | CONSIDER                 | 40.0                 | 12.0                       | 3.0                       | 1973                     | 1973-76             | b                 |
| 8.26 COSIM - Mogi das Cruzes - Steel Plant                       | CONSIDER                 | 45.3                 | 10.9                       | 9.2                       | 1973                     | 1973-75             | b                 |
| 8.27 GUARÁ Ltd.. - Steel Plant                                   | CONSIDER                 | 31.6                 | -                          | 15.0                      | 1974                     | 1974-77             | c                 |
| 8.28 COFAPI - Non-Plant Finished Products                        | CONSIDER                 | 54.4                 | -                          | 12.6                      | 1973                     | 1973-75             | b                 |
| 8.29 ANAMANGA Steel Ltd.   | CONSIDER                 | 30.1                 | 9.7                        | 7.4                       | 1973                     | 1973-75             | b                 |
| 8.30 CSMH Semi-Finished and Non-Plant Steel Product <sup>a</sup> | CONSIDER                 | 156.3                | 13.1                       | 11.2                      | 1973                     | 1973-77             | b                 |
| 8.31 ACESITA Ltd. - Special Steel                                | CONSIDER                 | 62.2                 | 62.2                       | 62.2                      | 1973                     | 1973-76             | b                 |
| 8.32 COSTUSA - Non-Plant Products (Phase II)                     | CONSIDER                 | 77.9                 | 15.7                       | 13.3                      | 1973                     | 1973-77             | c                 |
| 8.33 Iron Ore Pelletizing Plant                                  | IND/PRIV                 | 40.4                 | 12.0                       | 12.0                      | 1972                     | 1972-77             | c                 |
| 8.34 Iron Ore - Pellet Plant (PELPA)                             | PERTECO                  | 68.2                 | -                          | 68.2                      | 1973                     | 1973-75             | c                 |
| 8.35 IND/PRIV  | IND/PRIV                 | 23.0                 | 13.4                       | 13.4                      | 1973                     | 1973-75             | b                 |
| 8.36 Ferro-Manganese and Silicomanganese Plant                   | IND/PRIV                 | 3.5                  | 1.2                        | 1.2                       | 1973                     | 1973-75             | b                 |
| 8.37 Ferro-Silicon and Elemental Silicon Plant                   | IND/PRIV                 | 4.9                  | 2.1                        | 2.1                       | 1973                     | 1973-76             | c                 |
| 8.38 Foundry Tupy Ltd.   | IND/PRIV                 | 27.5                 | -                          | 11.0                      | 1973                     | 1973-76             | c                 |
| 8.39 Minas Gerais Foundry Shop                                   | IND/PRIV                 | 9.0                  | -                          | 3.6                       | 1973                     | 1973-76             | c                 |
| 8.40 Forge Shop in Minas Gerais                                  | IND/PRIV                 | 10.7                 | 2.0                        | 2.0                       | 1973                     | 1973-77             | c                 |
| <b>Mining and Ore Processing</b>                                 |                          |                      |                            |                           |                          |                     |                   |
| 8.41 CPRM Potassium/Magnesium                                    | CPRM                     | 80.0                 | -                          | 32.0                      | 1974                     | 1974-75             | c                 |
| 8.42 PRIVATE FIRM  | PRIVATE                  | 125.0                | 35.0                       | 35.0                      | 1975                     | 1975-76             | c                 |
| 8.43 Iron Ores   | CVRD                     | 700.0                | 260.0                      | 160.0                     | 1974                     | 1974-75             | c                 |
| 8.44 Nickel Extraction Project                                   | BANBICO                  | 250.0                | -                          | 100.0                     | 1974                     | 1974-75             | c                 |
| 8.45 Iron Ores - Faber   | PERTECO                  | 17.0                 | -                          | 17.0                      | 1973                     | 1973-74             | b                 |
| <b>Non-Ferrous Metal and Metallurgy</b>                          |                          |                      |                            |                           |                          |                     |                   |
| 8.46 Aluminum Extruder - Minas Gerais                            | IND/PRIV                 | 2.8                  | 0.5                        | 0.5                       | 1973                     | 1973-75             | b                 |
| 8.47 Compabita Brasileira de Alumínio                            | PRIVATE                  | 25.0                 | -                          | 10.0                      | 1973                     | 1973-75             | b                 |
| 8.48 Zinc - Companhia Mineira de Metais                          | IND/PRIV                 | 21.7                 | -                          | 9.0                       | 1973                     | 1973-75             | b                 |
| 8.49 IND - Precision Screws                                      | IND/PRIV                 | 7.3                  | 1.0                        | 1.0                       | 1973                     | 1973-75             | b                 |
| 8.50 Aluminum and Copper Conductors                              | IND/PRIV                 | 9.1                  | 1.4                        | 2.9                       | 1973                     | 1973-76             | b                 |
| 8.51 Electrolytic Zinc   | IND/PRIV                 | 13.9                 | 1.0                        | 1.0                       | 1973                     | 1973-75             | b                 |
| 8.52 Transistor Plant  | IND/PRIV                 | 2.3                  | 0.6                        | 0.6                       | 1973                     | 1973-75             | b                 |
| <b>Building Materials</b>  |                          |                      |                            |                           |                          |                     |                   |
| 8.53 Cement Portland   | BNDL                     | 51.6                 | 16.0                       | 18.7                      | 1972                     | 1972-73             | c                 |
| 8.54 Cement Soiocom  | BNDL                     | 60.6                 | 16.1                       | 14.4                      | 1973                     | 1973-74             | c                 |
| 8.55 Ceramic Pipe Plant  | IND/PRIV                 | 2.4                  | 0.6                        | 0.6                       | 1973                     | 1973-74             | c                 |
| 8.56 Floor Tiles - IND/PRIV                                      | IND/PRIV                 | 3.0                  | -                          | 0.8                       | 1973                     | 1973-74             | c                 |
| 8.57 Sheet Glass - IND/PRIV                                      | IND/PRIV                 | 7.4                  | 1.0                        | 1.0                       | 1973                     | 1973-74             | c                 |
| <b>TOTAL</b>   |                          | <u>3,699.6</u>       | <u>720.2</u>               | <u>1,395.2</u>            |                          |                     |                   |

