THE SOCIAL IMPACTS OF REGIONAL DEVELOPMENT POLICIES IN EASTERN AMAZONIA: A CASE STUDY OF PARAUAPEBAS

by

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Abstract

This dissertation analyses the adverse urban social impacts generated by regional development policies in Eastern Amazonia and illustrated by the town of Parauapebas. After the military coup of 1964, Brazilian Amazonia became the centre of attention for development planning. Due to its tremendous potential of natural resources as well as its vast areas of uninhabited land, this region was regarded by military governments as a means of rapidly tackling a range of economic, social and geopolitical objectives. In this regard, several development programmes, such as the Greater Carajás Programme (PGC), were planned and implemented by the Federal government. Brazilian development policies were heavily influenced by Perroux`s development pole theory, which suggested that economic growth, interregional equilibrium and integration of backward regions could be achieved through a strategy of decentralised development. This basic idea provided a convenient theoretical justification not only for economic reasons (accelerated economic growth), but also in terms of the geopolitical objectives (national integration and occupation of Amazonia) of the military regime. Development pole strategies were vigorously implemented by the Federal government through the PND II - Second National Development Plan (1975/79) - and these strategies continued with the advent of the PGC in the 1980s.

In order to exploit the huge iron-ore reserves at Carajás mountain, the Carajás Iron-Ore Project was established. CVRD was aware that this project would attract a considerable flow of migrants to the region and Parauapebas was built with the clear purpose of avoiding the formation an enormous shanty town at the company's entrance gate. Despite planning Parauapebas, however, CVRD could not avoid the formation of Rio Verde, a peripheral settlement contiguous to the planned town. CVRD`s under-estimation of the pace of urbanisation, its decision to force service workers to live outside the company town allied to the substantial flow of migrants contributed to producing a serious situation in which the Parauapebas/Rio Verde region presented inadequate urban infrastructure and services; a critical nosological table and worrying problems in the educational sector. However, the above factors are unable to explain entirely the worrying situation in Parauapebas. In fact, these problems are a direct product of development pole strategies, which advocated that the concentration of investments in selected poles would generate economic growth, which would in turn "trickle down" to peripheral regions. Investments were made, but the beneficial spread effects in Parauapebas fell below expectations and the main reason for this lies in the fact that the ferrous-alloy industries were not implemented as originally envisaged by the PGC. As a consequence, the lack of option for diversifying the local economy is considerable.

This dissertation analyses in detail the major social and environmental impacts of rapidly urban development in Parauapebas. It shows that development strategies in Eastern Amazonia have had limited positive effects and that the exploitation of the natural resources of the region has occurred in a predatory way and at the same time, it stresses that old projects and future undertakings in the region must be compatible with the environment. In this regard, this dissertation concludes with the discussion of policy implications for more sustainable policy for Eastern Amazonia.

This thesis is dedicated
with affection and admiration
to a friend I miss
Roger Walker
one of the wittiest of men
who died before his time.

To my beloved uncle Giovanni
an affectionate presence in my life
and whose loss is irreparable.

To Cristina and Gabriel,
my sources of love
and tenderness.

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List of Abbreviations

AEA - Associação dos Empresários da Amazônia (Association of Amazonian Businessmen).

ALBRÁS - Alumínio do Brasil (Aluminium Company of Brasil).

ALCOA - Aluminium Company of America.

ALUNORTE - Alumínio do Norte (Aluminium Company of the North).

ALUMAR - Alumínio do Maranhão (Aluminium Company of Maranhão).

AMZA - Amazônia Mineração SA. (Amazon Mining plc.).

BASA - Banco da Amazônia S.A. (Bank of Amazonia plc.).

BCA - Banco de Crédito da Amazônia (Credit Bank of Amazonia).

BNDE - Banco Nacional de Desenvolvimento Econômico (National Economic Development Bank).

BNDES - Banco Nacional de Desenvolvimento Econômico e Social (National Economic and Social Development Bank).

BNH - Banco Nacional de Habitação (National Housing Bank).

CAT - Centro Agro-Ambiental do Tocantins (Agro-Environmental Centre of Tocantins).

CDE - Conselho de Desenvolvimento Econômico (Economic Development Council).

CEDERE - Centro de Desenvolvimento Regional (Centre for Regional Development).

CEPASP - Centro de Educação, Pesquisa e Assessoria Sindical (Centre for Education, Research and union Advice).

CETEP - Centro de Ensino Técnico do Estado do Pará (Centre for Technical Teaching of the State of Pará).

CIMA - Comissão Interna de Meio Ambiente, CVRD (Internal Environmental Comission, CVRD).

CIMI - Conselho indigenista Missionário (Indigenist Missionary Council).

CNG - Conselho Nacional de Geografia (National Council for Geography).

CPT - Comissão Pastoral da Terra (Pastoral Land Comission).

CSN - Companhia Siderúrgica Nacional (National Steel Company).

CVRD - Companhia Vale do Rio Doce (Rio Doce Valley Company).

Decennial Plan - Plano Decenal de Desenvolvimento Econômico e Social (The Decennial Plan for the Economic and Social Development).

EEC - European Economic Community.

EEPP - Equipe de Educação Popular de Parauapebas (Peoples` Education Group of Parauapebas).

ELETROBRÁS - Centrais Elétricas do Brasil (Brazil Electricity Board).

ELETRONORTE - Centrais Elétricas do Norte (North Brazil Electricity Board).

EMATER - Empresa de Assistência Técnica e Extensão Rural (Technical Assistance and Rural Extension Company).

ESG - Escola Superior de Guerra (National War College).

FASE - Federação dos Orgãos de Assistência Social e Educacional (Federation of Organisations for Social and Educational Assistance).

FDPI - Fundo de Desenvolvimento de Programas Integrados (Fund for the Development of Integrated Programmes).

FINAME - Agência Especial de Financiamento Industrial (Agency for Industrial Financing).

FNS - Fundação Nacional de Saúde (National Health Foundation).

FPE - Fundo de Participação dos Estados (State Participation Fund).

FPM - Fundo de Participação dos Municípios (Municipal Participation Fund).

FSESP - Fundação Serviços de Saúde Pública (Public Health Services Foundation).

FUNAI - Fundação Nacional do Índio (National Indian Foundation).

GDP - Gross Domestic Product.

GEAMAM - Grupo de Estudos e Assessoramento de Meio Ambiente, CVRD (Environmental Studies and Advisory Group, CVRD).

GETAT - Grupo Executivo de Trabalho do Araguaia-Tocantins (Executive Group for the Araguaia-Tocantins).

IBAM - Instituto Brasileiro de Administração Municipal (The Brazilian Institute of Municipal Administration).

IBAMA - Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis (Brazilian Institute of the Environment and Renewable Natural Resources).

IBGE - Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics).

ICMS - Imposto sobre Circulação de Mercadorias e Serviços (Tax on Circulation of Goods and Services).

IDESP - Instituto de Desenvolvimento Econômico-Social do Pará (Pará Socio-economic Development Institute).

IDJC - International Development Corporation of Japan.

INCRA - Instituto Nacional de Colonização e Reforma Agrária (National Institute for Colonisation and Agrarian Reform).

INPES - Instituto Nacional de Pesquisa Econômica e Social (National Economic and Social Research Institute).

IPEA - Instituto de Pesquisa Econômica Aplicada (Institute of Applied Economic Research).

IPUR-UFRJ - Instituto de Planejamento Urbano e Regional, Universidade Federal do Rio de Janeiro (Urban and Regional Planning Institute, Federal University of Rio de Janeiro).

ISPN - Instituto, Sociedade, População e Natureza (Institute, Society, Population and Nature).

ISS - Imposto Sobre Serviços (Tax on Services).

ITERPA - Instituto de Terras do Pará (Pará Land Institute).

KFW - Kreditanstalt fur Wiederaufban.

METABASE - Sindicato dos Trabalhadores da Indústria da Extração do Ferro e Metais Básicos, do Ouro e Metais Preciosos e de Minerais Não-Metálicos de Marabá, Parauapebas, Curionópolis e Eldorado dos Carajás - Pará (Metallurgical Workers` Union of Marabá, Parauapebas, Curionópolis and Eldorado dos Carajás - state of Pará).

Metas e Bases para a Ação do Governo - Targets and Bases for Government Action.

MIPLAN - Ministério do Planejamento e Coordenação Geral (Ministry of Planning and General Coordination).

MIRAD - Ministério da Reforma e do Desenvolvimento Agrário (Ministry of Agrarian Reform and Rural Development).

MMA - Ministério do Meio-Ambiente, dos Recursos Hídricos e da Amazônia Legal (Ministry of the Environment, Hydrological Resources and Legal Amazonia).

MRN - Mineração Rio do Norte (Rio do Norte Mining company).

MST - Movimento dos Trabalhadores Rurais Sem Terra (Landless Workers` Movement).

NAEA/UFPa - Núcleo de Altos Estudos da Amazônia, Universidade Federal do Pará (Amazon Studies Nucleus, Federal University of Pará).

NUMA/UFPa - Núcleo de Meio-Ambiente, Universidade Federal do Pará (Environment Nucleus, Federal University of Pará).

PAEG - Plano de Ação Econômica do Governo (The Governmental Economic Action Plan).

PDA I - Primeiro Plano de Desenvolvimento da Amazônia (The First Development Plan for Amazonia).

PDA II - Segundo Plano de Desenvolvimento da Amazônia (The Second Development Plan for Amazonia).

PED - Plano Estratégico de Desenvolvimento (The Strategic Development Plan).

PGC - Programa Grande Carajás (The Greater Carajás Programme).

PGCA - Programa Grande Carajás Agrícola (The Greater Carajás Agricultural Programme).

PIN - Programa de Integração Nacional (The National-Integration Programme).

POLAMAZÔNIA - Programa de Polos Agropecuários e Agrominerais da Amazônia (The Programme of Agro-Livestock and Agro-Mineral Poles for Amazonia).

POLONOROESTE - Programa de Desenvolvimento Integrado do Noroeste do Brasil (The North-West Brazil Integrated Development Programme).

PND I - Primeiro Plano Nacional de Desenvolvimento (The First National Development Plan).

PND II - Segundo Plano Nacional de Desenvolvimento (The Second National Development Plan).

PND III - Terceiro Plano Nacional de Desenvolvimento (The Third National Development Plan).

PNRA - Plano Nacional de Reforma Agrária (National Plan for Agrarian Reform).

PPG-7 - Programa Piloto para a Proteção das Florestas Tropicais do Brasil (Pilot Programme for the Conservation of the Brazilian Amazon Forest).

PRODER - Programa de Mobilização Comunitária para o Desenvolvimento Regional (Community Mobilisation Programme for Regional Development).

PROTERRA - Programa de Redistribuição de Terras e Estímulos à Agroindústria do Norte e Nordeste (The Programme of Land Redistribution and Stimuli to Agro-Industry in the North and North-East).

RADAM - Projeto Radar na Amazônia (Radar Mapping Project in Amazonia).
North and Northeast).

SAREM - Secretaria de Ariculação com os Estados e Municípios (Secretary for Connection with state and Municipalities).

SDDH - Sociedade Paraense de Defesa dos Direitos Humanos (Pará Society for the Defence of Human Rights).

SEMED - Secretaria Municipal de Educação (Municipal Secretary of Education).

SEMPLA - Secretaria Municipal de Planejamento (Municipal Secretary of Planning).

SEMPRO - Secretaria Municipal de Produção (Municipal Secretary of Production).

SEPLAN-PR - Secreataria de Planejamento da Presidência da República (Planning Secretariat of the Presidency of the Republic).

SEPLAN/Pará - Secreataria de Planejamento do Governo do Estado do Pará (Planning Secretariat of the state of Pará).

SEST - Secretaria de Controle das Empresas Estatais (Secretariat for the Control of State Enterprises).

SIMETAL - Sindicato das Indústrias Metalúrgicas, Mecânicas e de Material Elétrico do Estado do Pará (Metallurgical, Mechanical and Electric Equipment's Industry

^^^SINTEPE - Sindicato dos Professores de Parauapebas (Teachers` Union).

SMS - Secretaria Municipal de Saúde (Municipal Secretary of Health).

SOF - Secretaria de Orçamento e Finança (Secretary of Budget and Finance).

SPI - Serviço de Proteção ao Índio (Indian Protection Service).

SPVEA - Superintendência do Plano de Valorização Econômica da Amazônia (The Superintendency for the Economic Valorisation Plan for Amazonia).

STR - Sindicato dos Trabalhadores Rurais (Rural Workers` Union).

SUCAM - Superintendência para Campanhas de Saúde Pública (The Superintendency for Public Health Campaigns).

SUDAM - Superintendência para o Desenvolvimento da Amazônia (Superintendency for Development of Amazonia).

SUDENE - Superintendência para o Desenvolvimento do Nordeste (Superintendency for Development of the Northeast).

SUFRAMA - Superintendência da Zona Franca de Manaus (The Superintendency for the Manaus Free-Trade Zone).

Triennial Plan - Plano Trienal de Desenvolvimento Econômico e Social (The Triennial Plan for Economic and Social Development).

UDR - União Democrática Ruralista (Rural Democratic Union).

ZFM - Zona Franca de Manaus (Manaus Free-Trade Zone).

List of Acronyms

Aviamento - is the term used to describe the great variety of economic systems in Amazonia which is based on debt-credit relationships.

Caboclo - a person of mixed race (indigenous, white or black).

Latifúndio - large estate with extensive areas of under-utilised land.

Mestiço - a person whose parents are of different races.

Várzea - a flood plain located alongside a watercourse and characterised by highly fertile and friable soils renewed by annual flooding and sediment deposition.

Chapter 1

Regional Policies and Frontier Integration in Brazilian Amazonia

1.1- Introduction

The general objective of this research is to analyse the social, economic and environmental impacts generated by regional development policies implemented by the Brazilian government in Eastern Amazonia and illustrated by Parauapebas.

Brazilian Amazonia has been subjected to successive government attempts to stimulate its economy. However, since the mid-1960s, under the authoritarian military regime, this region has become the target of a renewed and vigorous interest. Indeed, Amazonia, with its great potential of natural resources and also vast areas of uninhabited land, was regarded by the military governments as a means of rapidly solving a range of economic, social and geopolitical problems. In this context, several poorly-planned programmes were implemented in order to maximise immediate economic advantages and undoubtedly the most important development programme was the Greater Carajás Programme (PGC), which was the largest and the most pretentious integrated regional development scheme ever devised for any area of tropical rainforest in the world. This "integrated" programme involved investments in mineral, agricultural, infrastructural, livestock and forestry undertakings, which were associated with tax and heavy financial incentive scheme for attracting investors to the region.

In three decades, Amazonia, especially the Eastern region, has undergone a deep transformation due to the implementation of regional development policies, which attracted thousands and thousands of different workers, who came from distinct parts of Brazil, for whom Amazonia was a kind of Canaan, the promised land. However, the job-opportunities were transitory, settlements for small farmers had no suitable infrastructure and the problems were manifold, so the outcome was a great disappointment for most of these migrants. These tremendous impacts on people and also on the environment were exacerbated by this "integrated" development programme.

these migrants. These tremendous impacts on people and also on the environment were exacerbated by this "integrated" development programme.

The development policies implemented in Amazonia, and the PGC assumes a distinguished importance, were commonly pursued by a combination of domestic and foreign interests, allied to an aggressive strategy of integrating this region into the process of national development, a strategy which the Brazilian governments adopted, and the consequences of all these strategies have been felt up to the present time.

Euclides da Cunha said at the beginning of this century that "Amazonia is the last page of Genesis yet to be written". These words pronounced by virtue of the exuberance and perceived potential of the tropical rainforest have been understood by Brazilian governments in a different way and some slogans such as "integrate in order not to forfeit", "unite men without land to land without men" and more recently "who has Amazonia need not fear the future" can better illustrate their interpretation. However, these slogans have reflected not only their interpretation but also their undertakings, which have been responsible for significant social and environmental impacts on Amazonia. Thus, this last page of Genesis is being written but in a traumatic way.

The aim of this chapter is to analyse the effects of regional policies and frontier integration that have been undertaken in Brazilian Amazonia, always highlighting their social and environmental impacts on this region.

1.2 - Understanding Amazonia

> "To see Amazonia is the heart's desire of the youth of this country. The legends of Amazonia have their roots deep in the soul of our people, and the history of Amazonia, with its tales of heroism and bravery, reflects the tragic majesty of the battles we have fought against fate. To conquer the land, and tame waters, subjugate the jungle, these have been our tasks. And in this centuries - old battle we have won victory upon victory. The Amazon under the fertile impulse of your will and your labour, will not be merely another chapter in the history of the earth, but, like other great rivers, will become a chapter in the history of civilisation".
>
> (Getúlio Vargas in his speech in Manaus on 10th October 1940 in: SUDAM, 1974)

The Amazon forest conjures up various images in the mind, from a dark, ferocious and hostile jungle to idyllic scenes of an earthly paradise. Despite popular images of the Amazon forest, several researchers have unanimously appreciated the potential and importance of Amazonia's fragile rainforest ecosystem for generating significant benefits for humanity. In terms of their biodiversity, tropical rainforests are superior to any other forests and many specialists regard them as an essential genetic bank. Indeed, tropical rainforests are a vital source of medicines and some scientists believe that among its unstudied millions of species there could be some which would make possible the cure of cancer or even of AIDS. In addition, they supply an extensive range of industrial materials such as resins, fibres and oils.

The widespread deforestation that has occurred in Amazonia is very worrying because it may have destroyed some irreplaceable species of inestimable value, and has permanently reduced the productive potential of this region by causing soil erosion and climatic instability. It is important to stress here that deforestation in Amazonia has been caused mainly by development practices implemented and encouraged by the Brazilian government, principally after the military coup in 1964.

Although it is beyond the scope of this chapter to repeat in detail the history of Amazonian development, it is necessary to trace it briefly, highlighting its major landmarks in order to understand Amazonia as a whole. Penetration into Amazonia occurred at the beginning of 1616 and its first step was the construction of the *Forte do*

Presépio (Presépio Fortification) by the Portuguese, who wanted to expel the British, French and Dutch from Amazonian territory and prevent further incursions by them. This small nucleus, based initially at *Forte do Presépio*, was the origin of the city of Belém, capital of the State of Pará, and became the hub for expansion and settlement. Subsequently, other expeditions were undertaken by explorers such as *Pedro Teixeira* and Antônio *Raposo Tavares*, who set up fortifications at strategic points along the river Amazon, and these fortifications were fundamental for the colonisation of Amazonia. Political geography was modified by this efficient method of territorial occupation, this occupation being officially recognised by the Treaty of Madrid in 1750, which defined the frontiers of Brazilian Amazonia practically as they are nowadays.

During the XVIII century Amazonia, principally the State of Pará, was a base for extracting forest products such as resins, oils, cinnamon, clove, vanilla, cocoa and etc., for export. Nevertheless, with the advent of the vulcanisation of rubber at the end of the first half of the last century, Amazonia was for the first time affected by clearly expressed economic aims. The golden period of the rubber trade in Amazonia was between 1870 and 1912 and the two main cities at the time, Belém and Manaus, imported their clothes, social behaviour and culture from Europe. The smuggling of rubber seeds to Asia contributed to the final collapse of the rubber boom in Amazonia. Some attempts were undertaken by the Brazilian government to strengthen its position in the international market, but the outcome was negligible or only modest in comparison with the efforts made and consequently Amazonia suffered economic stagnation for 40 years.

With the creation of the SPVEA by President Getúlio Vargas in 1953, the Brazilian government admitted for the first time its former failures in transforming the Amazon economy and stressed the importance of elaborating a development plan for the region through a regional planning agency. By virtue of the area that would be controlled by SPVEA, the Brazilian government created a political definition for Amazonia, which was named "Legal Amazonia". This "Amazonia Legal" covers 4,975,527 square kilometres or 60 percent of Brazilian territory and is one-third larger than the classic Amazonia.

Nevertheless, the results obtained by SPVEA during its eleven years of existence were unimpressive. Indeed, this agency faced serious problems such as: the funds allocated to it never corresponded to those stipulated by constitutional law (3% of the income from national taxation and another 3% also the taxation of the States and municipalities which were legally defined as part of "Amazonia Legal"), the lack of an organisational structure, the failure of Congress to approve its five-year Plan (in 1955) and so on. The construction of the Belém-Brasília highway, which is more than 2,000 kilometres long, and which was its major project, was indeed completed in 1960 but was not officially inaugurated until five years later. This highway was the first to facilitate large-scale penetration and settlement in Amazonia.

In order to understand Amazonia as a whole, it is essential to bear in mind the conditions under which its population was generated. Amazonia was originally occupied by approximately one thousand indigenous tribes who were concentrated principally in the *várzeas* and whose population was estimated at between two and three million. These tribes spoke more than five hundred languages, classified into twenty branches (Ribeiro, 1995b). Over the centuries, the Amerindians accumulated a detailed knowledge of the tropical rainforest and developed a particular way of dealing with it. In this context, their harmonious integration with the native forest enabled them to exploit it with no destructive consequences. From the XVII century, they suffered massively as a result of their contact with European colonisers, which immediately caused huge depopulation because of the diseases introduced by white men, such as lung infections, measles, mumps, small-pox, venereal disease, and so on, which had been completely unknown to them beforehand. In addition to diseases, slavery, the deaths caused by fighting between Indians and Europeans colonisers and also the religious missions (Franciscans, Carmelites and principally Jesuits) were important factors for reducing the indigenous population. The religious missions aimed at converting the natives and as a direct result of this process, many Indians lost their mother tongue and their own cultural identity, and were neither transformed into white men nor left as Indians, or as Ribeiro (1995b) said they were turned into nobodies.

Parallel with the reduction of the Indian population, an important component of the Amazonian population was being generated by the miscegenation between white men, principally the Portuguese, and Indian women. Ribeiro (1995a) emphasises that the neobrazilian population of Amazonia was also formed by miscegenation between white men and Indian women, through a centuries-long process in which each man born or introduced into the earth [Brazil] had sexual relations with Indian women and *mestiças*, generating a racial type more Indian than white. Thus, the process of turning Indians into nobodies by missionary action added to miscegenation generated a new social group in Amazonia, named *cabloco*. They were to form a particular type among other important racial groups in Brazilian society. These *caboclos* inherited from the Indians the knowledge of how to cope with the native forest. Indeed, they occupied the area left by the former Indian inhabitants, who were devastated by civilisation.

1.3 - The Authoritarian Regime and Its Objectives

The year 1964 can be considered a clear dividing line in relation to actions taken in Amazonia. Until then, actions had concentrated on extracting forest products, and the concomitant reduction of the Indian population and of *caboclos* (to a lesser extent) without affecting the environment as a whole. However, after that year, the occupation planned and implemented by the military government completely modified the situation by reason of its effect on the native population - Indians and principally *caboclos* - and initiated an intense process of deforestation in Amazonia.

The Armed Forces took power in 1964, initiating an authoritarian period which persisted for twenty-one years. During this period, the military carried out their project of accelerating the development of Brazilian capitalism and were supported by the industrial and financial bourgeoisie and, moreover, gained acceptance by most of the middle classes. It is important to emphasise here that the importance of the military coup is characterised by its distinct intention of implementing a new development project for Brazilian society. This development project was based on a triple alliance (Evans, 1979) between State

capital, transnational enterprises and the local bourgeoisie, and it was associated orthodox monetary policies with resolute State intervention and widespread political repression.

There were a number of reasons behind the military coup. One is the apparent exhaustion of industrialisation based on the import substitution model of liberal democratic governments (O'Donnell, 1978; Hirschman, 1981). Nevertheless, this economic explanation alone is not sufficient for understanding the coup as a whole. Other factors were extremely important for the implementation of the authoritarian regime: the increasing incitement to class struggles in the early 1960s, characterised by strong popular demands for basic reforms; the climate of the Cold War; the Cuban Revolution (1959); the fear of dissemination of guerrilla-war tactics based exclusively on the Cuban example and; the determination of the United States to prevent another Cuba (O'Donnell, 1978; Cardoso and Falleto, 1979).

In addition, there were tensions, antagonisms and a complete lack of synchronisation between the two branches of the Brazilian Republic (Legislative and Executive), which generated political indecision and instability. These factors, connected with the weakness of popular organisations in Brazilian society contributed to the military control over the State, although the main factor was the military's will in undertaking their project of modernisation for Brazil (Ianni, 1986).

This military regime's project was intrinsically related to the National Security Doctrine (the influence of ESG`s geopolitical thesis may be mentioned here), which was a doctrine principally applied to the area of security policy and generally in war-time, but which was extended to all sectors of Brazilian society. This doctrine advocated a maximisation of economic growth and also the existence of well defined national objectives, which were the necessary conditions for surviving a war. Thus, the key-word became security, which was considered fundamental for attaining those objectives, principally rapid economic growth.

The principal objective of this project was to modernise the nation and at the same time construct a "new Brazilian society". In order to attain these objectives, the military

governments realised several specific goals, which varied from the institutional reforms (creation of the Central Bank, the Financial Housing System and so on) to populating Amazonia and integrating it into the national territory and also to stimulating its economy. Consequently, the Armed Forces believed that it was fundamental to have complete control over the State in order to achieving their objectives. This control was considered important for consolidating and expanding the leading role of the State (naturally under the protection of the Armed Forces), which was understood by the military as the only body capable of accelerating modernisation. Planning became the keystone of the authoritarian regime fundamentally because it was understood to be a rational and neutral technique. According to President Castello Branco (Ianni, 1986) in his speech in 1964, the first important objective of planning and economic co-ordination in Brazil was to increase the degree of efficacy and rationality of economic policy, both qualitatively and quantitatively. The second important objective was to make the country's representative forces conscious of the national objectives to be achieved.

It is important to stress that there was complete harmony between the goals of the military project and the National Security Doctrine, the latter expressed in government geopolitics. In agreement with the aims of the project, the government strategy had three basic points: the establishment of a modern technological structure in some important areas of the country; the rapid integration of national territory (especially the Amazon) and; the projection of the nation into the international arena.

The authoritarian regime embraced a complex period, which comprised the crisis of the 1960s, the "miracle" between 1968 and 1973, and the beginning of the recession in the early 1980s. Aiming at accelerated modernisation, the government fostered strategies for attracting foreign and domestic investments by protecting the internal market, creating development banks to provide long-term finance for private and public firms in sectors considered strategic, and establishing new State enterprises in public utilities and heavy industries. It is important to stress that the modernisation project was also based on a territorial programme inspired by ideas of national integration and of Brazil as a great power.

In fact, the economic policy fostered by the military governments followed practically the same directives. Nevertheless, until the "miracle" period the Brazilian government considered inflation the most important problem to be tackled and the relative success in bringing down its annual rate (from 100% in 1964 to 20% in 1969) allied with institutional reforms, paved the way for the rapid economic growth initiated in 1968. In spite of coinciding with the most brutal period (1968-73) of the military dictatorship (the establishment of Institutional Act n° 5 at the end of 1968 initiated a harder and more cruel phase of the military repression), Brazil achieved an impressive rate of economic growth, which, measured by GDP, showed an annual average of 11,2%, and this economic success was termed "the Brazilian economic miracle". However, this period is also important because the Brazilian government, principally under Medici`s administration, demonstrated an intense preoccupation with regional and national integration questions. Amazonia and the Northeast were considered problematic regions and received special attention from the government, which expressed these preoccupation in programmes such as PIN (which foresaw the construction of the Trans-Amazon highway) and PROTERRA, and governmental plans such as Targets and Bases for Government Action and the First National Development Plan - PND I.

The so-called "Brazilian miracle" might have been due to: reduction in wages and to the expansion of multinational, national, and State-capital - consolidating the "triple alliance"; the organisation of the governmental apparatus, which was crucial to the reinforcing of the centralising mechanisms of the State; control over the labour market, stimulating turnover and movement in the labour force and; reinvigoration of the economy (based upon the consumer durable-goods sector because this sector had an enormous potential for accumulation of money and, moreover, absorbed a great number of workers and did not require significant imports).

Despite the overcoming of the recession, the "miracle" period had a short life by virtue of the government's option of achieving rapid economic growth through the consumer durable-goods sector and not through the development of the Brazilian industrial park, and consequently the intermediate-goods and basic-inputs sectors experienced a relative deterioration. As a consequence of the rapidly growing imports, a crisis occurred in the

balance of payments in 1973, which was made worse in the same year by the first oil shock.

This was the situation when General Geisel assumed the Presidency of the Republic (1974-1979). However, as Hirschman (1995a) pointed out, instead of applying restrictive economic policies so as to rein in imports, his government set up the Second National Development Plan - PND II- (1975-1979), which aimed at modifying the focus of the economy, from the automobile consumer durables to the sectors that represent the ultimate stage of import-substitution industrialisation: the intermediate inputs and capital goods. Planners responsible for the economic policy misinterpreted the significance of the international crisis provoked by the first oil shock and its impacts on Brazil. As a consequence, the crisis of 1973-74 was ignored by the PND II, whose strategy for overcoming the serious problems in the balance of payments was to maintain of the high rates of investments, which made it possible to attain high rates of economic and also industrial growth. These investments were only possible because of the great amounts of petrodollars and of the extensive loans made by the major banks. Despite differences from other plans developed by military governments, the PND II practically maintained the same social objectives, which were to improve income distribution in regional and personal terms and also to carry out development without impairing the quality of life. It is important to note that social objectives expressed in governmental plans during the authoritarian regime were always relegated to a secondary position.

In order to improve the programme of import-substitution, the government made efforts to generate a comprehensive energy programme, establish a petrochemical sector and increase the production of exportable raw materials (cellulose, iron, steel and aluminium) through huge investments in the form of "joint ventures" between the State, multinational firms and, to a lesser extent, private national capital. However, it is necessary to emphasise here that the BNDES played an important role in this context with its credit facilities and also subsidised interest rates.

The crucial role exercised by the State in leading industrialisation aimed at: determining, articulating, and providing vast amounts of investments in order to modify the structure of

the Brazilian economy; generating an infrastructure to integrate the highway, energy, urban, and telecommunication systems and; producing intermediate inputs indispensable for heavy industrialisation (especially chemical and metallurgical industries). The modernisation of the economy was completed successfully, principally in terms of achieving the ultimate stage of import-substitution industrialisation. In fact, Brazil has an advanced industrial structure, although the military governments were not fundamental for its implementation because the structural changes in the Brazilian economy had already been initiated in the 1950s.

Despite positive effects, the Brazilian economy continued to have serious problems due to its profound dependence on petroleum imports, increasing inflation rates and increasing internal debt, at a time when the official banks had agreed to finance enormous projects. With the second oil shock in 1979, the Brazilian situation deteriorated because the former problems mentioned above adversely affected the balance of payments, decreased economic growth, and in particular increased the external debt, which became more and more a constant and difficult obstacle to be overcome by subsequent Brazilian governments. It is important to stress here that the greater part of the problems, principally the impressive increase in the external debt , was a consequence of the economic policy adopted during the PND II. Thus, as a result of this situation, the economic policy fostered by the government was to contain spending, eliminate incentives, and reduce financing in all sectors.

During the Figueiredo Presidency (1979-85), the Brazilian government elaborated the Third National Development Plan - PND III - ,which maintained some of the objectives of previous plans, such as: import-substitution of basic inputs, petroleum exploration, activities directed at increasing exports etc. These investments, which became top priorities (principally the increase in exports) in the PND III, were made possible by Mr. Delfim Netto, Minister of Planning, who was also responsible for the "miracle" years in the Medici`s administration, and who believed that it was essential to follow the economic policy implemented in the previous government in order to achieve high rates of economic growth. However, this policy advocated by Mr. Delfim Netto contrasted with the necessity of cutting government spending, which was constantly repeated by the

Brazilian government, in order to tackle serious problems, such as: deficit in the balance of payments, high rates of inflation and the exacerbation of the external debt, which were considered the main macroeconomic aims.

The objectives expressed in the economic policy elaborated by the military regime can be summarised in one general aim: to modernise Brazil in order to make it comparable with the developed countries. However, this general aim was associated with the Armed Forces' geopolitical project, which had the clear purpose of integrating national territory and, in this context, populating the Amazon through a strategy of implementing growth poles.

It is worth noting that the implementation of a new development project for Brazilian society was stressed by the military governments and was only possible by virtue of the authoritarian domination pattern, which was named "bureaucratic-authoritarian" State by O'Donnell (1978). This author pointed out that bureaucratic-authoritarian State is a system of exclusion of the popular sector, and is based on the reaction of dominant sectors and classes to the political and economic crises to which populism and its developmentalist successors led. In turn, such exclusion is the requisite for attaining and guaranteeing "social order" and economic stability; these constitute the necessary conditions for attracting domestic investments and international capital and, thus, for providing continuity for a new impulse toward the deepening of the productive structure. Society is deeply transformed by bureaucratic-authoritarian State, seeking to control it and render it predictable so that it is possible to obtain the necessary transfusions of international capital.

According to Cardoso and Falleto (1979), the State is the expression of the dynamism of business enterprises and of the classes that control them as they operate in a context in which bureaucracies and the regulative and organisational capacities of the state are expanding. The basic ideology of the State is fundamentally "developmentalism". In view of the explicit ends of economic growth and national grandeur, the exploitation of workers, if not openly defended by the State, is justified by the argument that the

tightening of belts is necessary "at the moment" so that "in the future" the results of this economy may be redistributed.

1.4 - Regional Policies and Frontier Integration in Amazonia

When the first military President, Marshall Humberto de Alencar Castello Branco, assumed control of the country, he emphasised the importance of making regional planning more efficient and of reformulating all federal government policies regarding Amazonia in order to bring about a new economic development strategy for the region. In this context, a five-member committee was set up in 1965 to elaborate a series of measures, known as "Operation Amazonia".

Among some of this committee's recommendations were the elimination of the old SPVEA, transforming it into the Superintendency for the Development of Amazonia (SUDAM), which was created by law n° 5173 on October 27, 1966; the abolition of the Credit Bank of Amazonia (BCA), establishing in its place a financial agency by law n° 5122 on September 28, 1966, named Bank of Amazonia plc (BASA), whose objective was to support SUDAM's projects; the adoption of a diversified policy on fiscal incentives; the setting up of the Superintendency for the Manaus Free-Trade Zone (SUFRAMA), whose main task was to supervise the Manaus Free-Trade Zone (ZFM). The ZFM was established by law n° 288 on February 28, 1967 and the basic aim of this law was to create, through fiscal means, an industrial, commercial, and agricultural centre in Manaus to serve as the "development poles" for western Amazonia (Mahar, 1979).

Fiscal incentives in the Amazon region came about through the BASA, the SUDAM and law n° 5,174, which outlined a programme of fiscal incentives for this region. This law permitted registered companies (including private firms) to deduct (until 1982) 50% from their income tax owed and invest it in agriculture, cattle-breeding, industry and services considered basic, such as education, health, transport, colonisation and tourism thought to be fundamental for the development of the region, and this exemption was increased to 100% until the end of 1994 for those companies whose projects were implemented, or

expanded, or even for those whose factories had already been built but were not yet in operation (Cardoso and Muller, 1977; Hall, 1991a).

These incentives given to private investors in Amazonia led to a large increase in the number of approved projects, which rose from only four in 1966 to one thousand by 1985 (Branford & Glock, 1985; Hall, 1991a; World Bank, 1992). Most of these projects (roughly 70%) were related to the livestock sector and were concentrated in southeastern Pará, north-eastern Mato Grosso and western Maranhão. These ranches covered up to ten million hectares and obtained credits of approximately US$700 million, an amount equivalent to slightly less than half of the total fiscal incentive funds allocated by SUDAM over this period (Mahar, 1989; World Bank, 1992). In addition to these incentives, cattle ranchers in Amazonia obtained rural subsidies through both regional and national livestock development programmes. This in fact reflected the Brazilian government's belief that cattle ranching would transform the Amazonian economy and also its endorsement by multilateral agencies such as the World Bank and the Inter-American Development Bank through loans of US$ 1.3 billion throughout the 1960s and 1970s (Hall, 1991a). As a consequence, the SUDAM incentives totally transformed the earlier slow process of penetration into Eastern Amazonia and at the same time provoked significant social and environmental impacts on the region.

Instead of supporting productive activities and trying to promote sustainable development, the large amount of resources applied to livestock development encouraged land speculation, land concentration, the expulsion of smallholders to newer frontier zones and environmental degradation as well. A significant area converted into pasture (approximately ten million hectares) is only productive for a transitory period because, as Hecht (1985) pointed out, soil nutrients during the first years are adequate for animal stocking rates of one animal unit (au) per hectare, but to only 0.25 au/hectare after five or six years. This process occurs by virtue of soil-nutrient changes, compaction and also weed invasion. Another source of environmental degradation is caused by modern technologies, such as fertilizers, pesticides, herbicides and large tractors utilised in the process of converting rainforest into pasture and agriculture. In addition, cattle ranching generates little employment in comparison with the investment made by the Brazilian

government. Each ranch creates only one permanent job per two thousand head of cattle or per 12 square miles, in contrast to the 100 people per square mile which can be supported by peasant agriculture in the tropical rainforest. The cost of the jobs created averaged US$63,000 each (Hall, 1987; World Bank, 1992).

It is important to emphasise here that "Operation Amazonia" marked a very important change in the Brazilian development policy for the Amazon region, revealing the government's transparent strategy directed towards the *latifúndio*, and consequently towards social exclusion. In relation to this strategy during the 1960s, State was granted on generous terms to private investors for the progressive monopolisation of huge areas of the native forest for commercial and speculative exploitation, leading to the intensification of land conflict in Amazonia.

Until 1970, the military regime had formulated three national plans: the Governmental Economic Action Plan (PAEG, 1964-66), the Decennial Plan (1967-76) and the Strategic Development Plan (PED, 1968-70). The PAEG hardly differed from the previous plan, the Triennial Plan (1963-65). Its main objective was to tackle the problem of regional disparities in Brazil, and although it concentrated on the Northeast, other regions, principally Amazonia, received special attention.

This governmental plan was drawn up during a period of high-inflation, so economic growth and price stabilisation were fundamental priorities. Indeed, the politico-economic problems allied with the PAEG's deficiencies contributed to the failure of its strategy. However, the importance of PAEG is principally due to its concrete proposal for integrating regional and national planning (the creation of an Extraordinary Federal Ministry to Co-ordinate the Activities of All Regional Agencies may be mentioned here).

According to Ianni (1986), the action of the State became more decisive for the national economy through the implementation of PAEG's directives. In order to take advantage of exceptional political conditions, which were created by the absolute hegemony of the Executive branch over the Legislative; and also to take advantage of favourable economic conditions, which were created by the experience of formulating and implementing the

PAEG, the Brazilian government decided to formulate the Decennial Plan for the 1967-78 period.

The Decennial Plan's principal objective was to accelerate national economic growth in the long-term. The economists and technicians responsible for elaborating this ten-year plan paid attention to the problems of urban and regional development, and also proposed the introduction of a "new concept of regional policy" based on the integration of the various regions of the country, with a view to creating a unified national market and to accelerating national economic growth (Neto, 1989). This plan manifested two important preoccupations, with national integration and the populating of "empty spaces". These preoccupations were intrinsically related to the military's geopolitical objectives and one of the regional policies to be implemented by this plan in order to tackle those problems above was the creation of urban growth poles.

In spite of being an ambitious governmental plan, the Decennial Plan was a mere collection of studies, reports and recommendations. It was not implemented by the subsequent Brazilian government under General Arthur da Costa e Silva. However, the Decennial Plan served as a basis for the Strategic Development Programme (PED) for the 1968-70 period.

The PED maintained the same attributes as its predecessor, the Decennial Plan. In regional terms, the PED aimed at creating a self-sustaining process of development in each major region; and at introducing this process into the promotion of national integration, whose objective was to have a relative economic differentiation of each region and to form an integrated national market (Mendes, 1978). In order to attain these aims, this plan established some instruments of economic policy and one of them was to create several regional poles, whose main objective was to expand the national market.

After the 1964 military coup, the State was led to intensify its participation in the whole economy in order to generate better possibilities for the expansion of private enterprises. As a consequence of this intense participation, the process of regional planning was centralised and was to be totally consolidated in the first half of 1970s. At the beginning

of the 1970s, the Brazilian government's presence in Amazonia became greater because such objectives as occupation and national integration became more important than all others. This presence was strongly reflected in federal programmes such as PIN and PROTERRA, and subsequent governmental plans. PIN was established by Decree-Law n° 1106 on June 16, 1970. This programme envisaged the construction of *Transamazônica* (the Trans-Amazon highway, BR-230) connecting Amazonia with the Northeast and also of the *Cuiabá-Santarém* highway (BR-165) linking *Transamazônica* with the Centre-South. In addition, there was a vast colonisation plan for both highways which aimed at relieving high-populated areas, such as the Northeast (SUDAM, 1973).

In this context, PIN sought a solution to social difficulties of both the regions considered problematic by the government: Amazonia and the Northeast, so the construction of highways and colonisation projects were seen as suitable measures for solving these problems because these measures would generate employment for masses of displaced people, principally from the Northeast which had recently suffered a severe drought, and would also encourage emigration on a large scale from crowded regions (principally the Northeast) to Amazonia. The Brazilian government believed that emigration would at the same time resolve three problems, namely the occupation of Amazonia (the military geopolitical aim may be mentioned here), alleviation of social tensions in the Northeast and avoidance of exodus from poor areas (especially the Northeast) to the highly-populated Centre-South cities.

Three months later, President Emílio Garrastazu Médici, launched the document Target and Bases for Government Action for the 1970-72 period. This document was launched in the period called "The Brazilian Miracle" and at that time there was a wave of optimism and nationalism, which was stimulated by the Federal government in order to transform the country into a great world power, and for Brazil to have a prominent role as the leader of Latin-American countries.

In relation to its regional objectives, the Targets and Bases aimed at developing the Northeast; consolidating the occupation of Amazonia and integrating it into the national economy; and centralising regional planning through a national strategy of integrated

regional development. Although some objectives and strategies had already been elaborated in previous plans, this document placed great emphasis on two depressed regions of the country: Amazonia and the Northeast. It is important to stress here that PIN was incorporated into the Targets and Bases document as its instrument for regional policy. Indeed, the Targets and Bases included several distinct programmes for different sectors of the Brazilian economy. The INCRA was created in 1970 in order to settle thousands of migrants along the Trans-Amazon and *Cuiabá-Santarém* highways. PROTERRA was set up by Decree-Law n° 1178 on June 1, 1971, and was a complement to PIN. With the aim of decreasing rural poverty, this programme aimed at redistributing unutilised lands and promoting agro-industry in Amazonia and the Northeast. In 1972, the Brazilian government decided to construct the 4,040-kilometre Northern Perimeter road (the Perimetral Norte, BR-210) along the northern bank of the River Amazon and the techniques used for the construction of this highway were based on the Trans-Amazon highway.

