

Picard 1982

The Grande Carajás Program

The internationalization of the Amazon

By IBASE

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This article looks at the pattern of internationalization inherent in the Carajás Program, its internal logic and consistency with other government programs. It also tries to point out alternative solutions.

This paper is the result of a teamwork by workers of IBASE, made as a contribution to the discussion of the Carajás Project.

So, this is a preliminary paper open to criticism and suggestions. IBASE will continue these efforts, going more deeply into the discussion of this subject in order to produce a more complete file on the "Grande Carajás Program".

We very much appreciate the critics, suggestions and contributions already given or still to be given on this paper. Please write to: IBASE, Rua Vicente de Souza, 22 251 Botafogo, Rio de Janeiro (RJ), Brasil.

Translation by Hillevi Nilsson p 51-56, all other material by IBASE.

There is a need for information and analysis on Brazilian reality which can offer an alternative to official statements, and promote the interests of a democratic society.

In the beginning of the eighties, the most important development projects in Brazil are the "Grande Carajás Program" and the "Energy Mobilization Program". The internal logic of conception and the means of implementation of these two projects must be thoroughly analysed. There is also a need for alternatives to break the monopoly of governmental information and decision, and to promote the democratic institutions of the Brazilian society.

The intention of this document on the "Grande Carajás Program" is to contribute to national efforts of meeting the people, solving the real problems and using the potentialities. Setting out from the identification of a pattern of internationalization in the program, its internal logic and consistency with other governmental actions are recognized. This document tries to point out alternative solutions.

AIMS OF THE PROGRAM

By law Decree No 1813 of 24.11.80 the Brazilian government established special incentives for enterprises included in the "Grande Carajás Program" to be developed in the region north of the 8th southern latitude between the rivers of Amazon, Xingu and Paranaíba, comprising parts of the Pará, Goiás and Maranhao provinces.

The Interministerial Council of the "Grande Carajás Program" was created through Decree No 85 387 of 24.11.80. It is composed of eight ministries (SEPLAN, Mining and Energy, Transport, Industry and Commerce, Interior, Finance, Agriculture, Labour) and led by the Minister of SEPLAN. It has great normative and executive judiciary power in the implementation of the Grande Carajás Program.

The instruments establishing the institutional basis of governmental action can be constitutionally disputed. In addition – apart from the promoting documents edited by the government – the ministers and top federal authorities have put forward a set of ideas, notions and projects which endorse the opinion of the Government on the development pattern of Eastern Amazon, taking advantage of its riches and potentialities.

The creation of the program and the definition of its institutional basis exhibit the old and well known signs of authoritarianism, centralization and lack of democratic control. All programs of public enterprises during these last decades exhibit the same signs. But it is something new that this happens at a time when the Brazilian society could assume an active and responsible role in the development process and take advantage of its results.

The first meeting of the Interministerial Council, held on 04.08.81, issued Resolution No 01, establishing a general policy and the criteria to be observed when evaluating and approving different enterprises within the "Grande Carajás Program". It is made up of "consideranda" and thirteen articles, with quite unclear wording. They emphasize the importance of obtaining external financial funds, giving no explicit priority to Brazilian national, private or state enterprises.

A more explicit picture of governmental opinion is given by speeches and interviews. From these the aims can be summed up as follows:

- a) **Exploitation** of the natural resources of the region (energy, mineral, agriculture and forest) as fast as possible, without bothering at all about a maturity process of the ideas and projects. Such a process is needed to use the resources rationally.
- b) **Exportation** of the products to balance Brazil's heavy national debt to foreign countries. There is no real perspective of integrating this sector into the national economy: neither into sectors which

CVRD copper mine at the Salobo 3A property, exploited by the CVRD subsidiary Docegeo.



are producing the same kind of goods, nor into the domestic consumer market.

c) Intense use of **external resources (funds)** to create productive enterprises, making it easier for foreign interests to profit by exploitation of Brazilian riches and workers. Furthermore, important parts of the decisive power on important economic sectors will be lost, and it will not be possible to use the internal surplus from private, national or state enterprises rationally.

DIMENSIONS OF THE PROGRAM

(Text included in Vol I of "Plano Preliminar de Desenvolvimento da Amazonia Oriental", Preliminary Development Plan for Eastern Amazon - CVRD - April 1981).

There are enormous quantities of natural resources in Eastern Amazon region, the most important being:

- **Minerals:** iron, copper, gold, aluminium, manganese, nickel and tin.
- **Hydraulic power:** great possibilities for hydroelectric exploitation.
- **Forests:** great disposability of biomass for generating energy and reducing for metallurgic purposes.

There are also good conditions for live stock breeding and forestry in the region.

Important investments in the infrastructure of Eastern Amazonia have already been done:

- **Network of roads:** the Trans-Amazon: east-west, and the Belém-Brasilia highway: north-south.
- **Railways:** a railway of 890 kilometres connecting Serra dos Carajás with Sao Luis, the capital of Maranhao, is being built.
- **Sea Harbours:** Itaquí, a commercial harbour for ships of 60 000 DWT, in Sao Luis; Ponta da Madeira, a pellet terminal for ships of 280 000 DWT, in Sao Luis.
- **River harbours:** Barbacena, in Pará, for ships of 50 000 - 60 000 DWT.
- **Electric energy:** the power plant of Tucuruí, on the Tocantins river is in its first phase will have a capacity of 1 000 MW.