Table 9: LIST OF PROJECTS SUITABLE FOR EXTERNAL FINANCING - MISCELLANEOUS

(In millions of US\$)

|                                       |   | Executing Agency/Sponsor         | Estimated Total Cost | Foreign Exchange Component | External Financing | Probable Commitment Date | Disbursement Period | Status of Project |
|---------------------------------------|---|----------------------------------|----------------------|----------------------------|--------------------|--------------------------|---------------------|-------------------|
| <u>Health</u>                         |   |                                  |                      |                            |                    |                          |                     |                   |
| 9.1                                   | Expansion of Sao Paulo Public Health Services | Sao Paulo State Government       | 51                   | 7                          | 10                 | 1973                     | 1973-75             | (b)               |
| 9.2                                   | Santa Catarina Health Project                 | Santa Catarina State Government  | 12                   | 4.5                        | 4.4                | 1973                     | 1973-75             | (b)               |
| <u>Regional and Urban Development</u> |   |                                  |                      |                            |                    |                          |                     |                   |
| 9.3                                   | Vale do Ribeira Integrated Development Plan   | SUDELPA                          | 34                   | 7.5                        | 7.5                | 1973                     | 1973-75             | (b)               |
| 9.4                                   | Industrial District of Curitiba               | Prefeitura Municipal de Curitiba | 41                   | 12                         | 12                 | 1973                     | 1973-75             | (b)               |
| 9.5                                   | Regional Park - Iguacu                        | Prefeitura Municipal de Curitiba | 6                    | -                          | 3                  | 1973                     | 1973-75             | (b)               |
| <u>Mapping</u>                        |   |                                  |                      |                            |                    |                          |                     |                   |
| 9.6                                   | Cartographical Equipment                      | IBGE/IBG                         | <u>9</u>             | <u>4.5</u>                 | <u>3</u>           | 1973                     | 1973-75             | (b)               |
|                                       | TOTAL   |                                  | 153                  | 35.5                       | 39.9               |                          |                     |                   |