The INCRA aimed at resettling 100,000 families along the principal highways in Amazonia. In order to attract thousands of migrants from southern, as well as northeastern, Brazil, the Brazilian government undertook a massive campaign which projected an image of Amazonia as a promising land, a land full of opportunities for every Brazilian who wanted to build a new life. The destiny of migrants were the colonisation schemes along the Trans-Amazon, located principally in Altamira, Itaituba and Marabá in the State of Pará. At the beginning, plots of 100 of hectares were offered to INCRA-approved families, together with a monthly subsistence allowance, agricultural production credit and housing at highly subsidised prices. These colonists were to live in several planned new rural and small urban settlements designed by INCRA: the *agrovila* is a small village for up to seventy families placed at ten kilometre intervals along the main highway and side-roads, designed to provide a medical post, school and government general store as well as offices for INCRA and the extension service, EMATER; the *agrópolis* is a small town for up to 600 families built every twenty kilometres as an intermediate administrative centre, provided with a small hospital and other services; finally, the *rurópolis* , embracing eight to twelve *agrópolis* with up to 20,000 people, each to be the main administrative and commercial centre, with facilities such as banks, a

hospital, an airport, hotels and restaurants (Hall, 1991a). Despite the significant expenditure of government funds, the official aims (100,000 families) were not achieved and by 1978 less than 8% or 7,647 households had been settled by INCRA. Thus, this scheme proved to be a complete failure and as a consequence, the INCRA desisted from colonising the Trans-Amazon highway and colonists opted for more "spontaneous" forms of colonisation elsewhere in Eastern Amazonia, but principally in Rondônia and Acre.

There are several reasons which explain the failure of directed colonisation along the Trans-Amazon highway. The most important reason is related to INCRA, which was not able to deal with the vast number of migrants during the early stages, while bureaucratic delays were responsible for the disorganisation of the agricultural calendar, which provoked poor harvests and consequently disillusionment. In addition, basic infrastructure, educational, health, credit, extension and other important and necessary services were not supplied, and land on its own was insufficient to ensure a livelihood in an environment strange for migrants from the Northeast and also southern Brazil. It is important to note that most of Amazonian soil is infertile (except for a few areas) and the colonisation schemes were located in these infertile areas. These problems were exacerbated by over-centralised and inefficient planning and also by administrative difficulties such as bureaucratic indiscipline, lack of interagency co-ordination and inefficiency, which were common to INCRA and other government agencies (Bunker, 1985; Hall, 1991a), the construction of roads which were inaccessible during the rainy season, the provision of seed of fast growing crop varieties which matured at the wettest time of the year in Amazonia, as well as long delays in providing colonists with the land titles, fundamental for obtaining subsidised credit, which was being monopolised by larger commercial producers to the detriment of small farmers.

In addition to the Trans-Amazon, Belém-Brasília and Cuiabá-Santarém highways, other federal and state highways, although less grandiose, were very important for consolidating the integration and populating of Amazonia. The total road network in Amazonia has grown eight fold since the mid-1960`s, from about 6,000 kilometres in 1965 to 46,000 kilometres only twenty years later (Mahar, 1989). The rapid expansion of the road network paved the way for the occupation of the region.

Various factors can explain this governmental emphasis on the rapid expansion of the road network, colonisation projects and agribusiness in Amazonia. Nevertheless, the most important one is geopolitics. Thus, integration became the cornerstone of the military government because it was seen as an essential condition for national security, which was embodied symbolised in the slogan: "to integrate in order not to forfeit". The communist threat represented by only sixty-nine Maoist guerrillas in the Araguaia region of southern Pará, the expansionist threat presented by neighbouring countries who share the Amazon rainforest and other ghosts which were part of the military imagination contributed to a strengthening of regional integration in Amazonia. By virtue of this preoccupation, a nation-wide campaign was promoted in order to attract thousands of migrants from southern and also north-eastern Brazil, and this massive propaganda emphasised projects which were being undertaken (principally the Trans-Amazon highway and settlements projects of PIN) by the government, the Brazilian economic progress (the "miracle" years), the country's transformation into a great world power and at the same time showed Amazonia as a promised land ready for occupation by hard-pressed peasantry. Obviously, this intense campaign had two clear motives: to divert public attention from the cruel political repression of the military regime and avoid agrarian reform in the North-East and South. The second factor is economic, because there was a real interest in exploiting the region's vast store of natural resources (the reserves of gold, cassiterite, copper and iron-ore had already been discovered). In addition, the Federal government believed that small properties could produce a surplus of staple foods such as rice and beans to compensate for the loss of production for export. Although colonisation projects showed some preoccupation with social issues connected with the northeastern drought, the government's main aim was to populate Amazonia`s vast empty spaces, which was a geopolitical objective, making it viable in agrarian terms and also avoiding agrarian reform by encouraging migration from areas with social tensions.

Mahar (1979) stressed that the creation of PROTERRA, like that of PIN, was an attempt to reorientate the previous strategy of regional development based on import-substitution industrialisation. The First National Development Plan - PND I - was elaborated for the 1972-74 period. It basically maintained the same objectives as those of the previous plans, such as national integration and the acceleration of economic growth through the

expansion of the national market. With regard to regional development strategies, PND I continued to put great emphasis on Amazonia and the Northeast regions and based its strategies on programmes (PIN and PROTERRA) which had already been implemented. It is important to note that this plan restored growth poles as a strategic part of regional development. PND I was complemented by SUDAM's detailed plan, which was named the First Amazon Development Plan (PDA I). The objectives of the PDA I endorsed the proposals of PND I.

Although reserves of iron-ore, gold, and copper had already been discovered, the Brazilian government plan was to exploit the huge store of natural resources in Amazonia. In this context, PDA I stressed the need to discover more minerals, so a sophisticated plan of mapping the region was implemented and named the RADAM Project. This project was the first systematic aerial survey of Amazonia's natural resources and went a long way towards confirming the vast mineral wealth in the subsoil, as well as the extent of timber reserves and land available for livestock production, thus setting the stage for later commercial expansion in the region (Hall, 1991a).

The Second National Development Plan - PND II - was launched by the Brazilian President, General Ernesto Geisel, on September, 1974. This plan followed the same directives established in the PND I and thus national integration continued to be the core of the problem. It is important to note that the first oil crisis, which occurred in 1973, contributed in large measure to the Brazilian government's decision to exploit Amazonia with the clear purpose of generating foreign exchange through export. Based on this governmental decision, the PND II concentrated on expanding infrastructure such as energy, transport and communications as well as the export of some specific products, and, moreover, on investing in the expansion of basic industries located in selected areas of the region (SUDAM, 1976a). Another important point is that PND II understood Amazonia as a "tropical frontier" because of its resources of comparative advantage, which were mainly in the mineral sector (iron ore, bauxite, manganese etc.), timber (laminates, composites etc.), beef (meat), crops (dende oil, cacau, rubber, pepper, jute etc.) etc. This understanding was reflected in POLAMAZONIA, which was established by Decree-Law n° 74,607 of September 25, 1974.

POLAMAZONIA aimed to create fifteen "growth poles" in selected areas, which were endowed with both investments in infrastructure and a stimulus to export-oriented activities in favour of private enterprises. Carajás was one of those "growth poles" and, although iron-ore mining was the central objective, there were other interrelated and important projects for this area such as the development of cattle-breeding and the relocation of the city of Marabá (SUDAM, 1976a). Nevertheless, the most significant fact is that POLAMAZONIA marked an important change in government policy in favour of large corporate agribusiness, livestock production and private colonisation schemes, allied with infrastructure investments, mineral mining and processing activities (including the exploitation of iron-ore mine at Carajás). This change was the result of pressures exercised by planners, politicians and even SUDAM, which blamed the small farmers for the negative impacts of government directed colonisation projects along the Trans-Amazon highway. These pressures had a clear intention: to force the Brazilian government to return to the previous policy for Amazonia, which was based on occupation by large-scale private enterprises, powerfully represented by the AEA, whose headquarters was located in São Paulo. Curiously, the interest of this influential lobby of businessmen were ably represented in the Médici government by the Planning Minister, Mr. João Paulo dos Reis Velloso (Branford & Glock, 1985).

PDA II was elaborated as a complementary plan to PND II for the 1975-79 period, and the strategies for regional development presented in it were in agreement with the aims of the national plan. Nevertheless, the PDA II placed more emphasis on the characterisation of Amazonia as a "tropical frontier", highlighting the great potential of this region in generating foreign exchange for the country.

The economic situation at the end of the 1970s was totally unfavourable to Brazil, principally because of the second oil shock in 1979, which contributed greatly to increasing the Brazilian external debt. In this context, the Brazilian government formulated PND III which maintained some characteristics of previous plans but focused on increasing exports in order to reduce the external debt crisis. With respect to Amazonia, the preoccupations of PND III were the same as those of previous national plans: integration and occupation. However, this plan stressed the necessity of

intensifying development in selected poles through POLAMAZONIA in order to carry out the occupation process of the Amazon region. Thus, this plan placed emphasis on "growth poles" as a means of integrating the Amazonian development and obviously of occupying this region.

In fact, the Brazilian government, under the PND III, had concluded that cattle-breeding was not the best solution for the long-term development of Amazonia and then put its trust in the mining sector. Although the Carajás Project had officially started in 1978 when the iron-ore operation was formally approved by the CDE of the federal government and the construction of the initial 80 kilometres of the Carajás railway outward from São Luís was authorised, the implementation of this project was only intensified after the change in the Brazilian government in March 1979. Indeed, the Figueiredo government decided to support the Carajás Project on October 15, 1980, authorising CVRD to obtain internal and external financing necessary to implement it, and one month later, on November 24, 1980, the PGC was officially established by Decree-Law n° 1,813. This Decree-Law instituted a special system of incentives for projects included in the PGC area and was complemented by Decree-Law n° 1,825 of December 22, 1980, which granted exemption from income tax and from additional non-refundable taxes levied on the profits earned by exploitation at legal entities for a period of ten years, when the same installed, expanded or modernised undertakings included in the Greater Carajás Programme by December 31, 1985 (SEPLAN-PR, 1988).

The mining sector was responsible for more than 10% of Brazil's exports, roughly 1.3% of GDP and about 1% of government revenues in 1980. While some seventy different minerals were produced at that time in Brazil, iron-ore dominated total national output, accounting for 26% of all mineral production and more than 90% of the value of mineral exports (World Bank, 1992). Moreover, Brazil had vast reserves of metallic and non-metallic minerals in Eastern Amazonia. Therefore, the Carajás Project and the PGC were regarded by the Brazilian government not only as a historical opportunity for solving the foreign debt problem, but also as a possible source of massive loans (from Japan, EEC, World Bank, etc.), which were more and more difficult to obtain by virtue of the deterioration of the Brazilian macroeconomic situation.

1.4.1 - Rio Doce Valley Company (CVRD)

The Rio Doce Valley Company (CVRD) has played a major role in Eastern Amazonia. Indeed, CVRD was a State-owned mining company, the Bank's client, the Government agency responsible for the Carajás project and for the PGC. In order to better understand its role in this region, it is important to briefly describe its history within the wider Brazilian context. The CVRD was created during the Second World War, specifically on the 1st of June, 1942, to exploit iron-ore at the Itabira mines in the state of Minas Gerais. Indeed, the establishment of the CVRD was the culmination of intense negotiation between Brazil, USA and the UK, who signed an agreement in Washington. According to this agreement, the UK purchased the Vitória - Minas railway as well as the ownership of the iron-ore mines from the English company Itabira Iron Ore and transferred them to the Brazilian government, while the U.S. lent US$ 14 million to Brazil to purchase machines and equipment for CVRD. In addition, both countries agreed to buy all iron-ore production to be exported by the State-owned mining company (Teixeira, 1993a; 1993b).

CVRD was created one year later than the National Steel Company (CSN), which was a landmark in the history of Brazilian industrialisation. After a long period of negotiation in which Brazil allowed American military bases to be built in the Northeast, the Vargas government obtained a loan of US$ 20 million (Teixeira, 1993b) from the United States to set up the Volta Redonda steel mill, which was the first industrial plant in this strategic sector. In fact, the creation of both companies, CVRD and CSN, was successful and the reason for this lies partially in the Second World War, from which President Vargas benefited by demanding favourable conditions to establish these companies in order for Brazil to join the Allied forces. Although the war was an important factor and Vargas took advantage of this situation to achieve his objectives, these companies were not a consequence of World War II but the result of socio-political changes which occurred when Vargas took power in October 1930.

The political and military forces which supported Vargas forced into being a State typically bourgeois, which replaced the previous denominated oligarchic State. By controlling the political power, these forces, formed by the mercantile and industrial

bourgeoisie allied to urban middle classes, imposed their interests and vision, eminently urban, upon the oligarchic sector, whose interests and vision were intrinsically related to an export economy based on the use of natural resources. The central point is the role played by the State in the economy and the world economic crisis caused by The Great Depression (1929-33) as well as The Second World War (1939-45) affected dependent countries such as Brazil and, consequently, led these governments to intervene, to a greater or lesser extent, in the economy in order to protect or stimulate the economic activities considered essential for the development of their respective nations or even to establish and stimulate new economic undertakings (Ianni, 1986).

With respect to Brazil, the world crisis affected the national economy, but they, despite the problems generated, did contribute to demonstrating the economic limitations of an economy based essentially on the external market. It is worth noting that the solutions for tackling these problems had a nationalist character and this nationalism was an important factor throughout the two phases of the Vargas administration (1930-45): The first period was from 1930 to 1937 and the second was initiated by the *coup d`etat* that established the *Estado Novo* (New State) in 1937, which was marked by political repression. Thus, the 1934 Constitution and the 1937 Constitution (sanctioned during the dictatorship period) were nationalist in relation to their economic directives (Ianni, 1986). At the same time, the debate on the exploitation of the petroleum deposits and on iron and steel, which culminated in the creation of the National Council of Petroleum (1938), the CSN (1941) and the CVRD (1942), were also examples of nationalist solutions for Brazilian society.

Insofar as the State was led to a major participation in the economy, the discussion about planning as a technical tool for government economic policy became more intense. The Second World War caused a decrease and transformation of international trade, which in turn generated a number of social, economic, financial, political, organisational and technological problems that had to be tackled rapidly and this is the main reason for the incorporation of planning as a technique by the Federal government (Ianni,1986). In this regard, the creation of the Co-ordination for the Economic Mobilisation (*Coordenação de Mobilização Econômica*), a type of super Ministry, in Ianni's words, which was responsible for regulating the national economy, including the industrial planning for the

country, through the SPI - Sector for Industrial Production (*Setor de Produção Industrial*) - one of the agencies set up by the Co-ordination itself - is an excellent example. Although adopted to face serious problems generated by the World War II, planning was also perceived as a means of promoting economic development and the State was an essential element for achieving this objective.

The centralised planning began to be implemented during the Vargas' New State (1937-1945) and flourished during the military dictatorship (1964-85), although there were certain differences between these periods. The main difference lies in the development strategy implicit in Brazilian economic policy. While the strategy during the Vargas government was to develop a "national capitalism" as the only alternative for the socio-economic progress, that during the military regime was to build an "associated capitalism" (Ianni, 1986). Nationalism was an important factor during the Vargas government and the idea that permeated Brazilian society in this period was that it was possible to achieve economic development independently, through the construction of a type of capitalism eminently national. In this regard, planning State intervention, industrialisation, and nationalisation of the economy were essential for constructing this capitalism and, consequently, for achieving economic emancipation. With respect to the military regime, its development strategy was termed as associated because these governments , by means of their economic policies, aimed to integrate the Brazilian economy with the world economy, and the presence of multinational enterprises was considered an essential part of strategy. Despite the importance of the role played by multinational enterprises in the national economy, nationalism was also present in this period, as evidenced by geopolitical preoccupations, of which national integration and occupation of Amazonia is an excellent example.

State-owned enterprises were located in specific sectors of the economy unattractive to private enterprise because of their heavy investment requirements and low profitability. Nevertheless, the State enhanced its intervention in the economy principally in those sectors which had important backward and forward linkages, of which the steel and basic petrochemical industries are traditional examples (Evans,1986;1995). The establishment of State enterprises played a central role in Brazilian development policies and through

these public enterprises the State became an active and decisive actor in the development process. The power of the State enterprises grew rapidly during 1967-73 and Stepan (1985, pp.331) pointed out that in ranking Brazil's thirty largest non financial companies according to net assets, thirteen of these were public enterprises in 1987, seventeen in 1971, and twenty-three in 1974.

This power did not decrease in the subsequent Geisel and Figueiredo administrations. The State enterprises played an important role in the PND II, which had opted for a new phase of import-substitution industrialisation: capital goods and basic raw materials, specially in petrochemical and metallurgical industries. Although more hesitant, the economic policy during the Figueiredo government continued the same as before, principally because the large industrial projects and programmes, such as POLAMAZÔNIA, elaborated by the previous administration had already been initiated, so they were continued willy-nilly. Evans and Rueschemeyer (1985) stressed that the State-owned enterprises, acting or not in the same way as private companies, represented a significant State intervention because through them the State supplanted private capital accumulation and itself became an agent for the accumulation of capital. In this regard, some State-enterprises, such as CVRD, are extremely profitable which make them relatively independent of the Federal government.

State intervention and the expansion of the role of State enterprises are associated with the development planning adopted by the military regime. This planning model, which has its roots in Vargas` New State, was a top-down process in which all decisions were centralised. By intervening in the economy, the State aimed to regulate all economic activities, administering prices, guiding market forces and controlling financial institutions. In fact, the military governments saw the State as the one body capable of co-ordinating the main economic activities, but for this purpose a minimum of consistency and co-ordination within and between different State agencies and a rationalisation of its objectives and actions was necessary. In this regard, the Federal government elaborated four or five years plan, such as PND I, II, and III, which had to be implemented.

The Ministry of Planning and General Co-ordination - MIPLAN - was in charge of governmental planning until 1974, when two agencies, the CDE (Economic Development

Council) and SEPLAN (Planning Secretariat of the Presidency of the Republic), directly attached to the Presidency of the Republic were established in order to assist to the President in the formulation of the economic policy (Ulysséa, 1982). Despite the importance of the formulation of economic policy, the powerful SEPLAN , which was the old MIPLAN, was responsible for co-ordinating government planning, while the CDE was principally responsible for co-ordinating the activities of several Ministries. Thus, the SEPLAN (General Secretary of the Presidency of the republic) was the key agency in the Brazilian Government and its structure until 1979 consisted of some secretaries, institutes, foundations, such as: Seplan (Planning Secretariat), SOF (Secretary of Budget and Finance), SAREM (Secretary for Connection with state and Municipalities), INPES (National Economic and Social Research Institute), IPEA (Institute of Applied Economic Research), IBGE (Brazilian Institute of Geography and Statistics),etc. After 1979, SEPLAN embraced some government bodies which were created by, and others transferred to, this secretary, the main ones being: SEST (Secretary for the Control of State Enterprises) and the Interministerial Council of the Greater Carajás Programme.

In fact, SEPLAN developed a number of activities, which varied from co-ordinating the elaboration of plans and programmes of the Federal Government and promoting integration between regional and sectoral plans; and monitoring the implementation of these plans and programmes to co-ordinating those activities related to the control of the resources and expenses of State enterprises and co-ordinating those activities related to integration between different tiers of government: Federal, state and municipal (Ulysséa, 1982). SEST, which was subordinated to SEPLAN, was in charge of important functions ranging from co-ordinating those State enterprise activities which were related to resources and expenses that could be adjusted to objectives, policies and directions specified in the government plan to monitor the management of State enterprises in relation to their performance, operational efficiency, profitability and financial-economic situation (Ulysséa,1982). The Interministerial Council of the PGC was set up within the SEPLAN in order to co-ordinate, promote and implement, in an integrated way, those measures required for the feasibility of the Carajás programme and for the granting of the necessary incentives. This Council was integrated by the Minister and Head of SEPLAN, who was its President, other Ministers (Mine and Energy, Transportation, Industry and

Commerce, Finance, Interior, Agriculture, Labour, and Agrarian Reform and Development), The Secretary General of the National Security Council and the Governors of the states of Pará, Maranhão and Goiás (now Tocantins), which formed the activity area of the PGC. In addition, the Interministerial Council had an Executive-Secretariat, which was directed by an Executive-Secretary designated by the Presidency of the Republic (SEPLAN-PR,1988).

The Interministerial Council had authority to determine the polices and general criteria to be observed in the analysis and approval of projects and programmes included in the PGC; to approve, on the basis of proposals presented by the Executive-Secretariat , the implementation of the infrastructure of the PGC; to approve, on the basis of proposals presented by the Executive-Secretariat, those undertakings that were to receive the benefits of the incentives; to define the conditions under which the Executive-Secretariat shall exercise the attributions of other organs and entities of the Federal government, in the carrying out of those acts that are necessary to the implementation of approved projects and programmes; and to channel complementary financial resources into the undertakings of the PGC and to supervise their utilisation. It was the duty of the Executive-Secretariat, together with other governmental bodies and entities to study projects and programmes; to practise the administrative acts required for the implementation of approved projects and programmes (SEPLAN-PR,1988).

The structure of the planning model adopted by the military regime illustrates perfectly how centralised decision-making was. The change in SEPLAN's structure that occurred in 1979 should be understood as a decentralisation undertaken by the Federal Government in order to achieve maximum efficiency. Decentralisation was an important measure commonly utilised when the Federal government decided to intervene in the market. Indeed, the military government opted for the market economy and consequently, development planning and government activities were directed towards guiding, supporting and stimulating the private sector, while the Federal government , as producer and investor, limited itself to those activities and areas considered as being of national interest and security. By deciding to intervene in the market in order to further its development policy, the Federal government needed to make its actions effective and

therefore it was important to give autonomy to subunits, but this decentralisation created a number of problems for the government, such as difficulty of the co-ordination and the integration between different governmental bodies. Despite their importance, it is beyond the scope of this research to analyse the problems generated by decentralisation.

What really matters here is that this planning model was highly centralised in the hands of the Federal government, which had control over its institutions, agencies, Superintendencies, enterprises, etc. State enterprises played an important role in expanding the participation of the State in the economy and even those enterprises which had a relative degree of autonomy, such as CVRD, were involved with the objectives of the Federal government. Therefore, State enterprises were an instrument through which the Federal government expanded its role and controlled its territory and the classic example of which was Eastern Amazonia, which was controlled by the Brazilian government through its State-owned mining enterprise, CVRD.

In relation to CVRD, some important aspects must be taken into consideration in order to explain CVRD's brazen attitudes at Carajás and its disregard for the local municipality as well as its casual attitude towards the impacts generated in this region. First of all, CVRD's attitudes at Carajás must be placed within the historical context in order to be better understood. It is important to remember here that CVRD was created during Vargas' New State, an authoritarian period in which planning was centralised, and became Brazil's iron-mining giant during the military regime, which maintained the tradition of centralised planning. As already seen, this top-down planning model was intrinsically connected with centralised decision-making, hierarchical organisational structures, and authoritarian leadership. Policy decisions were made "from above" and were not democratic, because they were handed down as orders which had to be implemented. Consequently, state and municipal governments neither participated in the formulation of Federal Government plans nor were they consulted about their local problems. Indeed, the Federal Government patronised other government tiers and sometimes its attitudes tended to be paternalistic, a good example of which is the speech of the President Médici, who, after visiting some areas affected by a severe drought in the Northeast, stated: "I want to say to the people of the Northeast that I do not promise you anything.(...) I only say that

everything has to begin to change" (Médici, 1970 quoted by Hall, 1991a, pp.10). In less than ten days, his Government launched the National Integration Plan (PIN), which financed the construction of the Trans-Amazon highway (BR-230) connecting the Northeast with Amazonia.

1.4.2 - The World Bank

The World Bank played a significant role not only in making the Carajás project viable, but also in assisting this industrial project. As already mentioned, the Bank loan was fundamental for CVRD aspirations and represented 20.4% of total expected foreign funding for the Carajás iron-ore operation. However, this loan assumes a greater importance insofar as most of Japanese and European loans was made conditional on the World Bank's approval of the project. In addition to US$ 304.5 million from the Bank, the main foreign lenders were: Japanese financial institutions (over US$ 530 million), such as the Japanese Exim Bank and Japanese commercial bank syndication; the EEC (US$ 400 million), through the European Coal and Steel Community (ECSC); the German KFW (US$ 130 million); and the US Exim Bank (US$ 58 million). Despite the massive external funding, the Federal government, through BNDES and FINAME, and CVRD, through convertible debentures (partial privatisation mentioned above) and own financial resources, were required to channel a significant amount of money into the Carajás project. Indeed, the total amount of foreign loan, including The World Bank, was estimated at US$ 1.5 billion, while the total cost of the project was US$ 4.5 billion (World Bank, 1992).

CVRD signed long-term contracts with several clients, such as German, French, Japanese, Korean, in order to assure sales during its first years of iron-ore production. Owing to these contracts previously negotiated by CVRD, the World Bank understood that the market risks for the Carajás project were reduced. This point is significant insofar as financial and economic aspects were always the main priorities, as will be seen below, for the World Bank. Its lending strategy for Brazil consisted of four main objectives and the Carajás project fitted in well with two of them, namely:

> "...to ease the foreign exchange constraint on national development by supporting projects designed to increase export capacity and substitute imports; and to provide part of the medium and long-term capital flows required by the country in order to sustain satisfactory growth and achieve its employment creation and regional development objectives" (World Bank, 1992, pp. 8).

The loan to help finance the Carajás project was approved on August 10, 1982, but before this approval the Bank undertook a preparation mission in February 1981; a pre-appraisal mission in July 1981; an appraisal mission between October 26 and November 11, 1981; and four post-appraisal missions, which took place in January, two in February, and May 1982. The preparation mission focused on financial and economic aspects, such as market constraints, financing plan, the size of the project, while the environmental issues were not mentioned by the Bank specialists, who stressed that

> "the Bank's role in support of the operation would be "critical" in two respects, by providing a "catalytic effect" on other external funding sources, as well as reinforcing Brazilian government commitment to the undertaking, and by strengthening project organisation and management arrangements in CVRD for efficient project implementation" (World Bank, 1992, pp. 60).

During the pre-appraisal mission, the Bank team concentrated on CVRD`s proposed measures for managing the environment in the Carajás project which included the creation of the GEAMAM in January 1981 and the CIMA in June of the same year. Although environmental measures were considered serious and comprehensive , the Bank specialist pointed out that they were insufficient and much more had yet to be done (evaluations, studies and preventive measures). Problems related to indigenous population settled close to the Carajás project were mentioned by the Bank mission, which recommended the participation of an Amerindian specialist in the appraisal mission. The financial and economic aspects of the project continued to receive special attention.

With respect to the project appraisal mission, the Bank team, which included several specialists, such as anthropologist, mining and transport engineers, financial analysts, etc., considered the environmental protection component of the Carajás project good enough for its purposes and at the same time FUNAI agreed to elaborate a plan for the protection

of Indian reserves. This plan was carefully analysed during the loan negotiations, which were held in June 1982. Despite all these considerations, the economic and financial aspects continued to be the main priorities and this point is confirmed by the Bank memorandum, which identified the principal post-appraisal issues as being:

> "the adequacy of the technical design and accuracy of cost estimates for the port and railway components; the capability of the iron-ore market to absorb Carajás` output without a depressant effect on ore prices; and economic justification for the project in light of possible additional production potential in CVRD`s southern system" (transmittal memorandum for yellow cover SAR, May, 6, 1982, quoted by the World Bank, 1992, pp. 64).

In this memorandum, the Bank stressed that

> "the estimated economic rates of return (13% and 15% for 35 and 50 million tons of iron-ore per year, respectively) are satisfactory for new mining projects where large capital investments and long lead times to development are required" (transmittal memorandum for yellow cover SAR, May, 6, 1982, quoted by the World Bank, 1992, pp. 64).

and emphasised that

> "the role of the project as a major foreign exchange is...particularly important to the government's plans to improve Brazil's balance of payments" (transmittal memorandum for yellow cover SAR, May, 6, 1982, quoted by the World Bank, 1992, pp. 64).

The two first post-appraisal missions undertaken by the Bank were related to the transport component of the Carajás project which received special attention, principally because the railway and deep-port components corresponded to more than 60% of total project capital costs (World Bank, 1992). However, these missions corroborated the appraisal conclusions, stressing that engineering work for the railway had been carefully implemented by CVRD. The other two post-appraisal missions concerned the urban development component of the Carajás project. The Bank specialists suggested improvements in the new Carajás town and the necessity of establishing land use controls and regulations for the deep-port area in São Luís. With regard to Parauapebas, the urban specialist recommended, as seen in chapter three, the implementation of basic

infrastructure and social services. However, the plans for this urban nucleus, unlike those for the company town, were not evaluated by the World Bank before its loan approval. They were only approved by the Bank in late October 1982.

1.4.3 - The Greater Carajás Programme (PGC)

The Greater Carajás Programme (PGC) covered an area of 895,000 square kilometres, which is equivalent to 10.6% of Brazil or larger than France and United Kingdom combined (see Fig.1). The PGC was the largest and most ambitious "integrated" development plan ever devised and implemented for an area of tropical rainforest. The concept of the "integrated" development plan has its roots in studies undertaken by the CVRD with assistance from the Japanese International Co-operation Agency (JICA), which was part of the Japanese Ministry of Foreign Affairs. These studies clearly proposed the implementation of industrial (whose top priority was the export-oriented mineral), agricultural, livestock and silvicultural projects in the Carajás region. In fact, these studies were important for convincing the incoming Figueiredo government to support this regional development strategy. This programme comprised four major projects: an iron-ore mine (the Carajás Project), which was the PGC's centrepiece; two aluminium plants: the ALBRAS-ALUNORTE complex and ALUMAR, of which the former was located at Barcarena, near Belém and the latter in São Luís; and the Tucuruí hydroelectric scheme on the River Tocantins. In addition, the PGC involved investments in infrastructure such as roads and rail transport and also in agriculture, cattle-breeding, fisheries, agroindustry, forestation, reforestation, lumbering and utilisation of energy sources.

It is important to stress here that the implementation of the Carajás Project, one of the ideas advocated by the CVRD (1979), would be the beginning of a development corridor, based firstly on the export mineral and agricultural products, and gradually embracing the establishment of industrial clusters (in the sense of development poles) and agro-industries also directed at the internal market. Consequently, the "integrated" implementation of these activities would supposedly result in a substantial development

of the region and of Brazil as a whole. Moreover, as the harmonious combination of State, private and foreign capital would be essential for the success of the PGC the CVRD (1980) would clearly be interested in furthering the PGC and obtaining official approval of it. This interest was very clear because of the difficult obstacles faced by the CVRD for obtaining the necessary resources for the interdependent mineral (the Carajás Project, ALBRAS and MRN) and infrastructural (the Tucuruí hydroelectric, the Carajás railway, deep-water port and new town) projects in which it was involved and dependent upon to varying degrees. On the other hand, the Figueiredo government decided categorically to support the PGC because this programme represented a more profitable strategy for Eastern Amazonia than cattle-breeding and also, because there was a great possibility of attracting overseas official and private capital and generating foreign exchange to service Brazil's foreign debt. Thus it was important and convenient for both CVRD and the Brazilian government that the PGC was presented as a ready-made and attractive "integrated" regional development strategy.

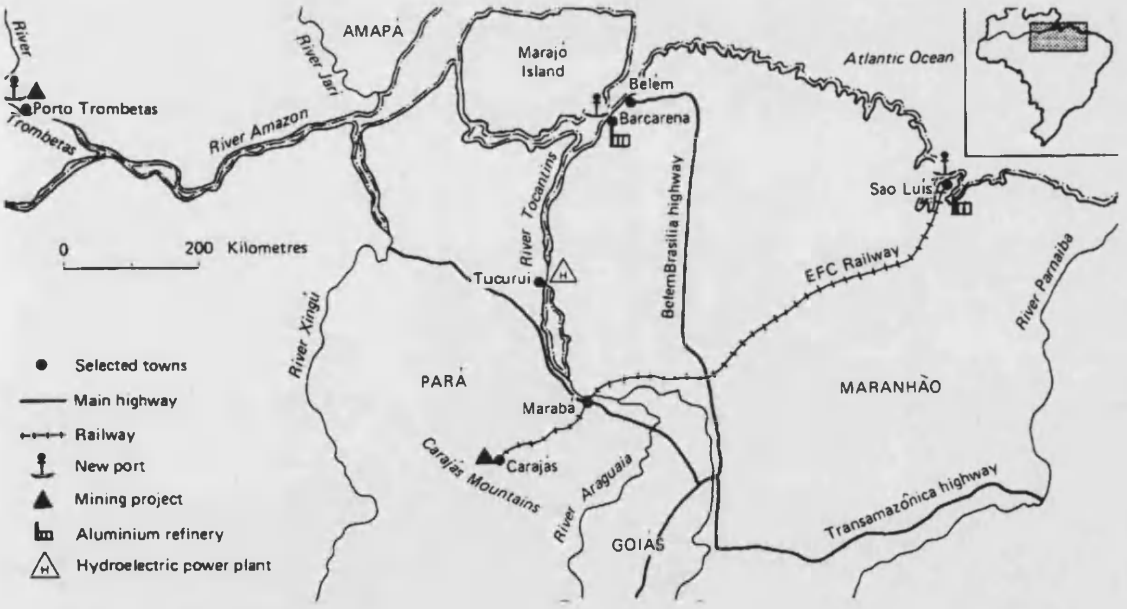


Fig. 1.1 - Area covered by the Greater Carajás Programme

Source: Neto, 1990

Hall (1991b) emphasised that the PGC was a combination of projects implemented previously and of new projects supported by legislation for special fiscal incentives, which were established in order to attract national or foreigner investors in the name of regional development. The Brazilian government hoped that, once these several investments were set up with the support of a wide range of fiscal incentives, further industrial and agribusiness ventures would be attracted to the PGC's "development poles", particularly along the Carajás railway corridor at Parauapebas, Marabá, Açailândia, Buriticupu, Santa Inês, Rosário, and São Luís (World Bank, 1992). In order to understand the PGC and its social and environmental impacts, it is necessary to describe below its major components: the Carajás Project, two aluminium plants and the Tucuruí hydroelectric scheme.

1.4.4 - The Carajás Project

The Carajás Iron-Ore Project was the centrepiece of the entire programme and comprises the mine, the railway, a deep-water port and also the town sites. The iron-ore mine is located at the *Serra dos Carajás* and its eighteen billion tonnes of high-grade iron-ore are the largest reserves in the world. The iron-ore is extracted by highly mechanised open-pit operations and because of its high quality requires no concentration or treatment except beneficiation, which involves consecutive crushing, screening and solid-recovery (Santos, 1986). After this process, the processed ore, in the form of sinter feed (mainly) and pellets, is transported by conveyor belts to the storage yards. In addition to the iron-ore, the *Serra dos Carajás* also contains other minerals such as: manganese (sixty five million tonnes, which is the second largest manganese reserve in Brazil), copper, nickel, chrome, cassiterite, tungsten and gold (Santos, 1986).

The port of *Ponta da Madeira* was built in the São Marcos Bay, which is located nine kilometres southwest of the island of São Luís (capital of the state of Maranhão). There are places in this port whose width and depth make them most suitable for large bulk carriers of up to 360,000 deadweight tonnes (dwt). The iron-ore from the Carajás mine is

unloaded by two rotating car-dumpers designed to empty two cars simultaneously. The discharged ore is carried by conveyor belts to the storage yard. This sector is complemented by the loading area, whose principal equipment is a shiploader which can handle 16,000 tonnes per hour of nominal capacity.

The Carajás railway is a single track, has a total length of 890 kilometres, and connects the mine site in Carajás to the Ponta da Madeira terminal in São Luís. It was designed with the purpose of transporting the high grade iron-ore economically. The railway crosses a flat surface without a tunnel or any large construction. The total length of the bridges and viaducts is only 11.2 kilometres and the longest bridge (2.3 kilometres) crosses the Tocantins River at Marabá. The standard ore train has 200 wagons, with a total capacity of 19,600 tonnes, and is pulled by three locomotives. In addition to iron-ore and other cargo, the railway also transports passengers from Parauapebas to São Luís three times a week in both directions.

The setting up of some thirty pig-iron smelters and industrial plants processing iron-ore and manganese along the Carajás railway corridor was an essential element in the PGC strategy for establishing integrated industrial development. These industries were to be concentrated in the following towns: Açailândia, Buriticupu, Marabá, Parauapebas, Rosário and Santa Inês. By 1989 the PGC Council had already approved, under the fiscal incentive scheme, thirteen pig-iron smelters and also six iron-alloy plants, with a total projected annual production of over 1.5 million tonnes. The first two of these smelters (COSIPAR - Companhia Siderúrgica do Pará - in Marabá and the Companhia Siderúrgica Vale do Pindaré in Açailândia) came on stream in early 1988, while two others (SIMARA - Siderúrgica de Marabá - in this town and the Viana Siderúrgica do Maranhão in Açailândia) initiated their operations at the beginning of 1989 (Hall, 1991a; World Bank, 1992). In order to make their production economically viable, these industries had access to a cheap source of fuel, namely charcoal obtained using the native rainforest. As a consequence, this industrial strategy was shown to be harmful to the environment and this specific problem will be discussed below.

An important component of the Carajás Project is the company town built for approximately 6,000 inhabitants and which has a relatively advanced infrastructure; good housing, shops, school, supermarket, banks, a hospital, an airport, a sports and leisure club, a cinema, a theatre, a hotel, public transport, and also zoological and botanical gardens. This urban nucleus is surrounded by a four metre high fence in order to protect the community from the animals which live freely in the surrounding forest. Environmental destruction is completely prohibited within a 411,948 hectare area under company control, which confers an idyllic atmosphere to the town on the top of the cool mountain and at the same time produces an unreal image of the area as a whole, a false Utopia, due to the unprecedented deforestation of most of the surrounding native forest. Carajás town was originally intended for the CVRD`s administrative staff and contract service workers, but the CVRD`s Superintendency changed the initial objective and only the company employees were allowed to live in the town, while contract service workers were forced to live in Parauapebas/Rio Verde, which is located outside the CVRD`s perimeter.

Strongly contrasting with the Carajás town, which was well planned and equipped with modern facilities, the nearby town of Parauapebas was planned to accommodate a population of up to 10,000 by 1988, including principally CVRD contract service workers. Basic infrastructure, housing investments and social services such as schools and hospital were conceived on a much smaller and infinitely worse scale than at Carajás. Rio Verde is completely different from both cities, principally because it was totally unplanned. It spread out along the highway, practically having bordered it, and has poor housing conditions (most houses are roughly made of wood) and a precarious urban infrastructure. In fact, Rio Verde originated as the "red light district" in order to provide services to construction workers close to Carajás and Parauapebas. Nowadays, Rio Verde has become a district of Parauapebas which means that its situation has improved a little bit.

1.4.5 - The Tucuruí Hydroelectric Scheme

Industrial development in Eastern Amazonia, particularly the mineral sector, is strongly dependent on abundant and inexpensive supplies of electricity. Thus, Tucuruí was built in order to provide cheap power to stimulate industrial growth in the region by attracting domestic and foreign investors. It is the largest hydroelectric plant ever built in a tropical forest, and is also the fourth largest in the world and stands on the Tocantins River, approximately 200 kilometres north of the Carajás mine. At a cost estimated at US$4.6 billion (two-thirds funded by foreign loans), it was inaugurated in November 1984 and its twelve turbines were to generate a total of 8,000 megawatts. As a key element in the whole PGC, Tucuruí supplies the aluminium complexes of ALBRÁS-ALUNORTE at Barcarena and ALUMAR in São Luís (both companies were to consume over half of Tucuruí's total output) and also the iron-ore mine, plants set up along the Carajás railway corridor, and the needs of the cities in the region.

The implementation of Tucuruí generated social and environmental impacts, such as the displacement of up to 35,000 people (including six small towns), the loss of Indian lands (those of the Parakanã and Gavião tribes), deforestation of the surroundings, which provoke siltation and climatic changes, failure to clear vegetation from the area to be flooded (2,500 square kilometres), which resulted in acid water, proliferation of water weeds and water-borne diseases (malaria, bilharzia and river blindness) and anaerobic decomposition. However, these impacts were not taken into account by the authorities (including the power company ELETRONORTE) because the most important target was to bring Tucuruí on stream in order to provide electricity for those great projects set up in the PGC area, which were to solve the Brazilian external debt. These impacts will be discussed in chapter three.

1.4.6 - The Aluminium Plants

Amazonia's bauxite reserves are estimated at 4.4 billion tonnes, or 15% of the world's reserves, which means that Brazil possesses the third largest aluminium deposits, just

behind Guinea and Australia (Santos, 1986). The bauxite reserves in Eastern Amazonia are at Carajás (48 million tonnes), Almeirin (404 million tones) and principally at Trombetas (1,170 billion tonnes) and Paragominas (2,794 million tonnes).

Two major integrated projects date from 1967, when the deposits were discovered in Trombetas, in northwestern Pará, by the Canadian multinational, ALCAN, and were later incorporated into the PGC. These projects are the largest industrial ventures in the region apart from the Carajás Iron-Ore Project. The US$ 1.9 billion ALBRÁS-ALUNORTE complex at Barcarena, near Belém, is composed of two distinct joint ventures between CVRD and the Nippon Amazon Aluminium Company (NAAC): ALBRÁS and ALUNORTE, which were to produce 320,000 tonnes of aluminium and 800,000 tonnes of alumina, respectively. This complex was only implemented in 1982, when the Brazilian government agreed to provide a basic infrastructure (port and urban schemes) and strongly subsidised energy production from the Tucuruí hydroelectric plant (Neto 1990; Hall, 1991a; World Bank, 1992). Thus, ALBRÁS production reached 100,000 tonnes of aluminium, but the second stage of this project was delayed because of disagreements over additional concessions to the Japanese, and, as a consequence, the plan to increase the annual production to 320,000 tonnes was adjourned sine die. The ALUNORTE half of this project had more serious problems and its inauguration was postponed from 1985 to 1989. The crucial point of this problem was related to the continued economic viability of ALUNORTE, since the price of alumina produced by this company was practically double that in the international market. However, the CVRD and the Brazilian government were reluctant to abandon this project because of the dependence generated by this measure, on the supply of imported alumina controlled by a major foreign multinational. In 1987, the Japanese decided that they would withdraw from ALUNORTE, leaving the project at a virtual standstill.