The construction of dams in Tucuruí will make sailing by smaller ships possible in the river Tocantins. This creates new transport possibilities for inland production. The navigable passage will increase considerably when the building of the power plants on the rivers of Araguaia and Tocantins (Santa Isabel, Santo Antonio and Carolina) is finished. Generally, this means that there will be two fundamental transport systems connected with each other: the railway system and the river transport system.

Simultaneously, some large metallurgic projects are being started up soon in the Eastern Amazon:

- **Mineração Rio do Norte:** Exportation of 3,4 million tons bauxite/year. (Already operating.)
- **CVRD-Ferro Carajás:** Production of 35 million tons iron ore/year.
- **ALUNORTE:** Production of 800 000 tons aluminium/year.
- **ALBRAS:** Production of 320 000 tons aluminium/year.
- **ALCOA:** Production of 500 000 tons alumina/year and 100 000 tons aluminium/year.

On the basis of existing natural resources, the projects have been classified in four categories:

- Mineral-metallurgic
- Forestry
- Agriculture
- Live stock breeding

Two project groups in the mineral-metallurgic category were considered:

Group I

Based on the market of:

- copper/gold
- bauxite/alumina/aluminium
- iron/nickel
- iron/manganese alloys
- pig iron
- tin concentrate

Group II

Based on new localization trends considering the difficulties of industrialized countries in terms of increasing energy and salary expenses, pollution, etc. The

extremely good conditions of Eastern Amazon in this respect would attract new export enterprises. In this context, there are possibilities of expanding the projects of iron alloys (nickel and manganese), of pig iron and of bauxite/alumina/aluminium. But there are also possibilities of starting up new projects:

- Sintering of iron ore
- Electrically made pig iron and sponge iron; coke
- Half-finished steel
- Metallic silicon

So far, these projects are mere working hypotheses to be studied.

There are seven economic and industrial *basic centres*: Sao Luis, Barbacena, Paragominas, Tucuruí, Marabá, Carajás and Sao Félix do Xingu.

About US\$ 40 billion will be needed to carry out this plan. On the other hand, annual revenues will be about US\$ 17 billion, as is shown on page 55.

Total investments foreseen in this plan amount to US\$ 61,7 billion, of which 36 per cent is intended for infrastructure.

The accomplishment of this plan would create over one million jobs. 93 per cent of those jobs would be in the categories of agriculture, live stock breeding and forestry.

A CRITICAL READING

The dimension of investments in the "Grande Carajás Program" and the stress on economic "national salvation" in official statements tend to consider the program as a "logical" set of projects, to be carried out as fast as possible.

The urgency is justified by the need to use opportunities created by the difficulties of rich nations to get cheap energy and to get around the rigid control against pollution in their own countries. If the Eastern Amazon offers cheap energy and a liberal legislation against pollution, it would be the ideal site for enterprises consuming a lot of energy or causing pollution. This kind of short-sighted attitude is not a new one. It was part and parcel of earlier

programs and projects approved by the Government – even for the Amazon region. But the dimension of the Carajás program and the investments are new.

A critical reading of the program is needed to investigate *how the factors of production are linked and what role existing or newly created institutions are playing*. This reading should evaluate which measures the authorities have taken and which political omissions they have made. This will make it possible to get a realistic view instead of an official.

a) The enterprise

The pace and the dimension of investments in the industry, forestry, agriculture and live stock breeding sectors will necessarily *introduce large enterprises controlled by foreign stockholders*.

As a matter of fact, the industrial projects demand such financial resources that it will be "logical" to invite multinationals. It has already been stated that the state will only participate financially in the iron ore project and that domestic companies are facing serious financial difficulties for the time being. Delegations have been sent abroad openly inviting foreign capital. Nothing has been mentioned about market reservation in favour of truly domestic companies with head-offices in Brazil. Resolution No. 01 from the Interministerial Council does not even foresee national control of small and medium enterprises.

According to the plans, ranches for cattle breeding should have areas of 10 000 hectares with turnovers of US\$ 5,77 million/ranch. Production is directed towards foreign markets and there are no proposals on cooperatives. Everything tends to point to large companies controlled by foreign capital as the "logical" solution.

This makes the program an invitation to big multinational companies or joint ventures controlled from abroad. They will get guaranteed rights of land, mining and cheap manpower. They will even get support when using foreign financial resources and when unnecessarily importing equipment and technology. Such linking of the factors of production could be efficient in regard to the costs, but it is highly undesirable because the profits are made abroad or exported, the head-offices being located outside Brazil.

There is also a danger of aggravating the existing social unbalance, if the migration provoked by the program is not sufficiently studied and taken into account.

b) The technology

The technology and techniques to be used will be coming from abroad, implying dependence. The initial document of the Interministerial Council openly speaks of the "introduction of techno-

Direct investments – Potential projects US\$ billion

Category	Investment	Annual Revenue
Mineral-metallurgic	28,1	9,2
Forestry	1,3	0,6
Agriculture	8,1	6,5
Live stock breeding	1,7	0,7
TOTAL	39,2	17,0

Indirect investments – Infrastructure US\$ billion

Specification	Investment	Annual Revenue
Mineral metallurgic category		6,8
Sao Luis	3,3	
Barbacena	0,2	
Paragominas	1,4	
Tucuruí	0,3	
Marabá and Minipólos along the railway Carajás, Vermelho, Salobo, Azul and Sao Félix do Xingu	1,2	
Agriculture, live stock breeding and forestry categories		13,3
Others		2,4
TOTAL		22,5

logy" as an important reason for inviting foreign companies. This means that the Council is unaware of all technological efforts in our own country. It does not appreciate these efforts, nor does it recognize the importance of our national institutions — enterprises, universities, scientific institutes — which are able to carry out intense programs of research and technological development on mineral and natural resources of the region. As there are enough machines and other capital goods in our country to meet almost every demand of the projects, and as our balance of payments is negative, it is surprising that there has neither been any decision on maximum use of domestically produced machines and equipment, nor on minimum levels of nationalization of equipment.

c) Financial resources and institutions

The financial resources cannot be analysed as pure factors of production. Their role is more important: *they articulate and structure all other factors*, because financial structures, incentive systems and tax exemptions determine the accomplishment of the projects and are part of the decision making.

Incentive and exemption systems have to be regarded as a financial resource flux which is not used by society as a whole but put aside to favour a project or an enterprise.

The rules for financial incentives and exemptions defined so far, are very vague. Hazard seems to be the principal rule. There is no rule of admitted maximum of foreign resources. There is no domestic financial agent of the program. But there are enormous efforts to "sell" the program abroad and to get participation by international financial and technical organizations. And the incentives do not favour domestic enterprises.

There is a pressure to speed up the accomplishment of the program, to make deals on "project reservations", on loans from abroad and on incentive concessions as soon as possible.

The potential domestic resources are unknown, because of the hurry, and because our national financial institutions have to carry through all permanent national objectives as well. By permitting immoderate use of foreign capital and accidental use of incentives and exemptions on equal basis for domestic and foreign companies, there is in fact a drive to internationalize the program and make deals which will influence the future. They will export profits, and there are the payments of financial costs and services of all kinds (known as "invisible" in commerce). All this will be guaranteed by international financial institutions acting in favour of foreign interests.

d) The state: the Federal Government

The state has two functions: *to provide basic and social infrastructures* (including urban centres and industrial districts) and *to provide financial incentives*. The Interministerial Council was created to coordinate all institutions which are going to build infrastructures and deal with incentives. No participation by any other members — representatives of other authorities (legislative, judiciary) or representatives of other sectors (employers, employees, workers, etc) — is admitted.

Tax exemptions have already been granted for three projects: Ferro-Carajás, Alunorte and Albrás. For Alunorte and Albrás there is a recommendation of exemption from the "freezing" of all loans from abroad (Declaration Acts of 04.08.81). All these projects are designed for exportation.

The most serious case of subventions took place before the creation of the Council, in the field of electricity. It is known that Eletronorte has made agreements on electricity supplies with several companies, including Alcoa. These agreements benefit the industrial consumers very much. But energy costs are increasing. Therefore, our society as a whole will have to pay the difference between costs and selling-prices. Notwithstanding, these kinds of decisions are

made without any process of democratic control.

So, at the institutional level the Council and others have *centralizing* characteristics. This is shown by the fact that the Minister of SEPLAN is given greater decisive power (Decree 85 387 — Article 1 — § 2) and that the function of "exercising the tasks of federal administrative institutions and authorities" are allotted to the Council "directly or through proper executive institutions" (Law Decree 1813 — Article 3 — § 1).

Without any doubt, this centralization is designed to simplify and hasten the internationalization process and the transfer of legal benefits and profits from the Amazon to foreign countries. Through Decree 85 387 the enterprises of the program are granted "preferences from federal administrative authorities", particularly concerning "authorization, issuing of documents and granting of financial means for exportation"; "authorization and issuing of documents for importing machines, equipment", etc; "authorization of loans abroad, including loans to pay goods and services abroad"; granting of national guarantees by public financial institutions for loans abroad".

The decision making of the Council itself is unknown. But there is no sign of internal discussions. On the contrary: all signs indicate that the Council is "a forum for approving proposals forwarded by the Executive Secretariate" with "administrative and technical support" from SEPLAN. So far, there have been no initiatives of getting participation from other governmental authorities in regard to approving, analysing or supervising the projects and programs. This means that *the decision making is closed and lacking participation even within circles of the Federal Government*.

The Government has neither been given the task of promoting research projects, nor of coordinating domestic groups of enterprises, of using technology from our own country, or of coor-

dinating domestic financial resources. In other words, the Government has not been given the task of planning, stimulating, supporting and coordinating domestic resources. This "passive" attitude is outstanding when confronted with the efforts made by countless delegations sent abroad proposing studies and research and contacting foreign financial groups and banks.

In short, the role of the state is that of supplying infrastructures, subsidies and incentives in order to favour the external sector of the economy. It has not been given the role of coordinating domestic resources of our country.

e) Society in general

Society in general plays no role whatsoever. There are no possibilities for its participation in formulating and implementing the "Grande Carajás Program".

PROBABLE CONSEQUENCES

The policy adopted in this program — the form and rhythm for its implementation — and the attitude of very important sectors of the government, will have consequences which are easy to predict.

These consequences can be negative to Brazilian interests, endangering both sovereignty and national integration, as well as a development which is economically and socially balanced, independent and self-sufficient.

a) Internationalization

The first consequence will be the *internationalization* of the so-called Eastern Amazon. Given the physical, geographic and environmental characteristics of the entire Amazon region, the manner in which its "entryway", the Eastern Amazon, is settled will undoubtedly condition the process and the form by which the region as a whole will be incorporated.