The second major alumina-aluminium complex, ALUMAR, is located near São Luís, the state capital of Maranhão and is also the largest privately funded project ever undertaken in Brazil. This US$ 1.3 billion complex is a joint venture between the American ALCOA, which holds 60% of the shares, and Billiton Metals (a subsidiary of Royal Dutch-Shell) with 40%. Its annual production was planned to reach 500,000 tonnes of alumina and

110,000 tonnes of aluminium. It is important to note that the Brazilian government saw great potential in this project for generating foreign exchange. In addtion to the strong official support, ALUMAR was favoured by several kind of incentives from SUDAM, the Maranhão state government (access to local resources such as land and water) and, last but not least, PGC (exemptions from income tax, IPI and ICM; subsidised electricity from Tucuruí and also the transmission line to São Luís).

In accordance with the Brazilian government, ALCOA could purchase large bauxite reserves at Trombetas and had three important goals: to expand its production, assure supplies for the ALUMAR plant and also reinforce its competitive position in relation to the rival ALBRÁS-ALUNORTE at Barcarena (Neto, 1990; Hall, 1991a). In order to finance the second phase of the ALUMAR plant (inaugurated in 1986), ALCOA decided to sell 36% of its Brazilian subsidiary to Camargo Corrêa, using the US$260 million revenue derived from the PGC tax incentives to the large construction companies. ALUMAR was expected to be the third largest aluminium smelter in the world. Nevertheless, it is important to stress here that ALCOA, although it achieved its industrial objectives, was responsible for several social and environmental problems, such as the displacement of up to 20,000 people (principally fishermen and small farmers), an increase in unemployment in São Luís, pollution of the sea, which affected fishing, and also atmospheric pollution caused by aluminium hydroxide emissions, which contributed to an increase in skin irritations, respiratory illnesses and dying crops. However, these aspects will be taken up in chapter three.

1.4.7 - Agricultural Plans

Mineral operations were the central focus of the PGC, but agriculture and forestry were important components in development plans for the Carajás Programme, at least in the early planning phases. Indeed, the earliest studies undertaken by the CVRD (1979, 1980) and also its Japanese consultants (IDJC, 1980) suggested that the transport infrastructure, principally the Carajás railway, should be utilised for expanding export-oriented large-scale farming and silvicultural activities, and at the same time that Carajás should become

a real "export corridor" based on agriculture, ranching and forestry. The CVRD improved these proposals and suggested a US$11 billion plan to exploit ten million hectares of which three million hectares were to be divided into 300 cattle ranches of 10,000 hectares each; four million hectares were to be devoted for large-scale rice cultivation; 2.4 million hectares were to be designed for sugar and manioc plantations and 800 ethanol distilleries; and also 1,800 square kilometres along the railway corridor which were to be destined for eucalyptus plantations in order to supply the planned pig-iron smelters (Fearnside, 1986; Hall, 1991a; World Bank, 1992).

Subsequent studies undertaken by the Japanese specialists from JICA (Japan International Co-operation Agency) suggested that there was an excellent export potential for some products already familiar to the international market, such as soybeans, palm-oil and rubber, while others such as Brazil nuts, animal foodstuffs, cotton and a variety of tropical fruits needed more prudence because of possible market restriction. Nevertheless, none of these Japanese suggestions were implemented mainly because that agricultural development in Amazonia, with its high plan-implementation costs, was not the top priority for the Brazilian government, whose most important objective was centred on mineral extraction and processing, which offered exceptional possibilities for increasing the foreign exchange earnings and also for improving the balance of payments. In addition, the Japanese proposals were seriously criticised for their social and environmental aspects. Most of these critics alleged that such plans would stimulate land concentration, rural violence, deforestation and also discriminate against small farmers.

The most comprehensive agricultural development plan for the PGC area was undoubtedly the PGCA, which was produced by the Ministry of Agriculture in 1983, budgeted at US$1.18 billion and also heavily influenced by the Japanese and the CVRD`s previous proposals. Thus, the PGCA emphasised large-scale, capital intensive modern technology and exported-oriented agribusiness. Its overall objectives were to increase and diversify the production of food and industrial goods within seven "development poles" in the Carajás region. Although the PGCA has not been implemented, other attempts to develop agricultural and livestock projects were implemented within the PGC area. These projects were supported by fiscal incentives from the own PGC and, in some cases,

together with SUDAM incentives. By mid-1987, over twenty such projects had been approved by the PGC Council, ranging from the Tucumã private colonisation scheme, oil palm plantations and processing facilities to ranching, meat plant, margarine, ethanol, poultry and charcoal production. Nevertheless, the most interesting point is that the major investors in these projects were also major participants in industrial and infrastructural developments, such as the large construction firms Mendes Júnior and Andrade Gutierrez (Hall, 1991a).

These projects, by its own characteristics and also by generous subsidies granted, contributed to aggravate the environment impacts in Eastern Amazonia. In relation to this point, cattle ranching continued to encourage land concentration, land conflict and environmental destruction; the pig-iron smelters continued to use charcoal from the native forest, which has been devastated. Thus, such schemes mirrored the official strategy for Amazonia and also were in agreement with previous agricultural and livestock plans for the region.

Another contemporary programme of the PGC was the POLONOROESTE,which was elaborated for Rondônia and Western Mato Grosso. Its main objective was to absorb the human influx in a sustainable manner by expanding infrastructure and increasing agricultural productivity, rural incomes, and social welfare (Redwood, 1993). At a cost of US$ 1.6 billion and implemented with assistance from the World Bank (which financed 34% of the total cost), the major components of this "integrated" development programme (such as the PGC) included: the improvement of the Cuiabá-Porto Velho highway, which was its centrepiece; the extension of the road network; agricultural colonisation projects; the environmental protection measures for the region as a whole and also measures to protect the indigenous population. Despite its intentions, the POLONOROESTE was responsible for generating several kinds of problems such as deforestation; pollution of rivers; the attraction of thousands of migrants searching for land and job as well; the invasion of the indigenous reserves and so on. These problems were very similar to those in the PGC area.

The regional policies and frontier integration undertaken in Amazonia from the 1960s to the mid-1980s had a common basis, which was to modernise this region through a policy of industrialisation and capital-intensive agriculture. However, the most effective instrumental capable of transforming the Amazon region were the "growth poles" or "development poles". In fact, few countries adopted the ideas of the French economist François Perroux to the extent that Brazil did, but this discussion will be taken up in the next chapter.

1.5 - Research Structure

The specific objective of this research is to verify the causes which have contributed to producing the negative social and environmental impacts on Parauapebas. In this regard, the analysis of development strategies implemented in Amazonia becomes fundamental because these strategies were based on development pole theory, which advocated, inter alia, that beneficial spread effects would be generated to the peripheral areas through the establishment of development poles. Analysed in this manner, Parauapebas assumes special importance insofar as it was within the limits of the Carajás pole, was a product of the Carajás project and at the same time was designated as one of the PGC`s development poles. In fact, all these attributes make Parauapebas an ideal case-study for examining the assumptions behind Perroux`s development pole theory about the trickle-down effects of such strategies and, moreover, for understanding the role played by important social, economic, and political forces which were also responsible for the adverse consequences in the region.

According to its specific and general objectives, this research is divided into seven chapters organised as follow. Development policies and frontier integration are outlined in the first chapter, which shows that the military governments regarded Amazonia, with its tremendous potential of natural resources and uninhabited lands, as a means of rapidly tackling a number of economic, social and geopolitical problems. These regional development policies, commonly pursued by a combination of domestic and foreign interests, aimed to modernise the region and integrate it into national development. By

following these objectives, the Federal government opted for a policy of industrialisation and of capital-intensive agriculture, which was, in essence, discriminatory, favouring large-scale farmers to the detriment of the vast majority of peasant farmers. In fact, this general negative tendency was caused by development policies and exacerbated with the advent of the PGC. Since then, land conflict, rural violence, land concentration and increasing deforestation is a reality in Amazonia, as will be seen in this research.

Perroux`s development pole theory was regarded by the Federal government as the most satisfactory theoretical instrument for transforming Amazonia according to the government's objectives. Indeed, the national development policies were strongly influenced by this theory, which fitted in well with the geopolitical and economic aims of the military regime. The implementation of development pole strategies in the Amazon region is discussed in the second chapter, where analysis is centred on the assumptions behind this theory about the beneficial spread effects, which were supposed to be generated by development poles to their surrounding regions.

Chapter three briefly analyses the social and environmental impacts in urban and rural areas generated by development pole strategies in Eastern Amazonia. This broader perspective provides a more complete understanding of the phenomena as it occurred in Parauapebas, which will be discussed in the following chapters.

The fourth chapter examines directly the planning of public policies and the process of their implementation in Parauapebas in order to better understand the future problems of this Amazon town. This chapter shows that CVRD badly underestimated the size of Parauapebas, despite all the evidence from past projects that the urban population would explode around the mining project. It will be argued that CVRD was not really interested in the urban problems generated by the Carajás project, as its negligence in relation to this urban nucleus testifies.

Chapter five analyses the implications of planning for Parauapebas, focusing on its two phases: before and after its emancipation. It will be shown that the worrying situation (inadequate urban infrastructure and services, critical nosological table, and a problematic

educational sector) in this Amazon town was responsible for the emancipatory movements and that its political emancipation, despite limited improvements, did not solve the mounting problems, which remain to be tackled in the face of its scarce financial resources.

The following chapter uses the development pole theory to analyse the problems faced in Parauapebas, which have been discussed to a large extent in the previous chapter. In fact, this chapter is a complement to the second chapter, which focused on the assumptions behind this theory in relation to beneficial spread effects of such development pole strategies.

Finally, the seventh chapter briefly summarises the principal impacts produced by such development strategies upon Parauapebas, draws some lessons learned from these experiences and finishes by raising some important questions which must be addressed in order to avoid the adverse effects generated by such development pole strategies.

1.6 - Methodology

This research consciously employs a variety of methods to examine the context of Parauapebas and understand the transformations undergone by this Amazon town. Unstructured interviews, participant observation, existing literature (books, articles, theses, etc.) and data from government agencies, NGOs and private firms are used in this dissertation. The reasons for employing such different methods lie in the fact that this combination was the best way of achieving the research objectives and also for dealing with the difficulties encountered during fieldwork. Unquestionably, the limitations of official statistics in Amazonia are extreme and there are very long delays between the gathering and publication of data, which are principally released by Brazil's census bureau - IBGE. An example of such delay can be seen in the fact that the penultimate census was done in 1980, when Parauapebas had not yet come into existence and the last census was undertaken only in 1991, when Parauapebas had already become a municipality. Despite

the considerable gap between official censuses, these difficulties were overcome by using data from other sources, such as IDESP and SEPLAN/Pará, which were available.

Preliminary, as well as final, research was undertaken at the British Library of Political and Economic Science, which is a reference library for the social sciences in United Kingdom. The fieldwork embraced the following places: Rio de Janeiro (the capital of the tate of Rio de Janeiro); Belém (the capital of the state of Pará); the town of Marabá (in the state of Pará); the town of Parauapebas (in the state of Pará); and Brasília (Brazil's capital). In Rio de Janeiro, a number of key people were interviewed[1] and data were collected from IBGE, CVRD, IBAM, the consultant firms NATRON and Mayerhofer & Toledo, FASE, IPUR-UFRJ, and Greenpeace. The documents and information gathered from both consultant firms were extremely valuable insofar as they played an important role in formulating plans for the Carajás region. For instance, NATRON was responsible for elaborating the Plano Diretor do Corredor da Estrada de Ferro Carajás (The Master Plan for the Carajás Railway Corridor) and the Mayerhofer & Toledo firm had previously elaborated the document Diretrizes para a Integração dos Núcleos Urbanos de Rio Verde e Parauapebas (Directives for the Integration of the Rio Verde and Parauapebas Urban Nuclei) and afterwards became involved in the Master plan.

IBAM was also a valuable source principally because this institute had been contracted out by CVRD to elaborate a proposal for the implementation and management of basic sanitation services which aimed to support the local government in its decision about what would be the best sanitation system for the municipality of Parauapebas. Despite the importance of the other sources, CVRD and IBGE`s documents were focused on. In fact, specific material was available only at CVRD, while at the same time other data concerning social and economic indicators related to this research were obtainable only from IBGE.

In Belém, documentary research was undertaken at SUDAM, FSESP, FNS (old SUCAM), IDESP, Goeldi Museum, NAEA-UFPa, NUMA-UFPa and SEPLAN/Pará, CPT and SDDH. The last two institutions were useful sources, supplying extensive material about

[1] The entire list of interviewees is provided in appendix I.

human rights and land conflicts in southern Pará. In addition, some key people were interviewed (see appendix I). In Marabá, the research material was collected from UFPa campus, FASE, INCRA, SDDH-Marabá, CAT, CEPASP and FUNAI. In fact, CAT and CEPASP were more helpful in providing information about local problems and their solutions for the region than in providing specific documents. At FUNAI, plenty of material about the indigenous tribe Xicrins do Cateté was obtained and at the same time permission for visiting its reserve, which is within the municipality of Parauapebas, was given. By this means, indigenous leaders were contacted and interviewed about their relationship with CVRD as well as with the local authorities. They also answered queries about a number of specific violations which had been recorded on their lands, such as invasions by lumber enterprises, and physical aggression in general.

During a visit to the Carajás mine, the structure of this industrial project, in which each detail was carefully planned and implemented, and the competence with which CVRD manages it, created a very good impression. This impression was reinforced by observation of the company town. This town is provided with an excellent urban infrastructure and facilities, has no problems related to robbery, assault, burglary, etc., and is well-maintained by CVRD, the streets being completely clean and free of dust and even of cigarette ash. In fact, this is a surreal town, when compared with most Brazilian towns and principally the Amazon ones, and the sharp contrast between the company town and Parauapebas, stressed in the existing literature (Piquet, 1988; Hall, 1991a; Roberts, 1991a; 1995a; Becker, 1992; World Bank, 1992) was confirmed by personal observation. In Carajás town, selected people were interviewed from both the employer's and Trade Union's sides, CVRD and METABASE, in order to obtain a real picture of the local problems, and data was collected from them.

In Parauapebas, documentary research was undertaken at the Municipal Secretary of Planning, Municipal Secretary of Health, Municipal Secretary of Education, Municipal Secretary of Production, ITERPA, CONDEPE, and EEPP. In addition, a number of people were selected for interviews, intentionally representing a wide range of civil society varying from the planning secretary of Parauapebas to the representatives of several labourers` unions, NGOs, and MST. The interviews with individuals from

different sectors of the civil society were particularly important insofar as they effectively contributed to creating an understanding of the complexity of Parauapebas. In Brasília, data was principally gathered from ISPN and the Regional Development Secretariat of the Ministry of Regional Integration. Naturally, some key people were interviewed in Brazil's capital.

As already mentioned, this research combined a number of methods for analysing the transformations undergone by Parauapebas. However, the use of multiple sources of information is a quite difficult task insofar as data gathered during the research needed to be properly examined, categorised and cross-checked with the purpose of addressing the main questions of this dissertation. The reason for cross-checking the evidence can be explained by the fact that there exist some limitations in relation to the sources of information. For instance, the interviewees could only provide their personal point of view, which could be motivated by their current status or represent only partial access to information. In addition, they could have forgotten about or have become confused about important facts since many issues were related to past circumstances. The official documents, such as government plans, programmes, etc., express official beliefs with respect to the policies already or to be implemented. Thus, information was necessarily cross-checked in order to corroborate or disprove its veracity.

The secondary sources, i.e. official documents, data from NGOs and private firms, provided plenty of evidence about the object of study. However, this strategy was complemented by observation and by note-taking methods of data collection, which were considered and, consequently, employed during the fieldwork as another important strategy. According to Adler and Adler (1994), the observation method embraces three steps: descriptive, focused and selective observation. These steps were essential for considering the whole environment; for directing the researcher's attention towards the more relevant circumstances; and for selecting those aspects which were more significant for the research purposes.

Another method commonly employed in this research was the interviewing strategy, in which people were selected to be interviewed before or during the observation phase. The

interviews were conducted informally. Fontana and Frey (1994) point out that this type of interview is termed unstructured, in contrast to structured interviewing. These authors stress that in unstructured interviewing the researcher does not use close-ended questions or a formal method of interviewing. This is as opposed to a researcher in a structured interview, who asks the respondent several questions established previously, with a limited set of categories of answers. The central point here is that unstructured interviewing does not impose any previous categorisation, whereas structured interviewing aims to gather information by means of pre-established categories.

Interviews conducted during the fieldwork were deliberately unstructured. The result of visiting the Carajás project and of talking to people involved in, or affected by, this industrial project is that many stories collected were so bewitching that they sometimes dominated the researcher's analysis. Indeed, this research is guided by the conviction that the human phenomenon is better understood when numbers are only one of several important means of describing the impacts occurred in the Carajás region, and are not the *raison d`etre*. In this regard, unstructured interviews were chosen over systematic surveys, which have a natural propensity to reduce every fact to a numerical problem.

Chapter 2

Development Pole Theory and the Brazilian Amazon

2.1 - Introduction

The first chapter showed that government policies for Amazonia, especially for Eastern Amazonia, have had negative social and environmental impacts and at the same time it highlighted that these development policies were heavily influenced by Perroux`s development pole theory. In fact, his ideas were present in most national development plans. There are particular reasons for this wide acceptance of the concept of development pole and one of them is centred on its underlying idea that it was possible to achieve economic growth, interregional equilibrium and also integration of underdeveloped regions by means of a strategy of decentralised development. This basic idea, whose appeal was very strong, fitted in well with the geopolitical (national integration and occupation of Amazonia) and economic objectives of the military regime. In this regard, development pole strategies were vigorously implemented when the Federal government launched the PND II (1975-79) in which the POLAMAZÔNIA programme had been formalised and these strategies continued with the advent of the PGC in the 1980s.

According to their potentialities, several development poles were selected. Owing to its huge iron-ore reserves, Carajás was considered the most important pole and Parauapebas assumes particular importance because it was one of the PGC`s development poles and at the same was located in the Carajás area of influence. The main purpose of this chapter is to examine the development pole strategy implemented in the Amazon region, but focusing on the assumptions behind this theory with respect to the beneficial spread effects, which were supposed to be generated by such induced poles to their peripheral areas.

2.2 - Historical Background

François Perroux was an important source of ideas and his development pole theory, whose influence on Latin American countries, principally Brazil, was significant, has a remarkable place, allied to other theories and strategies of development, in economic development theory. In order better to understand Perroux`s theory, it is important to set his work in historical context.

The term "pole" was first introduced by Perroux in his 1950 article "Economic space: theory and applications", which was a product of his lecture at Harvard University in 1947 (Perroux, 1988b). In this article, Perroux discussed "economic spaces", which were categorised into three types: as a plan; as a field of forces and as a homogeneous aggregate. This discussion served as a basis for his explaining that the firm was the core of the problem and not the region itself, and even the use of the term "pole", mentioned as synonymous with "centre" (this reference is important because it marks the origin in the economic literature of the conceptual confusion caused by Perroux, who never made a clear distinction between growth pole and growth centre), emphasised this belief, as Perroux stressed:

> "As a field of forces, economic spaces consist of **centres** (or **poles** or foci) from which centrifugal forces emanate and to which centripetal forces are attracted. Each centre being a centre of attraction and repulsion, has its proper field, which is set in the fields of other centres. Any banal space whatever, in this respect, is a collection of centres and a place of passage for forces.
> The firm, considered as centre releases centrifugal and centripetal forces. It attracts men and objects (personal and material aggregations around the firm) into its banal space, or it removes them (diverting tourist activities, land reserved for further expansion, etc.). It attracts economic elements, supplies and demands, into the space of its plan, or it removes them.
> Through this process, the economic zone of influence, whether or not it is linked to the topographical one, is determined. The topographical zone of influence of Michelin in France is inscribed in a region, but its economic zone of influence, like that of all large firms, defies cartography" (1950, pp. 95-96).

This article, based on his lectures at Harvard at the end of 1940s, was relevant because Perroux provided some insights into his views on the development of capitalist economies and, at the same time, he paved the way for the construction of his own theory. Despite

Perroux`s first mention of pole, he only discussed the concept of pole in his 1955 article "La Notion de Pôle de Croissance", which can be considered his most important and influential work.

Some important factors contributed to Perroux`s conclusions about growth poles in particular, and also his views on economic development in general. The first factor was related to post-war problems of economic reconstruction and co-operation in western Europe where the Marshall Plan, whose main objective was to contain the progress of communism, was implemented and a large amount of money was invested in disrupted economies such as those of France, Italy, etc. in order to tackle serious problems. The success of this Plan generated confidence in the role of economic aid.

The second and more important factor was the controversy between two distinct doctrines of economic development: the then prevailing view of "balanced growth" and the insurgent "unbalanced growth". Perroux was well-informed about the current economic development literature in the late 1940s and 1950s and in his 1961 book L`Économie du XXe Siècle, he made references to the writings of now eminent development economists, such as Hirschman, Myrdal, Nurkse, Rosenstein-Rodan, Tinbergen, Rostow, Harod, Domar, etc. Perroux was influenced by, and in turn influenced, many of them and also future generations of development economists.

The third factor was the great influence of Schumpeter`s writings on Perroux`s ideas. In fact, Schumpeter`s innovation concept was essential for Perroux`s explanation of the growth and development of capitalist economies because Perroux believed that entrepreneurial innovation was primarily responsible for the development process which, therefore, would encompass a sequence of poles, considered as dynamic centres, over time. It is important to stress here that Perroux`s growth pole gained prominence in the context of the controversy between the balanced growth, and unbalanced growth, theory. Thus, it is necessary to examine briefly both theories in order to understand Perroux`s theory itself.

The names of Rosenstein-Rodan and Nurkse are closely associated with the theory of balanced growth, which advocated that economic development would best be achieved by the simultaneous establishment of many complementary industries. The main reason was that investments in productive activities and also in infrastructure would only be profitable for the ensemble by virtue of external economies. In general, the advocates of balanced growth believed that in backward countries the market left to itself perpetuated poverty and in order to overcome this situation, heavy investments would be necessary to increase productivity, which was impeded by two interrelated factors: low income and consequently purchasing power, and the small size of the domestic market, which was unable to absorb the output of high-productivity factories. As a means of breaking this vicious circle of poverty, these authors defended the central planning of balanced industrial investments allied to the need to mobilise both domestic and foreign resources to finance the investment programme. In this regard, the government of underdeveloped countries had to play a key role in overcoming these constraints because there was a complete disbelief in market forces, as Rosenstein-Rodan himself stressed:

> "The market mechanism does not realise the "optimum" either in one nation or between nations because it relies on such unrealistic assumptions as linear homogeneous production functions, no increasing returns or economies of scale or of agglomeration, and no phenomenon of minimum quantum or threshold. This obscures the nature of the development process and the risks involved. Nothing in theology or technology ordains that God created the world convex downwards" (1984, pp. 209).

Although the balanced growth theory had been criticised on several grounds, it remained dominant until late the 1950s, when the seminal works of Hirschman, Myrdal and Perroux were independently published. Criticisms related to balanced growth theories were based on the belief that economic development does not take place simultaneously and in the same proportions throughout an economy. The foremost and most influential advocate of unbalanced growth was Hirschman, who pointed out that:

> "Whatever the reason, there can be little doubt that an economy, to lift itself to higher income levels, must and will first develop within itself one or several regional centres of economic strength. This need for the emergence of "growing points" or "growth poles" in the course of the

> development process means that international and interregional inequality of growth is an inevitable concomitant and condition of growth itself" (1958, pp. 183-4).

The strategy of unbalanced growth advocated by Hirschman had important implications for investment decisions because such decisions should stimulate other investments and this phenomenon would occur because of their linkages. In this regard, development strategies should be based on a few sectors but with strong backward and/or forward linkages. Other well-known concepts introduced by Hirschman were "trickle-down" and "polarisation" effects, which were created in order to explain the idea that economic growth produced positive and negative effects, respectively, on the economies of other regions. In fact, these concepts elaborated by Hirschman were similar to those employed by Myrdal in his famous book Economic Theory and Underdevelopment Regions (1957). His "spread" and "backwash" effects were part of the explanation of the principle of "circular and cumulative causation" of inequalities at the international level.

Despite the identical meaning of the Hirschman and Myrdal`s conceptual tools, there were considerable differences in emphasis and conclusions. In particular, Hirschman believed that the emergence of "growing points" (or "growth poles") and differences in development between regions and between nations were inevitable and a condition of further growth anywhere; he also believed that the emergence of strong forces was fundamental for making a turning point possible, once polarisation effects had proceeded for some time. It is important to note here that the term "growth poles" used by Hirschman in his seminal book The Strategy of Economic Development (1958) had been coined by the French economist François Perroux in his 1955 article. The common use of this term was not a mere coincidence and showed that these authors had some related viewpoints in relation to the process of development, which contrasted with the then prevailing balanced growth approach.

When the concept of "growth poles" was elaborated, Perroux, despite his emphasis on the interactions among industrial branches, focused his attention principally on economic activities and also on the geographical location of population rather than spatial development processes. Boudeville, who was Perroux`s disciple, was mainly responsible for transforming the economic phenomenon that was observed in an abstract space into a

concept applicable to a geographical space. Thus, the transformation of Perroux`s concept into an operational tool for regional planning was an important factor for its widespread use in several countries. In fact, growth pole strategy was implemented in different nations such as the United States, Spain, Italy, Brazil, Venezuela, Kenya, Nigeria, Japan etc., whose contexts were completely distinct.

2.3 - Development Pole Theory

Development pole theory has its origins in Perroux`s observation of the notion that:

> "growth does not appear everywhere and all at once; it appears in points or growth poles with variable intensities; it spreads along diverse channels and has varying terminal effects for the whole of the economy" (Perroux, 1955, pp 308).

This understanding of the process of economic development contrasted clearly with the balanced growth approach and led Perroux to consider development itself as fundamentally polarised, because the propulsive effects intrinsic to a development process tended to be generated by a cluster of economic activities and also tended to engender the growth of the economic whole. Although Perroux was not primarily concerned with the spatial implications of development in geographical terms, his concept of the growth pole, which was elaborated in order to describe and explain the process of economic development in an abstract economic space, attracted the attention of regional planners, geographers, economists and many other professionals involved with problems of regional development. As a consequence, the concept of growth poles, together with similar concepts such as growth centres, growing points, core areas, etc., which were conceptual tools developed to solve problems of regional inequalities, became a catchphrase. The wide acceptance of these concepts, principally of the growth poles, is centred on their underlying idea, whose appeal was very strong, that it was possible to achieve economic growth, interregional equilibrium and integration of backward regions by means of a strategy of decentralised development. However, the use of these concepts as slogans in the political discussion of regional problems and, especially, the necessity of applying Perroux`s theory as a basis for regional planning, contributed to the generalised

confusion of the concepts and also to his theory losing much of its original content and meaning.

In relation to Perroux`s theory, Paelinck stressed that:

> "the growth pole concept has often been misunderstood. It has been confused with the notions of key industry, basic industry, and industrial ensemble; from this follows the erroneous conception according to which the growth pole would be an industrial monument raised to the glory of future regional industrialisation, a guarantee of certain economic growth. Or again, to make this scarcely rigorous concept more precise some would have as a growth pole any important implantation of firms, preferably industrial, which would exercise salutary effects on the geographic area where it is introduced" (1965, pp. 10-11).

More recently, Higgins stated that:

> "as initially presented by Perroux, the theory was too complex, too abstract, and too nonoperational to be used as a basis for planning. Indeed to apply the pure theory of Perroux would require global planning, if we take into account Perroux`s more recent insistence on planning transmission lines and receptors as well as generators of growth. Perroux`s economic space, in which spread effects are felt, is global. He argues, for example, that Latin America`s true growth poles still lie in Europe and, to some degree, in the United States. Such a concept is useless for regional planning which is confined to a single country. As a consequence, economists who found themselves involved in practical regional planning simply discarded the pure theory of Perroux. They converted it into a totally different theory which treated growth poles as urban centres, and spread effects as being generated in a particular geographic space, namely the region adjacent to the urban centre itself. Once this happy doctrine is accepted, it is possible to imagine that by pushing and pulling new enterprises (mostly industrial enterprises) into urban centres of retarded regions, it is possible to reduce regional disparities, decentralise urbanisation and industrialisation, and accelerate national development all at once. It did not take long for this pleasant version of the growth pole doctrine to spread to developing countries and to be applied there as well" (1988, pp. 44).

Both statements suggest that Perroux`s theory was misunderstood. Nevertheless, an important question remains: why did development pole theory generate so many bewildering concepts? In order to answer this essential question, certain inconsistencies in his theory will be analysed and, thereby, clarified.

The basis for such confusion is centred on Perroux himself, who, despite being an important source of fruitful ideas, was far from clear in his conceptualisation. A good example is the term pole, which Perroux never defined exactly and which was interpreted as a cluster in geographical space or as a set of linkages in economic space within a general equilibrium system. This kind of impreciseness and ambiguity in Perroux`s writings contributed enormously to the generalised misinterpretation and also to the use of his concepts in vague, unclear and oversimplified ways.

These confusions do not invalidate Perroux`s concepts at all. His theory that growth neither appears simultaneously, nor regularly throughout an economy and that it tends to be polarised are unquestionably important. These convictions led Perroux to develop other significant arguments, such as: that growth industries (*industries de la croissance*), also termed propulsive industries (*industries* motrices), tend to be clustered in geographical space and moreover, tend to generate spread effects (*effets d`entraînement*) on their environments; and that these propulsive industries tend to grow faster than and, as a consequence, dominate, other industries that are linked with them. Thus, owing to its perceived theoretical potential, Perroux`s ideas became the focus of interest of several professionals, who were seeking a tool for solving problems of national and regional development both in industrialised and underdeveloped countries. However, difficulties arose when these ideas, which were conceived in an economic space (abstract space), were applied to geographical space (banal space). As a consequence, Perroux`s theory was considerably broadened by other important contributions to his work and, as will be seen, some of these contributions differed from the original ideas.

Before examining some of these contributions to Perroux`s theory, it is important to analyse certain aspects of his own theory. The first aspect is his understanding of the development process, an understanding which is essential for perceiving the difference between growth poles and development poles. According to Perroux, although growth and development can occur jointly in the same place, they are far from synonymous. In this regard, he stressed that:

> "growth means a sustained increase in the dimension index for an economic entity (for example, gross product). (...) Development is the sum of the changes in social patterns and mentalities through which the production device is coupled with the population: the latter acquires the capacity to utilise the production device to achieve what is considered to be a satisfactory growth rate, and the production device supplies a product that serves the population instead of being "alien" to it" (1968, pp. 248; 1988a, pp. 70).

This difference between growth and development is fundamental for pinpointing the distinction between the development pole and the growth pole. In this regard, Perroux pointed out that:

> "the growth pole is a set that has the capacity to induce the growth of another set ("growth" being defined as a lasting increase in the dimensional indicator); the development pole is a set that has the capacity to engender a dialectic of economic and social structures whose effect is to increase the complexity of the whole and to expand its multidimensional return" (1968, pp. 247-8; 1988a, pp. 49)

In order to understand Perroux`s scheme, it is fundamental to recognise that propulsive industries play a key role in the development process. These industries are highly innovative and, according to Perroux, innovation or technological progress is the pillar of economic development. The propulsive industries tend to be clustered in particular areas, which can be centres for the extraction of raw materials, for production and distribution of power generation and for technological research, or also agro-industrial centres. Owing to their nature, the propulsive industries tend to generate spread effects, such as the increase in income and employment, to their environment and some of them can be internal to the industry itself. These beneficial diffusion effects are stimulated by geographical clustering of these propulsive enterprises and any concentration of them is necessarily considered a growth pole or development pole.

The growth or development poles will certainly produce spread effects, but Perroux never indicated where these effects would be felt and moreover, there was no guarantee that they would be felt in the immediate surrounding region. The main reason for this lies in the fact that Perroux`s theory was elaborated for an economic space, which was extremely

abstract, and, therefore, the creation of growth poles and development poles and their performance were problems considered on a theoretical plane.

As was mentioned above, transfer of the concept from abstract space (economic) into geographical space was carried out by Perroux`s disciples, principally by Boudeville, who transformed it into useful and important concept for regional development theory. According to Boudeville:

> "a regional growth pole is a set of expanding industries located in an urban area and inducing further development of economic activity throughout its zone of influence" (1966, pp. 11).

Besides his emphasis that a set of dynamic industries should be geographically clustered, he also widened the definition beyond this point by arguing that there were three types of space: homogeneous; polarised; and planning, or programme, space. A homogeneous region can be characterised by its relative uniformity; a polarised region is a heterogeneous space, which comprises a set of units, or economic poles (*pôles économiques*), which have more exchanges (goods and services) or linkages (interdependencies) with a dominant pole than with other poles of the same type. The notion of polarisation involves the notion of a hierarchy of poles, which are classified according to the activities they perform; and the planning region is "a continuous space, a technical and geographic instrument to attain a goal localised in the region itself in the most economic way" (Boudeville, 1968, pp. 35). In fact, Boudeville, with his new concepts, made Perroux`s theory more operational, especially in the context of underdeveloped countries.

Nevertheless, it is important to stress here that some basic ideas of the unbalanced growth theory, principally those advocated by Hirschman, such as the importance of induced investment decisions for the promotion of development, and also the belief that infrastructure investments could be essential for the development of backward regions - although the most important aim was the provision of regularly inducing activities in industry, agriculture and services, - provided significant parameters for development pole policies implemented throughout the 1960s. During this decade, most of these policies were designed to promote the development of backward regions by concentrating

investment in order to obtain scale and agglomeration economies. Despite this favourable context, structural problems persisted and a good example, especially in developing countries, is the constant population growth of large urban areas and the concomitant decline of some peripheral regions. Although such large urban areas continued to grow because new entrants benefited from the economics of agglomeration, the marginal social costs prevailed over the marginal social benefits. In this regard, a plausible alternative for overcrowded urban areas as for the country itself would be centred in the intermediate (medium-size) centres (or development poles), whose accelerated economic and population growth could be induced by government policies in relation to infrastructure, capital subsidies and other types of incentives.

This development pole strategy stressed the advantages of agglomeration economies and at the same time these induced, medium-size development poles were conceived as truly poles of attraction for migrants who would otherwise go to large congested urban centres, which were considered spontaneous development poles. In addition, these induced development poles , according to the theory, would generate beneficial spread effects to their immediate peripheral regions, so that in the long-run an "equilibrium growth" throughout a country would be expected. An excellent example of this strategy was the French spatial development policy of the 1960s, which designated eight metropolitan areas whose concentrated investments would stimulate economic and population growth and, therefore, would, it was hoped, counterbalance the growth of the Paris region (Hansen, 1967; Darwent, 1975).

An important contribution to the understanding of the incidence of economic growth in spatial terms and the problems of regional allocation of investments was Friedmann`s core-periphery, or centre-periphery, model, which, in certain aspects, was related to the notions of growth poles (development poles) and also growth centres. According to Friedmann, core regions were major centres of innovative change and as a consequence the places where development occurred, whereas all other territory consisted of peripheral regions. However, the main point is that innovations generated in these dominant centres spread to their peripheral regions, whose development is completely dependent on the core regions. Although it is beyond the scope of this chapter to analyse the theoretical

weakness or validity of Friedmann`s propositions, it is interesting to note, as Darwent (1975, pp. 548) had pointed out, that French regional planning could be thought of in Friedmann`s terms because this was "a policy of encouraging spatial integration between core and periphery, at the intra-regional scale - the level of polarised region - while correcting the imbalance evident between Paris (as a core) and the rest of France (as a periphery) at the inter-regional scale".

It is necessary to highlight the terminological confusion generated by the use of "growth pole" (development pole) and "growth centre". In its origins, both terms were used synonymously, but the lack of a precise definition by Perroux allied to the searching for conceptual tools in order to overcome regional inequalities led many professionals to employ these terms interchangeably as well as definitively. In this regard, a useful distinction was made by Kuklinski:

> "the promotion of growth pole policies is a phenomenon on the national scale, changing not only the structure of a given region where the pole is located but also the interregional proportions in the distribution of population and economic activities of a given country. The promotion of growth centres policies is a phenomenon on the regional scale, transforming the pattern of urban and rural settlement inside the different regions" (1975, pp. 9).

However, this distinction was not entirely acceptable and the semantic confusion persisted in the regional development literature. It will be recalled that this sort of ambiguity found in Perroux`s theory generated extensive misunderstandings which, in some cases, could have been incidental but also deliberate.

The development pole strategies implemented in the 1960s are closely related to the model of hierarchical diffusion of innovation which prevailed at that time. According to Hansen (1981, pp. 21), "this urban-oriented framework of economic activities in space has two major elements: a system of cities arranged in a functional hierarchy, and corresponding areas of urban influence surrounding each of the cities in the system". Within this framework, development-inducing innovations were disseminated from higher to lower centres in the urban hierarchy and also from urban centres to their immediate peripheral regions. In addition, the magnitude of development, in spatial terms,

was determined by the size and functions of the urban centre. The hierarchical diffusion of innovation model stressed the importance of continuing innovation in large centres as the crucial factor for the development of the whole urban-economic system.

This general background showed the connection between the hierarchical diffusion of innovation model and the induced development poles that were implemented in order to "link lagging regions more closely with the national system of hierarchical filtering and spread effects from urban centres to their hinterlands" (Hansen, 1981, pp. 22).

Despite its great acceptance and implementation in many countries, the results of development pole policies were highly questionable. However, it is difficult to evaluate them concretely because it is not a simple task to find a genuine example of a development pole policy that was effectively implemented in practice. Problems are manifold. One of them is that in many countries development pole strategies were elaborated but were not implemented for various reasons according to their context. The serious problem identified is related to the political difficulty of selecting geographical development poles because many policies that had begun by concentrating investments in a few urban centres were attenuated by political pressures to include more centres, thus impeding the inducement of extensive agglomeration economies elsewhere. Nevertheless, the foremost problem is the implementation of development pole policies in completely different contexts, such as developed countries and developing countries.

In the context of developed countries, it was verified, for example, that development-inducing linkages (through innovations) were not only transmitted from larger to smaller centres but also in the reverse order, as well as between centres of similar size. Another important point was that industrial sources of innovation were increasingly widely dispersed, which meant that linkages between these industries involved relatively large distances. This evidence undermined the idea that induced development poles could generate development in their own peripheral regions. The above evidence contributed to the generalised pessimism in relation to the promotion of induced development poles in developed countries.

Developing countries, in general, have manifold problems, which vary from high unemployment rates to sharp regional inequalities. Planners and policy makers believed that, in order to overcome social and economic disparities between regions and also between larger urban centres and their peripheral areas, it would be necessary to implement development pole strategies. In the understanding of these professionals, "if the developed countries appear to have an orderly hierarchy of central places through which development-inducing innovations filter and spread, then this spatial structure must also be created in the developing countries" (Hansen, 1981, pp. 32).

Owing to scarce resources in these countries, development pole policies focused on a few urban centres selected where investments would be allocated in order to obtain scale and agglomeration economies. The argument was that the induced poles would generate beneficial spread effects to their hinterlands, which would necessarily be underdeveloped areas.

Development pole policies took a number of forms, particularly in developing countries such as Brazil. Some focused on infrastructure, aiming at supplying a basic level of power, water, transport and other public facilities. Others were based on intermediate or heavy manufacturing industries (generally public enterprises), these projects being commonly associated with industrial complexes organised around such sectors as iron and steel, aluminium, petrochemicals and heavy engineering. The common factor in all these projects was the importance of the direct use of large-scale investment resources to produce structural changes through accelerated economic growth.

Nevertheless, there were many criticisms related to development pole policies. Some of them stressed the fact that that spread effects claimed by the theory were smaller than expected and limited in geographical extent, so that peripheral regions were benefited in a minimal scale. Others, such as Coraggio argued that development pole theory was:

> "really designed for the development of the poles and their associated social groups and that any clever attempt to "extract" from it the ideological elements, so as to remain with a set of technical relationships, is a contribution to the advance of dominating ideology" (1972, pp. 39, quoted by Hilhorst, 1981, pp. 161).

Higgins, in turn, pointed out that:

> "the strategy applied was seldom the one that Perroux favoured. Far from strengthening and encouraging existing growth poles, the strategy has been one of trying to create growth [development] poles in retarded, disadvantaged regions, hoping for spread effects from the chosen pole to its own geographical regions...In my view, it is very important to make it clear that "the failure of the growth-pole [development pole] strategy" was not the failure of the Perroux`s theory, but failure of a distorted version applied by his disciples, mainly Boudeville" (Higgins, 1985, pp. 3, quoted by Polenske, 1988, pp. 105).

In fact, many development pole strategies implemented over the world had just one point in common with Perroux`s theory: the name. However, Higgins argument that the failure cannot be attributed to Perroux`s theory but is due to a version that had been misinterpreted and applied by his followers - especially by Boudeville - is highly questionable because Perroux himself recognise the significance and also the validity of contributions made by Boudeville and other disciples to his theory. This suggests that Perroux was completely aware of this "distorted version" and agreed with the new viewpoints implied by his concept of growth (development) poles.

Although development pole theory had been criticised in many of its aspects, some authors, despite difficulties, believed in its potential, principally in the context of Latin America. In this regard, Richardson and Richardson stressed that:

> "the practical objections to growth [development] pole strategies such as the selection of growth centres, the identification of propulsive industries, and the choice of effective instruments arise wherever growth [development] centre strategies are adopted, and are in no sense peculiar to Latin America. Moreover, the existence of these difficulties does not provide an argument for rejecting the growth [development] centre approach, but may instead suggest the need for perseverance and improvement. The disenchantment with growth [development] centre policies in many countries is not evidence that the principle of polarisation is wrong. On the contrary, it reflects the over-optimism and short-run time horizon of regional policy-makers, the failure of sustained political will, the use of deficient investment criteria, bad locational choices, and lack of imagination in devising appropriate policy instruments" (Richardson and Richardson, 1975, pp. 169).