The immensity of the region, the difficulties of its inhospitable environment and the present stage of Brazil's development have not allowed for its full integration with the rest of the country.

The ties and links that unite us are tenuous, and it is likely that without special efforts they will not resist the competitive onslaught of other cultures and dominant economies.

Strategically the region is located equidistant from Europe, Africa and North America, and next door to the effervescence of Central America, and its internationalization will certainly deprive Brazil of the possibility of taking geopolitical or economic advantage of this situation.

Finally, we should mention the risk of negative consequences of unforeseeable connotations for the Brazilian nation as a result of the internationalization of such a strategic region. Transformation of the area into a Territory or Province could be a first step in this direction.

b) Enclaves

A second consequence will be the formation and implantation of *foreign socio-economic enclaves* inside the Brazilian economy and territory. Indeed, the incentives and facilities offered or created by the government, the sheer dimensions of the project and the difficulties presented by the region will certainly confer an extraordinary degree of autonomy to initiatives controlled and directed by foreign or transnational capital.

This autonomy will be exercised in the conceptualization of the projects, in investment and construction schedules, in decisions regarding which markets are to be served by the production, in the setting of prices and terms of sale, and in the appropriation of the benefits. All this will be decided and agreed upon beforehand, attending exclusively the foreign interests involved. This new form of colonialism already has precedents such as the

Jari Project, which has now confirmed and materialized the risks foreseen and pointed out before its implementation.

c) Immediatism and predatory exploitation

The region's hydro-electric potential, the mineral veins and deposits already prospected and identified, the possibilities for intensive and extensive agricultural undertakings, the investments in physical infrastructure already made or underway — these elements together make up the most important and promising set of projects ever imagined or projected for any region of the country. Given their characteristics, the implementation of these projects along with the rational and integrated settlement of the Amazon, beginning at its eastern end, could be the most significant shot in the arm to be given to the country's economic and social development over the next two to three decades. Yet the government's exacerbated preoccupation with short-range and conjunctural aspects rejects this broader integrationist perspective and *precipitates the undertaking of projects and the assumption of foreign commitments*, without full knowledge of what exists in the region and without allowing ideas to fully ripen.

In the case of the Amazon this is particularly serious. Its environmental characteristics — a humid tropical climate, land poor in nutrients and a thin layer of fertile soil — forecast the destruction of its agricultural potential unless appropriate techniques are adopted, including forest management systems. This demands study, research and time. At the same time, open-pit mining and the concentration and processing of heavy metals demand special attention to avoid pollution of rivers and the destruction of their hydro-electric potential. Such care requires much study and major investments.

Project schedules are being stepped up and there is a rush to negotiate the entry of foreign capital — often with-

out complete knowledge of what is being negotiated. Stages necessary to a balanced implementation are being lightly skipped over and the future is being pawned for short-term results. The outcome will be inevitable: predatory exploitation of natural resources, the likelihood of ecological deterioration, the infeasibility of the country's economic and social development during the coming decades, the virtual impossibility of participation by Brazilian companies in the program and the aggravation of present social imbalances.

THE STRATEGY BEHIND GRANDE CARAJAS

The logic of the government's strategy is to overblow the dimensions of the foreign debt problem and to step up the Grande Carajás schedule through the internationalization of the region. No advantage is to be taken of the country's internal capacity, nor of the technological and management efforts of investments already made — mainly by the State itself. The region's economic and social imbalances are thus maintained and aggravated, and its integration with the rest of the country ignored.

a) Emphasis on the external sector

The struggle to overcome the balance of payments deficit and the payment of Brazil's foreign debt obligations (which now total nearly US\$60 billion) are the prime concern of the government's economic policies.

In late 1980, prospects of difficulties in obtaining financing for the 1981 balance of payments deficit prompted the government to intensify its policy efforts to overcome the unfavorable situation.

At the time, the possibility of obtaining resources from the International Monetary Fund was mentioned, along with the concomitant adoption of orthodox economic measures recommended by that agency. After some discussion within government circles the

position adopted was to avoid turning to the IMF. Yet, significantly, orthodox measures to control the economy were adopted, particularly a drastic restriction of credit and government spending cutbacks, in order to reduce inflation and encourage the entry of foreign resources.

The Grande Carajás Project fits directly into this context and vision. It is to be the instrument by which the necessary foreign resources will be raised.

Foreign indebtedness is indeed a serious problem, but it is perfectly manageable in the medium to long run, without resort to measures which compromise the Nation's economic future.

Brazil's GDP is nearly US\$230 billion today, with the external sector accounting for little more than 10 per cent of the total. The economy as a whole presents an appreciable degree of integration; it possesses a modern productive structure; the labor force is abundant, young and skilled; there is a reasonable availability of natural resources; and the internal market is fairly large and dynamic. Under such conditions, there is no way to justify recessive measures resulting in high unemployment rates and the disarticulation of productive activities, along with the denationalization of the economy and the interruption of the country's development process. Although all sectors of the economy depend to some degree on imports, the capacity of our internal resources and markets is far from exhaustion.

Nor can the country's entire future be compromised, specifically the economic use and the rational and integrated settlement of the Amazon, in order to obtain the resources necessary to meet foreign obligations.

b) Stepped-up schedules

In addition, the projects are still at an early stage of planning. Aside from the Tucuruí hydroelectric plant, which is already at an advanced stage of construction, only the Iron Project of the Vale

do Rio Doce Company (mine, railroad and port) and the Albrás and Alunorte projects (joint CVRD/Japanese) are anywhere near presenting conditions for implementation. All the rest — mineral extraction, iron processing (sinter, pig iron, steel), agricultural projects and the construction of infrastructure — still demand considerable research (geological, technological and pedological) and study to bring them off the drawing board. Thus, despite all the facilities and incentives being offered, it will be impossible to carry out the investments (much less increase the country's foreign reserves) in the near future, at the accelerated rhythm called for by the government. The physical and natural conditions for skipping necessary stages simply do not exist. Why then such an unconditional rush to procure multinational capital for these projects if not to assure an open field to the foreign groups' participation?

c) Domestic capacities

Having completed its cycle of heavy investments in the capital goods and basic inputs sector, Brazil offers a complex and relatively integrated industrial park, which is both modern and quite competitive internationally. It is both necessary and possible to take advantage of this capacity. A real strategy for development would seize this opportunity to begin a new investment cycle that could carry the country's economy to new levels of integration and efficiency. Indeed our number-one development alternative, based on our needs and potential, is to invest in non-oil energy resources and to adapt consumption patterns accordingly, if we are to overcome our present difficulties and redimension the country's energy matrix. There must also be investments in the opportunity now presented to deploy the mineral and natural resources available in the Carajás region to supply the domestic market and integrate its riches into the economy's productive process. In this

sense, Carajás is one of Brazil's most valid and promising investment opportunities.

The country possesses the means to supply the Program's financial resources, with foreign resources taking a subordinate position. Even calculating investments of US\$62 billion, but on the realistic basis of a 20-year period for their implementation, US\$2-3 billion would need to be invested per year. Taking the present GDP of US\$230 billion, and conservatively assuming a zero growth rate and a 20 per cent savings rate (in the not-too-distant past we had a 25 per cent rate; and Japan saved consistently more than 30 per cent during the 1960s), the investment required to implement the program will be equivalent to between 4-6 per cent domestic savings.

This will demand tremendous, but not impossible, efforts, considering the dimensions and characteristics of our economy during the 1980s and 1990s. Yet the execution of the Kubitschek government's development plan in the 1950s, as well as the import substitution programs for basic input and capital goods during the 1970s demanded even greater efforts.

Once again it is clear that there is no need to rush into the unconditional contracting of multinational capital to carry out the Grande Carajás Project.

d) Technological control

The Program's proposed mineral and industrial projects all correspond to areas which the country has had great experience in developing. The technology necessary for their implementation is thus completely integrated and available from Brazilian private and state corporations, leaving no need for multinational participation in this aspect of the Program. Several examples follow:

e) The efficacy of the "export" model

Innumerable previous examples have

shown that, systematically, projects under the command or strong influence of foreign capital depend to a high degree on imported equipment. In some cases the foreign capital depend to a high degree on imported equipment. In some cases the foreign equipment supplier is actually the same group undertaking the project in Brazil, or another closely tied to it, and the sale of these items is an indispensable part of the generation of the very resources to be applied in the project as risk capital. In any case, Brazil possesses an enormous, modern and capable equipment industry which was installed recently and as yet remains largely idle. *It is therefore mandatory that no thought be given to importing equipment for the Grande Carajás Project*, aside from a very few exceptional items, if we are to avoid exporting capital in exchange for machinery that could be produced here.

Projects controlled and directed by multinational capital will probably seek captive markets, thus reducing the in-

vestment's microeconomic risks and justifying a financial structure largely dependent on third-party resources. Such projects rarely show a debt/equity ratio below 70:30, thus implying a significant growth of foreign indebtedness and the obvious need for the generation of resources, within Brazil, to meet the growing debt. With a net resource entry of merely 30 per cent, we will once again be expatriating our financial resources.

The basic and immediate motivation behind multinational investments in projects such as Carajás resides in the promise of using a small investment, sheltered by abundant government incentives and benefits, to assure control over a secure, permanent and low-priced source of raw or semi-processed materials. In these consumer's partnerships, the partner's interest lies more in the flow of raw materials and inputs assured by their stock participation than in the flow of dividends that might result. Thus, the prices will always be contained at the lowest possible level; it is enough that the com-

Project	Technology controlled by
Iron ore (mining, railroad, port)	Cia. Vale do Rio Doce
Copper/Gold	Carajás Metais/CEPED (Ba)
Bauxite/Alumina/Aluminum	Votorantim Group (C.B.A.) Cia. Vale do Rio Doce
Iron-nickel	Votorantim Group (Cia. Níquel do Tocantins) Prometal Group
Iron-manganese alloys	Cia. Siderúrgica Nacional Sibra Prometal Group Cia. Paulista de Ferro-Ligas
Blast furnace pig-iron	Hundreds of pig-iron plants in Minas Gerais ACESITA/Pains/Aliperti/CIMETAL
Tin concentrate	Brumadinho Group Metropolitana Group
Sinterization, BFER pig-iron, sponge iron, coke, semi-finished steel	Siderbrás Group Piratini/Usiba Gerdau Group Agrima/Natron
Metallic silicon	Liasa (MG)

pany's survival be assured, with no concern to be given to profits or dividends, since the foreign investors' own invested resources are minimal and their interest as the "buyer" of the output prevails over their interest as partners. *Capital accumulated from production is not realized in Brazil, in the producing company; it takes place abroad, in the buying company.*