After more than three decades of many experiments with development pole policies in Latin America, especially Brazil, some significant factors contributed to Perroux`s theory having been unsuccessful, and thus it is important to comment on them here. The main problem is centred on the selection of development pole locations, which was commonly based on criteria such as national sectoral projections and urban population growth projections instead of being based on the development potential or demand of the peripheral regions. As a result, development poles generated a limited impact on their immediate hinterland areas and the reasons for this are: the linkages involved in the development process were largely with distant suppliers and markets, and also the derived demand for labour and for agricultural outputs frequently encouraged an intense flow of migration and supplies from outside the regions where development poles were located. In addition to the foregoing problems, employment was not generated to the degree expected in view of the considerable resources invested. What boomed instead was informally organised work, and mostly on a subsistence basis, and a main reason for both these developments is associated with the highly capital-intensive nature of development pole activities.

Nevertheless, the most important criticism that was addressed to development pole strategies implemented in developing countries was that these strategies were unable to improve the social and economic well-being of populations who live in peripheral regions and who belong, to a large extent, to the poorest social stratum of society. It is important to stress here that development pole policy is one form of the top-down development paradigm, which is in fact a development paradigm "from above". This paradigm placed its emphasis on urban, industrial and capital-intensive, technology (innovation), and also on the use of external and scale economies.

According to Hansen (1981), the prevalent attitudes toward development pole strategies have passed from a period of optimism in relation to the generation of spread effects by the creation of induced poles, to one of pessimism when these expectations were not realised, and subsequently to a broader understanding that induced development poles would be just one aspect of more comprehensive development planning.

2.4 - The Diffusion of the Development Pole Theory in Brazil

In retrospect, the influence of Perroux`s development pole theory in Brazil can be traced to the end of 1950s when his disciple Boudeville, who lived in Brazil for three years, published an important study in 1957 about the State of Minas Gerais. This study, Contribution à l`étude des Pôles de Croissance Brésiliens - Une industrie motrice - La Sidérurgie du Minas Gerais, focused on the development of the metallurgical industry in Minas Gerais and also on the possibilities of transforming the city of Belo Horizonte, which is the capital of the State of Minas Gerais, into a powerful development pole. In 1964, Boudeville published another significant study, Croissance Polarisée du Rio Grande do Sul, whose main focus was on the economic polarisation in the state of Rio Grande do Sul and he highlighted its capital, the city of Porto Alegre, as the main pole of the State and at the same time defined other smaller poles.

The presence of the French geographer, Michel Rochefort, who taught in some Brazilian universities, supervised academic studies, fieldwork, etc., in Brazil contributed to the consolidation of Perroux`s ideas in this country. Although Rochefort had used the terminology of his French geographer colleague, Chardonnet, and not that of Perroux, Andrade (1977) stressed that it was not significant because the two terminologies were similar.

These presences and studies marked the deep influence of Perroux`s ideas on Brazilian economists, geographers and other professionals involved with regional problems. In this regard, private enterprises such as SAGMACS - Economia e Humanismo (Economics and Humanism) and EPEA - *Escritório de Pesquisas Econômicas Aplicadas* (Office for Applied Economic Researches) as well as governmental agencies, such as CNG, BNH, SUDENE and the Ministry of Planning adopted the development pole theory in their plans.

Andrade (1977) pointed out that SUDENE began to adopt development pole theory definitively in 1966, when this agency decided to use Perroux`s concepts in its III Master Plan (*Plano Diretor*) for Economic and Social Development of Northeast for the 1966-68

period. In that same year, SUDENE promoted the First Seminar on Development Poles, which was an important event because by congregating several professionals with different backgrounds in order to discuss Perroux`s theory and Brazilian regional problems, it served to diffuse the theory itself even more and also to consolidate the prestige of Perroux`s ideas in the national territory.

However, that, despite the importance of Perroux`s ideas in Brazil, this fact does not means that SUDENE, in its Masters Plan, had understood and, more importantly, applied his development pole theory correctly. According to Richardson and Richardson:

> "although Brazil has had a long experience with regional policies, particularly with the ambitious SUDENE programme for the Northeast, its programmes have been too diffuse to be described as a growth [development] pole approach" (Richardson and Richardson, 1975, pp. 174).

The National Housing Bank (BNH) also illustrates very well the influence of Perroux`s ideas in Brazil. This Bank was created in 1964 and one of its objectives, clearly stated in its report for the 1969 period, was the "creation of development poles and a consequent improvement of living condition in rural areas" (quoted by Bolaffi, 1982, pp. 51). In addition, famous economists, such as Celso Furtado and Roberto Campos, and other professionals were familiarised with Perroux`s concept. For instance, Roberto Campos (1962, pp. 27) stressed that "a controversy, which only occurs when economic development programmes are formulated, is between the supporters of "integrated development" and those who support the selection of "growing points"" (as seen above, this term, coined by Hirschman, is synonymous with "growth poles"). Furtado in his book Teoria e Política do Desenvolvimento Econômico discussed the main ideas of Myrdal (spread and backwash effects), Hirschman (backward and forward linkages), Rosenstein-Rodan (Big Push) and also Perroux (growth poles). In relation to Perroux`s theory, Furtado (1967, pp. 278) stressed that "as the starting point for the formulation of a development strategy for underdeveloped countries, the idea of poles shows clearly the importance of the connection of [development] projects and this gets closer to the doctrine of balanced development".

Perroux`s theory was also discussed by other professional in several articles. In this regard, Tolosa and Reiner (1972, pp. 75-76) stressed that "our conceptualisation of planned poles as public instruments for achieving national goals of regional development implies a policy of urban development co-ordinated at national level (by a central planning agency) and implemented at regional level (by a regional planning agency)". In another article, Tolosa (1974, pp. 214) emphasised that "growth poles may emerge as a result of the performance of market forces or may service as an instrument of governmental economic policy in order to achieve a set of national goals of regional development". The geographer Milton Santos (1974, pp. 274) points out that "the application of the growth pole theory in underdeveloped countries allows to raise the problem of knowing if the space can be indifferently defined in developed countries and in underdeveloped countries. The majority of those who dedicate to the analyse and planning of the space behave as if theories elaborated in developed countries and directed to their realities could be transplanted to underdeveloped countries".

Nevertheless, the most important point is that Perroux`s theory had been accepted by most Brazilian professionals involved with regional inequality problems, who would apply the concepts to national plans, such as the PND I, PND II, etc., as well as to regional plans, such as those elaborated by SUDAM (especially PDA II). The fact that there were some misunderstandings in relation to Perroux`s theory is no novelty, because Perroux himself, as was seen above, generated this sort of confusion and Brazil was no exception to the rule. Another substantial point is that these misunderstandings verified in SUDENE`s plans do not mean that they have constantly appeared in other Brazilian plans.

It is important to recapitulate some chief points in relation to spatial aspects of the national development plans in order to understand and also verify the extent of Perroux`s ideas. Regional disparities were a constant and serious preoccupation of several Brazilian governments, which formulated a number of national development plans in order to tackle these problems. In fact, these policies were intensified when Brazil had already created one of the most advanced and diversified industrial structures amongst developing countries, after the consolidation of the import-substitution process at the beginning of the 1960s. However, this industrial structure was practically limited to the Southeast region,

principally to the two Brazilian states Rio de Janeiro and São Paulo. The military regime established in 1964 emphasised these inequalities between Brazilian regions and also the unequal relations existing between production structures. Each military government tackled these problems in a different way, but each of them had some common characteristics, which can be exemplified by the fact that their spatial development policies were uniform in certain respects, such as centralised decisions at Federal government level, adoption of a polarised development model from the expansion of economic activities in industrial areas, etc.

During the military regime, spatial planning was considered a cornerstone in the development process. The policy instruments adopted by these governments varied from the isolated use of fiscal incentives in order to attract private investments for areas lagging behind to more integrated development programmes to exploit natural resources in vital areas of Amazonia.

With respect to Perroux`s theory, the national development plans after the Decenial Plan, which was formulated for the 1967-78 period, adopted the terminologies of the French economist. In this regard, the Decenial Plan, although it had not passed the stage of being only on paper, established in its second chapter the basis for the formulation of a national policy of urban development through the characterisation and study of "programme regions" (it must be mentioned here that this concept was created by Boudeville in order to make Perroux`s theory more operational) and also through the definition of development poles. In parallel, some studies based on professor Rochefort`s methodology were undertaken with the purpose of establishing a hierarchy of the urban net and there were three levels of development poles: development poles of national interest, poles of interest of micro-regional development and poles of equilibrium (Loeb, 1987); the PED (1968-70) referred to the creation of regional poles (Haddad, 1981); the PND I (1972-74) mentioned the creation of development poles:

> "the economic occupation and the development process will be effected through: 1) occupation, basically by means of: (...); 2) development programmes, based especially upon fiscal incentives and exemptions administered by SUDAM and SUFRAMA, along the following lines: selection

> of development and integration poles (priority areas and border zones) to achieve regional priorities, via the concentration of investments; (...)"(Brazil, 1971, pp. 29).

The Second National Development Plan - PND II (1975-79) suggested the creation of growth (development) poles, which were called agro-mineral growth (development) poles (Brazil, 1974). In addition, the PDA II also mentioned the establishment of development poles:

> "the spatial strategy of the Federal government will be completed with a special project, which is being planned by SUDAM and was included in the Second National Development Plan (PND II), concerning to the establishment of development poles in the region [Amazonia]" (SUDAM, 1976a, pp. 46).

This evidence clearly shows the popularity of Perroux`s ideas among Brazilian professionals involved with regional inequality problems. However, this acceptance of his ideas does not mean that they were strictly implemented, because it is hard to find any example of a development pole policy that was vigorously implemented in practice and most of these Brazilian national plans cannot be described as examples of development pole approach. Nevertheless, the PND II can be considered the one exception because its main policy instrument was the development pole strategy and moreover, the directives established in this plan were in fact implemented by the Brazilian government.

Before discussing development strategies adopted by the PND II in the next section, it is important to stress that one of the principal objectives stated in this national development plan was to consolidate Brazil as a modern industrial economy and in order to achieve this objective it was necessary to incorporate the vast "empty spaces" into the market economy. Thus, national integration was an essential part of the geopolitical objectives of the Federal government for modernising the country. Although there were several criticisms of modernisation theories, modernisation remained a prevalent strategy in a number of development plans, and in Brazil the development model adopted by the Brazilian government was intrinsically associated with the precepts of modernisation theory and also with the development pole theory, the latter being used as a regional planning strategy.

Although the economic modernisation theories and development pole theory have divergence of perspective and analysis, there are some parallels between them. Modernisation theories understood development as an economic problem, being economic growth a suitable measure for it. In fact, economic growth was practically synonymous with development. In this regard, growth meant the reduction in inequalities (both within and between countries), unemployment levels, and poverty. Such development would occur because the essential technologies were already available.

After this generalisation, it is important to highlight some basic points of modernisation theories, which were impregnated with a profound dualism (traditional-modern) and ethnocentricity. First of all, industrialisation was considered the key element for achieving economic development, which would transform the stagnant economy of backward countries and regions into a modern and dynamic capitalist economy that would provide, in the long term, an increase in income levels. However, the main question was the way in which underdeveloped countries could best achieve the economic prosperity and social development of advanced industrial economies. In this regard, an essential element was the entrepreneurial class, which should be psychologically and technically prepared for introducing new production functions into the economy, and at the same time they had a high propensity to save and invest out of their profit income. It is interesting to note that this emphasis on the key role played by entrepreneurship in economic development was based on Schumpeter`s idea. Allied to the rule played by the entrepreneurial class was the capacity of developing countries to absorb modern technologies. Another significant point was related to the labour force. There was an acceptance of the existence of unemployment and underemployment, especially in the agriculture sector, in developing countries and as a consequence, the mobilisation of this labour force into more productive activities was considered an essential part of economic development.

The most influential modernisation theorist was Rostow (1960), whose preoccupation with the process of economic growth led him to develop a mechanism that catapulted a backward economy into take-off. The propulsive mechanism was supplied by the leading sectors (could be one or more), but all sectors remain in a continual change as production functions, modern technologies become available, and new linkages reach out into the

economy. The leading sectors were a key element in Rostow`s work because the vital energies were accumulated there, although they derived from different sources, such as: new inventions or the absorption of available technology; the emergence of an entrepreneurial class who invested in and exploited the market possibilities; a productive agriculture; etc. It is interesting to note here that there are some similarities between Rostow`s "leading sector" and Perroux`s "propulsive industry", which were concepts used for describing the dynamic of industrialisation.

In relation to the development pole theory, it is important to note that Perroux was influenced by Schumpeter`s ideas, especially his innovation concept. In fact, Perroux believed that entrepreneurial innovation was primarily responsible for the development process in which the propulsive industries played a key role because they were highly innovative and according to him, innovation or technological progress was the pillar of economic development. Second, industrialisation was an important aspect of economic development. Third, the most important objective was to generate the spread effects, such as the increase in income and employment and at the same time produce structural change through economic growth. Obviously, the implementation of development poles was the essential vehicle for achieving these objectives.

Summarising, the basic idea that permeated these theories and the development model itself adopted by the Brazilian government was that the necessity of having an accelerate economic growth, principally in terms of GDP, in order to favour the poorest stratum of society, which meant that the social development was a consequence of economic growth. In other words, problems such as poverty and underemployment were regarded as temporary obstacles, which would be overcome through the beneficial spread effects generated from dynamic centres, generally richer areas, to the periphery, generally backward regions, leading in the long run to a more egalitarian and principally prosperous society.

2.4.1 - The Amazon Region

As was seen above, few countries adopted Perroux`s ideas to the extent that Brazil did and his influence can be attested by various national development plans that adopted his concepts. Although most of these plans implemented his theory partially or in different ways, the PND II was the only Brazilian plan whose spatial planning approach was based on Perroux`s development pole theory and was strictly implemented according to the directives previously established. Thus, this national plan is an excellent example for analysing the beneficial spread effects generated by development poles to their surrounding hinterland areas.

In order to understand the spatial planning approach of the PND II, it is also important to bear in mind its objectives and development strategies. Development and security were keywords in this national development plan, whose general objectives were: to maintain the accelerated growth rate of the "miracle years"; to contain inflation in a gradual manner; to keep the balance of payments in relative equilibrium; to improve personal and regional income distribution, simultaneously with economic growth; to consolidate Brazil as a modern industrial economy; to adjust to new realities of the world economy; to initiate a new stage in the struggle for national integration; to implement social development strategy in order to guarantee to all classes, especially middle and working classes, substantial increases of income, and also to eliminate the "pockets of absolute poverty" that were principally located in the Northeast region and in the periphery of the great urban centres; and to integrate with the world economy.

According to these general aims, the PND II designed development strategies. The consolidation of Brazil as a modern economy was associated with the maintenance of high rates of industrial growth and in order to achieve this aim, implementation of industrial and agricultural strategies was fundamental. The industrial strategy was based on a "new phase" of import-substitution, whose emphasis was on basic sectors in order to correct imbalances in the industrial structure and also to save foreign exchange. One important aspect is what the PND II called the "Brazilian model of industrial capitalism", which was intrinsically related to the way of making economic objectives viable. This

model, known as "triple alliance" due to the association of multinational, State and domestic capital, aimed at encouraging industrial development through the private sector and at the same time ensuring a key role for Brazilian enterprises in the modern industrial structure that was desired. It is important to note that the Geisel government placed much greater emphasis than previous military governments did on the role of the State and principally on its role as protector of national industries.

The industrial strategy comprised five important points: 1) Development of basic sectors with special emphasis on capital goods industry, the basic electronic industry and basic raw materials. The main groups of basic materials were: iron and steel products; non-ferrous metals; petrochemical products; fertilisers; and pesticides. All of these groups include their respective raw materials. In addition, there were three other groups: paper and cellulose; raw materials for the pharmaceutical industry and cement, sulphur and other non-metallic minerals; 2) Opening-up new fields for exportation of manufactured goods of greater technological complexity; 3) Greater impulse for industrial technological development; 4) A boost to the development of the foodstuffs industry, continuation of the drive for modernisation and reorganisation of certain traditional industries; and 5) Reduction in regional imbalances in industrial development for the purpose of avoiding industrial concentration in a single metropolitan area. In this regard, the idea was to favour industrial dispersion in order to strength new centres of production.

Based on these points, fiscal incentives, loans from the BNDE and other sorts of government stimuli would be related to decentralisation criteria; industrial poles would be set up in order to take advantage of scale and agglomeration economies and also to guarantee articulated operation of large, medium and small industries; and the policy of identifying, through national and regional planning and also official banks, opportunities for industrial programmes and projects in Amazonia and the Northeast.

With respect to agricultural strategy, the PND II considered that this sector would contribute to the expansion of the GDP and also to the realisation of Brazil's role as a world supplier of food, agricultural raw materials and industrialised agricultural products. This document stressed that Brazil was one of the few countries in the world with vast

spaces at its disposal. As a consequence, the settling of new areas was considered fundamental for the expansion of agriculture and the highways system already constructed was making access to huge areas in Amazonia and the Centrewest possible. It was hoped that the growth in income from agriculture would help to sustain the intense dynamism of the rest of the economy by demanding more raw materials and consumer goods and this, in turn, would contribute to reducing the deficit in the trade balance.

Another important aspect is that the PND II placed a great emphasis on the diversification and regional specialisation of agriculture in order to take advantage of the productive potential of each region. Correspondingly, the agricultural strategy comprised the following points: A policy of land use for agricultural purposes. These purposes in Amazonia were associated with another objective, which was to regularise the land ownership and also to distribute land, through INCRA, in areas of tension; modernisation of the agricultural sector; institution of agricultural reform and land redistribution programmes in problematic areas, where distortions of the system of land tenure were viewed as obstacles to agricultural development; strategy for the occupation of new areas, specially in Amazonia, the Centre-west and the humid valleys of the Northeast; continuation of the policy of establishing new market structures; strengthening the action of the public sector in areas where this action cannot be delegated such as: sanitary protective measures for crops and livestock; the formation of buffer stocks; a sectorial concentration of incentives; social strategy for the rural sector in order to assure the producer of a greater participation in the profits of the sector (Brazil, 1974).

One of the most important objectives of the Federal government was national integration, which was related to two preoccupations: geopolitical and economic. In fact, the occupation of "empty spaces", especially in Amazonia and the Centre-west, had implications of security and sovereignty for the military regime. At the same time, the incorporation of these vast spaces into the market economy was fundamental for the PND II economic strategy, in which decentralisation of economic activity was a key factor.

The Federal government hoped that these new areas would contribute substantially to the growth of GDP, especially through a number of projects (agricultural, mining, livestock,

forestry, etc.) to be implemented, and at the same time, considered the best way of integrating and occupying the regions was by means of the highways system, which was already constructed to a large extent (Trans-Amazon highway, BR-230 and the *Cuiabá-Santarém* highway, BR-165). The foremost point in the national integration strategy was the "integrated areas" concept, which made concentrated efforts of the Federal government and the private sector possible, and moreover allowed external savings and scale and agglomeration economies to be taken advantage of. The objective was to create blocks of integrated investments in these areas (which was development poles) which would, it was hoped, permit the adoption of clear priorities and the physical control of the results by selected areas. Several programmes were based on this concept, such as: POLAMAZÔNIA, the Programme for Integrated Areas in the Northeast, the Special Programme for the Development of the Pantanal and the Special Programme for the Development of the Geoeconomic Region of Brasília. It is important to stress here that colonisation and agricultural enterprises were important elements of national integration strategy.

The strategy of the economic occupation of Amazonia (and also the Centrewest) was based on (Brazil, 1974; CDE, 1974):

- Utilisation of the natural axes of penetration for Amazonia and the Centre-west and principally of the important influxes of people which occurred: the first started in the state of Paraná and the state of São Paulo, passed through the state of Mato Grosso and continued to Rondônia; the second started in the same area, ran toward the North of the state of Goiás and southern Pará; and the third started in the Northeast, passed through the state of Piauí and the state of Maranhão and continued to the Central Plateau or the South of Pará;
- Promotion by the government of the occupation of the most fertile land of selected areas (and therefore geographically separated), and of the development of comparative advantages;
- The orientation of export activities, associated with export corridors, aiming at clear comparative advantages and dynamic sectors of the international market (beef, mineral deposits, lumber, cellulose). Export activities were expected to grow at a rate of 25% annually.

According to these guidelines, the PND II established the following points in order to occupy Amazonia productively: the creation of the POLAMAZÔNIA, which comprised fifteen development poles and whose investments were estimated at Cr$4 billion; the setting up of the mineral-metallurgical complex of Eastern Amazonia, which embraced the integrated Carajás - Itaqui scheme (iron-ore mining and steel mills), the bauxite-aluminium complex (Trombetas - Belém) and a large number of other undertakings associated with exploiting the hydroelectric potential of the Araguaia - Tocantins region (São Félix and Tucuruí); lumber exploitation in a planned way; and conclusion of the industrial district of the Free Zone of Manaus and the establishment of its agricultural district.

The social development strategy of the PND II was related to the maintenance of an accelerated rate of economic growth. The rationale was that rapid expansion, through accelerated growth, would provide more income to, and increase consumption by, everybody and, moreover, would encourage more investment. In other words, given high rates of growth it would be possible to undertake redistributive policies "while the cake is growing" (Brazil, 1974, pp. 69). The Brazilian government opted for the market economy and, consequently, government actions were directed towards private initiative, which was responsible for developing some sectors, such as manufacturing industries, construction industries, commerce, farm and stock raising, insurance, etc. In order to achieve this objective, the private sector was stimulated and encouraged, through a number of incentives, to invest therein, while the Federal government concentrated its investments in those sectors considered of national interest and security and in those which were not of interest to private initiative. Thus, the government, through its enterprises, limited its activities principally to economic infrastructure, i.e. energy, transport, and communication, although its activities also embraced some groups of basic materials, especially petrochemical, and iron and steel products, and their respective raw materials, which were considered strategic.

Another important point of the PND II is related to the integration of the Brazilian economy with the international economy. In order to maintain the balance of payments in relative equilibrium, the strategy was: to expand economic relations with other countries,

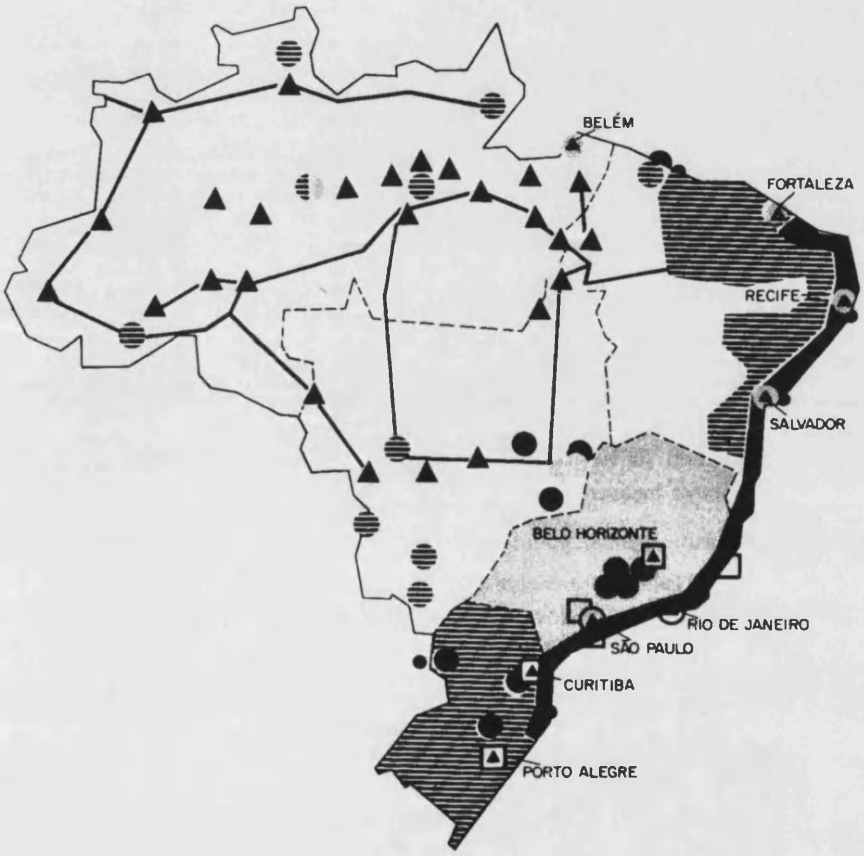
including those of the ex-socialist block; to stimulate exports in categories such as manufactured goods, ores and non-traditional agricultural products in order to consolidate the system of export corridors; and to maintain the policy of diversification.

In connection with all these points above, there was a policy of urbanisation (see Fig. 2.1) that served as a basis for both national development and the occupation strategy advocated by the PND II. The main points of the urban development strategy were: the implementation of nine metropolitan regions that were already created: São Paulo, Rio de Janeiro, Belo Horizonte, Fortaleza, Porto Alegre, Recife, Salvador, Curitiba and Belém; the identification of the functions that were to be performed by the national metropolitan centres and also by the regional metropolitan centres, especially in areas of greatest demographic and economic concentration; and decentralisation, through the definition of medium-sized centres (poles), on national and regional scale. The principal objective was to take advantage of the existing agglomerations in economic, social and political terms. With respect to Amazonia, the setting up of urban poles was fundamental for the occupation of the region.

The urban development strategy for Amazonia and the Centre-west was based on: the development of the cities of Manaus and Santarém and also of the metropolitan region of Belém. The aim was to complement their urban infrastructure and support their productive secondary and tertiary activities; the implementation of the development guidelines for the geo-economic region of Brasília, especially the occupation along the road axes which led to the Brazilian capital (principally the Brasília-Anápolis-Goiânia axis); the development of the following cities: Cuiabá, Campo Grande, Corumbá, Dourados, Macapá, Boa Vista and Rio Branco; and the establishment of selected urban poles along the main highways (the Trans-Amazon, the Cuiabá- Santarém, the Belém-Brasília, etc.) and also in the hinterlands. The objective was to occupy and to promote the agricultural and agro-industrial development of the region.

Urban development strategy for the Northeast followed practically the same directives as had been established for Amazonia and the Centre-west. In this regard, regional urban

poles that were performing or were to perform as centres of regional polarisation would be strengthened by productive activities and investments in urban infrastructure and social



Containment Area
Control Area
Area for Control and Dynamisation
Area for Dynamisation
Support Nuclei for the Process of Occupation
Tourist Regions
Special Programme Areas
Road Axes of Penetration
Metropolitan Regions

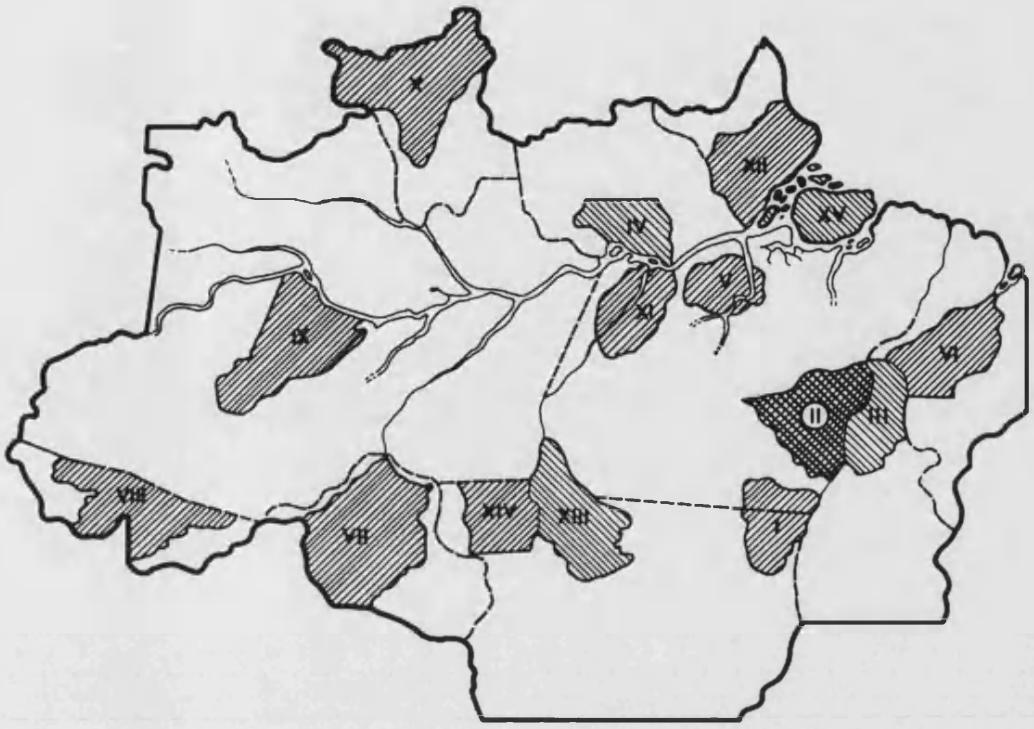
Fig. 2.1 - National Urban Development Policy
Source: Brazil, 1974.

apparatus. These poles, it was hoped, would play as important a role in containing migration as in supporting agricultural and agro-industrial activities. The most important "integrated" projects to be implemented were: the improvements of urban infrastructure in São Luís by the Carajás Project, the Itaqui port in the state of Maranhão, the Suape port in the city of Recife, and principally the petrochemical pole at Camaçari, which is located in the metropolitan region of Salvador.

The spatial development strategy of the PND II was formalised in the POLAMAZÔNIA programme (see Fig. 2.2), which was set up by Decree-Law n° 74,607 on September 25, 1974. This programme aimed to establish fifteen development poles in selected areas throughout "Legal Amazonia" according to their potentialities, which were: mineral, forestry, agro-livestock and agro-industrial. In this regard, infrastructure, capital subsidies, taxation and other countless similar incentives were provided by the Federal government in order to accelerate economic growth and also create the necessary conditions for these poles to generate the hoped-for spread effects to their peripheral areas. The selected development poles were: Xingu-Araguaia; Carajás; Araguaia-Tocantins; Trombetas; Altamira; Pré-Amazônia Maranhense; Rondônia; Acre; Juruá-Solimões; Roraima; Tapajós; Amapá; Juruena; Aripuanã; and Marajó.

In the five years from 1975 to 1979, the Federal government predicted the investment of an amount estimated at Cr$4 billion in the POLAMAZÔNIA using resources from already existing programmes such as: PIN, PROTERRA, FDPI, etc. In broad terms, POLAMAZÔNIA aimed to increase the cattle herds of the region, especially in the North of Mato Grosso, northern Goiás and South of Pará, to five million head by the end of the 1970s; support the growing of traditional regional crops such as rubber, sugar, cocoa, dende, fruit, pepper and rice and also finance research into these crops; and exploiting the vast mineral deposits in the region. It is important to describe below the main characteristic and the planned implementation of the Carajás pole in order better to understand what were the expectations of the development poles strategy in the region.

Carajás, pole 2, comprised the entire municipality of São João do Araguaia, practically all the municipality of Conceição do Araguaia and part of the municipalities of Marabá,



I) Xingu-Araguaia; **II)** Carajás; **III)** Araguaia-Tocantins; **IV)** Trombetas; **V)** Altamira; **VI)** Pré-Amazônia Maranhense; **VII)** Rondônia; **VIII)** Acre; **IX)** Juruá-Solimões; **X)** Roraima; **XI)** Tapajós; **XII)** Amapá; **XIII)** Juruena; **XIV)** Aripuanã; and **XV)** Marajó.

Fig. 2.2 - Development poles Selected by POLAMAZÔNIA

Source: SUDAM, 1976b.

São Félix do Xingu and Santana do Araguaia, all of them in the state of Pará and covering an area of 88,300 square kilometres (SUDAM, 1976b). This pole was a priority area under the POLAMAZÔNIA programme because of its huge iron-ore deposits (estimated at 18 billion tons) principally in the valleys between the Xingu and the Tocantins rivers and the Carajás mountain chain. In order to exploit these vast deposits, mining was programmed to start in 1978/79 and the feasibility studies recommended that the ore should be carried by rail from the mine to the port of Itaqui, which was located 940 kilometres away from the Carajás mine and close to São Luís, the capital of the State of Maranhão. The Carajás pole also had reserves of manganese, cassiterite, diamond and tin and a survey was started to determine how best to use the natural resources of the region.

Moreover, to the west of the iron-ore deposits there was land with a high potential for agro-livestock and also forestry resources, both of which were to be exploited by private enterprises. In fact, agro-livestock, and especially mineral undertakings, were the main activities of this pole and it is interesting to note that six years before the PGC had been established, the potential and strategic importance of iron-ore, manganese, bauxite and other mineral deposits in eastern Amazonia was completely understood and stated.

The document POLAMAZÔNIA: Carajás traced a complete picture of this region, pointing out its main problems and recommending guidelines in order to accelerate the development of this area. Owing to the importance of this pole, it is necessary to describe these problems and also the programmed actions for it. In this regard, problems related to agro-livestock, food supply and colonisation were (SUDAM, 1976b; pp. 124-127): an agrarian structure in which 90% of the land was estimated to consist of large rural properties (*latifúndios*), which were considered a significant problem for implementing agriculture and cattle ranching activities; the lack of technical knowledge (use of rudimentary methods of cultivation); insufficiency of financial resources; transport difficulties because the system of highways, despite the construction of the axes of penetration, was still insufficient and its completion and also the construction of a network of vicinal roads were considered essential for providing easier access to new land and, therefore, for the export of its production to other centres; the lack of, and high prices of, basic products because of the location of the Carajás pole, to which access was very difficult and which was far from the principal production centres of basic products for agro-livestock activities; an unsuitable commercial system, in which the persistence of *aviamento* system and of the role of the "intermediary" in the commercial process were considered evidence of this problem, which was aggravated by difficulties in transporting the products out of the pole and by insufficiency of credits, of technical assistance and also of a storage system; and the lack of agricultural research.

Based on these problems, the guidelines were: the delimitation of an area estimated at 2,200 million hectares, in the south-east of the pole for livestock and long-cycle crops, as indicated in the PND II, such as rubber, sugar-cane, cocoa, dende, fruit, pepper, etc.; the development of short-cycle agriculture, especially that of subsistence, as in traditional

areas of cultivation represented by the spontaneous nucleus of colonisation (inclusive within the area reserved for livestock and permanent crops) and in the areas to the south of the city of São Félix do Xingu, in the extreme north-east of the pole, where long strips of fertile land had been identified, which were destined for colonisation. The area in the north-east of the pole was also reserved for short-cycle crops. This area comprised the valleys of the Baixo Itacaiúnas and Baixo Araguaia and was crossed by the Trans-Amazon highway, where the activity described above had already begun; to promote the designation of the land reserved for these activities, especially the land programmed for colonisation in the Município of São Félix do Xingu, and also the small strips of land close to the city of Marabá, where some of these strips were being designated for colonisation that was being promoted along the Trans-Amazon highway; to implement a widespread programme to experiment on different crops, liming and fertilisation in order the better to obtain detailed information of cultivation zone by zone; to establish control posts to determine the influx of products and their consumption, which were completely unknown, with the purpose of elaborating a programme for supplying the existing urban nucleus and also to develop a programme for agricultural production, whose objective was to supply the local and external market; to set up an integrated programme of technical assistance, principally for small farmers, in order to change the predominating productive system of agriculture.

This programme was to be supported by other programmes such as: local experiment on crops, land on designation of growing plants for vegetative propagation and for seed, the supply of basic agriculture products required for the rationalisation of the agricultural activity, the control of animal health and the provision of storage facilities; the correction of the distortions in the existing methods of cattle raising through the allocation of fields for research into the production of seeds, of leguminous, and of grass and also the development of research on cattle in order to reach better levels of productivity; to intensify the use of credit for the benefit of farmers; and to make transport of the products viable in order to improve the region commerce.

With regard to timber, the problems pointed out in the POLAMAZÔNIA: Carajás document (SUDAM, 1976b; pp. 127-128), were: the use of rudimentary technology and

the predatory character of forestry exploitation; the lack of specialised labour to supply the needs of the sector; the lack of data and, therefore, ignorance in relation to the behaviour of tree species in plantations; difficult access for timber extraction, which was aggravated by the lack of transport; and the lack of knowledge of the properties and also of the use of timber species in forestry. On the other hand, the recommendations were: to plan the rational exploitation of forestry in order to reach a qualitative and quantitative level of timber production which would be suitable for the great potential of the region; to reconcile forestry exploitation and the use of the land in general with conservative measures that would assure the continuous renewal of forestry resources; to take advantage of the timber to be felled in the area of mineral exploitation, whose extent was estimated at 590,793 hectares, principally of those species of commercial value for export from the pole although most of them would be required for civil construction within the pole; to delimit the areas destined for the protection of the indigenous population, for colonisation and agrarian reform, for the implementation of livestock projects and also for the development of sustainable forestry exploitation; to rationalise timber exploitation in the region, by means of modern techniques of extraction and forest renewal in order to overcome predatory extraction.

In relation to mining (SUDAM, 1976b; pp. 127-129), the main problem was that the difficult access to potential areas of ore made research in these locations very expensive. Nevertheless, the main directives were associated with the development of research in order to discover new potential areas; to define the real possibilities of areas rich in carboniferous deposits, which had been discovered in the river Fresco region; to research on the use of materials for civil construction, principally limestone, in agriculture and industrial undertakings.

With respect to fisheries (SUDAM, 1976b; pp. 128-129), the principal problems stressed in the document were: the lack of the minimum infrastructure essential for developing this sector; the lack of financial and technical support; primitive fishing because of unsuitable equipment and the use of obsolete techniques; and the lack of orientation to organise the fishermen into co-operatives and colonies. On the other hand, the main guidelines were: to promote the creation of Central Co-operatives supported by Basic Co-operatives and

fishermens` colonies, which would act as a technical instrument essential for modernising the primitive fishing; to support this primitive system in the main fishing zones of Amazonia, where one of them, which was affected by the rivers Xingu, Tocantins and Araguaia, showed excellent prospects for development, but to achieve this objective it would be necessary to solve the following basic problems: production, commerce, storage, transport, conservation (by cold and salt), technical assistance, training and credit; to assure the spontaneous positive trend of the primitive fishing production; and to assure that the excess of fish would be absorbed by the consumption markets, principally those of large urban centres.

According to the document (SUDAM, 1976b; pp. 132-133), the Carajás pole also showed problems in the hierarchical level of its existing urban nucleus; insufficiency of urbanisation; a disorientated growth of the urban nucleus; and the lack of a suitable basic infrastructure in the urban centres. In order to tackle these problems, the planners established the following directives: to elaborate the "Master Plan" for developing the cities of Conceição do Araguaia and São Félix do Xingu; to promote the urban expansion of the city of Marabá, and moreover to implement its basic urban infrastructure; and to improve the water-supply system in the urban nucleus of Conceição do Araguaia and Santana do Araguaia. In relation to the basic services, the document stressed the importance of constructing a port near the city of Marabá in order to transport the regional products, of improving the existing airports and also constructing new ones, of constructing 891,5 kilometres of highways and more 2,8 kilometres of bridges (over the rivers Araguaia and Tocantins) during the 1975/79 period, of gradually increasing the system of generation and distribution of the existing electric power in the cities of São Félix do Xingu, Conceição do Araguaia, Santana do Araguaia and Marabá, which were the support nucleus for the development of the region.

In relation to health and education (SUDAM, 1976b; pp. 130-131), both sectors were rather problematic. The lack of infrastructure and the few existing medical centres had neither the necessary equipment nor specialised labour, and high levels of malaria, leprosy, leptospirosis and leishmanioasis were the main health problems stressed by the document, while the principal problems in the educational sector were: 67% of the

population was illiterate; 78% of the teachers had no license to teach in the elementary school and 67% of the unlicensed teachers had just completed primary school; the few courses offered by the educational system (Marabá had just one specialised course); the high percentage of non-specialised labour, which was unable either to satisfy the demand to be generated by economic activities or to increase the productivity of the existing economic sectors. In order to tackle all these problems, the planners stressed the importance of intensifying the struggle against the above diseases, of improving the level of education, of training teachers in order to assure higher productivity from teaching, and of providing specialised courses in order to train the labour available in the region.

The POLAMAZÔNIA: Carajás document stressed that the projects which were being implemented or to be implemented in the Carajás pole would generate 81,500 jobs including 80,600 in construction activities, in the 1975/79 period (SUDAM, 1976b; pp. 118). It was expected that the Carajás project alone would generate 20,000 jobs in the construction phase and between 3,000 and 4,000 permanent jobs.

Although Carajás was unquestionably the most important pole, there were fourteen other selected development poles. Thus, agro-livestock, forestry, mineral, agro-industrial and infrastructure projects would be financed by POLAMAZÔNIA in order to take advantage of their economic potentialities. In addition, the cities of Manaus (the capital of the State of Amazonas), Belém (the capital of the State of Pará) and São Luís (the capital of the State of Maranhão) were classified as urban poles. The idea was the same: to transform these capitals into dynamic centres or poles, from which development could spread to their peripheral areas. The Federal objectives for these urban poles were centred on the development of their infrastructure.

According to POLAMAZÔNIA, the actions of the Federal government, of the State governments, and also of private initiative would be co-ordinated in these fifteen development poles and the plans for the development of each pole would be part of an integrated development plan. Obviously, the specific objective of massive investments in infrastructure allied to countless types of fiscal incentives provided by the Brazilian government was to attract private industries and consequently to set in motion a dynamic

process of economic growth, but in addition to this objective there was a general one: to occupy "the empty spaces" (SUDAM, 1976a; 1976b).

With the coming to power of the Figueiredo government, the development of Eastern Amazonia gained a new impetus and as a consequence the POLAMAZÔNIA programme was maintained, the PGC was set up and infinite additional incentives were created in order to accelerate economic growth, solve the foreign debt problem and also consolidate geopolitical objectives, such as the occupation of empty spaces, which had been established by previous military governments. However, it is important to highlight here that with the advent of PGC in 1980, seven development poles were established along the Carajás railway corridor at Parauapebas, Marabá, Açailândia, Buriticupu, Santa Inês, Rosário and São Luís. The logic was the same as for previous development poles: the stimulus to mineral, agro-livestock, lumbering and infrastructural undertakings would attract industrial and agribusiness ventures, and would thereby accelerate the development of the region.

Although the POLAMAZÔNIA programme had been formally abolished in 1987, the emphasis on development pole strategies continued, of which a good example is the "Master Plan" for the Carajás Railway Corridor, which had been elaborated in order to correct the errors of the Carajás programme implementation. In fact, the document recognised that the expansion of agro-livestock had occurred with speculative aims and had been encouraged by fiscal incentives and capital subsidies. These factors had contributed to generating serious conflict over land and also to increasing the level of urbanisation in the Carajás corridor region. At the same time the Master Plan stressed that the implementation of the great industrial projects oriented towards the external market reinforced the process of modernisation and urbanisation, which were on course since the construction of transport infrastructure, in the region. Thus, past Amazonian development strategies had resulted in negative social and environmental impacts and the Plan highlighted that the pressure on the indigenous community was becoming more intense (SEPLAN/PGC, 1989).