These three aspects — high rates of equipment imports, low investment of risk capital and artificially low prices for the raw materials and inputs to be produced — characterize what we call the efficacy of the internationalization model. The net inflow of reserves will certainly be less than current projections and, what is worse, profitability will also be low, and will be appropriated by the foreign sector.

f) The maintenance of imbalances

Infrastructure investments represent nearly a third of the US\$22 billion overall Carajás investment program, not counting what the government has already invested in the region. In addition, tariff reductions and the minimization of investments in productive projects constitute a direct and gratuitous transfer of benefits from the entire Brazilian society to the hands of a few privileged controllers of multinational capital who, on top of all this, appropriate the results of their exploitation by maintaining the structures of foreign control over strategic sectors. This situation maintains and aggravates the imbalance in favor of the foreign sector.

At the same time, the exportation of the fruits of its activities inhibits the accumulation of capital in the region, thus maintaining and aggravating regional imbalances in favor of the country's more developed regions.

Meanwhile, the lack of concern for the issues of employment and the appropriation of the results by the less-favored sectors of the region's population, or for alternatives which could avoid social tensions provoked by the land-tenancy

structure and internal migrations, assure the maintenance and aggravation of social imbalances.

Brazil thus loses a singular opportunity to achieve solutions that could contribute to a more just and balanced process of economic and social development. Yet the government will be investing heavily, and Brazilian society will be shouldering the heavy onus of paying for these investments.

The necessity of alternative solutions

The Grande Carajás Program, as presented by the government, means internationalization, economic enclaves and a "logical" set of investments that will undoubtedly expatriate many of the country's mineral, natural and financial resources, in the name of resolving our balance of payments problems.

Yet we must at least recognize the program's internal coherency, inasmuch as there has been no open discussion, nor any democratic control exercised by public institutions.

For that very reason, it is essential that alternatives be presented, and, especially, that positive actions and practical steps be proposed — measures capable of being implemented immediately by the nation's institutions, on the basis of the country's own domestic resources: human, managerial, financial, fixed assets, technological, etc.

The Grande Carajás Program will be extremely significant for Brazil during the 1980s. It represents the beginning of the effective economic occupation of the Amazon region — 3 550 000 km², or 42 per cent of the nation's territory — with its still unknown potential, with its difficulties and, above all, with its future. Moreover, implementation of the Program now represents an opportunity for the Brazilian economy to launch a new and decisive cycle of development. It is our chance to complete and correct distortions left by previous cycles, and to deepen other, not merely economic,

aspects of the development process. It will be the stage which can at once consolidate the last four decades of development and evolution, and engender the process which will prevail in the beginning of the 21st century.

In this perspective, the conception of the Program and the definition of the ways and means of implementing it are eminently *political issues*. The nation's living forces — workers, students, intellectuals, politicians, military and businessmen — must participate in the process of formulation in order to be able to be real adherents and participants in its implementation.

There must first of all be an enormous campaign to *obtain and publish all available information* on the region and its potentials and obstacles, to reach all the country's social classes and sectors. We must be aware to be able to analyse. It is urgent that information be democratized, since this is the best way to democratize power. Discussion must then begin on the fundamental issues: objectives and means for settling the region and putting its resources to work for Brazil.

Next, and within a democratic conception of long-range planning, the first requisite will be to demand that the *political objectives, the criteria and the general directives orienting the Program's conception and implementation be approved by the National Congress*, following a broad debate of ideas and alternatives to be carried out: 1) within Congress itself, 2) within the competent agencies of the Executive Branch, and 3) within the trade unions, class entities and grassroots organizations of the civil society.

All this will necessarily imply a reformulation. And the reformulation process should contemplate the immediate and intensive utilization of the domestic institutions capable of undertaking study and research projects (universities and institutes, public and private companies), as well as the financing and articulation of domestic and foreign resource centers, etc.

The site for the future iron ore beneficiation plant at Carajás. Top.
The immense hydroelectric potential of the Eastern Amazon region is one of the most important factors behind the government's drive for a rapid industrialization. Photo from the Guaira Falls. Bottom.

The reformulation must also take a second look at the value of projected investments, in order to make them both opportune and compatible with domestic investment capacities. The opportunity of each investment depends not only on the "logic" of each undertaking, but above all on the bargaining power of what has already been and is yet to be invested in infrastructure, on the strategic use of strategic materials, on the degree of knowledge and projections developed regarding exploration and the projects themselves etc. The discussion should be oriented not so much by logical consideration as by consideration of the very strategy which will determine the area's settlement and resource utilization policies.

The third requisite is to conceive of the Grande Carajás Program as part of a *long-range planning* action, integrated with the development of the entire country, whose implementation will be updated periodically and/or whenever justified by the completion of previous stages. This planning will be the basis for mobilization of national resources and energies, and for the economic policy measures aimed at its realization.

Once these requisites are met, alternative solutions must necessarily take into account the following factors:

- a) the realization of a broad and extensive program of geological, technological and pedological surveys, as well as studies on the viability of and alternatives to productive and infrastructure projects, aimed at carrying out a program that will be politically, economically and socially integrated with the country's needs, avoiding predatory exploitation and irrational investments.
- b) the maximization of the use of domestic and local resources, ranging from domestic savings and investment to managerial skills, machinery, equipment and technology produced in the



- c) the destination of the raw materials, inputs and fabricated products, with priority given to supplying the domestic market, and only secondary emphasis on supplying foreign markets. In the latter case, the basic attitude should be to seek the highest possible prices and to optimize other sales conditions, taking care to avoid the creation of situations which, in practice, will mean substituting the country's present foreign financial

- dependence (high indebtedness) with a dependence on trade (high export levels), which is equally risky and undesirable, besides being unnecessary.
- d) the establishment of a broad program of human resource training, with absolute priority to be given to inhabitants of the region, and to the study of land-holding patterns and the control of migratory movements.
- e) the drawing-up of a series of measures necessary to protect the region's environment and its indigenous population, respecting the commitment to economic development which preserves natural resources and seeks the advancement of human resources. ■



POLLUTION AND THE GRANDE CARAJAS ACTIVITIES

The lack of concern with the environment has been a constant in major industrial undertakings in Brazil. Even in those where some measures are taken, many fundamental aspects are ignored.

Such aspects as the influence of wind and rain patterns on projects, rational planning of settlement of residential, industrial and agricultural zones and the protection of surface and underground waterways are nearly always forgotten.

Considering the scale of the Carajás project, concentrating several highly polluting mining and metallurgical activities in a single region, an in-depth environmental impact study of these activities is an imperative.

In practical terms, the following well-known technical aspects should be dealt with first: pollution of rivers and underground waterways by heavy metals, the silting up of rivers, atmospheric pollution by noxious gas particles and soil impoverishment.

Heavy metals: violent poisons in small doses

The quality control of waters within national territory is regulated by the Ministry of the Interior's Directive No. 0013 of January 15, 1976. It has been repeatedly emphasized by the scientific community and in press reports that heavy metals are responsible for liver ailments such as cirrosis, nervous system diseases such as Saturnism and skin illnesses such as cancer.

Even small quantities of these agents are absorbed and concentrated by a large number of life forms, entering the food chain through crustaceans, mollusks, fish and vegetables. In addition there is the danger of direct contamination of human and industrial water supplies. The following are some of the effects of heavy metals:

Mercury	intra-uterine toxicity, mental retardation
Lead	miscarriages, underweight foetuses, convulsions, lead-poisoning.
Arsenic	poisoning of foetuses; lung, liver and kidney ailments
Copper	effects on the liver and kidneys
Cadmium	poisoning of foetuses, various effects on the liver, lungs and circulatory system

Ref.: *Environmental Science and Technology*, June 1981.

Some of the aspects of water pollution by minerals should be mentioned, to better understand how they might be controlled.

First of all, it is common that recently extracted ore presents an exceptional reactivity. This means that the freshly exposed rock, no longer isolated from its surroundings, is susceptible to the immediate attack of atmospheric oxygen, light, heat, humidity and micro-organisms. As a result, the metals in the piles of mineral ore are dissolved, forming soluble ions which combine known as metallic or acidic lyes, a veritable broth of metallic pollutants carried away by the rain. These lyes infiltrate the soil and reach the rivers, sometimes provoking true ecological disasters.

In addition, minerals deposited in the bottom of rivers, besides producing silt build-up, release metals into the water, even contaminating the life forms present in the watery environment.

Nor can we minimize the fact that the processing of ores uses various quite toxic chemicals.

Waters flowing from the mines and from sub-soil infiltration, and the off-flow of water used for drill-bit cooling and dust control are constant currents similar to the ore pile waters, and demand the same care.

These facts are not new in Brazil, and the authorities of the State of Santa Catarina have already revealed that their rivers are showing higher acidity levels in coal-mining regions, due to the sulphuric acid produced in the mining operations.

As if these facts were not enough, the development of the Carajás region will mean the installation of several different metal processing plants, including steel, aggravating the problem even more with the release of waste materials rich in heavy metals. In addition, these wastes will be contaminated with various solvents used in the extraction-concentration process, almost all of them poisonous.