In order to tackle the above problems, the Plan proposed a wide access to land; to give priority to those projects that meet the basic needs of the local population; to increase the level of self-determination of the local population; to restructure the urban and transport systems with the purpose of not only improving the regional access to the external market, but also to the urban functions; prioritise projects, those related to the development of basic activities for export, in peripheral regions which would facilitate: the rational and non-predatory use of renewable natural resources, the employment creation for the regional labour force, and the competitiveness in external markets (domestic and foreign) based not only on prices and scale of production, but also on the qualitative differentiation of products (SEPLAN/PGC, 1989). Indeed, the Master Plan suggested a "bottom-up" development strategy for the Carajás corridor region to avoid a situation of an export-enclave, in which limited positive effects are generated to local, regional, and even on the Brazilian economy (SEPLAN/PGC, 1989). The "bottom-up" approach advocated a community participation in the planning process and the Plan emphasised a greater decentralisation of decision-making through a number of formal and informal channels. Despite the importance of this development paradigm, the Master Plan clearly stressed that the social development should be planned by the Federal government, which had to have the social question as a fundamental priority. However, the Master Plan remained only a plan on paper.

Development poles, induced or not, associated with massive investments and all sort of incentives are essential for understanding the process of transformation that occurred, principally in Eastern Amazonia. However, these strategies implemented by the Brazilian government were intrinsically related to other important factors, such as the geopolitical objectives and also the pattern of economic development, which together were responsible for the change introduced in the region. Thus, in order to better understand the Amazonian situation and the effects generated by development pole strategies in particular, it is fundamental not to dissociate these factors.

The occupation and also the national integration of Amazonia as a whole were the highest priorities for the military regime, and government policies that had been implemented hoped to attain these objectives. In this regard, colonisation projects reflected in

programmes such as PIN and PROTERRA, the construction of highways such as the Trans-Amazon, the Cuiabá-Santarém, Northern Perimeter road, etc. were concrete examples of these policies. Despite their importance, these policies did not significantly alter the Amazon region, but the context changed with the PND II. In fact, this national development plan placed considerable emphasis on expanding the mineral sector, especially Carajás iron-ore, and also on infrastructural projects, which were considered very important for Brazilian development. This emphasis was complemented by the POLAMAZÔNIA programme, whose proposals were based on development poles.

By involving selected areas, which would receive large-scale investment resources, would involve infrastructure undertakings and where industries would be located owing to countless government incentives, development pole strategies proved to be an important instrument for transforming the Amazon region, especially its Eastern part. It is important to note that the performance of these poles was conditioned to favour internal conditions, which meant that the Federal government should supply several public facilities, such as water, transport, power, etc., but in addition to these infrastructure undertakings it was fundamental for the linkages between these poles to create favourable external conditions, which meant the construction of highways and vicinal roads. In this regard, the road network was a decisive factor in paving the way for the occupation of the region.

According to the theory, development poles would attract a population in search of employment and as a consequence, they would become productive. In fact, a mass of unemployed construction workers, landless rural labourers and migrants from different regions of Brazil was attracted to these poles, which could not absorb them because employment generation was very limited. As a result, most of the unemployed entered the swollen informal sector. Owing to the rapid influx of migrants, these poles, especially Parauapebas, had a rapid population growth rate, which is intrinsically associated with the growth of squatter neighbourhoods in which most of population lives. In this regard, Rio Verde, now a district of Parauapebas, provides an excellent example, because it is essentially a poorly-serviced, large-scale squatter settlement, whose population had grown from 3,000 in early 1984 to on the order of 30,000 people in 1986 (World Bank, 1992). In these low-income districts and neighbourhoods, the level of formal employment among

male adults does not usually exceed 10% (World Bank, 1992) and most of this population combines seasonal jobs in agriculture with irregular activities in construction work and gold prospecting or is employed in a wide range of marginal urban commercial and service occupations. In addition, women and many children are similarly engaged in a vast range of informal commercial and service activities.

Another significant point is that the economic benefits generated by development poles to their peripheral areas as well as to the population were very limited and the reason for this is centred on the fact that linkages involved in the development process were largely with distant suppliers and markets. In fact, the central point is that these industries set up in Amazonia during the 1970s and 1980s generally formed isolated enclaves, because they were established in local economies with which they had little contact and moreover, their capital, plant and many workers came from outside the region. These industries were located in Amazonia either for infinite fiscal incentives or as the result of policy decisions by the Federal government, which had opted for large export-oriented development model in order to solve some important problems, such as difficulties in the balance of payments, the increase of foreign debt and also the rapid decline in the GDP. In this regard, the main objective was directed to extra-regional interests, either in the Centre-South or abroad, while the growth of internal regional markets was relegated completely to second or an even lower place.

In essence, POLAMAZÔNIA was set up in order to promote the occupation and also an integrated development of Amazonia Legal through fifteen development poles, which had been previously selected. As was seen above, the predictions of this programme, in quantitative terms, were vague and restricted to some sectors, especially mining which was the key sector. In fact, this programme placed great emphasis on infrastructural undertakings because it was considered essential for attracting private investments to the region. Nevertheless, it is important to stress here that this emphasis on infrastructure was one of the forms taken by development policies (principally in development countries), which sought to invest large amount of resources in backward regions with the clear purpose of producing structural changes through accelerated economic growth.

Despite the importance of the POLAMAZÔNIA programme, one basic question remains: why did the Federal government adopt the development pole theory? In order to answer this question, it is important to recapitulate the chief points mentioned beforehand. On the one hand, Perroux`s theory had a very strong appeal because its underlying ideas suggested that economic growth, interregional equilibrium and integration of backward regions could be achieved through a strategy of decentralised development. On the other hand, the military regime was acutely aware of the sharp regional inequalities in Brazil and this problem was introduced in its geopolitical and economic objectives.

Becker and Egler stressed that:

> "the ideology of development poles showed itself to be the most adequate model for territorial organisation proposed by the authoritarian state, since it involved the creation of privileged locations, from the perspective of capitalist accumulation, capable of interlinking the national and international circuits of financial and mercantile flows" (1992, pp. 100).

Unquestionably, the main focus of the Federal government was economic, but at the same time the implementation of development poles associated with infrastructural undertakings, which meant the completion of the axes of penetration (see Fig. 2.1 above) and principally the construction of a network of vicinal roads, were essential for the strategic occupation and also for the integration of Amazonia. In addition to the geopolitical and economic objectives, the Brazilian government hoped that development poles would act like efficient counter-magnets to the large and congested metropolitan areas by attracting populations in search of employment. Thus, the military government saw the development pole theory as a convenient theoretical tool which served to justify its distinct objectives.

2.5 - Summing-up

The concept of development pole, which was elaborated in order to describe and explain the process of economic development, was based on the following argument: the propulsive effects intrinsic to a development process tended to be generated by a cluster of economic activities and also tended to engender the broader economic growth. Owing to its perceived potential, this concept attracted the attention of many professionals involved with problems of regional development. However, Perroux`s concept was conceived in an economic space, which was too abstract and non-operational to be applied as a basis for planning. Boudeville, who was Perroux`s disciple, was the main responsible for transforming this concept into an operational tool for regional planning and this fact was essential for its widespread use in several countries.

According to the theory, development poles could be induced and the logic was that these induced poles would act such as efficient counter-magnets to the large and congested metropolitan areas; would produce scale and agglomeration economies; and would generate beneficial spread effects to their immediate hinterlands, so that in the long-term an "equilibrium growth" throughout a country would be expected. In addition, the accelerated economic and population growth would be encouraged by government policies in relation to infrastructure and several types of incentives.

These ideas advocated by development pole theory showed to be a convenient theoretical justification for the specific geopolitical (national integration and occupation of Amazonia) and economic objectives of the military regime. In this regard, the POLAMAZÔNIA programme was established and massive investments were channelled into infrastructure undertakings, capital subsidies, taxation and thousands of other incentives with the clear purpose of producing structural changes through accelerated economic growth.

In pushing forward with a development strategy that was associated with the development pole theory and also with the basic precepts of economic modernisation theory, the military government opted for a policy which would be responsible for negative social

and environmental impacts. This chapter has outlined the development pole theory, always focusing on its expectations, especially in Amazonia with POLAMAZÔNIA and the Carajás pole. The next chapter will analyse the negative impacts in urban and rural areas generated by development pole strategies in Eastern Amazonia.

Chapter 3

A Brief Overview of Regional Impacts in Eastern Amazonia

3.1 - Introduction

This chapter gives an overview of the social and environmental impacts generated by development pole strategies in eastern Amazonia. This brief overview will prepare the way for understanding a number of problems occurred in Parauapebas.

As seen in the previous chapter, the Brazilian development policies were heavily influenced by Perroux`s development pole theory, which showed to be a convenient theoretical justification not only for economic objectives (accelerated economic growth), but also for the geopolitical objectives (national integration and occupation of Amazonia) of the military regime. These development strategies implemented in Eastern Amazonia have had negative social and environmental impacts in urban and rural areas. The Carajás project allied to several other public interventions in that region have been responsible for attracting, directly or indirectly, a considerable flow of migrants, which has worsened the already inadequate infrastructure and services-capabilities of all cities and towns along the Carajás corridor.

Municipal governments have attempted to tackle a number of problems, with very limited assistance from the CVRD, in their municipalities, improving some facilities, but they have not been succeeded. In fact, the local administrations have been totally unable to deal with the growing local demand, and dismemberment of some districts contributed to exacerbating the already problematic situation.

3.2 - Social and Environmental Consequences of Carajás

In general, Brazilian public policies within the economic sphere can be characterised by inefficiency in proposing a well-organised and efficient spatial occupation. Although the enormous investments of regional infrastructure have contributed to reducing the isolation between distant regions of the country and have shown alternatives for investment and for extraction of the economic surplus, they have also accelerated spatial occupation, which has resulted in predatory exploitation of natural resources, and has aggravated social disparities, reproducing and intensifying situations of poverty which occur in other Brazilian regions.

The intensive migration in response to road building was inevitable. However, official colonisation projects supported by INCRA and GETAT, the discovery of gold at *Serra Pelada* and principally the Carajás Project were determining factors in attracting these flows into Eastern Amazonia. In fact, urban areas, from the state capitals of São Luís and Belém to small cities located along the Carajás corridor, have experienced a rapid growth rate since the advent of the PGC. For example, the population of Parauapebas increased from 8,577 in 1980 to 53,312 in 1991 at an average annual rate of 18.07%; Marabá grew by more than 90,150 at an average rate of 8.34% per year; while in Imperatriz, even though the demographic growth rate was less (4.05%) than in Marabá, the population increment in absolute terms was even greater, the number of inhabitants increasing from 294,816 in 1980 to 456,044 in 1991 (IBGE, 1991).

The Carajás Project was responsible for generating considerable amounts of temporary and permanent employment, which reached a total of 27,000 jobs at the peak of construction activities (August 1982) at the mine, rail and port sites. As a consequence, the very rapid growth of cities along the Carajás corridor is also related to the permanence of most of these construction workers, who generally came from the low-income southern and north-eastern Brazil, in the region. Despite important effects produced by substantial flows of migrants, the principal point is that these flows were products of official development policies, which had serious social and environmental impacts in rural and urban areas.

3.2.1 - Urban Impacts

With regard to impacts on urban development, it is unquestionable that industrial activities in Eastern Amazonia have brought some benefit to the cities in the region. For example, the number of persons transported by the Carajás railway increased from 571,000 in 1990 to 836,000 in 1995 (Mayrink, 1996) and at the same time large quantities of products ranging from pig-iron to food have been carried. In addition, there have been noticeable improvements in road-building and sanitation infrastructure, and also in the construction of schools and hospitals in several cities, which previously lacked such facilities. Another important point to note is the increase in indirect employment and income effects generated by industrial activities, which have contributed to the development of the local economies. For instance, the permanent jobs created directly by the Carajás project support between 20,000 - 25,000 people, including family members and other dependants, and it is likely that two or three times this number are supported in the Carajás corridor region through a number of activities indirectly related to this project (World Bank, 1992). Insofar as CVRD employees` salaries are higher than the regional standards, there is increased demand for goods and services, which in turn stimulates the local economies, although these signs are more visible at nearby Parauapebas than in other towns and cities along the Carajás corridor such as Marabá, Santa Inês, Açailândia, São Luís etc.

However, it is important to bear in mind the fact that the amount of direct and indirect employment to be created in the region is only an estimate, and moreover, these estimates must be treated with caution because they represent a possibility and not the reality. For example, in January 1988 the PGC approved thirteen industrial projects, which were to generate 5,149 jobs directly and 31,537 indirectly (Gistelinck, 1988), but of those pig-iron plants approved only five are now in operation, and probably the other plants will not be built in the near future because of potential environmental destruction. On the other hand, the impressive growth of the cities has had several negative impacts, such as deficiencies in infrastructure and services, underemployment, poverty, illiteracy, health and nutrition problems, urban displacement and involuntary resettlement.

Indeed, the substantial flow of migrants, stimulated directly or indirectly by industrial projects and other public interventions in the region, has aggravated the already inadequate infrastructure and local service-provision capabilities. Municipal governments have attempted to solve the countless problems of the cities along the Carajás corridor with very limited assistance from the CVRD. This has resulted in improvements of some facilities, but these efforts have been totally inadequate. The reason for this lies in the fact that the necessary improvements in urban infrastructure requires financial resources beyond what is available in municipal budgets. The local authorities have been unable to find a solution to the growing needs, and some political changes (dismemberment of some districts) have exacerbated this situation. A classic example of this can be seen in the municipality of Marabá, which lost considerable revenues from taxes on Carajás ore production and wild-cat gold mining at Serra Pelada through the political emancipation of the former districts of Parauapebas and Curionópolis.

All cities along the Carajás corridor have experienced problems of infrastructural deficiency. Water supplies are usually untreated, sewage and trash collection and storm drainage systems are restricted to a few, higher income neighbourhoods, while sewage treatment and adequate solid waste disposal are basically non-existent. In Parauapebas, the water supply is taken directly from the local river (Parauapebas River), which is contamined with mercury from gold prospecting at nearby wild-cat gold mining (*garimpos*). With regard to Buriticupu colonisation villages, Bom Jesus da Selva/Km 100, Trecho Seco, Pequiá and Açailândia, water scarcity is a tremendous problem which has forced many inhabitants to obtain their water from wells, although most of water table is contamined. The reason for this lies is that sewage is disposed of in local rivers. The Jacu and Pequiá rivers, which supply water for the towns of Açailândia and Pequiá respectively, have become sewage dumps where excrement as well as industrial refuse is disposed of (Coelho, 1991).

It is worth noting that the widespread use of private wells aligned with the extensive deforestation occurring in most towns along the Carajás corridor region, has contributed considerably to a lowering the water table. This is also the case in the Buriticupu colonisation area, where people have been forced to sink wells deeper and deeper (Coelho, 1991). Another important point is that few roads in towns such as Parauapebas,

and in the poorer districts of larger cities like Marabá and Açailândia are paved, and this generates a serious problem: soil erosion. In extreme cases, soil erosion can disintegrate houses precariously built. Coelho (1991) points out that soil erosion has affected the urban areas of Açailândia, whose streets have become deep gullies leaving many people homeless during the rainy season.

As a consequence of intensive migration, the growth of urban districts in the cities along the Carajás corridor has resulted in large-scale squatter settlements poorly provided with municipal services. A large part of the population in these low-income districts is underemployed in a wide range of informal commercial and service activities (principally women and children), while male adults combine seasonal jobs in agriculture with irregular activities in construction work and gold prospecting or are engaged in a variety of marginal urban commercial and service occupations, such as sidewalk vendors selling fruit, candy and cigarettes, drivers and carters, assorted repairmen, car washers and watchers. Women find additional income as cleaning women, seamstresses, baby-sitters and prostitutes. Many farms and firms avoid registering employees, who would then be entitled to rights and benefits such as job stability, social security and so on, because businessmen consider the official taxes too numerous and also extremely high. The direct result is that the informal sector in Brazil has expanded to a very significant proportion of the economy. In 1988, 47.4% of the non-agricultural employees did not have their work cards signed (Martine and Torres, 1991) and one of the indicators of informality is the number of employees with signed work cards. The proportion is certainly larger in the Carajás corridor area, where any kind of formal employment is scarce.

Public health impacts are directly associated with a lack of basic urban services and facilities. This is reflected in the rapid increase in a variety of health problems and a worsening of social indicators, such as infant mortality. In 1988, the municipality of Parauapebas showed high incidences of malaria, tuberculosis, leprosy, measles, hepatitis, whooping cough, meningitis and tetanus which exceeded the state of Pará averages (IDESP, 1990). The Brazilian researcher Coelho (1991) stressed that the most common diseases to be found in the municipalities of Açailândia and Santa Luzia were malaria, diarrhoea, allergies, verminoses, influenza, malnutrition and snake or scorpion bites. Amongst them, malaria presented the highest rate of incidence; a good example of this

can be seen in Presa de Porco/Vila Pindaré, where 60% of inhabitants was infected with this disease. In addition, there were high occurrences of leprosy, tuberculosis and sexually transmitted diseases in both municipalities.

Sexually transmitted diseases are intrinsically related to a lack of information, of hygienic habits, of treatment and, principally, to high rates of prostitution, which is a very common phenomenon in the Amazon frontier. Widespread urban poverty and malnutrition are reflected in high indices of mortality, especially infant mortality, which averages 125 per 1,000 live births in São Luís (World Bank, 1992). In urban areas of Açailândia and Santa Luzia, 40% of the low-income population has lost a family member since their arrival in the region and the incidence of infant mortality is significant (Coelho, 1991). Industrial activities such as pig-iron smelting with its associated atmospheric pollution, have contributed to the increase of allergic, respiratory and dermatological problems in cities which are closer to these activities, such as Marabá and Açailândia.

Access to formal education is also connected with the insufficiency of urban services and facilities because even schools are frequently non-existent or greatly overcrowded in most of the region. In 1984, 59.04% of the school-age (from 7 to 15 year-old) population in Santa Luzia and 70.27% of that population in Açailândia were out of school (Gistelinck, 1988). Despite improvements, the school deficit continued significant. For example, five years later, the municipal administration estimated that at least 50% of school-aged children were not able to attend school in Açailândia (Coelho, 1991). At the same time, in the low-income districts in São Luís, only 44% of primary school-aged children were effectively enrolled, while in the municipality of Marabá, 65% of its population did not attend school beyond the first school year (World Bank, 1992). In Parauapebas, 90% of primary teachers had not completed primary school themselves (IDESP, 1990), while 20% of adults were illiterate (Mayerhofer, 1986; Roberts, 1991a). Moreover, there is a lack of basic facilities such as teaching materials. These problems, associated with the need to supplement family incomes, contribute towards making the situation more dramatic.

Urban displacement and involuntary resettlement are a direct result of industrial projects implemented in Eastern Amazon and at the same time reflect the negligence of the

Brazilian authorities and planners, who failed to take into account the small communities affected by industrial activities. In general, the displaced population neither obtained any substantial compensation nor was attention paid to providing alternative sources of housing or employment. The villages were simply demolished and the only option for most of the displaced was to live in squatter settlements. There are numerous examples of displacement caused by industrial projects, such as the ALUMAR factory, the construction of CVRD`s infrastructural undertakings (rail and port complex) and the Tucuruí dam and reservoir. These will be described briefly below.

As indicated in chapter one, ALUMAR succeeded in achieving its industrial objectives. However, the ALUMAR complex was responsible for significant social and environmental impacts in São Luís. In fact, this complex, which covers one-sixth of São Luís island's 60,000 hectares, displaced 7,000 families, mainly small farmers and fishermen (Hall, 1991a; World Bank, 1992). Although this fabric had created 2,000 jobs, most skilled and semi-skilled workers were hired from southern Brazil. This aluminium plant stimulated a considerable flow of migrants to São Luís. As a consequence, local unemployment increased and the city's capacity to provide suitable urban infrastructure and facilities substantially worsened. In addition, the ALUMAR plant affected the local ecosystem by generating aluminium hydroxide emissions which destroyed farmers` crops and caused serious respiratory illnesses and skin diseases. As well it produced waste "red mud" which polluted the sea and caused widespread disruption of the artisanal fishing industry. It is important to stress here that most of displaced people were forced to leave the area and were offered no financial compensation, alternative employment or housing.

In relation to the Tucuruí hydropower project, it was implemented, as already mentioned in chapter one, in order to supply subsidised power for the aluminium complexes of ALUMAR and ALBRÁS-ALUNORTE, the Carajás mine, the metallurgical plants set up along the Carajás corridor, and to meet the needs of towns and cities in the region. However, the dam and reservoir, which occupy an area of 2,500 square kilometres, caused the displacement of up to 35,000 people (60% rural), including the inhabitants of six small towns (Hall, 1991a; World Bank, 1992). Owing to the fact that no planning authority was created to oversee and co-ordinate a comprehensive resettlement strategy,

serious problems occurred and ELETRONORTE, a poorly equipped State power company, was put in charge of conducting this process.

Indeed, ELETRONORTE did not take into consideration alternative provisions or adequate compensation. For instance, criteria adopted for indemnifying displaced people clearly ignored the Amazon region's land tenure structure insofar as "land is frequently not owned *de jure* by individuals with legal titles but this does not detract from their *de facto* right to permanent occupation of the land as individuals or in groups" (Hall, 1991, pp. 160). In this regard, an important segment of the rural population (60% of displacees), namely *posseiros*, became ineligible for any type of compensation and this fact created strong popular resentment towards the authorities. Furthermore, the reservoir flooded a 100-kilometre stretch of the Trans-Amazon highway (BR 230), partially flooding the INCRA colonisation project near Marabá and as a consequence, up to 800 colonists had to be relocated from their 100-hectare plots to areas of uncleared rainforest. This took place despite the fact that Tucuruí was planned before the construction of the Transamazônica. This fact characterises the sheer incompetence, as well as the inadequate planning of the hydroelectric project.

The Tucuruí dam also impacted Indian tribes. The physical area occupied by the *Gavião da Montanha* tribe was completely destroyed and its cemeteries and villages are now submerged in the Tucuruí reservoir. This tribe was forced to move to the *Mãe Maria* reserve, which is bisected by the BR 322 highway and crossed by the main Tucuruí transmission line as well as by the Carajás railway (Ferraz & Ladeira, 1991). Another serious impact caused by the Tucuruí dam on Indian population relates to the *Parakanã* tribe, which had 30% of its land flooded (Magalhães, 1991). This substantial loss implied that a new area had to be chosen and demarcated, a task continually postponed by the Federal government, which never took the Indian question seriously. A number of further hydroelectric projects along the Xingu river are planned, and the social consequences are predictable insofar as there are several indigenous territories in this region. The environmental impacts generated by the Tucuruí project will be discussed in section 3.2.3.

In order to build its rail terminal and port complex, CVRD expropriated an area of 2,200 hectares affecting several communities, namely Santo Antônio, Mapaúra, Boqueirão,

Irinema, Itaqui, Conceição, Gapara, Piancó, Mocó, etc., which consisted of small farmers and fishermen (Andrade and Corrêa, 1986/87). Perceiving that they would be evicted with only a minimal compensation, the community decided to defend its interests and to fight against CVRD. After a five year struggle, a period during which the villagers of Boqueirão were subjected to intimidatory pressures which lead many of them to give up the cause, CVRD agreed to resettle the remaining families of those small villages to "Morro Pelado" ("Naked Hill"), renamed afterwards "Alto da Esperança". Although this new area was provided with a primary school, power supply, social centre and communal standpipes, CVRD only liberated the plots for displaced families three years after the indemnification for improvements made on the expropriated land. During this period, the money received was spent on family support and, consequently, the majority part of these families were left with insufficient funds to purchase construction materials to rebuild their houses. In addition, their previous occupations as fishermen and farmers were no longer viable, principally because this new area was distant from the sea and its soil completely infertile, as is suggested by the name of the area.

The displacement of population in São Luís is a direct consequence of the Carajás project. In fact, the construction of CVRD`s rail and port terminal facilities affected many small farmers and fishermen, who lived within the city's "greenbelt". There is no agreement in relation to the number of people displaced by these undertakings because while informal local observers estimate it to be 10,000, CVRD admit to only 1,800 (World Bank, 1992). However, the main point is that the means by which expropriation and resettlement were conducted meant that most of the displaced people were unable to obtain alternative houses or jobs, and even the indemnity offered was very limited. In making any gains at all, the small village of Boqueirão despite a struggle, was apparently only an exception to the rule, insofar as most of small communities affected by the Carajás project as well as the ALUMAR plant, which was responsible for displacing 20,000 people, were simply evicted. Their population was considered to be unworthy of notice, a hindrance to the plans of companies and Brazilian planners, and the government.

Many people displaced by these industrial undertakings found a place to live in very poor districts such as Itaquibacanga, whose population is estimated at 80,000. As a result, there was an increase in underemployment rates in the area. This considerable flow of people,

as has already been mentioned, generates a number of social consequences. A very telling indicator is infant mortality, which increased from 90 to 190 per live births among displaced people (World Bank, 1992).

3.2.2 - Rural Impacts

The Brazilian development policies for Amazonia in general, and the Carajás region in particular, adopted a clear *latifúndio*-biased model, which operated in favour of large-scale, individual and corporate landowners (with generous subsidies) to the detriment of the vast majority of peasant cultivators. Thus, these policies have been responsible for transforming the rural sector, which has also experienced several and interrelated impacts such as the growing land conflicts, rural violence, food insecurity and land concentration.

Eastern Amazonia has witnessed a rapid increase in land conflicts as a direct result of land battles between peasant cultivators and indigenous groups on one hand, and larger commercial farmers on the other. In fact, violent land conflict is a common phenomenon in Brazil's history and Amazonia is no exception. Land-grabbing has followed the agricultural frontier in Brazil as migrants moved westward from the Northeast, and northward from the South over the past three decades. It is important to highlight that rural violence and land concentration in Eastern Amazonia were intensified throughout the 1980`s with the implementation of both the PGC and the Carajás Project, which were responsible for increasing land values in the region. Exacerbated land concentration, struggle for land, and moreover, greatly stimulated migration into the region were other results. In addition to both projects, there were two measures which contributed to the increase of rural violence and land concentration: the government's "Cruzado Plan", which was an economic reform package for the 1985/86 period and also the Brazilian plan for agrarian reform, known as PNRA. The "Cruzado Plan" temporarily reduced the large speculative profits obtained on the financial market, on the one hand, but, at the same time made property (rural and urban) the best investment for those with funds to spare. The PNRA expropriated areas of under-utilised land and encouraged peasant evictions and violent confrontation (Hall, 1991a).

According to the Ministry of Agrarian Reform and Development (MIRAD, 1987), by 1981 over half of Brazil's land conflicts occurred in Amazonia. Within Amazonia, the state of Pará had the highest death-rate from land conflicts, registering 568 cases from 1964 to 1992, while the municipalities of Marabá, São João do Araguaia and Xinguara in the Carajás Project area accounted for approximately 36% of the total death-rate in Pará (Berno de Almeida, 1994). Moreover, intense land conflict still occurs in several areas, notably in the western part of the Carajás area, known as the "parrot's beak", which is located in the confluence of the states of Pará, Maranhão and Tocantins and is synonymous with rural violence.

In general, most deaths associated with land conflicts in Amazonia have derived from gunmen hired by landowners, mining companies, property companies and agro-livestock enterprises to expel small farmers or to assassinate peasant activists who decided to offer resistance to land-grabbers. In these assassinations are included the non-peasant activists such as lawyers, priests, bishops, politicians, and other professionals who have defended the interests of small farmers in the region. In Eastern Amazonia, however, the rising number of fatalities is related to a decision taken by peasant farmers to organise into a movement to better to resist land-grabbers, and this attitude is reflected in the spread of estate occupations throughout the region and also in the significant number (twenty-eight to 200 in 1986) of gunmen and bodyguards recruited by estate owners killed by their own intended victims (Hall, 1991a). It is interesting to note that many bodyguards and gunmen hired by landowners are members of the police force in civilian clothes.

The use of violence against the peasant families is changing in Brazil, with oppressors emphasising non-fatal aggression methods, which assumed several forms such as threats, intimidation, physical and sexual abuse of women and minors, beatings, evictions, kidnappings and also slave labour. Denunciations of slave labour increased from 4,483 in 1991 to 16,442 in 1992 in Brazil as a whole. In the state of Pará, the situation is considered "macabre" because the terrible condition of slave labour is associated with cases of beating, enchaining and also death (Bergamo, 1993).

The persistence of rural violence in Brazil is associated with both the police and judiciary, whose local and state structures are slow and corrupt. In addition, there is omission and

even connivance of the Federal government, which could use its powers to ensure that the law is better enforced. Moreover, the State is also responsible for elaborating and implementing development policies for Amazonia, which have helped to increase land concentration and the exclusion of a large part of the peasant population from access to land. A recent confrontation between the police of the state of Pará and landless workers, occurred in Eldorado dos Carajás, which is very close to Parauapebas, on April 17, 1996, not only illustrates perfectly this situation, but also suggests that rural violence is far from finishing in Brazil. By 1500 landless workers obstructed the highway PA-150 to protest against the postponement of the Federal government to settle their families in the Macaxeira farm. The governor of the state of Pará send its police troops, which came from Marabá and Parauapebas, to remove them by force and the result was a brutal massacre of seventy landless workers, being nineteen deaths and fifty-one seriously wounded (Bergamo & Camarotti, 1996). One year later and nothing was done to investigate and punish the main responsible for this tragedy.

The problem of rural violence embraces the indigenous question because the programmes, projects and plans implemented and also encouraged by Brazilian governments have directly affected Indian people. There are forty tribal territories under the PGC`s area of influence which are located in the states of Pará (18), Maranhão (18) and Tocantins (4) and whose legal situation is: thirty-six areas officially recognised and four unrecognised by the Federal government (Berno de Almeida, 1994). In addition, there are twenty-seven tribal territories within the direct area of influence of the Carajás Project, i.e. within a 10-kilometre radius of the mine and railway (Hall, 1991a). The Brazilian government has been acutely aware of its obligation to protect and assist the indigenous population and this obligation is clearly confirmed by several laws and decrees which date from the Brazil monarchy to the present day. However, in practice the Federal government has never tried to implement this legislation in favour of the interests of the Indians.

In fact, Amazonian development policies implemented during the military regime and continued by the civilian governments have been directly responsible for countless impacts on the indigenous population, whose lands have been coveted because of their valuable natural resources. In 1983, the Federal government sanctioned Decree N° 88,988, which legitimised mechanised mineral extraction on all Indian lands, demarcated

or not, and thus mineral concession was permitted to State, private, Brazilian and multinational enterprises, including the CVRD. As an immediate consequence of these policies and also of the authorities` slowness in assuring territorial protection and assistance to the indigenous population, Indian lands in the PGC area have registered several violations including assassinations, invasions by agricultural, mining and lumbering enterprises, physical aggression, threats of deaths and outbreaks of disease.

Berno de Almeida (1994, pp. 67-82) catalogues a sequence of recent violations of Indian lands in the PGC region. Some of them are: the Kaiapó Indian Area (Kaiapó A`Ukre, Kaiapó Gorotire, Kaiapó Kikretum, Kaiapó, Kokraimoro, Kaiapó Kuben and Kran Ken tribes) - invasions by gold miners, lumbering and agrolivestock enterprises; an outbreak of respiratory diseases; mercury contamination; physical aggression by an ex-Lieutenant of the Brazilian Army against Kenti Kaiapó; the Trincheira/Bacajá Indian Area (Kaiapó Xicrin do Bacajá, Kaiapó and Kararaô tribes) invasions by lumbering enterprises and 2,500 gold miners; the Cana Brava Indian Area (Guajajara tribe) - thirteen cases of cholera with one death registered; physical aggression by federal policemen against Indians; the assassination of the Indian Augusto Pereira because of land conflict; invasion by 2,400 inhabitants of the small village of São Pedro dos Cacetes. In addition, other transgressions occurred in Indian lands such as: the Guajajara tribe (Rio Pindaré Indian Area) and the Gavião tribe (Mãe Maria Indian Area), whose territories were divided by the PA 156 road, by the BR 322 highway from Açailândia to São Luís, the Carajás railway line and power transmission lines; moreover demarcation itself sometimes takes place to the detriment of indigenous groups, as in the case of the Xicrin, whose southern boundary was deprived of an eight kilometre-wide strip that was subsequently occupied by sawmills and a GETAT colonisation project, which resulted in further invasions of the reserve by small farmers and timber extractors (Hall, 1991a).

An agreement supported and encouraged by the World Bank was signed by the CVRD and FUNAI in 1982 in order to provide land demarcations and for long-term development of indigenous groups located in the Carajás region. Nevertheless, this official agreement failed and the reason for this failure is centred in Amazonian development policy itself, which clearly shows the contradictions between the real interests and priorities manifested by the Federal government, Brazilian (state and private) and foreign companies and the

actual circumstances of the indigenous population. The CVRD and also FUNAI are significant examples of these contradictions. The Brazilian enterprise was an important part of the agreement and, moreover, oversaw the Indian Support Programme, which suggests that the CVRD had a resolute commitment to protect Indian groups in the Carajás area, but at the same time this company was responsible for invading tribal territories in search of minerals and also for obstructing "the demarcation process in an attempt to guarantee access to valuable bauxite deposits" (Treece, 1987, quoted by Hall, 1991a, pp.90).

In 1968 FUNAI substituted the old SPI, and this year is very significant because it is the beginning of both the most cruel period of the authoritarian regime and the "economic miracle", which means that this agency was created under strong centralisation and the influence of the ideology of Development and National Security (the fact that for a long time FUNAI was firstly "occupied" by militaries and secondly by employees without any experience with Indians is not a coincidence). These points are fundamental for understanding the authoritarian and bureaucratic attributes of FUNAI and its behaviour, which is marked by complete subjection to military, government and commercial interests and also by total monopolisation of Indians and its inherent tradition of making life difficult for researchers and outside consultants. Thus, its Indian policy, whose aim was to integrate them into Brazilian society progressive and harmoniously instead of giving them a certain autonomy, was completely in line with government priorities and this fact can be illustrated by Mr. Costa Cavalcanti, the second President of FUNAI, who in 1969 announced: "We do not want a marginalised Indian, what we want is producing Indian, one integrated into the process of national development" (Beltrão, 1977, quoted by Treece, 1991, pp. 268) as well as by Mr. Nestor Jost, then head of the Carajás Inter-ministerial Council, who said: "the Indians will reach a degree of acculturation sufficient for them to be assimilated as workers on the project" (Treece, 1987, quoted by Hall, 1991a, pp.92).

Indian groups were not consulted before the project implementation. Although relevant, this fact cannot be considered surprising because Brazilian plans hardly took the interests local of the population into account and the PGC and The Carajás Project were no exceptions. Indeed, Indians and peasants have been victimised by development policies

and the PGC has exacerbated the violence against them by generating opportunities for economic gains in industrial and agricultural sectors and also land speculation. Everything would be perfect for the Brazilian government, domestic and foreign investors if it were not for the unpleasant and unwanted presence of small farmers and the indigenous population, who are a concrete impediment to direct access to land and minerals.

This confrontation between small farmers and Indian groups on the one hand, and heavily subsidised commercial and speculative interests on the other, is a product of the incessant struggle for access to land and the most appalling fact is the evident connivance of the Federal government with all forms of violence such as removal, suppression, hostility and slowness of political-juridical structures, assassinations and so on used against these groups. It is important to stress here, however, that the victims of such strategies have opposed resistance instead of accepting their destiny passively. In fact, land struggle has contributed to forging a social consciousness and principally to unite disadvantaged and unprotected groups, which have been supported by a variety of institutional organisations such as trade unions, left wing parties, NGOs and the progressive Catholic Church.

Intrinsically related to rural violence is the problem of land concentration and speculation, which can be considered a typical feature of development policies for Amazonia. Although polarisation of landownership in the region had already reached an advanced stage before 1980, the implementation of the PGC exacerbated this process, in the first instance through its generous subsidies to larger farmers, and secondly, through the rise in land values as a consequence of industrial, agricultural and infrastructural activities generated by this programme. These factors associated with a great variety of fiscal incentives granted by the PGC itself and also SUDAM and SUDENE (many ventures were benefited from both sources) made Eastern Amazonia extremely attractive for private investors. It is important to note that these countless subsidies allied to high rates of inflation encouraged the acquisition of large rural properties with speculative aims.

The tendency towards land concentration in Eastern Amazonia can be best illustrated by recent data related to the PGC area. There are 465 rural properties of over 10,000 hectares (451 located in the state of Pará and 14 in Maranhão) totalling 12,930,467.7 hectares, which account for 14,3% of the Carajás Programme. According to Berno de Almeida

(1994), this percentage would considerably increase if it had been possible to collect similar data for the states of Tocantins and Maranhão. This trend observed at regional level is also confirmed at a microregional level. Compared with the 1980 agricultural census, the 1985 census shows clearly that the number of smallholdings of less than ten hectares fell from 15% to 4% in Pindaré, from 5% to 3% in Imperatriz, from 10% to 6% in Mearim, from 3% to 0.2% in the "Parrot`s Beak" and from 44% to 15% in São Luís. On the other hand, the area controlled by large rural properties of more than 1,000 hectares increased significantly from 10% to 37% in Pindaré, from 22% to 37% in Imperatriz, from 38% to 58% in the "Parrot`s Beak" and from 9% to 53% in São Luís (World Bank, 1992). Santa Inês is an important example because it is affected by the Carajás Iron Ore Project (through the Carajás railway) and is also the future site of four metallurgical plants approved by the PGC Interministerial Council. Thus, in this municipality, farms of less than one hundred hectares decreased their share of agricultural land from 33% to 21% between 1980 and 1985, while the area covered by *latifundia* between 1,000 and 10,000 hectares more than doubled from 23% to 49% over this same period (Hall, 1991a; World Bank, 1992).

These examples certainly indicate that land concentration is strongly associated with the expulsion of small farmers and that the PGC was an important factor in exacerbating this process. Hall properly stressed that:

> a direct cause is the subsidies provided to large-scale agricultural and industrial commercial enterprises, but perhaps even more important is the indirect stimulus given by such "development poles" to land values and the increasing attractiveness of the area as a source of purely speculative, as opposed to productive, investment in land as a long-term hedge against Brazil`s rampant inflation (1991a, p 106).

Rural violence, land concentration and conflicts were products of Amazonian development policies, which also had an important impact on food security and, consequently, on the nutritional levels of the population in the region. This impact has its roots in the decision made by authorities and planners, particularly in the mid-1970s, in favour of livestock, lumbering and the production of cash crops for export, to the detriment of food staples; the total control over agricultural lands of largely unproductive estates; the increase in landless small farmers owing to the incessant process of expulsion

and also the impediment to access to new land and the rise in temporary wage labour on larger estates.

Food deficits occurred in the Carajás region in particular and for Amazonia as a whole. From the state capitals such as Belém to the towns along the Carajás corridor, urban areas in Eastern Amazonia experienced problems in maintaining supplies of foodstuffs, which had to be imported expensively from distant southern Brazil. As seen in chapter four, Parauapebas is a very good example of this phenomenon. This point is illustrated by a national survey which showed that Belém and other cities in Amazonia experienced Brazil's highest prices for food staples such as root vegetables, green vegetables, beans and fruits (Hall, 1991a). The shift in crop-production patterns associated with rural violence, land concentration and worsening landlessness have contributed to making the rural population poorer. The underlying cause of the lack of food entitlements is poverty, which is also responsible for nutritional and health problems. It is worth noting that all these above mentioned problems directly affect urban development insofar as migration from rural to urban became more intense as people seek economic opportunities. A result of this are local authorities completely unable to meet the growing demand for urban services.

3.2.3 - Environmental Impacts

Until the 1960`s, the forest cover of Amazonia remained practically untouched because the only great government initiative to develop the region was the construction of the Belém-Brasília highway (BR-010), in the late 1950`s. Since then, especially at the beginning of the 1970`s, deforestation has increased at an exponential rate as a direct result of the construction of new highways such as the Trans-Amazon highway, the Cuiabá-Santarém highway (BR-165), the Cuiabá-Porto Velho highway (BR-364) and several vicinal roads, which paved the way for the rapid occupation of the region. This impressive destruction of the rainforest can be corroborated and illustrated by some significant data. In an 8,000 square kilometre area polarised by the city of Marabá, the area deforested increased from 1.8% in about 1972 to 37% in about 1985 (World Bank, 1992); from 1977 (before the implementation of the PGC) to 1985, the annual

deforestation in southern Pará (equivalent to 10% of Amazonia) increased by 6,715% (Hall, 1991a); another important source estimated that deforestation in the Legal Amazon region increased from 152,200 square kilometre to 415,200 square kilometres (Hagemann, 1994). According to recent data, 12% (600,000 square kilometre) of the Amazon forest has already been devastated. This represents an area bigger than France (Veja, 1995).

It is important to bear in mind that the Amazonian development policies which were responsible for the environmental destruction, were made in accordance with foreign and domestic commercial interests. The development of the Amazon region since the military coup has been implemented through several private undertakings as well as those supported by the Federal government. These undertakings comprise: the construction of new highways and vicinal roads; cattle-ranching; lumber industry; official and "spontaneous" colonisation; mining together with associated infrastructural projects, such as railway and hydroelectric power; and pig iron smelters. All these initiatives are interrelated and have contributed to aggravating, to a greater or lesser extent, the rainforest destruction. However, it is important to discuss below, the environmental problems generated by each, separately.

With respect to cattle-ranching, conversion into pasture means that the soil is no longer protected by its original vegetation. This lack of natural protection results in soil erosion, leaching and loss of fertility. These problems have had a dual impact: firstly, on the economic viability of livestock production because the decline in pasture productivity due to them has been aggravated by the soil compaction by cattle hooves. Without heavy applications of expensive fertilisers and herbicides, Amazonian soils, which are already characterised by poor quality, became exhausted and susceptible to invasion by weeds, many of which are extremely harmful to the cattle. Secondly, this impacts the environment itself, because concomitant with deforestation are those factors mentioned above, species loss, flooding, spread of diseases, general impoverishment of the rural population and so on.