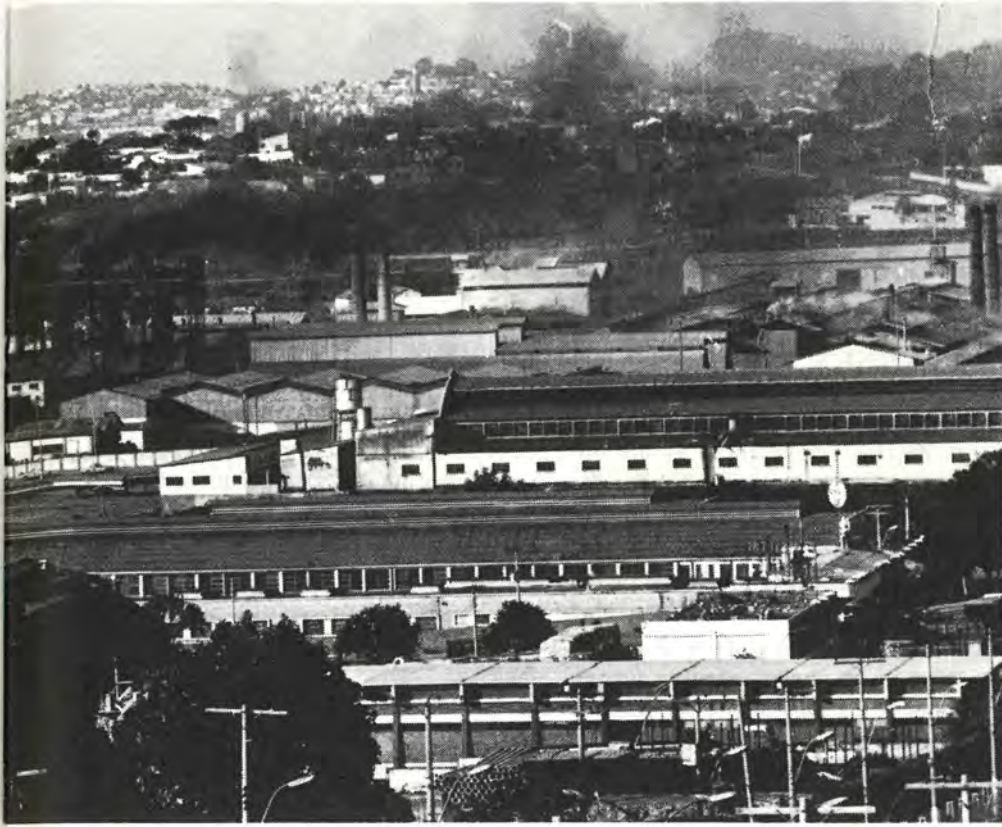
It is of prime importance that surface and underground waters be protected against contamination by these pollutants.

The filling of river bottoms: more common than is thought

In Brazil, the drama of the riverside populations of the lower Sao Francisco River and of the Capibaribe River during the rainy seasons are examples of this phenomenon.

The uncontrolled clearing of river shore areas creates an irregular water flow into the rivers themselves. The soil loses its capacity to retain water and the volume reaching the river becomes greater than normal. This watery avalanche also provokes soil erosion, depositing solid material in the river bed in quantities that can actually fill it up. The picture is completed by the tailings washed out of the mining region.

The Carajás region is a virgin forest, and is being (or will be) cleared. The number and scale of the mines leave no doubt that the volume of solid material to be released will be enormous. If some basic precautions are not taken, regions along the Tocantins, Balsas, Mearim, Itapecuru, Gurupi and Telespíres rivers, among others, will end up facing



The steel industry has seriously damaged the environment in the city of Belo Horizonte.

flooding problems identical to those mentioned above.

Mineral tailings+ industrial waste = desert

The removal of the fertile layer of soil and the stirring up of its deeper levels have extremely negative effects on the future growth of surface vegetation. This phenomenon is aggravated to the extreme by mineral upgrading and metal processing wastes.

If such were not the case, the city of Belo Horizonte today would not offer such a dismal aspect in its outlying areas.

The procedures involved in mining, the upgrading of mineral ore and the metallurgical processes release into the soil products which are very poor in nutrients, especially organic nutrients.

The correction of such deficiencies is expensive. It includes, among other things, the storage of the intact fertile soil, enrichment of wastes and the selection of plant species more adaptable to the new conditions. Only a very well planned mining project can avoid the creation of agriculturally useless or even desert regions.

Dust clouds: long-distance pollution

Until recently, little attention was given

to pollutants transported over long distances by the wind. Perhaps the radioactive dust produced by atomic explosions and the sulphuric acid pollution of some continental European cities by a British power plant gave rise to the care taken nowadays with this problem.

The use of explosives and open-pit mining are significant dust producers. Yet the phases of mineral ore transportation, grinding and granulometry classification are even bigger polluters.

To deal with this aspect of the pollution problem, a perfect knowledge of local wind-current patterns is of prime importance. It is indispensable that the location of residential and industrial areas take this into account. It is also appropriate to remember that the Ministry of the Interior's Directive No. 0231 of April 27, 1976 establishes the limit of 80 mg/m³ of particles in the atmosphere as an environmental standard. To go past this limit in the area in question would be very unfortunate, considering the region's present air-quality levels.

Another aspect that cannot be neglected is that the wind-carried mineral solids will dump materials containing heavy metals into virgin areas, further intensifying many of the problems mentioned above.

Other atmospheric pollutants

Noxious compounds such as sulphur and nitrous oxides may be released from the ustulation of minerals, along with CO, CO₂, hydrocarbons and aldehydes produced by internal combustion engines.

Pollution, capital and technology

There are solutions available for all these problems. They undoubtedly demand a tremendous amount of resources.

Yet there is no guarantee that these issues will be taken into account in defense of the nation's interests, if left in the hands of multinational capital. The systematic tendency of international capital to seek out underdeveloped countries lacking adequate environmental legislation in which to locate polluting industries, with cheap and aggressive technology, will most certainly be repeated in the case of Carajás.

The SEMA (Special Office for the Environment) of the Ministry of the Interior, along with other agencies specialized in environmental problems, should be given the responsibility for rigid zoning of industrial, mining and residential areas; protection of soil, air and water resources minimum standards for environmental quality, water recovery and selection of technologies as non-polluting as technically possible.

The unavoidable leap which the region will take in industrial and demographic terms must be taken into account. The region's rivers and subsoil must be protected as water sources, the soil must remain at least as high in quality as at present, and the atmosphere cannot be allowed to become a vehicle for ecological disasters.

Such a planning and development can only take place over a long period of time. An attempt to rush them would certainly give rise to one of the greatest crimes in Brazilian history. ■