Another important source of deforestation in Amazonia is peasant farming because its methods are based on traditional forms of "slash-and-burn" agriculture, which is limited

in terms of sustainability. This method consists of clearing small areas of forest, burning the vegetation, growing a few harvests of food crops and finally abandoning the exhausted soil in order to reproduce the same process elsewhere. Abandonment is due to the impoverishment of already poor soils, which are unable to sustain permanent agriculture. "Slash-and-burn" agriculture practised by the indigenous population and also by *caboclos*, i.e. by a limited number of people, does not affect the environment, but when practised by thousands and thousands of migrants, is potentially harmful to the environment, leaching, laterisation, weed invasion, soil erosion, loss of nutrients, etc. being the inevitable consequences.

Despite its significance, traditional slash-and-burn agriculture affected only a small portion of the total deforested area. In fact, small farmers in colonisation schemes or spontaneous settlements have deforested far less than medium- and large scale landowners, who cleared the native forest in order to introduce crops or pasture land. According to Hagemann (1994), in 1980 42% of deforestation was attributed to small farmers (up to 200 hectares of landownership), while medium- and large farmers (from 200 to 5,000 hectares of landownership) were responsible for 57%. This deforestation rate rose to 70% between 1990-91.

The destructive potential of the lumber industry is determined by wholesale deforestation, which devastates an entire area, and also by the felling of selected species of trees. Amazonia has become a major producer of timber in Brazil. In fact, this region's production increased from 14% in 1976 to 66% (corresponding to 24.6 million of cubic metre) of the country's timber in 1989 and this increase contributed to making Brazil one of the world's largest producers. This impressive production is also related to the number of sawmills in the region. In the state of Pará alone, their number increased from 1,500 in 1986 to 3,500 in 1991 (Hagemann, 1994). The lumber industry has been responsible for reducing stocks of various valuable species and also for many invasions of the indigenous areas. It must be mentioned here that an important stimulus for deforestation lies in the demand for hardwoods from industrialised countries, both for luxury and basic timber products.

In addition to livestock production, farming and lumbering, two other important causes of deforestation in Brazilian Amazonia are dams and mining, both of which were key elements of the PGC. Besides causing serious social problems such as the displacement of thousands of people, as mentioned above, the implementation of Tucuruí hydroelectric plant has generated tremendous ecological impacts, which can be related to two basic problems: the deforestation of surrounding areas and also the failure to clear vegetation from the area to be flooded. The impressive increase in local deforestation for farming, lumbering and cattle-ranching has provoked siltation, which has been responsible for negative results such as the reduction in regular natural flooding of the valley floor (which affects fishing, interrupts riverine agriculture and destroys crops) and at the same time it can affect the Tucuruí's future performance.

However, the most serious ecological consequences results from the failure of authorities to take into account the warnings of specialists, who alerted them to the necessity of removing vegetation from flooded areas. This process has led to problems of "acid water", which kills fish, destroys rivers and corrodes turbines and other equipment; proliferation of water weeds, which obstruct turbines provoke frequent shut-downs and are the ideal places for water-borne diseases such as malaria, yellow fever, river blinness (oncherciasis) and schistosomiasis (bilharzia) to breed; they also provides sites of the anaerobic decomposition of rotting biomass (World Bank, 1992).

The Carajás project has also had, direct or indirect, environmental impacts. Deforestation in the Carajás region has been considerable and the reasons lie in a number of interconnected factors including: 1) The attraction of an intense flow of migrants to the region in order to implement the mine and railway. Many of these labourers later decided to remain in the area as small farmers, gold prospectors or to undertake any type of urban service; 2) The construction of new roads and the improvement of existing ones to provide access to the Carajás mine. These roads made the access to remote areas viable and, consequently, substantial rural areas were cleared by colonisation projects, logging companies, cattle-breeders squatters and gold prospectors; 3) Private land speculation in the Carajás region in general and along the corridors formed by the railway and project - supported roads; 4) Lumber requirements for the implementation of the railway and other facilities related to the Carajás project as well for the provision of shelter and services to

the population attracted; and 5) The use of fuel wood from the forest to produce charcoal for the pig iron smelters located along the Carajás corridor (World Bank, 1992; Redwood,1993).

Indeed, the above factors contributed to significantly increasing deforestation in the area influenced by the Carajás project. According to the World Bank (1992), 99.2% of the areas cleared was native forest. Some good examples serve to illustrate perfectly this accelerated deforestation. With respect to the state of Pará, in an area of 8,000 square kilometre polarised by the city of Marabá, while only 1.8% of the total area of the region had been deforested by 1972, this percentage had increased to 8% by 1980 and to 37% by 1985 (World Bank, 1992). In the state of Maranhão, specifically in the municipality of Açailândia, the rate of deforestation increased from 8.1% of the total area in 1975 to 20.6% in 1978 and to 46.9% in 1988 (Coelho,1991). An IBGE study found that less than 1% of the native forest around Santa Inês remained untouched in 1988 (World Bank, 1992).

Besides clearing land for the implementation of the railway, road and urban facilities at the Carajás mine site, the construction of the railway resulted not only in deforestation of an 80 meter strip along of its length of 850 kilometres, but also in timber extraction for the production of railway sleepers. The area cleared, including those for the train stations, maintenance yards, housing for CVRD employees and crossings, was approximately 20,000 hectares, while the railway sleepers required at least 50,000 hectares of high quality wood (World Bank, 1992). A more direct environmental impact caused by the Carajás project relates to the pig iron industries implemented, and those to be set up, along the Carajás corridor. One of the major constraints of the industries is exactly their environmental impact on forests and air quality, insofar as they use wood-based charcoal both as an energy source and as a reacting agent.

The main reason for the use of fuelwood is economic the cheapest source of fuel is the charcoal from the native forest. It is important to stress here that part of the charcoal produced in the region is derived from the remaining scraps of timber at local sawmills, but the capacity of these suppliers is limited and production will tend to occur at increasingly greater distances, a fact which has important implications not only for the

long-term economic viability of these industries, but also for the sustainability of the native forest. In addition to deforestation, dense industrial smog produced by the operations of these pig-iron industries associated with the burning caused by other enterprises, such as tree-failing and farming, have resulted in an increase in the atmospheric pollution, which represents a real danger to the health of local population as well as to local air traffic.

Inside CVRD's concession at Serra dos Carajás, the native forest has been preserved. The reason for this lies in the Carajás project's environmental protection measures, which vary from air and water pollution monitoring and control at the mine and port areas, to the establishment of an "environmental zoning" exercise for the Carajás region. However, this idyllic situation represents a sharp contrast to the situation outside CVRD's main entrance gate, where the pace of deforestation is considerable. Although the Carajás project can not be directly blamed for most of the adverse environmental impacts generated by other public and private sector interventions such as road building, fiscal incentives, wild-cat gold mining, etc., that have occurred on the region, it has indirectly reinforced and, in certain areas, accelerate this process by improving access and consequently, attracting a significant flow of migrants to the region.

6.3 - Summing up

This chapter has shown the adverse impacts generated by development policies implemented in Eastern Amazonia. Industrial undertakings have been responsible for attracting an intense flow of migrants, which have worsened the already precarious urban infrastructure and services of urban nucleus in the region. In fact, all cities and towns along the Carajás corridor have problems of infrastructural deficiency. Water supplies are commonly untreated, sewage and trash collection and storm drainage systems are usually restricted to higher income neighbourhoods, while sewage treatment and adequate solid waste disposal are scare. The insufficiency of urban services and facilities affects directly the health and education sectors. The impacts on the health sector are aggravated by widespread urban poverty, which is caused by the intense flood of migrants attracted to the region in search of economic opportunities. In general, the towns and cities in the Carajás region present high incidences of a number of diseases, which vary from malaria to sexually transmitted diseases, and also high indices of infant and foetal mortality. With regard to the education sector, schools are frequently lacking or greatly overcrowded in most of the region and these problems connected with the need to supplement family incomes contribute to making the situation more problematic.

The Brazilian development policies, principally for Eastern Amazonia, adopted a clear *latifúndio*-based model, which favoured large landowners with generous subsidies to the detriment of the vast majority of small farmers. In this regard, these policies have affected directly the rural sector, which have undergone many and interconnected impacts, namely land conflicts, land concentration, rural violence, and food insecurity. The implementation of both the PGC and the Carajás project, by increasing land values in Eastern Amazonia, exacerbated land concentration and rural violence, and moreover, stimulated a considerable flow of migrants into the region.

Rural violence is intrinsically associated with land concentration and speculation, which are a direct product of development policies. The implementation of the PGC including the Carajás project exacerbated this process through generous subsidies provided to large farmers and also through the indirect stimulus given by development poles and land values. These factors made Eastern Amazonia an area extremely attractive for purely

speculative investment in land. Another important impact caused by development policies is on food security, which affects directly the nutritional levels of the population in the region. Food insecurity is a common phenomenon in Eastern Amazonia, whose urban areas, from the state capitals to towns along the Carajás corridor, which have to import food from the Centre-South.

In relation to the environmental impacts, it is important to bear in mind that the forest cover of Amazonia remained practically untouched until the military coup. All undertakings, varying from cattle ranch to pig iron smelters, stimulated by Amazonian development policies are interconnected and have contributed to worsening deforestation and environmental degradation in Eastern Amazonia. Although the Carajás project is not directly responsible for most of environmental impacts that has occurred in the Carajás region, it has indirectly contributed to this process by attracting a considerable flow of labourers, many of whom decided to remain in the region after the construction works; by constructing and improving new roads, facilitating the access to remote areas of the region; by means of private land speculation along the Carajás railway corridor; through lumber requirements for construction of the Carajás project facilities; and more directly through the consumption of charcoal from native forests promoted by the implementation of metallurgical industries. The next chapter will analyse the planning and implementation process of public policies in the city of Parauapebas in order to better understand the existing discrepancies between what had been initially planned and what was concretely implemented.

Chapter 4

Planning for Parauapebas: Expectations

4.1 - Introduction

In order to exploit the huge iron-ore reserves at Carajás, which had been designated as an important development pole in the POLAMAZÔNIA programme, the Carajás Project (also known as the Carajás Iron-Ore Project) was created. While this project was being implemented, CVRD believed that the construction of a high standard urban nucleus on top of Carajás mountain would be necessary for attracting and convincing skilled labours from Southern Brazil to live in that town and, consequently, to operate the iron-ore mine. Planners were acutely aware that the Carajás Project would inevitably attract a large flow of migrants to the region and, at the same time, that Carajás town which was christened Parauapebas ought to be preserved from the population and activities not directly related to mining.

In fact, Parauapebas, which was to accommodate a population of 5,000, was built with the clear aim of avoiding the formation an enormous shanty town at the CVRD`s entrance gate and also of reducing some past problems with this kind of human agglomeration, such as the occupation of hills and areas liable to flooding. Despite planning Parauapebas, however, CVRD could not avoid the formation of a peripheral settlement, which came to be known as Rio Verde, contiguous to the planned town. Rio Verde originated independently of Parauapebas because of several factors, such as poor planning, CVRD`s under-estimation of the pace of urbanisation, its decision to force service workers to live outside Carajás town, etc. These aspects, allied to a certain negligence on the part of local authorities and a difficult relationship between CVRD and these authorities, contributed to generating serious and worsening problems in the area. This chapter aims to analyse the planning and implementation process of public policies in Parauapebas in order to better understand the situation of the twin towns of Parauapebas and Rio Verde

4.2 - General Considerations

It is worth recapitulating previous regional development interventions in Eastern Amazonia in order to better understand the contrast between what had been originally planned and the reality of what was implemented in the town of Parauapebas, discussed in this chapter. This is also important for understanding the implications of planning for the twin towns of Parauapebas and Rio Verde, which will be taken up in chapter four.

The 1964 military coup, as seen in the first chapter, was a watershed in Brazil's history, principally in relation to actions undertaken in Amazonia. In fact, the authoritarian regime, motivated by geopolitics, xenophobia and development objectives, implemented regional policies which were essential for stimulating the forces that promoted the occupation and integration of Amazonia.

During the 1960s, the military regime launched "Operation Amazonia" and established the Superintendency for the Development of Amazonia (SUDAM) to exploit the already perceived potential of the region in a more aggressive way. SUDAM offered profitable tax and credit programmes to investors from southern Brazil and abroad, principally for cattle ranching.

The National Integration Programme (PIN), launched in 1970, the Programme of Land Redistribution and Stimuli to Agro-industry in the North and Northeast (PROTERRA), which was in fact a complement to PIN and was set up in 1971, and the First National Development Plan (PND I) for the 1972-74 period inaugurated a new phase in Amazonian development.

Although the fiscal incentives for cattle ranching continued, the first half of 1970s was characterised by construction of new highways, such as *Transamazônica* (BR-230) and Cuiabá-Santarém (BR-165), with special emphasis on directed resettlement projects. These projects, which were the most important "social" objective, aimed at absorbing the Northeast's "surplus" labour and the *Transamazônica*, according to official propaganda, would thus connect "men without land to land without men" (Hall, 1987; 1991a; Schmink

&Wood, 1992). Another important aim, which was PROTERRA`s major social objective, was to increase agricultural production through promotion of agro-industry as well as the creation of a new class of "modern" small and medium farmers.

Colonisation projects, road-building and agro-industries were encouraged by the Federal government largely for geopolitical reasons, which meant integration and occupation of Amazonia. Thus, a major expansion of the road network allowed greater military penetration and, consequently, control over the region, which was perceived as being potentially threatened, from the military point of view, by communist guerrillas in the "Araguaia War" and by foreign interests, which were represented by neighbouring countries who share the Amazon rainforest.

Settlement projects, new highways, especially the *Transamazônica*, and other undertakings were regarded by the authoritarian regime as synonymous with economic progress, national unity and the sensitivity of the Federal government to social issues. Other concerns were to divert public attention from internal political conflicts as well as to maintain the social structures in the South and, principally, in the Northeast. In this regard, Amazonia functioned as a "safety-valve" for social tensions in these regions. In addition to this role, the Federal government hoped, by attracting North-eastern migrants to Amazonia, to alleviate urban pressures in Southern Brazil. Rapid expansion of the road network paved the way for the occupation and integration of Amazonia and facilitated access to the exploitation of its already perceived huge natural resources.

The early 1970`s were the "miracle years" in which Brazil had achieved an impressive rate of economic growth providing a wave, which was greatly stimulated by the Federal government, of optimism in relation to the country's future (transformation into a great world power) and of nationalism as well. The rapid economic growth achieved during those years was based on aggressive development policies elaborated in order to attract foreign investments, principally through fiscal incentives, and to stimulate capital accumulation in the Brazilian industrial sector, particularly in the consumer durable-goods sector (moreover, this sector absorbs a great number of workers and did not require significant imports). Reduction in wages and tax incentives were measures considered

essential for achieving exponential economic growth. Allied to these factors, the "miracle years" also relied on a brutal political repression and on the centralisation of power in the hands of the Federal government. These characteristics, centralisation and political repression, despite the lessening of the latter in the subsequent years, would be maintained until the end of the military regime.

The focus on the consumer durable-goods sector caused some deterioration in intermediate-goods and basic-inputs sectors, this deterioration forced the Federal government to increase its imports. As a result, a crisis occurred in the balance of payments in 1973 and coincided with the first oil shock, which made the situation even worse. All these problems occurred in late 1973, which marked the end of "miracle years" as well as the change in the Presidency of the Republic. At the beginning of 1974, Geisel assumed power and his government established the PND II, which ignored restrictive economic policies and the first oil shock and decided to build up large-scale industrial and other projects. High rates of investments in sectors that represented the ultimate stage of import-substitution industrialisation, i.e. in intermediate inputs (especially in chemical and metallurgical industries) and capital goods, were considered essential for attaining high rates of economic growth.

Problems in the balance of payments and the first oil shock coincided with the failure of directed colonisation in Amazonia. In fact, the policy of social colonisation, principally alongside the Trans-Amazon highway (the settlements were known as Agrovilas, Agrópolis and Rurópolis), proved to be a great disappointment. Although several factors were responsible for the discrepancy between government promises included in the official objectives and the success of settlement projects, the crucial factor was that the planning was itself over-centralised and hastily implemented (Hall, 1987; 1991a; Almeida, 1990; World Bank, 1992).

The Geisel administration's option for developing large-scale projects was definitively sealed with the POLAMAZÔNIA programme, which aimed at establishing fifteen development poles, of which Carajás was one, in selected areas that would be endowed with investments in infrastructure and a stimulus to export-oriented activities. In addition,

POLAMAZÔNIA represented a significant change in governmental policy compared with the "social colonisation" period of 1970-74 in favour of large corporate agribusiness, livestock production and private colonisation projects, together with continuous investments in infrastructure as well as in mining and mineral-processing activities (the exploitation of the Carajás iron-ore was obviously included).

Indeed, this change was a consequence of pressures exerted on the Federal government through the AEA (Association of Amazon Businessmen) by businessmen anxious for a return to the previous policy of the 1960s, in which Amazonian occupation was based on large-scale private enterprises, and benefited from generous federal fiscal incentives. The main argument used to lobby the Brazilian government was the failure of directed colonisation projects and its negative environmental impacts on Amazonia in terms of deprestation, etc.

However, agrarian policy biased heavily in favour of large-scale commercial farming for export, was responsible for more serious social and environmental problems. Cattle ranching proved to be a tremendous failure in many ways. The financial return was unsatisfactory because of a number of problems such as soil erosion, declining soil fertility, soil compacting, weed invasion and leaching, which were aggravated by radical methods, especially chemical defoliants and the chains pulled by bulldozers, used to clear the land. These methods not only had irreparable environmental impacts, but cattle ranching also generated very little employment and this fact caused severe criticism of this form of Amazonian settlement (Hecht, 1985; Hall, 1987; 1991a).

These technical, ecological and social objections were associated with another serious negative aspect, namely the improper use of the government funds by "entrepreneurs" who used the scheme in order to obtain cheap money, which was invested in other sectors. In fact, land was commercialised with speculative aims because it had simply become the main commodity instead of processed meat, which never became, in spite of official belief, a major stimulus to Amazonian development (Branford & Glock, 1985; Hall, 1987; 1991a; Hecht, 1985; Schmink & Wood, 1992). The fiscal incentives granted by the

Federal government for cattle ranching encouraged land concentration, land speculation, land-use for unproductive activities, environmental degradation and social conflict.

The Brazilian government, through POLAMAZÔNIA, had also emphasised private colonisation schemes, which became a very interesting alternative for large southern companies wanting to make considerable profits. Owing to the reduction of government incentives for cattle ranching, these companies, encouraged by government incentives, acquired huge areas of land at nominal prices, divided them and resold them to small farmers. According to several authors (Branford & Glock, 1985; Hall, 1991a; Schmink & Wood, 1992; World Bank, 1992), the economic performance of such private colonisation schemes varied from abandonment of land because of soil exhaustion to its use for more successful schemes, where it was possible to develop crop production and agribusiness activities.

Nevertheless, these schemes generated serious problems such as the invasion of Amerindian reserves by colonising companies as well as the invasion of the entire project at Tucumã, close to the Carajás Project, by approximately 12,000 families of landless small farmers, large land-grabbers and wild-cat gold prospectors. Even so, these schemes attracted a large number of small farmers to Amazonia from north-eastern and, principally, southern Brazil.

By the beginning of the 1980s, the economic situation in Brazil was aggravated by the second oil shock in 1979, which contributed enormously to increasing the country's external debt. The Federal government, under the Figueiredo administration, launched the PND III, which prioritised the increase of exports as the best way to tackle the worrying foreign debt. Owing to the failure of cattle ranching as a major means of developing Amazonia, the Brazilian government decided to put its trust in the mining sector. Although it was no novelty to the Amazon region, the Figueiredo government gave a tremendous boost to this sector by intensifying the implementation of the Carajás Project, which had officially started in 1978, and by establishing the Greater Carajás Programme (PGC), which was the largest and most ambitious plan for mineral exploitation in Eastern Amazonia.

The Carajás Project and the PGC were regarded by the Federal government not only as a means of tackling the foreign debt problem and obtaining massive loans, but also as a means of achieving geopolitical objectives, namely the occupation and integration of Amazonia. The PGC embraced projects that had previously been implemented, such as the Carajás Project, which was the cornerstone of the entire programme, the aluminium complexes ALBRÁS-ALUNORTE and ALUMAR, and the Tucuruí hydroelectric scheme, and a number of smaller livestock, agricultural, forestry, lumbering and silvicultural projects. In addition, vast infrastructural investments were made to accompany these projects. By encouraging such distinct projects, the Federal government hoped to attract new industrial and agribusiness ventures to the PGC's development poles and its additional fiscal incentives and subsidised credit, which were a complement to SUDAM and SUDENE incentives, played an important role.

As seen in the first chapter, the PGC aggravated existing negative trends in Amazonia. This programme attracted thousands of construction workers (principally to the Carajás Project), wild-cat gold miners (especially at *Serra Pelada*) and small farmers (to private colonisation schemes) in search of job opportunities, wealth and land respectively, as well as many other migrants in search of whatever employment they might find. Urban areas, to which access was facilitated by the construction of roads, became swollen, and the accelerated spatial occupation contributed to predatory exploitation of natural resources and to aggravation of social disparities. In addition, the PGC also exacerbated the rural violence associated with land conflicts, land concentration and environmental degradation. Although mineral and infrastructural projects were the PGC's main priorities, the agricultural, agroindustrial and livestock projects were also significant in that they clearly reinforced a *latifúndio*-biased model, which favoured large-scale, individual and corporate landowners to the detriment of the vast majority of small farmers.

Indeed, many negative social and environmental consequences were determined by factors such as Brazil's high inflation - which stimulated land speculation -, the political and economic influence of large landowners, the inefficiency of the police and judiciary in tackling land-grabbing, the economic recession which caused public spending cuts, and to

some extent the intense flow of migrants, all factors that were beyond the immediate control of government planners. Despite contextual factors beyond the control of policy-makers, the socio-economic and environmental impacts that occurred in Amazonia were understood as a natural and even necessary consequence of progress by successive governments, whose major development strategies were based on modernisation principles and development pole theory, which became, with its famous beneficial spread effects, a convenient tool for different aims of the military regime. By establishing development poles through large-scale investment resources, the government hoped to accelerate economic growth, which in turn would serve to tackle Brazil's huge foreign debt, and produce structural changes by means of spread effects, and, last but not least, to occupy Amazonia, which was a clear geopolitical objective.

It is important to stress here that the formulation and implementation of regional development strategies was controlled by the Federal government through its institutions, mainly MIPLAN, which was transformed into a powerful planning secretariat (SEPLAN) attached directly to the Presidency of the Republic in May 1974 (Ulysséa, 1982). The structure was thereby significantly changed and the regional Superintendencies such as SUDAM, whose plans were reduced to a mere elaboration of regional strategies defined at Federal level, were relegated to a secondary role (Neto, 1989). By centralising planning, the Brazilian government imposed its regional strategies upon State and Municipal governments, which had to accept the official ruling. Although planning for Amazonia was technocratic, over-centralised and negligent in relation to the interests of the vast majority of urban and rural populations, the crucial point is that the State played a vital role in sponsoring the development of the region. Through its institutions, agencies and enterprises, the State, by omission or by its incessant activity, marked the Amazon region indelibly.

The advent of the civilian "New Republic" in 1985 marked the beginning of progressive changes in the Federal government's stance. In fact, the State's intervention in the economy was still strong and its initiatives in Amazonia followed practically the same directives as past development policies. For example, the geopolitical aims in occupying Amazonia and securing its borders against incursions continued under the Calha Norte

Project (PCN), which entered public awareness through criticisms and denunciations made by the Indigenist Missionary Council (CIMI) in October 1986, one year after the project was born (Oliveira Filho, 1990).

The emphasis on development poles persisted, although the POLAMAZÔNIA programme was formally abolished in 1987. Owing to a promising initiative of restructuring landownership, a new ministry - MIRAD - was created and a few months later, in October 1985, the National Agrarian Reform Plan - PNRA - was launched. Implementation of the PNRA was hamstrung by intense pressure from the landowners` lobby, called the Rural Democratic Union (UDR), and was later weakened under the 1988 Constitution (Hall, 1991a). As a result, the unequal structure of property ownership, consolidated ironically by Brazilian agencies such as GETAT which had special powers to regularise land tenure issues in Amazonia (Berno de Almeida, 1990; 1992), continued unalterable.

Despite the appearance of unchangeability, the context in which all the problems persisted did change. Brazil's new Constitution, ratified in 1988, stated that the Federal government, through its agencies, was responsible for protecting and preserving the environment for future generations (Brazil, 1988). In contrast to the military regime, domestic pressures from the Brazilian NGOs regarding the environmental impacts generated by development policies in Amazonia allied to pressures from international lobby groups that were acutely aware of the contribution of Amazonian deforestation to the "greenhouse effect" compelled President Sarney to launch the "Our Nature" (*Nossa Natureza*) Programme in 1989. This included the temporary suspension of fiscal incentives for cattle ranching in Amazonia and at the same time the setting up of IBAMA, a new federal agency which was responsible for co-ordinating environmental affairs nation-wide.

The 1988 Constitution marked a very important change in relation to the role of the Federal government. This new federal Constitution approved and encouraged a major decentralisation of responsibilities, a substantial redistribution of revenues, and an increase in the power of State and Municipal governments. Decentralisation as well as

redistribution of revenues were centred on both the Municipal Participation Fund (FPM) and the State Participation Fund (FPE), by means of which the Federal government transferred part of its revenues to different levels of government. Socolik (1989), for example, showed that in 1988 the FPM represented approximately 25 percent of the current revenues of municipalities, albeit this percentage was much more significant in the North and Northeast regions, where it represented almost 50 percent.

The growth rate of transfers in the state of Pará increased considerably from 4.41 percent in the 1982-88 period to 29.27 percent after the 1988 constitutional reform. This increase in the amount of transfers from the Federal government to Pará as well as to other northern states was, as suggested by Almeida and Campari (1995), an important factor in strengthening the economy of the region. However, the crux of the matter is that while the state and municipal governments, the main beneficiaries of the constitutional reform (Serra & Afonso, 1991), enjoyed not only more economic but also political autonomy, principally because of the end of the military regime in 1985.

This trend has its roots in the late 1970s, in the neo-liberalism of Thatcher and. Reagan Deregulation and State withdrawal became key priorities in the economic policies advocated by advanced capitalist nations. This period, in which conservative governments assumed power, coincided with the incoming Figueiredo government (1979-85), which was responsible for setting-up the Greater Carajás Programme (PGC). Neto (1989; 1990) argues that because of Brazil's huge external debt, foreign financial agencies undermined Government control over national economic planning and this dependency was well-illustrated by the PGC, whose regional development strategy had been distorted in order to decrease the Brazilian foreign debt and fulfil the requirements of global corporate strategies.

Neto`s analysis, although partially true, does not provide a whole picture of the reality. As Hall (1991a) points out, the Brazilian government used Carajás for a number of economic, political, geopolitical and social purposes and, of course, the foreign interests were significantly benefited in this process. In this regard, the thesis that national and, consequently, regional planning were entirely controlled by foreign interests does not

correspond with the facts. Nevertheless, it is unquestionable that there was international pressure on the Brazilian government and also that multilateral agencies, specially The World Bank and the IMF, played a preponderant role over the developing countries such as Brazil in making them follow neo-liberal policies.

Despite conservative winds from advanced capitalist nations, the pressure on developing countries began to be intensified only after the Mexican moratorium in 1982 (the PGC had been established two years before). After that, the developing countries which wanted to obtain loans from the international financial system (private or public) had to follow the structural adjustments imposed by IMF. Indeed, the indebtedness of developing countries throughout the 1980s led many of them to increase their exports in order to solve their balance of payment problems and this fact marked the beginning of the great influence and pressure of multilateral agencies on debtor countries. Thus, the huge loans provided by these agencies were destined to cover balance of payments deficits and also to restructure the third-world economies. However, these loans were accompanied by the famous conditionalities, which were a subtle form of pressure applied by multilateral agencies.

With regard to Brazil, trade-policy conditionalities were included rather loosely in the letters of intent to the IMF. Initially vague commitments were signed by the Brazilian authorities only in 1983, although the Federal government was reluctant to agree with the World Bank's proposals to eliminate exports, reduce tariffs, devalue the exchange rate to the extent proposed, etc. According to Abreu (1993), since the mid-1980s, modest trade reform had curtailed the more generous export-promotion schemes and implemented import liberalisation through a cut in tariffs and the number of items subject to licensing and prohibition. This reform was partly a result of trade conditionalities that were included in agricultural-sector and "export development" World Bank loans and was also partly due to IMF conditionalities. However, negotiations on a completed trade reform loan remained unresolved.

The crucial point is that the Brazilian government was reluctant to accept of the unrestricted liberalisation required by the World Bank and the IMF programmes during

the 1980s. This reluctance relied upon the confidence of the Federal government that the rapid economic growth based on its economic policy of combining export promotion and import substitution would provide favourable conditions for exchange trade concessions with the advanced capitalist economies; and also upon the successful Brazilian tradition of import substitution. Moreover, this reluctance clearly shows that the State was neither powerless nor dominated by foreign interests.

In spite of its resistance throughout the 1980s, the Brazilian government, now under the Collor administration, implemented a stabilisation plan and finally capitulated to the liberal trade policies advocated by the international financial agencies and principally by the U.S. Although the liberal "package" had been implemented, the period of the Collor government was marked by high inflation, economic recession, low rates of economic growth and corruption which led to the President's impeachment in 1992.

The weakening of the State was another important characteristic of this period and was intrinsically related to President Collor`s macroeconomic austerity plan, which was based on liberal policies. As a consequence, regional development strategies were also affected by this change in Brazilian economic policy. According to SUDAM itself (SUDAM/PNUD, 1993), there was no regional policy for Amazonia and the action of the State in the region was fragmented, compensatory and very limited. Even the environmental issue, to which President Collor had paid special attention by designating a well-known agronomist, Mr. Lutzemberger, as Secretary of the Environment and also by launching "Operation Amazonia", through which IBAMA hoped to reduce Amazonian deforestation, proved to be more a question of rhetoric than a sincere commitment.

After President Collor`s impeachment, the Federal government was headed by Vice-President Itamar Franco. Despite the successful "Real Plan" (*Plano Real*) for combating inflation, the Itamar Franco government continued the liberal reforms initiated by the previous administration. A question of overriding importance is that the Federal government was less capable of implementing its own development policies. The reasons for this lie in the political and economic crisis in Brazil since the late 1970s and also upon the economic adjustment plans advocated by advanced capitalist economies as well as by

multilateral agencies. These plans were based on the belief that the State machine should be sharply reduced in size in order to be capable of achieving sustained economic and social development and institutional growth. In addition to these factors, the shift of economic and political power towards the state and municipal levels of government was another important element. Since the institutionalisation of changes in the distribution of tax revenues between different tiers of the State in the 1988 Constitution both state and municipal governments have become more independent.

The direct consequence of these changes between the tiers of government was that the states and municipalities became responsible to a large extent for policy formulation and implementation. However, it is worth stressing here that there are considerable differences between Brazilian states and municipalities in relation to issues, such as technical capacity, the ability to forge external links and obtain access to funding and implement policies (Interview, 1995).

4.3 - What was the original concept behind Parauapebas?

"Parauapebas is our vision of the future".
(Luís Carlos Nepomuceno, Manager of the
Sustainable Development Department of
CVRD, Jornal da Vale, September, 1992)

Before examining the original concept behind the town of Parauapebas, it should be stressed that Brazilian State enterprises were fundamental instruments in developing policies formulated by the Federal government. In this regard, the CVRD played a pivotal role in designing and implementing development strategies for Eastern Amazonia. CVRD was largely interested in expanding its activities in Eastern Amazonia because of the vast mineral resources in Carajás, and the advantages to be gained from heavily subsidised electricity prices and infrastructural developments, as well as the plentiful and cheap supplies of timber from the native forest that would make economically viable the setting up of an integrated iron and steel industry in the region (Hall, 1991a). Allied to CVRD`s interests, the Federal government was, by the late 1970s, searching for another development strategy, which would be based on strategies other than cattle ranching. In fact, the government was disenchanted with cattle-ranching because it proved to be an ineffective way of developing and integrating the Amazon region, and moreover, this strategy generated serious social and environmental impacts, while generous funds granted by the Brazilian government to encourage livestock production were misused. As a consequence, the focus was re-directed towards mineral exploitation.

Mineral exploitation had been encouraged in Eastern Amazonia since POLAMAZÔNIA, which was established in 1974. Despite being included in previous government policy, mineral activities acquired more importance with the advent of the PGC because this programme was imbued with a concept of integrated development. The idea of an "integrated" regional development seemed to the Figueiredo government a strategic opportunity which would serve many purposes, but would principally tackle Brazil's huge foreign debt.

The Federal government, through its State enterprises and bureaucracies, was a dominant presence in all national territory and principally in Eastern Amazonia, with the PGC. In this regard, the government believed that its economic, social and geo-political objectives could only be achieved through the development of the region. However, such an achievement would require centralised planning. By inducing and directing industrial and agricultural development in the region, the negative consequences were considerable. These negative impacts can be attributed largely to the Federal government, which consciously chose the development pathway for the region.

The state and municipal governments played a secondary role in the development of their regions to the extent that a great part of the development projects or programmes, such as the Carajás Project and PGC, were formulated and implemented during the military regime, which did not allow any pressure, interference or participation by different tiers of government. In fact, planning for development was a totally "top-down" process, in which local needs were determined by the Federal government. Even functions of a purely local nature such as primary education and urban infrastructure were financed and implemented by the central State. This situation only began to change under civilian rule and, principally, after the 1988 Constitution, which established decentralisation and gave more political and economic power to state, and especially, municipal governments.

The mineral deposits at the Serra dos Carajás were discovered in 1967 by the *Companhia Meridional de Mineração* (CMM), a Brazilian subsidiary of U.S.Steel. Aware of the importance of its discovery, U.S. Steel asked the military government for exploration rights over the area. However, the military government did not want to place such power in the hands of a single foreign company, and after exhaustive negotiations a joint venture called AMZA (*Amazônia Mineração S.A.*) was established in 1970, with 51% of its share capital controlled by the CVRD (Brazil`s State mining enterprise) and 49% by U.S. Steel, in order to undertake feasibility studies for the exploitation of iron-ore and also other mineral resources at Carajás.

Several studies were undertaken by AMZA and the best proposal was an "integrated" project consisting of mining operations, a processing plant at the mine site, a railway and

a deep water port at Ponta da Madeira, São Luís. In 1975, AMZA initiated construction activities of the port and at the same time began to build the PA-275 road to connect the already existing PA-150 highway and the Serra dos Carajás. One year later, the Brazilian government officially allowed AMZA to construct and operate the Carajás railway. Nevertheless, this joint venture collapsed in 1977 when U.S.Steel decided to withdraw from the project, selling its share in AMZA to CVRD. In 1981, the State mining company formally incorporated AMZA in order to strengthen its control over the Carajás Project.

In parallel with the feasibility studies for the exploration of mineral resources in the Serra dos Carajás, other studies were undertaken in order to construct an urban nucleus in the Carajás highlands. During 1974-79, the dimensions as well as the aspects of the architecture, urbanism, landscape gardening, and transport facilities of this nucleus were defined. Recent Brazilian[1] and even international experience, with projects for, and the performance of, isolated urban nuclei for specific purposes were considered with the aim of drawing important lessons from them (Piquet, 1988).

While the Carajás Project was being implemented, a temporary urban nucleus was built close to the mine site for CVRD employees and contract service workers. This nucleus was progressively depopulated with the transfer of CVRD staff to the definitive town at the top of the Carajás mountain. It had previously been foreseen that CVRD contract workers would also be transferred to the new town, but the State mining enterprise changed its plans and decided to restrict residence to just its employees. This decision forced service workers to live outside the Carajás project gate, specifically in the town of Parauapebas, which is some 40 kilometre east of the mine site.

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[1]With regard to the construction in Amazonia of urban nuclei close to mining activities, the main examples considered were: the urban nuclei of ICOMI, which were constructed in 1960 to support the exploitation of manganese in the Federal Territory of Amapá (now State); the urban nucleus of Trombetas, which was built to support the exploitation of bauxite, whose operational phase was initiated in 1979 by the MRN (Mineração Rio Norte), a subsidiary of CVRD; and the urban nuclei of Tucuruí, which were constructed in 1976 when the Hydroelectric project was being implemented, and for which the Vila Pioneira was built at the beginning of the construction activities, and soon after two temporary villages were built for construction workers and a permanent town for workers involved in operation and maintenance of Tucuruí Hydroelectric. In addition, CVRD's past experience with the town of Itabira in the State of Minas Gerais was very important for designing the town of Carajás.

In order to operate the iron-ore mine in Carajás, the CVRD needed to import skilled labourers from the Centre-West and South regions, which are the most developed regions of Brazil. Thus, a strong incentive was necessary to attract and convince engineers from there to move from those regions to live in an inhospitable and underdeveloped area without attractions or facilities. The key attraction was the high-quality urban nucleus located in the Carajás highlands on a 640 metre-high plateau about 12 kilometres from the N4E mine.

Indeed, the urban nucleus on the top of Carajás mountain is an impressive company town, successfully constructed, with a high level of urban design providing most modern services and community facilities, such as schools (primary and secondary), a supermarket, shops, public transport, a cinema, an airport, a sports and leisure club, a hotel, a well-equipped hospital, rubbish collection and banks. In addition, this nucleus possesses zoological and botanical gardens and the residences resemble, in terms of quality, those of middle and upper middle class districts anywhere in Brazil. It is worth noting that the town was composed of such standardised block units (see Fig. 4.1) and this geometric order, once established, shows clearly an artificial and rational control over space and at the same time a standard gridiron plan was essential for the rapid occupation of the area.

Carajás town as a whole is totally controlled and well maintained by CVRD. For example, environmental destruction is inadmissible within the 411,948-hectare area under company responsibility, which makes this town very attractive. However, this pleasant atmosphere is completely unreal because of the unprecedented deforestation of most of the surrounding area. Moreover, behind the peaceful climate in the town there are several conflicts among CVRD employees which are related to two basic problems: lack of freedom and absence of affinity with the town (Eiras de Oliveira, 1989; Interview, 1995).

The lack of freedom is caused by the need to work and live in close proximity to neighbours twenty-four hours a day. The absence of affinity with the town is due to the rigid control exercised over people as well as the urban nucleus by the CVRD, which has absolute power to specify, for example, the boundaries of the gardens of the houses and

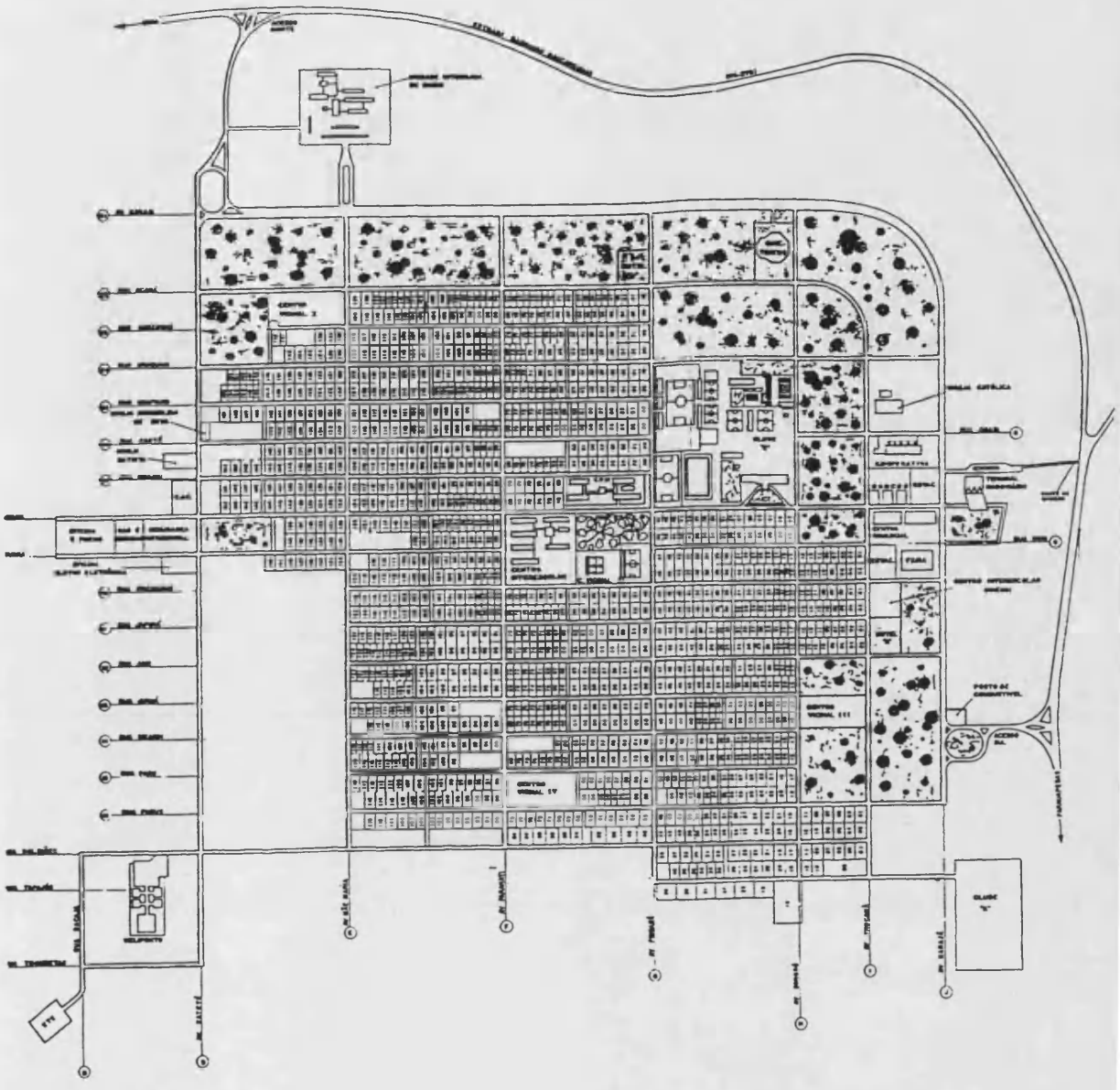

Fig. 4.1 – Carajás Urban Plan

Source: Planning Secretariat of the Municipality of Parauapebas

what kind of plants may be put there. This urban nucleus is the product of a well-designed and implemented plan. Approximately US$150 million were spent on its construction and over US$ 8 million are spent annually on its upkeep (Piquet, 1988; Roberts, 1991a).

Although the urban nuclei of Carajás and Parauapebas have both been planned, there is a sharp contrast between them, which can be illustrated by the blatant difference in the infrastructural investments made in these towns. While roughly US$ 3 million were spent in Parauapebas, Carajás received fifty times that amount (Piquet, 1988; Roberts, 1991a). The CVRD was largely responsible for this contrast, which will be made clearer subsequently when the origins of Parauapebas as well as the formation of the peripheral settlement surrounding this urban nucleus will be discussed. By clarifying this visible contrast, the role and limitations of the CVRD itself in the region will be better understood.

4.4 - Parauapebas: its origins as a planned town.

Parauapebas is intrinsically connected with the Carajás Project. In fact, the origin of this urban nucleus is associated with the exploitation of iron-ore at the *Serra dos Carajás* and accordingly, it is possible to affirm that the urban nucleus of Parauapebas is a direct product of the Carajás Project, which became the cornerstone of the entire PGC. This programme was also important for Parauapebas to the extent that this nucleus was selected as one of the PGC`s own development poles.

It would appear that, based on past Brazilian experiences related to the implementation of urban nuclei close to mining activities, the Construction Department of AMZA, which was responsible for the planning and the implementation of the urban nucleus of Parauapebas, was convinced that the Carajás Project would inevitably attract a great flow of migrants to the region while Carajás town was being established. In this regard, the AMZA document stressed:

> "... even with a tenacious policy of opening up the pioneer nucleus (of Carajás) to a large extent to a population and activities not directly related to the undertaking [the Carajás Project], the urban structures of the town will not make the settlement of all contingent of adventurers migrating unwisely to the area socially, economically and spatially viable in the short-term.
> "This population, attracted by the perspective of economic opportunities derived from the stages of implementation and operation of the mine, will tend to reproduce peripheral settlements, such as those of the periphery of the urban nuclei of ICOMI, of Jari or, to a large extent, in the "free"

> towns which surround the Pilot Plan of Brasília, at the border of the new town" (AMZA, Planos urbanísticos dos núcleos de Carajás e Parauapebas, 1981; quoted by Mayerhofer, 1986, pp. 6).

The real intention was to avoid the formation of an enormous shanty town at the gate of the company town as well as to reduce some problems that past experiences with this kind of human agglomeration could bring, such as the occupation of hills and flooded areas, the invasion of the strip belonging to the highways and principally the "sanitary short circuit" between the systems of water supply and sewage disposal. On this point, the AMZA document emphasised that:

> "Owing to the short distance of this nucleus (Carajás) from the spontaneous agglomeration, the involvement of AMZA will also be necessary, although to a lesser extent, in order to provide a minimum urban infrastructure to the spontaneous agglomeration which will certainly form at the foot of the Serra [dos Carajás], at its border with the AMZA property, and the development of the mining activities will tend to attract a great contingent of population not directly related to the company [CVRD]" (AMZA, Planos urbanísticos dos núcleos de Carajás e Parauapebas, 1981; quoted by Mayerhofer, 1986, pp. 6-7).

Indeed, the original proposal was to transform this area, which became the town of Parauapebas, into an area of "planned invasion" in Mayerhofer`s terms (1986). This "planned invasion" was to have represented an alternative to the haphazard settlements which were commonly encountered in Brazil`s peripheral regions. In this regard, an area of approximately 170 hectares close to the CVRD`s gate was poorly urbanised in order to receive migrants not directly related to the company and attracted to the region because of the economic opportunities generated by the Carajás Project. Like Carajás town, Parauapebas presented an urban geometric design (see Fig. 4.2), which was a condition for rapid building and, consequently, for settling a large contingent of migrants. Despite the similarity, the geometric design of Parauapebas was infinitely simpler than that of the company town and this simplistic plan consisted of, and is illustrated by, a poor urbanisation, a water-supply and sewage disposal systems, and four buildings: a hospital, a school, a police station and the local administration. All this urban infrastructure and facilities was originally planned to accommodate 5,000 people and was implemented by CVRD. The donation of this urbanised area to the municipality of Marabá had been foreseen since the beginning of the implementation of Parauapebas.

Fig. 4.2 - Parauapebas Urban Plan

Source: IBAM, 1994a.

Owing to the predictions of an inevitable and massive flow of migrants that would be attracted to Parauapebas, those responsible for the administration of this urban nucleus were advised on the following points:

> "In the exercise of the powers conferred upon the Development Council of Parauapebas, especially the sanction of land titling, it is important to bear in mind that the foremost objective of the nucleus [Parauapebas] is to accommodate a population not directly related to the CVRD, but

> one which will be - and is already being - attracted to the region by the economic opportunities derived from the Carajás Project.
>
> "In the first years of the occupation of the area, this population will not have the resources to ensure access to essential urban services. The investments made by the CVRD in urbanisation, and in networks of infrastructure and community equipment aim at providing these basic conditions, reducing the problems usually associated with spontaneous undertakings such as the Carajás Project.
>
> "Thus, the nucleus of Parauapebas will tend to be inaccessible to most migrants if they are required to construct their own houses and/or the charge for the public services is beyond their means, which will induce the formation of a shanty town at the periphery of the planned town as well as distorting the basic function for which it was originated" (Mayerhofer, M., Procedimentos a Adotar para a Ocupação de Terceiros dos Lotes Urbanisados pela CVRD em Parauapebas, 1982; quoted by himself, 1986, pp. 7-8).

This warning was given to those responsible for Parauapebas before the massive and definitive occupation of the area which lies outside the limits of the planned urban nucleus. In fact, this prediction came true: migrants occupied the area, which belonged to GETAT, without any planning whatsoever. In the short-term, the population of this peripheral settlement, which came to be called Rio Verde, exceeded that originally estimated for Parauapebas and eventually became the main urbanisation pole of the Parauapebas valley (Mayerhofer, 1986; Piquet, 1988).

In mid-1983, GETAT donated to the Municipality of Marabá the above-mentioned area of approximately 150 hectares, which was destined for the "formation of the urban patrimony of the settlement of Rio Verde do Pará [the Brazilian State]" (Cláusula Primeira do Título de Domínio 4 (GETAT) 82 (1) 007; quoted by Mayerhofer, 1986, pp. 8). Some months later, CVRD adopted the same attitude and donated to the County of Marabá roughly 170 hectares related to the urban nucleus of Parauapebas.

In October 1984, exactly one year after the donations made by CVRD and GETAT, an aerial photographic survey of the whole area revealed the existence of one thousand buildings in Rio Verde, while the urbanised nucleus of Parauapebas, whose distance from Rio Verde is less than two kilometres, showed practically only those constructions built by CVRD (Mayerhofer, 1986; Piquet, 1988). In fact, the population of Rio Verde

increased rapidly from some 3,000 in early 1984 to 9,419 a year later, and subsequently to 25,000-30,000 in early 1986 (adapted from Mayerhofer, 1986 and World Bank, 1992).

After describing the origins of both urban nuclei, Carajás and Parauapebas, as well as the formation of the peripheral settlement of Rio Verde, some important and related questions remain: what were the principal factors that contributed to the population growth of Parauapebas and Rio Verde? Why did the population growth at Rio Verde increase much faster than at Parauapebas? In order to answer these questions , it is necessary to recapitulate some key points.

Although the Carajás Project had been mainly responsible for attracting thousands of migrants to the region of Parauapebas - Rio Verde, other factors contributed to the population growth of this area. One of these factors was GETAT`s determination to establish colonisation schemes (Carajás I, II and III) close to the Carajás Project. GETAT was set up in 1980, during the Figueiredo administration (1980-85), to defuse social tension and land conflict in the "parrot's beak" (the area where the States of Maranhão, Pará and Tocantins meet) region.

Subordinated directly to the National Security Council, the agency was granted special powers to expropriate land, resettle the landless, grant titles and implement colonisation projects. Instead of confronting large landowners, small farmers were encouraged by GETAT to abandon conflictive areas with the guarantee of being resettled elsewhere, on plots generally smaller than the officially recommended minimum of one hundred hectares for Amazonia and with scant regard for maintaining family or community cohesiveness (Hall, 1991a; World Bank, 1992)

In fact, one of GETAT`s major activities was the setting up colonisation projects. The three resettlement schemes, Carajás I, II and III were close to the iron-ore complex, to the immediate Southwest of Parauapebas. When GETAT was abolished, in May 1987, only the latter two schemes were operational, with 2,136 families settled on fifty-hectare plots. Carajás I, which was to accommodate 4,000 families, as well as eight projects elsewhere, which were to resettle 5,000 families, were never implemented (Hall, 1991a; World Bank,

1992). Therefore, these colonisation projects stimulated a considerable inflow of migrants to the Carajás region, obviously including Parauapebas, but at the same time they did not generate the stability of land tenure originally envisaged.

GETAT's performance was intrinsically associated with the criterion of national security, which continued to be a relevant preoccupation of the previous military government. The adoption of security criteria to solve land conflicts was related to two objectives: alleviation of tensions through the transfer of peasant cultivators (*posseiros*) to the colonisation projects areas, which acted as "safety-valves"; and principally an economic objective, because those lands occupied by peasant cultivators were coveted by large landowners as well as for large projects. This economic objective was clearly stressed in the document elaborated by GETAT and the General Secretary of National Council:

> "... the disorganised invasion of lands situated along the access roads to the Serra dos Carajás and of those located in the vast area of its [the Carajás Project] influence was already initiated and tends to be intensified in an uncontrollable way. This situation, if it is not rapidly corrected, will irremediably prejudice... the development projects of the region" (CSN-GETAT, Estudos sobre o Projeto Carajás, 1981; quoted by Berno de Almeida, 1992, pp. 270).

Apart from the economic objective, this statement also demonstrates the preoccupation with the inflow of migrants, which had already been initiated and whose influx was to become more intense in the short term.

There were several reasons for GETAT's failure to successfully tackle the problems of rural violence and land distribution, but consideration of these reasons is beyond the scope of this chapter. It is sufficient to stress here that this agency consolidated as well as reinforced an unequal structure of property ownership in favour of large capital enterprises which deny permanent access to the peasantry. The aspect related to land concentration can be verified within the Carajás colonisation schemes themselves. For example, one farmer in the Carajás II project purchased over forty plots from colonists, and on these 2,000 hectares he intended to expand his cattle herd from 10,000 to 50,000 head (Hall, 1991a; World Bank, 1992).

Other important factors in attracting large numbers of migrants to the Parauapebas-Rio Verde region were the spontaneous establishment of small farmers and ranches of varying sizes and principally extensive gold and other mineral prospecting activities in the surrounding region. Serra Pelada, located less than 100 kilometres by road from the Carajás mine, was the most important and famous wild-cat gold-mining site. Its rich deposits were discovered in the late 1970s and in the early 1980s this site had a population of 100,000 wild-cat gold prospectors (*garimpeiros*). Serra Pelada was made viable by the road network, which was implemented because of, and associated with, the Carajás Project. The urban nucleus of Curionópolis, which is approximately 10 kilometres from Serra Pelada, was founded in order to provide services to Serra Pelada gold prospectors, who could not keep their families and women at the nucleus because this was expressly prohibited. Parauapebas as well as its peripheral settlement Rio Verde were directly due to the Carajás Project, which generated roughly 27,000 jobs at the peak of construction activities at the mine, rail and port sites.

Many of those attracted to Parauapebas - Rio Verde arrived in the region either as construction workers or to serve the construction camps close to Carajás and Parauapebas through commercial activities such as bars, restaurants, boarding-houses, etc. Indeed, Rio Verde had its roots as the "red light district" for construction workers in both Carajás and Parauapebas. Obviously, the permanence of most of these construction workers after the end of the construction phase played a major role in the rapid population growth of Parauapebas and Rio Verde.

Despite the importance of other factors already mentioned, the Carajás Project was the main factor in attracting extensive population flows to the region of Parauapebas - Rio Verde. It is possible to affirm that Parauapebas as well as Rio Verde were direct products of the Carajás Project because without this project neither nuclei would have come into being. The growth of Parauapebas and Rio Verde reflected a number of factors and the foremost was establishment of the Carajás Project. However, the question of why population growth in Rio Verde was higher than in Parauapebas has not yet been explained.

Before answering this question, it is important to stress here that Parauapebas and Rio Verde have been deliberately considered as distinct urban nuclei in this study because the two nuclei, although originating from the Carajás Project, appeared for different reasons. Thus, this differential treatment shows that Rio Verde originated independently of Parauapebas owing to several correlated aspects, such as poor planning, CVRD`s lack of interest in tackling the mounting problems in the region, etc., which will be discussed below.

The rapid growth of Rio Verde compared with that of Parauapebas can be explained by various factors, such as the extension of the construction of the urban nucleus of Parauapebas by one and a half years, during which plots of land were not made available for the settlement of people in the area itself; the emergence of tertiary activities caused by the existence of construction camps, by other opportunities for work which were being generated at the same time in the Serra Norte and by the surrounding wild-cat gold-mining sites. These tertiary activities in turn induced the invasion of land immediately to the east of the construction camps, this invasion being the origin of the settlement of Rio Verde; and an elitism in relation to the quality of life, housing and work, which was imposed on the applicants who wanted to occupy the plots of land in the brand new urban nucleus of Parauapebas (Mayerhofer, 1986; Piquet, 1988; Mayerhofer & Toledo, 1988a).

With regard to this last factor, the requirement to self-build their own houses and pay charges for public services were imposed on all migrants who arrived in Parauapebas in search of job opportunities, but at the same time these requirements were beyond the economic means of this population. As a result, Parauapebas become inaccessible to most migrants who were obliged to look for another place to live in and the viable alternative was the surrounding area of Rio Verde. In fact, the 1985 CVRD survey (Mayerhofer, 1986) showed clearly that there was a large difference between population growth in the two urban nuclei, Parauapebas having a population of 2,313 and Rio Verde 9,419, which means that the population of Rio Verde was four times greater than that of Parauapebas.

The factors mentioned above contributed to the rapid population growth in Parauapebas and, principally, in its peripheral settlement Rio Verde. If the urban infrastructure of the

former urban nucleus was already inadequate for accommodating all migrants attracted to the area, the urban infrastructure of the latter nucleus was practically non-existent. In addition to these factors, there was CVRD`s refusal to accommodate contract-service workers, despite the availability of land in Carajás town, forcing these workers to live in Parauapebas or Rio Verde. This refusal is significant insofar as that it reveals one of the CVRD`s facets, namely a type of social discrimination in relation to people who do not work for the company and, consequently, live outside its main entrance gate. The various facets of the State mining company will be made clearer in the next chapter, when the implications of what had been planned for Parauapebas will be discussed.

This decision taken by CVRD showed clearly its real intention of establishing the town of Carajás as a company enclave and at the same time it implied an increasing pressure on the already debilitated urban infrastructure and services in both outside urban nuclei. Despite the future consequences caused by CVRD`s decision, the point here is that the Brazilian State mining company was committed to accommodating service workers in Carajás town, as established in the Loan Agreement. In this regard, the World Bank report (1992, pp. 93) stressed that:

> "CVRD shall reserve about 1,000 plots for additional service workers in the first stage of development of [Carajás township] and shall enter arrangements with BNH, for carrying out a credit programme to finance the construction or purchase of the houses to be built on such lots, in order to enable the permanent settlement of such service workers in such townsite over a period of about five years from the Completion Date".

According to this paragraph, there was a commitment with which CVRD did not comply. CVRD`s non-compliance with the Loan and Guarantee Agreement with the World Bank is intrinsically associated with another important point, which is related to the original plans made for the urban nucleus of Parauapebas. As was previously indicated, CVRD originally planned this urban nucleus to accommodate a population of 5,000, but later the company revised its plans and decided to double the number planned in the first proposal. Thus, the town of Parauapebas was to house 10,000 people by 1988 and the change in CVRD`s plans is important for understanding the problems in this urban nucleus.

CVRD did not change its plans because of any failure found in its original plan or for any moral principle, but simply because its plan for accommodating 10,000 people was one of the conditions established in the Loan Agreement. In February and May 1982, the World Bank urban development specialist visited the area in order to evaluate the urban development component of the Carajás Project. In relation to the town of Parauapebas, the Bank specialist recommended that:

> "... the town`s sanitation infrastructure and community facilities be designed to accommodate an expected population of 10,000 residents by the late 1980`s" (World Bank, 1992, pp. 66).

At the same time, this specialist noted that:

> "... there was an urgent need for the provision of urbanised plots by December 1982 since more than twenty families are currently squatting on the edge of town" (World Bank, 1992, pp. 66).

Significantly, the place mentioned by the Bank specialist subsequently became the peripheral settlement of Rio Verde.

In accordance with this recommendation by the Bank urban development specialist, CVRD was required under the Loan and Guarantee Agreement to send, by September 1982, the final plans for the town of Carajás together with a plan for housing a population of 10,000 in the town of Parauapebas by 1988 for review and approval by the World Bank (World Bank, 1992). Indeed, these documents were sent by the Brazilian State mining company within the stipulated deadline and were approved by the Bank in late October 1982.

Associated with the previous questions about CVRD`s non-compliance with the regulation as well as the change in its prior plans for Parauapebas, there is another important question related to the faulty prediction of the size of the population to be attracted to the town. In order to have a concrete idea of this error, CVRD had predicted in its later plan for Parauapebas a population of 10,000 by 1988 (the company had predicted 5,000 people beforehand), while the report of the Bank supervision mission,

whose visit to the area was in March 1986, estimated that the total population of Parauapebas plus Rio Verde would be between 45,000 and 50,000 (World Bank, 1992).

This error occurred although a number of documents had predicted that a considerable flow of migrants would be attracted to the region. In this regard, GETAT`s document Estudos sobre o Projeto Carajás (Studies on the Carajás Project) elaborated in 1981 and mentioned above was a clear example. In addition, a better and more important example was provided by the 1976 document POLAMAZÔNIA: Carajás, which stressed that:

> "... the process of exploring iron at Carajás will provoke a considerable demographic influx reflected in urban nuclei near the mineral exploration area, necessitating the improvement of the deficient existing urban network, and the implementation of others with the end in mind of receiving and sheltering the migrant flux that will come in search of work" (SUDAM, 1976b, pp. 81).

The World Bank in its report suggested that the basis for such a faulty prediction centred on the fact that neither the implementation of GETAT`s colonisation schemes, which were close to the Carajás mine, and their associated demands, nor the demands generated by extensive gold and other mineral prospecting activities were completely taken into account in the planning of the urban nucleus of Parauapebas. In relation to the colonisation schemes, the Bank argued that their development had only been formally authorised in October 1982, practically one month after CVRD had been required to send the definitive plans for Parauapebas for review and approval by the Bank (World Bank, 1992).

The arguments used above to justify CVRD`s faulty prediction are not convincing. On the contrary, they make the CVRD failure worse, because neither the colonisation schemes nor the expanding small-scale prospecting activities near the Carajás mining concession could be ignored, even partially. Moreover, it is very difficult to imagine that a powerful company such as CVRD would not have been acutely aware of the previous predictions made by several agencies such as SUDAM, GETAT, etc.

CVRD`s faulty prediction of the pace of urbanisation, its non-compliance with the regulation and the change in its plans for Parauapebas reveal not only negligence on the part of CVRD, but equally that this company was not really interested in the problems generated by the Carajás Project. In this regard, the improvements made in Parauapebas as well as in other towns along the Carajás corridor were more the result of foreign and domestic pressures than of CVRD`s commitment to regional development. However, this discussion will be elaborated in the next chapter.

As shown above, the growth of Parauapebas and Rio Verde was the result of several factors, which led to an extremely rapid influx of migrants, which contributed to worsening the already inadequate urban infrastructure and services of Parauapebas and Rio Verde. The situation at both nuclei compared with that at Carajás town presented a sharp contrast, and a plausible explanation for these growing disparities lies in the fact that CVRD had total control over Carajás town, whose urban infrastructure and community facilities were well-maintained by the company, while the town of Parauapebas as well as its peripheral settlement Rio Verde were the responsibilities of the Municipality of Marabá, whose seat of government was in the city of Marabá, approximately 170 kilometres away. Due to the growing demands for urban infrastructure and services in the city of Marabá itself, whose population had also increased rapidly, partly because of the construction of the Carajás railway, Parauapebas and Rio Verde were a low priority for the Municipal authorities.

After all these considerations about the origins of the towns of Carajás and Parauapebas, and the formation of the peripheral settlement of Rio Verde as well as the rapid growth of these latter urban nuclei, an important question remains: would better planning have prevented the emergence of Rio Verde and, consequently, would it have provided a more appropriate urban infrastructure and services in the "planned" town of Parauapebas?
Some factors which contributed to the aggravation of many social and environmental problems were beyond the immediate control of the Federal government and CVRD planners; for example, Brazil's rampant inflation and economic recession. But in relation to Eastern Amazonia and, specifically, the Carajás region, the most significant factor was the exacerbation of the already limited urban infrastructure and services of the local urban

nuclei by the intense flow of migrants. Tens of thousands were attracted to the region in search of job opportunities, land and wealth generated by the Carajás Project, colonisation projects (principally GETAT's settlement projects Carajás I, II and III) and nearby wild-cat gold-mining sites at *Serra Pelada* and surrounding areas.

Although these factors were beyond the control of planners, the negative social, economic and environmental impacts that occurred in Eastern Amazonia were accepted not only as natural, but as a necessary condition of progress by consecutive governments, whose development strategies were based on modernisation principles and, principally, on development pole theory. It is worth noting here that development pole theory, as seen in the second chapter, stressed that the advantages of scale and agglomeration economies were essential elements for achieving economic growth.

Two interconnected questions here are extremely important. First, development pole theory, like other development theories, assumed that development depended entirely on economic phenomena. Thus, an increase in economic indicators, such as gross national product (GNP) and income per capita, meant that beneficial spread effects (trickle down) were being generated in the form of jobs and other economic opportunities. On the other hand, problems such as poverty, deforestation, underemployment and unemployment were considered of secondary importance insofar as the achievement of high rates of economic growth by means of development poles and the generation of trickle down effects were factors that would lead to balanced growth throughout the country in the long-term and, consequently, would overcome these problems.

The second question is related to the attraction of thousands of migrants to these induced development poles. The crux of the matter is that a "surplus" population was important for setting in motion the economic process, was useful for CVRD and met the geopolitical objectives of the Federal government. However, the number of migrants exceeded completely the predictions made by CVRD for the region and this fault prediction shows not only incompetence, but also opportunism on its part. The reasons for this lie in the fact that the State mining company was acutely aware that the Carajás region would attract an intense flow of migrants and at the same time a "surplus" population at

Parauapebas was convenient because labourers would always be available and, consequently, would provide Carajás town with a number of services such as an informal market vending , cleaning women, car washers, baby-sitters, seamstresses, brothels, etc.

The belief that development pole strategy was a means of achieving high rates of growth as well as of promoting social welfare in the region was intrinsically related to the idea that poverty and underemployment were secondary problems. This belief, together with the importance of "surplus" labour for the economic viability of development poles, partly explains attitudes of the CVRD in relation to its commitments to regional development in general and to the twin towns of Parauapebas and Rio Verde in particular. Yet CVRD did not play a passive role, development poles proving to be a useful and convenient strategy for its negligent attitude in the region.

With respect to the Carajás region, CVRD`s faulty prediction of the pace of local urbanisation, its "unawareness" in relation to previous predictions made by agencies such as SUDAM and GETAT, its non-compliance with the Loan and Guarantee Agreement with the World Bank and the change in its plans for Parauapebas, principally because of pressure from the World Bank, clearly show its negligence as well as its lack of interest in the local problems, which were to a large extent a product of the Carajás Project. There are some reasons that explain CVRD`s behaviour and one of them is based on the questions mentioned above. However, these questions were alluded to the context of development pole theory and it is worth examining briefly in respect to the Carajás region.

The main priority and what really mattered to CVRD was the mineral exploitation and correlated activities. In this regard, a pleasant town at the top of Carajás mountain was carefully planned and constructed by CVRD because of the importance of attracting and convincing skilled labours from Southern Brazil to operate the iron-ore mine. Every aspect considered fundamental for making the Carajás Project work properly was taken into account by CVRD. Although "surplus" labour was an important aspect, the State mining company had no intention of building a town for migrants in accordance with the

pattern of Carajás town and the blatant difference in the amount of money spent in the two towns, Carajás and Parauapebas, was irrefutable evidence of this.

Indeed, Parauapebas town was "planned" and implemented by CVRD with the obvious purpose of avoiding the formation of a shanty-town at the foot of Carajás mountain. Since Parauapebas was of secondary importance for CVRD, the company did not pay much attention to the problems of this urban nucleus, which became worse and the formation of Rio Verde is a concrete example. As already mentioned, the belief that an increase in economic growth was a necessary condition for generating the hoped-for trickle down effects in the hinterlands and, at the same time, the recognised importance of a "surplus" population for achieving high rates of growth, were important, but nevertheless insufficient, to explain the attitudes of CVRD. Thus, other factors have to be taken into account in order to provide a whole picture of the situation.

Corruption, misuse of municipality funds and, principally, the lack of municipal resources were other important factors that contributed to exacerbating urban problems. With regard to the municipality of Marabá, its considerable area, the rapid increase in its population, and its insufficient financial resources for tackling growing local problems were relevant reasons for Parauapebas and Rio Verde to be considered of low priority by the municipal authorities.

Despite the importance of the above factors, many problems in Parauapebas and Rio Verde were due to the problematic relationship between CVRD and local authorities. Most of these difficulties were caused by the omnipresence as well as omnipotence of CVRD itself, which considered local authorities as a group that only knew how to complain about its circumstances and whose lack of competence and dynamism was an obstacle to the solution of local problems and also a continual annoyance to the company. This type of attitude has its roots in the creation of CVRD. In fact, this company was established during Vargas` New State (*Estado Novo*), which initiated a long tradition of centralised planning in Brazil. This tradition continued throughout the military regime, a period from which CVRD became a powerful mining company (see chapter 1). However, the role of CVRD is discussed in greater detail in the final chapter.

Although not passive, the role of the state and municipal governments in the planning process was very limited. Paradoxically, these governments were anxious for the implementation of development projects in their regions because these projects meant a probable chance of "progress" and, principally, of obtaining a considerable amount of money from taxation. Despite these good prospects, the possibility of interference or even of participation in the planning process was very restricted because it was a top-down process in which objectives were determined by those who had the power, the CVRD and the Federal government.

This situation is well-illustrated by the relationship between CVRD and local governments. Owing to the fact that these governments represented the interests of the local population and could also provide a number of incentives to companies which wanted to set up in their municipalities, they were important elements in the development process in their region and, thereby, were entitled to a preponderant role in every decision-making related to the interests of their region. However, the dominant role was played by the CVRD, which determined the priorities for the region and excluded local governments from any participation and discussion about local development. In this inverted situation, these governments were practically subordinated to the interests and objectives of the State mining company.

The top-down process was the current model of planning adopted by the military regime. Decisions, plans and strategies were taken, formulated and implemented by the Federal government, which centralised every function in its own hands. This centralisation fitted in well with the geopolitical and economic objectives of the authoritarian regime. In this regard, there was no opportunity for other tiers of government, specifically state and municipal governments, to take part in the planning process. Changes only began to occur with the advent of the civilian government in 1985 and, principally, with the 1988 Constitution, which gave more economic and political power to state and, especially, to municipal governments.

It is important to stress here that the lack of improvements in urban infrastructure and facilities in the Parauapebas - Rio Verde region was the underlying cause of the struggle for the emancipation of this region from the Marabá administration. It was hoped that the emancipation (independence) of Parauapebas, which would include its satellite Rio Verde, would improve its situation principally because the new Municipality would have its own revenue base. However, this theme will be discussed in the chapter four.

4.5 - Summing up

Parauapebas is intrinsically associated with the Carajás Project because without the iron-ore project, the urban nucleus would not have come into existence. In fact, this town was envisaged as an area of "planned invasion", in other words, an alternative to human settlements that were commonly encountered in Brazil`s peripheral regions. Thus, the urban nucleus was urbanised in order to accommodate a planned population of 5,000. However, this number seriously underestimated the rapidly expanding population in the area and the emergence of Rio Verde, a peripheral invasion very close to Parauapebas, was concrete evidence.

The explosive growth of Parauapebas and Rio Verde was due to several factors which contributed to the rapid flow of migrants to the region. This great flow of migrants led to a worsening of the poor infrastructure and services in both urban nuclei and was, to some extent, beyond the control of policy-makers. It was difficult to predict the magnitude of the flow of migrants because of the existence of colonisation projects, the spontaneous establishment of small farmers and ranches of varying sizes, various wild-cat gold-mining sites in the surrounding area and, of course, the Carajás Project itself in the region. However, the intense flow of migrants was largely stimulated by the Federal government, whose overriding development strategies in Eastern Amazonia were based on modernisation principles and development pole theory.

In accordance with development pole theory, a "surplus" population was a necessary condition for setting in motion the dynamic process of economic development. The belief that high rates of growth would generate a "trickle-down" effect to benefit the entire population has been unfounded in relation to the Carajás region. In this regard, the attraction of tens of thousands of migrants was a deliberate attempt to make the Carajás pole viable and policy-makers were not worried about the number of migrants attracted to the region, certainly because of the economic objective, but also because of the crude and extremely convenient "trickle down" assumptions.

CVRD`s faulty prediction of the pace of urbanisation, its non-compliance with the Loan and Guarantee Agreement with the World Bank, its "unawareness" of previous prediction made by government agencies and the change in its plans for Parauapebas, occasioned principally by pressure from the World Bank, can be partly explained by the factors mentioned above. Although the negligence of the CVRD and its lack of interest in tackling local problems were obvious, other factors are also important for understanding the consequences in Parauapebas and Rio Verde.

Corruption, misuse of municipality funds and the lack of municipal resources were other important factors that contributed to the worsening of the situation in local urban nuclei. These factors were associated with problems such as technical capacity , the ability to forge external links and obtain access to funding and to implement policies, which were faced by all municipalities, and the municipality of Marabá was no exception. Parauapebas and Rio Verde were considered of low priority because of the factors mentioned above and also because of the growing demands for urban infrastructure and services throughout the whole municipality, which occupied a considerable area, especially in the city of Marabá, whose population growth had been extremely rapid, principally because of the construction of the Carajás railway.

Furthermore, many problems in Parauapebas and Rio Verde were caused by the problematic relationship between CVRD and local authorities. This problem has its roots in the omnipresence and omnipotence of CVRD and in its inherent lack of sensitivity to the nature of local problems which led the company to adopt hostile attitudes to the population of both urban nuclei. The disagreement between the two sides over their individual responsibilities was also an important part of the problem. The local authorities considered CVRD mainly responsible for the many problems generated in their municipalities and most of their negligence was based on this attitude, while the CVRD alleged that local problems were beyond its competence. All these aspects contributed to making this relationship continually difficult and also to generating a widespread resentment against CVRD.

CVRD`s behaviour, faults and attitudes suggest clearly that what really mattered to the company was the Carajás Project and those preconditions considered essential for making this industrial project work properly. Thus, every detail of the Carajás Project was carefully planned and implemented by CVRD, which did not pay much attention to other aspects that were relegated to secondary importance. In fact, the CVRD could have done much more than it has done to tackle local problems, which were, to a large extent, generated by the company itself. In this regard, the planning process represents a more significant example than do CVRD`s attitudes and behaviour.

The planning for development was very technocratic, over-centralised and clearly took priority over the economic aspects. Indeed, it was a "top-down" process in which even the local needs were determined by the Federal government - through its agencies, institutions and enterprises -, which did not tolerate any type of pressure, interference or participation by different tiers of government. By centralising every function and by giving priority to the economic aspects, planning fitted in well with the geopolitical and economic objectives of the Federal government on the one hand, but was absolutely negligent in relation to the interests of the vast majority of urban and rural populations on the other hand. In this regard, development planning contributed, to a large extent, to the process of social exclusion, as will become clearer in the next chapter, which will discuss the implications of the planning process for Parauapebas and Rio Verde.

Chapter 5

The Implications for Parauapebas: Success or Growing Pains?

5.1 - Introduction

By the time Parauapebas was implemented, its peripheral settlement of Rio Verde was already established. Due to the substantial flow of migrants, encouraged largely by government policies, problems were multiplied and aggravated in both urban nuclei. These problems, which varied from inadequate urban infrastructure to high levels of ill health and poor educational provision, were not successfully tackled by the municipality of Marabá, which was responsible for both nuclei. In fact, the Marabá administration had to cope with many problematic areas, such as Curionópolis and Eldorado, in the municipality itself, but its difficult relationship with CVRD contributed to making the situation in the Parauapebas/Rio Verde region even worse.

The worrying situation in the Parauapebas/Rio Verde region was the underlying cause for the emancipation of this region from the municipality of Marabá. It was hoped that the investment of tax revenues, principally those related to the Carajás mine, in the new municipality of Parauapebas would not only improve its circumstances, but would also represent the beginning of a new development phase in the region. Indeed, many improvements have been made in the municipality of Parauapebas since its emancipation, but thousands of problems remain to be tackled in the face of severe funding problems.

This chapter will analyse the implications of planning for Parauapebas, focusing on its two phases: before and after the emancipation. This focus will provide a whole picture of Parauapebas in which its gradual development will be traced.

5.2 - Parauapebas: before and after its emancipation

> "(...) In principle, this separation [of Carajás town and Parauapebas] was natural. After all, CVRD needed to maintain the security of an urban nucleus [the Carajás town] (...). Owing to this, we are preparing Parauapebas to become a town where it will be worthwhile settling down".
> (Luís Carlos Nepomuceno, Manager of the Sustainable Development Department of CVRD, Jornal da Vale, September, 1992).

Chapter three discussed the question of planning for Parauapebas and showed how it was centralised in the hands of CVRD, which ignored local governments before, during and after the implementation of this urban nucleus. This centralisation cannot be dissociated from the CVRD`s behaviour and attitudes, which together undoubtedly demonstrated that the Carajás Project was the foremost preoccupation of CVRD. Consequently, all other aspects, including the town of Parauapebas itself, were considered secondary.

Although CVRD was not responsible for every problem generated in Parauapebas and Rio Verde, because of its importance for regional development, the company could have done and could still do much more to improve the living conditions in both nuclei. In fact, the worsening situation of Parauapebas and Rio Verde was the result of many factors, including the ineffectiveness of local administrations. These factors are important as causes, but insufficient to provide a complete view of the current problems of these urban nuclei. Thus, in order to better understand the real situation of the twin towns of Parauapebas and Rio Verde, the implications of planning for Parauapebas will be traced below but always focusing on two different phases of this town, before and after its emancipation (the new municipality was to include the peripheral settlement of Rio Verde). This focus will provide a picture of Parauapebas since its embryonic stage of development up to the present day.

Before examining the implications for Parauapebas, it is important to make some observations about local government, its relationship with CVRD, its responsibilities and the problems which provoked the emergence of the new municipality of Parauapebas. As seen in the last chapter, CVRD considered the town of Parauapebas of secondary

importance. In fact, this urban nucleus was "planned" and implemented by CVRD with the clear purpose of avoiding the formation of a shanty town very close to its main entrance gate. The formation of a shanty town was regarded by CVRD as a probable and permanent "focus of tension", which could cause continuous trouble for the Carajás Project. Thus, there was no propensity towards humanitarian actions in CVRD`s plans. The reputation of the Carajás Project was its principal preoccupation and, consequently, nothing should hinder its progress or its broader image.

The fact that the GETAT`s colonisation projects, specifically Carajás II and III, were located on the southern boundary of CVRD`s iron-ore concession area is no coincidence. CVRD asked GETAT to locate these settlement projects strategically around its territory in order to avoid possible invasions. Thus, these projects, despite their other objectives, were part of CVRD`s "buffer zone", which was completed by the Indian reserve of Xicrin do Cateté, west of CVRD`s area and whose demarcation was supported by the 1982 CVRD/FUNAI/World Bank agreement; by the areas of Gleba Aquiri and Gleba Cinzento, which were areas destined for the Armed Forces; and by Gleba Ampulheta, which belonged to the state of Pará. In 1985, the state of Pará, through ITERPA, implemented a colonisation project named Jáder Barbalho in Gleba Ampulheta.

In addition to its concession area (approximately 412,000-hectare), CVRD occupied a total of 199,000-hectare in parts of three distinct areas: Gleba Cinzento, the largest one; Gleba Aquiri; and Gleba ampulheta, the smallest ones. The CVRD`s interest in these areas was not in vain. Important mineral deposits, especially gold and copper, had been discovered there and the company already had plans to exploit them. In 1989, IBAMA created three environmental-conservation areas: the environmental-protection area of Igarapé Gelado of 21,600 hectares; the biological reserve of Tapirapé of 103,000 hectares; and the national forest of Tapirapé/Aquiri of 190,000 hectares. These two latter areas overlapped to a large extent the areas destined for the Armed Forces, the Gleba Cinzento, whose area was 165,000 hectares, and the Gleba Aquiri, whose area was 141,000 hectares (IDESP, 1990; Berno de Almeida, 1994). Although CVRD had already occupied a considerable part of both the biological reserve and the natural forest, the company

became responsible for the protection of the three environmental conservation areas and, thereby, expanded its territorial dominion considerably.

Despite all the precautions taken by CVRD against possible invasions or any interference that could affect its industrial project, the company could not avoid a number of problems which were generated principally by the intense flow of migrants attracted to the region in search of jobs. However, the company itself, with its traditional arrogance, lack of sensitivity to problems which were not directly related to the Carajás Project and its hostile attitudes towards the local population, contributed to the exacerbation of region's problems as well as to the generation a growing wave of animosity towards itself. A very good example is the agricultural colony Jáder Barbalho, where 700 families of small farmers were accommodated by ITERPA.

These small farmers were dissatisfied with their situation and, principally, with CVRD, which did not allow them to transport their crops along the Raimundo Mascarenhas road, which was paved by CVRD and was within its concession area, to the town of Parauapebas. Consequently, these colonists could not market their products, which rotted on their plots (IDESP, 1990). However, CVRD argued that the exclusiveness of the Raimundo Mascarenhas road was perfectly normal because it was a private road and if access had been made easier, the colonists and local wild-cat gold prospectors might have been able to occupy the area. Owing to the general dissatisfaction and the fear of possible conflicts, the CVRD solved this problem by constructing a ring-road around the mining enclave from the colonisation project to Parauapebas.

It is worth noting that CVRD alleged that the Raimundo Mascarenhas road was private, although the company belonged to the Federal government and, consequently, this "private" road was constructed with public funds. One of the most important characteristics of this company is its clever use of its dual status - a State enterprise which acts like a private one - depending on the situation, but this theme will be made clearer below. Despite having been solved, this situation does illustrate a certain kind of behaviour by CVRD as well as the difficulties faced by small farmers in transporting their

products to the towns. Similar difficulties occurred on the agricultural projects Carajás II and III.

The construction of new highways and vicinal roads associated with official colonisation projects supported by INCRA, GETAT and, to a less extent, ITERPA, the discovery of gold at *Serra Pelada* (the huge and most famous wild-cat gold-mining site), the extensive gold and other mineral prospecting activities in the surrounding region and principally the Carajás Project were determinant factors in attracting an intense flow of migrants into Eastern Amazonia. In fact, urban areas, from the state capitals of São Luís and Belém to small cities located along the Carajás corridor, have experienced an impressive growth in population since the advent of the PGC. For example, the population of Parauapebas increased from 8,577 in 1980 to 53,312 in 1991 at an impressive average annual rate of 18.07%; Marabá grew by more than 90,150 at an average rate of 8.34% per year; while in Imperatriz, even though the demographic growth rate was less (4.05%) than in Marabá, the population increment in absolute terms was even greater, the number of inhabitants increasing from 294,816 in 1980 to 456,044 in 1991 (IBGE, 1991).

Indeed, the substantial flow of migrants, which was basically a product of official development policies, resulted in predatory exploitation of natural resources and aggravated the already inadequate infrastructure and local-service capabilities. The adverse impacts caused by the impressive growth of the cities reproduced and intensified situations of poverty which occurred in other Brazilian regions. With respect to Parauapebas and Rio Verde, these two urban nuclei had countless problems, which varied from inadequate urban infrastructure to high levels of ill health and poor educational provision. Despite the significance of these problems, two important questions remain: who was the responsible for that region? How did those responsible tackle these problems?

The authority responsible for Parauapebas, Rio Verde and surrounding invasions was the municipality of Marabá, which was also included other problematic areas, such as the towns of Marabá, Curionópolis, Eldorado, etc. Owing to the many problems in distinct areas within its own municipality, the municipality of Marabá could not successfully

tackle all them at the same time. This argument partially explains the unsatisfactory performance of the County in the Parauapebas/Rio Verde region.

In order to tackle a number of problems in Parauapebas, the municipality of Marabá maintained a local sub-administration (*sub-prefeitura*), whose autonomy was extremely limited. This limitation was reflected in two facts: the first two years of the sub-administration were subsided by CVRD; and the agreement between CVRD and the municipality of Marabá that 10% of royalties from mineral exploitation in Carajás should be applied to programmes and investment projects in the urban nucleus of Parauapebas (from beginning of its third year of administration) was never complied with by the municipality of Marabá.

Besides these above facts, the relationship between CVRD and local authorities was never good because of different understandings of, and positions on, their individual responsibilities. On the one hand, local authorities believed that CVRD should be responsible mainly for the problems generated in the area and, consequently, they wanted the Brazilian company to take firm action. Indeed, most of the negligence of the local authorities can be explained by this attitude. On the other hand, CVRD believed that municipal and State authorities had to assume their responsibilities in order to deal with regional problems, which not considered CVRD`s responsibility.

In fact, CVRD never understood (or never wanted to understand) the tenuous limits that separated its social responsibilities from that of the local governments. The reason for such a lack of understanding centred on CVRD`s dual status (a State company that acted like a private one), which was reflected in its own behaviour. This permanent "identity crisis" contributed, to a large extent, to making the relationship between the Brazilian company and municipal authorities more difficult. As a direct result, this problematic relationship made the situation in Parauapebas and Rio Verde even worse.

It is important to highlight here that the dual status was cleverly used by CVRD for obtaining large foreign loans from the World Bank, Japan, and EEC, etc. as well as some special advantages, such as the mining concession, from the Federal government. In the

first example, CVRD stressed its competence, dynamism and other attributes which were generally associated with private companies. In the second instance, CVRD emphasised its status as a State company and, therefore, its importance for the development of Brazil in general and of the Amazon region in particular. The use of its dual status became problematic when the objective was to cope with regional impacts, which were generated to a large extent by the company itself.

Until 1986, the Parauapebas administrator was appointed directly by the Mayor of Marabá. From that year, inhabitants of Parauapebas/Rio Verde could elect their representative, who continued under the authority of the municipality of Marabá. In spite of electing a sub-Mayor, the situation in both urban nuclei remained practically the same as before. As a consequence, the dissatisfaction of the population rose gradually and became the germ of emancipatory movements in the region. It was expected that the creation of the new municipality of Parauapebas (Município de Parauapebas) would be the beginning of an important stage in the development of the region, principally because mining royalties could be invested there.

Besides being a powerful mining company, CVRD also planned the town of Parauapebas, constructed most of its urban facilities and implemented its urban infrastructure. Owing to all these aspects, the CVRD`s presence in the area has been strongly felt by the local administration and population as well. This presence has meant a constant involvement of CVRD in local problems. Its participation in the development process of the region and in the discussion about problems and the future development plans for the twin towns would be an important and salutary experience for local communities, administrators and, especially for CVRD itself. However, problems arose principally because of CVRD`s "identity crisis", which made its understanding of its role and of its fundamental importance for the development of the region very difficult.

Owing to this ambivalent attitude, CVRD was generally hostile towards the population of Parauapebas and Rio Verde. One of these attitudes was the severe security control exercised by CVRD guards at its entrance gate, where people who wanted to visit Carajás town had to be inspected. In addition to subjecting people to certain embarrassments, such

as personal belonging searches, this attitude shows explicitly the CVRD`s aim of keeping people away from its territory in general and Carajás town in particular. In other words, it means a clear process of social exclusion, which was corroborated by CVRD`s decision of transforming its urban nucleus in Carajás into a "company town". Obviously, there was widespread resentment against the Brazilian State mining company.

This resentment caused by CVRD`s attitudes and decisions and worsened by the blatant contrast between Carajás town and the twin towns of Parauapebas and Rio Verde was vividly manifested in, and ridiculed by, some popular expressions. For example, Carajás town was called the "gold cage" or "fantasy island" by the population of Parauapebas and Rio Verde; CVRD`s entrance gate was designated a "chain", although there was no chain on that gate; and the superintendent of CVRD was known as "vice-roy" (see Mayerhofer, 1986; Piquet, 1988).

The extremely rapid population growth, CVRD`s decision to transform Carajás town into a company enclave, the inability of the municipality of Marabá to cope with all the problems in the municipality itself, and the problematic relationship between CVRD and local authorities were important factors that contributed to generating a problematic situation in Parauapebas and Rio Verde. The difficult resulted in widespread dissatisfaction, which was, in turn, the underlying cause for the emancipation of this region from the municipality of Marabá. It was hoped that the investment of the mining royalties in the new municipality would not only improve its circumstances, but would also mark the beginning of a new development phase in the region.

The municipality of Parauapebas was established on 10 May 1988 by state law nº 5,443 sanctioned by the Governor of the Pará state Hélio Mota Gueiros. However, this new municipality only initiated its activities on 1 January 1989, when the Mayor, Mr. Salmen, the vice-Mayor, Mr. Araújo, and nine town councillors (*vereadores*) were installed (IDESP, 1990; A Província do Pará, 1994). The first Mayor of Parauapebas was a doctor, who had moved from the state of São Paulo to follow big construction projects in Amazonia and had worked, always as a doctor, for the construction firm Andrade Gutierrez and, principally, for the colonisation projects near Parauapebas town before his

arrival at this town in 1985. Owing to his work as a rural doctor in these colonisation projects, Mr. Salmen became very popular amongst the poor population and won the first municipal election in Parauapebas, based on a political platform stressing social programmes and economic development for the region that would not neglect the least favoured in the population (Roberts, 1991a).

Since tax funds including mining royalties began to flow directly to the municipality of Parauapebas in 1989, a series of actions could be undertaken by this new municipality and, consequently, several improvements, such as the road repairs, the construction and restoration of rural schools, expansion of the sewage network, the repair of the water-treatment which had been completely abandoned (IDESP, 1990), were made in the region. Although significant, these improvements fell far short of meeting growing local demands.

According to Mr. Salmen:

> "It is important that Parauapebas obtains the necessary support from the PGC [the Greater Carajás Programme] to be a harmonious and integrated municipality. In this regard, the municipality needs [financial] resources to bring electricity to CEDERE II project, which is located in an agricultural region with a large number of rural producers, and to construct a road from CEDERE II to Água Azul to integrate them into the municipality; to structure and organise the tax collection system in order to invest collected taxation in benefit of the population; to improve the infrastructure of the hospital; to construct more schools and improve the existing ones" (IDESP, 1990, pp.12).

This statement shows clearly the difficult situation of the municipality of Parauapebas, which was deficient in everything, and also the lack of financial help from the Federal government, whose support, as suggested by the Mayor, would be essential for tackling the social problems generated, to a large extent, by development projects in the region. It is also implicit in Mr. Salmen's words that the municipal budget, in which mining royalties played an important part, was not cope with the complete range of problems. There were innumerable problems which had accumulated over the years and which were aggravated by the continuous and intense flow of migrants. Furthermore, some taxes, principally those for which the Federal government was mainly responsible, were

financially insignificant for Parauapebas, principally because of local problems, such as lack of tax collectors and law enforcement capacity. Even in relation to the ICMS tax, which formed the largest part of the municipal budget, there was a serious problem which was connected with the delay of the Brazilian census data.

The total population level helps to determine tax revenues and the delay in census data implied that the amount of money received by the municipality of Parauapebas never corresponded to its real situation. For example, when Parauapebas became independent, in 1989, the previous census had been carried out in 1980, when there was neither a municipality nor a town of Parauapebas. Nowadays, this problem continues because the money from the ICMS tax is based on the 1991 census and, consequently, there is a considerable gap between what the municipality receives and what it should receive. This financial difference is extremely important for a municipality such as Parauapebas whose population growth is continuous and rapid.

Despite the problems mentioned above, the municipality of Parauapebas was, paradoxically, privileged because of its location. In this regard, any increase in production of iron-ore and any diversification by CVRD into other mineral means that this municipality will receive more money from the ICMS tax as well as mining royalties. Indeed, there was a considerable increase in the ICMS tax and, consequently, the municipality of Parauapebas' income became the third largest in the state of Para. In 1994, Parauapebas' income was R$14,285,714.00 and the municipality foresaw more than double this amount for 1995, which was estimated at R$40,000,000.00 (IBAM,1994b). Despite its significance, the municipal budget was still insufficient, as will be seen in the following sections, for tackling mounting problems, which varied from the lack of schools and hospitals to inadequate urban infrastructure and facilities, in the region. Although there is no data available related to the size of the municipal funding gap, the dimensions as well as the substantial number of problems that must be faced seriously by the municipal administration will provide a clear idea about the discrepancies between the significant municipal budget and the growing problems to be solved.

With respect to the lack of federal support to the municipality of Parauapebas, it is important to bear in mind that the Federal government at that time began to be shrunk and, consequently, its presence in Eastern Amazonia was drastically reduced. This occurred because of the Brazilian economic crisis (high rates of inflation, balance of payment problems, etc.) and the 1988 Constitution, which had approved and encouraged a substantial decentralisation, a considerable redistribution of revenues and an increase in the power of state and municipal governments. As a consequence, the municipality of Parauapebas could only depend on itself to face the countless problems in the region, because CVRD`s assistance only materialised in accordance with its interest and convenience.

In fact, the worrying situation in Parauapebas, in which problems were being multiplied rapidly, led Mr. Salmen to affirm that this municipality, despite being located at one of the world's largest and richest mineral reserves, presents a tremendous paradox, which is "our wealth [of the municipality of Parauapebas] has generated our own poverty, our own misfortune, i.e. we export iron and have to deal with the social onus, the poverty generated by the Carajás Project" (IDESP, 1990, pp. 10).

Despite the improvements in the municipality of Parauapebas, Salmen's administration was accused of fiscal irregularities, which led him to temporarily withdraw from his function as Mayor. Only owing to judicial decision was he allowed back to could carry on his administration. Nevertheless, his accounts were rejected by the Tribune of Municipal Accounts (*Tribunal de Contas do Município*) as well as by Municipal council (*Câmara Municipal*).

The new Mayor of Parauapebas, Mr. Francisco Alves de Souza, was elected in November 1992 and installed on 1 January 1993. Unlike from his predecessor, Mr. Souza was of humble origin, he had no university degree (his job was to make curtains) and, his potential clientele was formed by CVRD`s employees, who lived in Carajás town. He was known by his nickname "*Chico das Cortinas*" (which was an allusion to his job), which became the slogan of his election campaign (Interview, 1995).

Although Mr. Souza had made some improvements in Parauapebas, the main achievement and pride of his administration was the agreement between CVRD and the municipality to provide the whole population of the Parauapebas town with water, sewage disposal and garbage collection facilities. The financial resources to implement this project were obtained from the World Bank through CVRD, which acted as an intermediary between the municipality and multilateral agencies because this urban project was part of CVRD`s environmental programme (IBAM, 1993a and 1994b; Parauapebas em Revista, 1994). The implementation of this project began in September 1994.

This basic sanitation project is very illustrative in many respects. The central point is that CVRD, by alleging the existence of corruption in Mr.Souza's administration, became responsible for practically all stages of this project, while the municipal administration was only in charge of supervising and paying its costs, which were deducted from mining royalties by CVRD. Thus, fiscal irregularities were corroborated by CVRD's attitude and at the same time this project shows clearly that the municipal administration was very limited and dependent on the mining company, which continued to have a considerable influence upon the region.

Like the former Mayor, Mr. Souza experienced difficulties in tackling mounting problems in the municipality, which continued to receive a large number of migrants in search of economic opportunities; was aware that the municipal budget was not sufficient for dealing with all problems at the same time; and was also involved with a series of irregularities (EEPP, 1993). In spite of these similarities, the relationship with CVRD was completely different. While Mr. Salmen used whatever means he could to put pressure on CVRD to assume its responsibilities for local problems, Mr. Souza was the opposite and his actions did not bring him into any conflict with CVRD. In fact, his administration, as mentioned above, maintained a dependent relationship with the mining company.

The lack of improvements in urban infrastructure and facilities in the Parauapebas/Rio Verde region was the main reason for the birth of the municipality of Parauapebas. On the one hand, administrative autonomy brought some improvements, principally because the

new municipality had its own revenue base. On the other hand, many problems persisted while others were generated and the municipal budget, despite being invested in the region, was insufficient for tackling every problem. Paradoxically, the worrying situation remained and the local government as well as CVRD contributed, to a large extent, to generating this situation. In the following sections, a series of social problems will be traced in order to provide a whole picture of the municipality of Parauapebas.

5.3 - Population

It is important to stress that the data which will be used here as well as in the subsequent sections of this chapter are related to two phases of Parauapebas: before and after its independence from the Municipality of Marabá. The first phase, which covers the 1980-88 period, is associated with the embryonic stages of Parauapebas and Rio Verde, while the second one, initiated in 1989 when the first Mayor was installed, is connected with the beginning of a new phase in its own development, which was mainly based on royalties from the mineral resources of Carajás. In 1985, the combined population of Parauapebas and Rio Verde was estimated at 13,603 and both nuclei had an average of 4.34 persons per household, which was less than that of the Municipality of Marabá and of the State of Pará as well (see table 5.1). This average cited in the 1985 CVRD census reflects the initial stages of these nuclei, which were undergoing a brutal process of transformation.

Table 5.1 - Persons per Household in the Area, Municipality and State

Location	Urban Population	Urban Households	Persons/household
Parauapebas - Rio Verde	13,603	3,135	4,34
Municipality of Marabá	41,657	7,346	5,67
State of Pará	1,667,356	291,835	5,71

Source: SUMIC/ASE - CVRD, 1985 and Demographic Census of the State of Pará (Mayerhofer, 1986)

Roberts (1991a) pointed out that the total population of Parauapebas town (which included its satellite Rio Verde and other peripheral invasions) was estimated at 29,019 in 1990. Thus the population of this town increased more than 100% in five years. The population of Parauapebas, Rio Verde and other surrounding invasions were estimated at 2,313; 9,419 and 1,871 respectively by the 1985 CVRD census (Mayerhofer & Toledo, 1988a). Five years later, Roberts estimated these population at 3,905; 13.937 and 11,178 respectively, showing a rapid growth.

According to the 1991 Brazilian census, the population of the municipality of Parauapebas was 53,312, its urban population estimated at 27,452 (IBGE, 1991). The difference between both, these two, estimates does not invalidate the main argument: the rapid growth of this town. The lack of recent data is a serious problem in Brazil as well as in Eastern Amazonia in particular and the latest estimates show completely different numbers. For example, while CVRD (Carvalho, 1994) estimated the population in the municipality of Parauapebas at 75,000, the municipal administration itself estimated 101,440 (Parauapebas em Revista, 1994). Despite these differences, the main point is that the municipality continued to attract a significant number of migrants.

With regard to the origins of the population of Parauapebas and Rio Verde, most migrants came from the Northeast (68%), although one-third of this contingent was from the State of Maranhão (see table 5.2). This fact was confirmed by American sociologist Roberts (1991a) five years later and, therefore, after Parauapebas became independent from the municipality of Marabá. By interviewing a sample of 100 households in this town, Roberts found that 68% of adults were Northeasterners, 36,2% of this contingent from the state of Maranhão.

5.4 - Activities

The 1985 SUMIC/CVRD survey showed that there were 3,908 people employed in Parauapebas/Rio Verde at that time (see table 5.3). According to this survey, only 1.3% of the employed population worked in the surrounding wild-cat mining-sites. This number

reveals that both urban nuclei were completely independent of this economic activity.

Table 5.2 - Origin of families

Region	Number of Families	Percentage
Marabá	33	1%
Pará State (except Marabá)	181	5.8%
Maranhão State	1043	33.3%
Goiás State	357	11.4%
Northeast	1088	34.7%
Other Regions	433	13.8%
Total	3135	100%

Source: SUMIC/ASE - CVRD, 1985 (Mayerhofer, 1986)

However, 44.2% of the population was absorbed by the metallurgical industry because most of the employees in this activity were residents of Carajás town. The reasons for this significant number are associated with the criteria adopted by the survey for classifying activities, such as workers who were directly or indirectly involved with the maintenance services of vehicles, including agricultural machinery, and the fact that some of the CVRD contract workers, specifically those who were married, had "opted" to live in Parauapebas/Rio Verde because of difficulties in finding accommodation for their families in Carajás town (Mayerhofer, 1986; Piquet, 1988; Mayerhofer & Toledo, 1988a).

Table 5.3 also shows the importance of the tertiary sector, which absorbed 37.4% of the population, and is explained by the fact that CVRD employees as well as those who were employed by CVRD contract firms still working at the Serra dos Carajás represented a reasonable market.

However, the question of unemployment has not been mentioned in the above table. This question is very important because the construction phase of the Carajás Project was finishing in 1985 and, as a consequence, massive unemployment was imminent. It was

hoped that the setting up of the Copper Project by CVRD as well as of two iron-alloy plants by companies COJAN Engenharia and PROMETAL, which were to generate a total of 566 direct jobs, would alleviate such anticipated unemployment. By 1987, these two industrial plants together with twelve pig-iron and another three iron-alloy projects had already been approved by the PGC Council. The setting up of these kind of industrial plants was a key element in the PGC strategy to establish an "integrated" industrial development along the Carajás railway corridor.

Table 5.3 - Population according to activities

SECTORS	Population Employed in Parauapebas/Rio Verde (1985)	
	Number	Percentage
PRIMARY	539	13.8
-Agrolivestock	487	12.5
-Wild-cat mining sites	52	1.3
SECONDARY	1877	48.0
-Metallurgical industry	1727	44.2
-Other industries	150	3.8
TERTIARY	1461	37.4
-Commerce	808	20.7
-Services	653	16.7
OTHERS	31	0.8
TOTAL	3,908	100%

Source: SUMIC/ASE - CVRD (Mayerhofer, 1986; Piquet, 1988; Mayerhofer & Toledo, 1988).

Despite the importance of the industrial sector for the development of Parauapebas/Rio Verde, another factor centred on the linkages between these urban nuclei and the surrounding rural area. It was hoped that both nuclei could achieve their own development by marketing primary products and supplying goods and services to their immediate

hinterland. In this regard, GETAT's colonisation projects played an important role because one of the objectives of these projects was to stimulate food production to meet rapidly increasing urban-nuclei demands.

In order to achieve this objective, the agricultural colonisation schemes close to the iron mine, specifically Carajás II and III, were provided with a reasonable infrastructure: 561 kilometres of roads, 8,855 metres of gutters and 240 metres of bridges (Danna et al, 1993). In addition, these agricultural colonisation projects were served by two small urban nuclei called CEDERE- Centre for Regional Development, which were created to support both resettlement projects.

The CEDERE I and CEDERE II were 25 and 70 kilometres respectively from Rio Verde and were provided with the same basic infrastructure: a heath clinic, a primary school, a refectory, accommodation for interviewing candidates, three offices for GETAT's employees, a storehouse and a radiotelephone station (CPT, 1986). Allied to these colonisation projects, there was another: the Carajás I, which was initially expected to absorb 4,000 families. In spite of the infrastructure and official support given to colonists, food production was still incipient in 1987, the year in which SEPLAN (Mayerhofer & Toledo, 1988a) undertook its fieldwork to elaborate the document Plano Diretor do Corredor da Estrada de Ferro Carajás (Master Plan for the Carajás Railway Corridor) and when GETAT was abolished.

GETAT's colonisation schemes were also understood as an alternative to the urban development of Parauapebas/Rio Verde. However, the abolishment of GETAT and other agencies marked the beginning of a complete abandonment of government-sponsored colonisation. The failure of these colonisation projects and consequently the idea of encouraging small farmers to increase food production in order to supply local demands was based on several factors, which will be discussed in the next chapter. At the moment, it is sufficient to stress that these failed colonisation schemes helped to attract an intense flow of migrants, which contributed to worsening the already inadequate urban infrastructure and facilities.

Although the setting up of two pig iron plants in Parauapebas had already been approved by the PGC, they were never implemented and the reasons for this were due entirely to the environmental risks. By using wood-based charcoal both as a fuel and as reacting agent, these industries have been responsible for causing deforestation and atmospheric pollution, which represents a considerable danger to the health of local populations as well as to local air traffic. In addition, the pole of Parauapebas, where these two plants were to be set up, was located in a valley surrounded by *Serra dos Carajás* and, consequently, a critical area with problems of ventilation and thermal changes. Therefore, the establishment of these plants in Parauapebas would certainly contribute to the increase of allergic, respiratory and dermatological problems which are caused by this type of industrial activity.

There was a significant increase in the number of shops and industries registered in the municipality of Parauapebas. For example, there were 200 shops in 1989 (IDESP, 1990), 414 two years later (SEPLAN/Pará, 1995) and 1,105 in 1994 (Parauapebas em Revista, 1994). Thus, the number of shops increased more than five times in only five years and this fact shows clearly the importance of the tertiary sector. With regard to industries located in this municipality, the Department of Finance of the state of Pará registered 16 industries in 1989 (IDESP, 1990), principally: timber (3) and food products (3). Within three years, there were 63 industries (SEPLAN/Pará, 1995): timber (33), food products (6), metallurgical (2), mechanical (3), non-metallic (2), chemical (1), mineral extractive (4), perfumery, soaps and candles (3), graphic (1), footwear and textile (3) and other industries non-specified (5).

These numbers above, especially those related to industries, must be treated with caution because they may suggest a promising and dynamic industrial pole and Parauapebas is in fact far from it. In this regard, it is important to take some points into consideration. Firstly, the term industry is generally associated with a particular branch of trade which employs large numbers of people and uses machinery and/or modern industrial methods. Nevertheless, this idea does not fit in well with the local reality because these industries in Parauapebas are small commercial establishments and not exactly large-scale industries.

Secondly, the metallurgical, mechanical and non-metallic industries are likely to be subcontracting firms which work for CVRD. By subcontracting workers, CVRD tried to save a considerable amount of money as well as avoid possible strikes. Thus, subcontractor workers meant that the State-owned company was free from paying social security benefits, such as paid vacation and sick leave, etc. At the same time, CVRD, by subcontracting firms to undertake several services at the Carajás mine, divided, intentionally or not, the working class and, consequently, made strikes a remote possibility. It is beyond the scope of this chapter to analyse CVRD policy of subcontracting workers, which will be taken up in the next chapter.

In relation to the second question, the existence of subcontracting firms in the region means job opportunities, but the increase in employment is relative because it was verified that the number of CVRD employees decreased insofar as more subcontracting firms worked for CVRD (Santos, 1994). It is beyond the scope of this chapter to analyse the relationship between CVRD and subcontracting firms, a theme which will be taken up in the next chapter.

It is worth nothing that the number of timber industries increased ten times in a short-term. The reasons lie in the dynamic production of furniture, as suggested by IDESP (1990), and, principally, in the civil construction activities because Parauapebas, as already mentioned before, continued to attract thousands of migrants. These activities are intrinsically related to accelerated deforestation in the municipality of Parauapebas.

5.5 - The Urban Structure

Located just outside of CVRD`s main gate, the urban nucleus of Parauapebas was originally planned to accommodate a population of 5,000 inhabitants and its urban design was totally geometric. The straight lines and right angles of geometric design adopted in Parauapebas, instead of winding roads, culs-de-sac, free areas, etc. commonly seen in planned cities, demonstrate a preoccupation with rational occupation of space, which was seen as the best way of settling migrants.

The basic urban infrastructure and social services implemented by CVRD comprised: a water-pumping station, a water-treatment plant, a water-distribution network, a system of sewage disposal, an electricity network, a building for local administration, a police station and a prison, a hospital and a school. In addition, CVRD was to construct twenty-five housing units and accommodation just for its employees who would work permanently at Parauapebas railway station. It is important to stress here that in the localities other than Carajás and Parauapebas, urban investments consisted mainly in the provision of housing units for CVRD employees who worked on the railway corridor, plus assorted community facilities in the towns of Rosário, Vitória do Mearim, Santa Inês, Nova Vida, Pequiá and Marabá.

Unlike Parauapebas and Carajás town, Rio Verde was totally unplanned and the map (Fig 5.1) shows clearly the planned and the "invaded" part. Rio Verde, called "burgeoning town" and "squatter colony" by different missions of the World Bank, spread out along the highway and its population was increasing so rapidly and perfectly predictably in the short term in view of its contiguity with Parauapebas. With regard to its urban infrastructure, the Rio Verde nucleus was essentially limited to ungraded lanes and precarious electrical connections, while other facilities such as a water-distribution network, a water-treatment plant, a water-pumping station, street lighting, and storm drainage, were non-existent. In general, housing conditions in Rio Verde were also very inadequate because most of the houses were built with rough-cut lumber slats and corrugated fibreglass, while their floors were compressed earth or cement. In the poorest parts of Rio Verde, the houses were wattle-and-daub: mud and stick adobe with thatched roofs and floors also of compressed earth. Both types of houses stood in sharp contrast with the homogenous brick and title-roofed houses of Carajás.

Owing to the explosive growth and the lack of any kind of planning in Rio Verde, areas which were not suitable for construction, such as the periodically flooded lowland areas and hills, were occupied by migrants. In fact, Rio Verde, like Curionópolis and many other frontier towns, had its origins in a group of bars, restaurants and brothels to serve

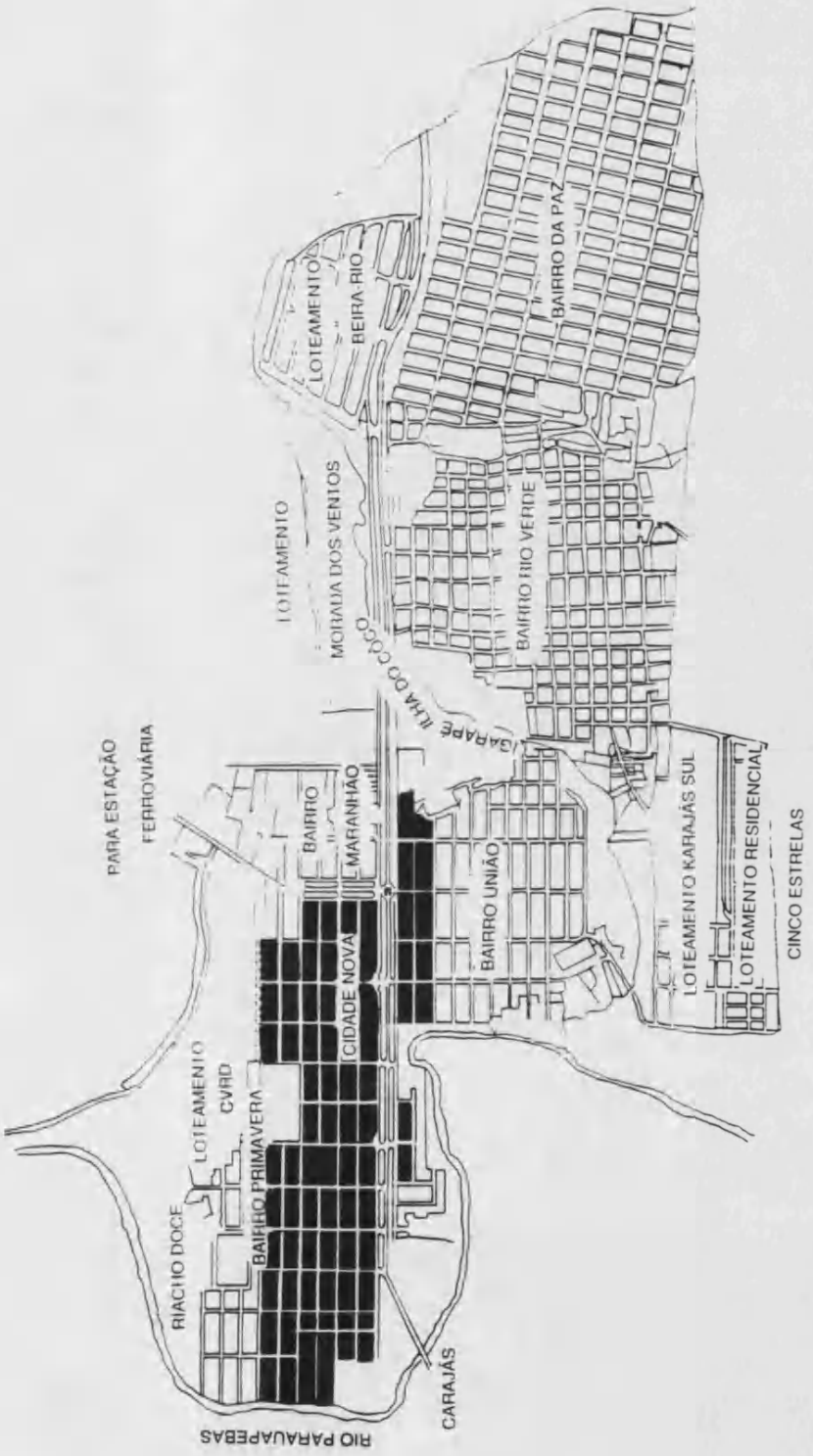

Fig. 5.1 - Parauapebas, Rio Verde and surrounding invasions.

■ Planned part with water-supply and sewage-disposal systems.

construction workers at Carajás and Parauapebas as well as local wild-cat gold prospectors.

With regard to the situation of Rio Verde, a 1986 World Bank report noted that, although CVRD had already spent some US$ 13.7 million in Parauapebas, another US$ 18 million were required to implement necessary improvements in infrastructure networks and community facilities in the twin towns of Parauapebas and Rio Verde. This report recommended that these improvements should be set within an integrated land use planning framework and proposed that such a plan should be elaborated by consultants to CVRD on the basis of terms of references approved by the Bank (World Bank, 1992). Indeed, this plan was drawn up by the consultant firm Mayerhofer & Toledo in mid-1986. However, a subsequent Bank mission in September-October 1986 continued to stress "the urgent need to rehabilitate, sanitise and expand the urban networks of Parauapebas to serve the expansion areas in Rio Verde" (World Bank, 1992, pp. 94). Thus, the changes pointed out and required by the World Bank were not made by CVRD, despite the loan received by his company. Another mission, which was undertaken jointly by the World Bank, specifically its Operation Evaluation Department (OED), and SEPLAN, visited Parauapebas and Rio Verde in April 1989 and verified that the improvements made in both urban nuclei continued to be insignificant.

Due to the continuous arrival of new migrants, other areas were occupied in a disorderly fashion in the town of Parauapebas and, consequently, new districts such as Bairro da Paz, Maranhão, União, Riacho Doce and Primavera were formed (see Fig. 5.1). The urban infrastructure and facilities of these new districts were practically non-existent. However, in these districts were benefited insofar as improvements were made in the old districts such as Rio Verde and Cidade Nova, which was the origin of this town.

According to a recent study undertaken by IBAM (1993a), the situation of Rio Verde improved because it had an electricity supply, street lighting, garbage collection and most of its streets were paved. In addition, housing conditions follow a regular pattern. The União district is close to Cidade Nova, which was the planned part, and to the PA-275 highway. In this regard, housing conditions were considered good by IBAM's technicians

and this is the predominant pattern in this district, although there is a small percentage (7,52%) of houses built precariously. Cidade Nova is the best district in terms of urban infrastructure and, consequently, housing conditions in this district are good. Bairro da Paz and Maranhão are similar, because they are served only by street lighting and electrical connections, being scarce their paved streets. Most of houses in these districts are very poor. With respect to Riacho Doce and Primavera, housing conditions in the first district are precarious, while in the second are regular.

5.6 - Basic Sanitation

With regard to basic sanitation, especially water supply, the urban nucleus of Parauapebas was provided with a water-pumping station, a water-treatment plant and a water-distribution network, which were insufficient to meet local demand. Even those who received mains water were frequently affected by the same problem: lack of water, and usually because of pump failure or electricity cuts. In addition, there was another problem which was more serious and was related to water contamination. In Parauapebas, the water supply is taken directly from the Parauapebas river, which flows outside the town and is polluted with mercury by nearby wild-cat gold mining.

There was no water-distribution network in Rio Verde. The alternatives for obtaining water were to sink a well or take it directly from nearby creeks (*igarapés*). According to the 1985 CVRD survey (Mayerhofer, 1986), 65.8% of houses in Rio Verde and other peripheral invasions nearby obtained water from wells, while 32.2% obtained it from creeks or by other methods. This same survey also indicated that 90% of 1,000 houses inspected had their wells built close to the cesspits and this short distance was a tremendous threat to the health of the local population because fifteen metres is the distance considered satisfactory for avoiding the "sanitary short-circuit" between the water-supply and sewage-disposal systems. In addition, it was verified that more than 43% of houses with no water supply did not have water filters to safeguard against intestinal-tract bacteria. As a result of all these problems, practically 100% of patients

examined in a 1985 health campaign suffered from diseases caused by intestinal bacteria and parasites (Mayerhofer, 1986).

With respect to the sewage system, the situation of both nuclei was problematic. In Parauapebas, the system was frequently blocked because of inadequate housing connections as well as by the precarious laying of the sewage network. Although four artificial lakes (*lagoas de estabilização*) were planned for treatment of raw sewage, only one was working, and very precariously. The situation in Rio Verde was even worse because this nucleus and other surrounding invasions were not served by the sewage network at all. As a consequence, excrement was disposed of in pits (black as well as dry pits), which was the predominant system, or in the open air.

This dramatic situation is confirmed by table 4.4, which shows that the sewage disposal system served less than 11% of houses in Parauapebas and only 0.63% of the total houses in Rio Verde and adjacent invasions. This table must be interpreted with caution because of its central columns, "dry pit" (*fossa seca*) and "black pit" (*fossa negra*). These systems are usually adopted in areas where the water supply is non-existent or problematic and their advantage is that they are cheaper than other systems, they can be constructed individually and they also diminish the risk of contaminating rivers and creeks.

Although different, the similarities between the two systems are much more evident, principally in relation to the region of Parauapebas, Rio Verde and other surrounding urban agglomerations. The main difference between "black pit" and "dry pit" systems is that in the first the excrement is deposited directly in the pit, while in the second, the excrement is disposed of by means of a lavatory. Despite being more hygienic and obviously more comfortable than the "black pit" system, the "dry pit" represents a more serious threat to contamination of the water table because this system requires water in order to function. It is also important to observe that the simple presence of a lavatory in the house indicates a better economic condition, which contributes to establishing some differences among urban agglomerations.

In relation to the "black" and "dry" systems, 55.83% of the total houses in Parauapebas, Rio Verde and surrounding invasions had "black pits" (*fossas negras*), while less than 11% had "dry pits" (*fossas secas*). Allied to these numbers, 21.71% of houses in all these nuclei did not have any inside sanitation, which means that excrement was disposed of in the open air. Table 5.4 shows clearly that the sewage network was totally unable to meet local demands and Parauapebas is the concrete example because 11.70% of houses in this nucleus were not connected with the sewage network, which serves less than half of the total number of houses in this town. In Rio Verde 70.69% of its houses had "black pits", 22.31% had no inside sanitation and just 6.10% had "dry pits". Thus, the total percentage of the houses in this nucleus not served by the sewage network was 99.10%. The same trend is noted in the surrounding invasions, but one specific characteristic distinguishes Rio Verde from other peripheral invasions: the percentage of houses with "dry pits" was 6.10% in Rio Verde and 1.02% in the invasions.

Table 5.4 - Systems of sewage disposal (in percentage of total number of houses)

PLACE	Treated sewage	Dry pit	Black pit	No installation	TOTAL
Parauapebas	10.95	6.82	2.40	2.48	22.65
Rio Verde	0.60	3.93	45.63	14.40	64.56
Invasions	0.03	0.13	7.80	4.83	12.79
TOTAL	11.58	10.88	55.83	21.71	100.00

Source: SUMIC/ASE - CVRD, 1985 (Mayerhofer, 1986).

As mentioned above, CVRD and the municipality of Parauapebas signed an agreement in June 1993 to provide water-supply, sewage-disposal and garbage collection systems for the whole town of Parauapebas. With respect to the situation of basic sanitation in this town, the IBAM`s reports (1993a;1994a ;1994b) show clearly that few improvements have been made since its implementation.

In relation to water-supply, this system only served 6,000 inhabitants, while the total population of the town of Parauapebas was estimated at 48,500 (IBAM, 1993a). Those

inhabitants who were served by this system lived principally in Cidade Nova, which was a district privileged in terms of infrastructure and services because it was the original nucleus constructed by CVRD. Nevertheless, 85% of the urban population obtained water from wells, which were poorly built and located close to the cess pits and this short distance was a serious threat to public health.

With regard to the sewage system, the situation of Parauapebas town was even more problematic. This system was already insufficient for meeting local needs and this problem was aggravated by the continuous arrival of migrants. Thus, most of the population was not served by the sewage network and as a result, the excrement was disposed of in pits, the predominant system, or in the open air, principally in the Parauapebas river and the Coconut creek (*igarapé do Coco*). Both methods, pits and open air, represented a threat to the health of local population because of the "sanitary short-circuit" (the short distance between well and pit) and pollution of local river.

5.7 - Urban Maintenance and Transport

Urban maintenance-services in Parauapebas and Rio Verde were non-existent in some cases and precarious in others. For example, the streets, public square, gutters, etc. were not cleaned either in Parauapebas or in Rio Verde. As a consequence, the grass grew close to the gutters and contributed to making the drainage of rain water difficult. At the same time, the rapid growing of grass along the strip of the PA-275 road obstructed visibility and impeded the use of the hard shoulder, which made this road unsafe for pedestrians as well as drivers.

In relation to trash collection, Marabá County was responsible for this service, which was highly precarious. The trash was collected on alternate days only in the central areas of Parauapebas and Rio Verde and was disposed of in the open air, the trash dump being less than 500 metres from the urbanised area. This service was eventually abolished. As a result, the population of Rio Verde deposited its trash alongside roads, and in Parauapebas, it was disposed of in the streets as well as in the backyards. In fact, this

situation went from bad to worse and is well-illustrated by the permanent free-market that was held on a public square, called *Praça do Mercado*, in Rio Verde. This free-market produced daily a large amount of garbage which was not collected and, consequently, caused fetidness and was a threat to public health, which in turn provoked discomfort and trouble in the local population.

The means of access to the twin towns of Parauapebas and Rio Verde was by road, railway and by air. CVRD had constructed an airport, which was very close to Carajás town, and transferred its control and operation to the Ministry of Aeronautics. At the time, there were direct flights by jets connecting Carajás with Brasília and Belém twice a week. Moreover, there were regular direct flights to Belém and Brasília as well as other cities of the States of Pará, Maranhão and Goiás. However, there was a limitation, which was due to the fact that the airport was located in CVRD`s concession area, for the inhabitants of Parauapebas and Rio Verde: obtaining of authorisation to pass through the company`s gate and, consequently, to have access to the airport. This caused a lot of dissatisfaction between those who lived outside the CVRD`s enclave.

Road access was via the PA-150 and PA-275, which were paved. The PA-275 road, specifically the strip from the CVRD`s gate to the Serra dos Carajás, is called Raimundo Mascarenhas and was constructed and paved by the Brazilian State mining company. As a consequence, this strip was restricted to the company`s own use and this fact created severe problems, as seen before, for 700 families of small farmers settled in the agricultural colony Jáder Barbalho who wanted to transport their crops to the town of Parauapebas. These difficulties were similar to those faced by colonists in the agricultural projects Carajás I and II.

The town of Parauapebas did not have an adequate system of urban transport. Despite the precariousness of the system, which subjected the passengers to great discomfort and risk, eighteen buses of the Transrodovia company connected Parauapebas and Rio Verde to CEDERE, São Geraldo and Xinguara (Mayerhofer & Toledo, 1988a). The public transport which connect the railway station with the twin towns of Parauapebas and Rio Verde was problematic because of the times of the trains, which departed and arrived in

the early morning, and principally because of the bad condition of the road, which became impassable in the rainy season. The transport of passengers and cargo by rail was inaugurated in 1985 and one year later this service became regular. At that time, the service ran two or three times a week in both directions on the Carajás line, which covered the route between Parauapebas and São Luís in seventeen and a half hours.

Regularity, safety, speed and low fares were the advantages offered by the Carajás railway to the passengers. There were also advantages related to the transport of goods because the rail fair was cheaper than that by road. However, the Carajás railway was built to transport iron-ore from the Carajás mine to the port of Itaqui and stations along the railway were not provided with shelter for passengers, platforms for mounting and dismounting, depots for storing the goods, car parks, public conveniences, etc.

Nowadays, only Cidade Nova, Rio Verde and Paz are served by the garbage collection system, but even so this system is a complete failure. The municipality has three trucks and one of them is responsible for collecting the trash in Cidade Nova three times a week, while the other two trucks are in charge of the other two districts. However, these trucks are frequently switched from their original functions. In addition, the area destined for garbage-disposal was considered inadequate by the consultant firm EPC due to the existence of a temporary watercourse (in the rainy season), which brings about the lixiviation of garbage and, consequently, contaminates other watercourses in the region (IBAM, 1993a).

With regard to other aspects mentioned above, the improvements were extremely limited. Thus, the system of urban transport has remained precarious, subjecting passengers to discomfort and risk. Some stations along the Carajás railway were improved, but the changes, in general, were very limited.

5.8 - Health and Literacy

In relation to basic health services in Parauapebas, CVRD constructed a hospital, which was transferred to the State health agency FSESP, with a capacity of 25 beds to attend an estimated population of approximately 12,000 (IDESP, 1990; Roberts, 1991a). However, medical staff, which comprised a general practitioner, a surgeon, a dentist and the director of the hospital (Mayerhofer, 1986), as well as the equipment, were completely insufficient to meet local demand, from over 90,000 people. A great part of this population came from surrounding towns, such as Curionópolis, Eldorado, Rio Maria and Xinguara, whose health services were worse than that those of Parauapebas.

A sharp contrast is provided by Carajás town, in which CVRD constructed a beautiful, well-maintained, equipped and staffed hospital, called Yutaka Takeda, only for its employees. This hospital contains 52 beds and was built to attend the 6,720 inhabitants of this urban nucleus. The World Health Organisation (WHO) considered the proportion of 5 beds for every 1,000 inhabitants the ideal situation for a hospital (IDESP, 1990). In this regard, Carajás town showed an excellent level with 7.7 hospital beds per 1,000 inhabitants, while Parauapebas presented a critical situation with 0.23 beds per 1,000.

The fact that the hospital in Carajás town was for CVRD`s exclusive use demonstrates the absurdity of the situation in which thousands of people did not have access to a modern hospital, which was 80% underused. In addition, this fact illustrates the behaviour by CVRD, whose significant characteristic, as mentioned above, was its clever use of its dual status, and contributes to making the real intentions of this company clearer. By restricting the hospital access to its employees, CVRD acted like a private company, but this company is truly a State-owned company which mobilises public funds for the implementation and maintenance of health and other services owing to that specific condition.

Public health impacts are intrinsically associated with inadequate urban infrastructure and local service-provision capabilities, which were tremendously aggravated by the substantial flow of migrants attracted to the region in search of economic opportunities. In

addition, these migrants, who were attracted principally by the Carajás Project and surrounding wild-cat gold mining, came from other disease-ridden areas of Brazil. As a result, this population introduced new diseases, such as Chagas disease (American trypanosomiasis) as well as schistosomiasis (bilharzia) into the area and made the control of those already existing illnesses more difficult. The lack of slaughterhouses was another serious threat to the health of the local population because cattle were slaughtered in unsuitable locals such as streets, with no hygiene or controls.

Based on all these problems, the nosological table of the twin towns of Parauapebas and Rio Verde was critical (see table 5.5). According to the 1985 CVRD census (Mayerhofer, 1986), both urban nuclei presented high incidences of malaria, trachoma, leishmanioasis, tuberculosis and syphilis.. In addition, practically 100% of those patients examined had dermatological problems and suffered from intestinal infections.

Only four years after the 1985 CVRD census, the municipality of Parauapebas showed a rapid increase in a variety of health problems and a worsening of social indicators, such as infant mortality. In this regard, table 5.6 indicates that high incidences of malaria, tuberculosis ,leprosy, measles, hepatitis, whooping cough, meningitis, tetanus and infectious diarrhoea and parasitic diseases exceeded the state of Pará averages (IDESP, 1990).

Table 5.5 - The Results of Medical Examination

Main Diseases Researched	Patients Examined	Positive Cases N°	%
Trachoma	1440	282	19,6
Malaria	1165	291	14,9
Leishmanioasis	60	29	48,3
Tuberculosis	121	2	1,7
Syphilis	232	25	10,8

Source: CVRD/SUMIC (Mayerhofer, 1986).

Table 5.6 - Coefficient of incidence of Diseases in Parauapebas and in the state of Pará (100,000 inhabitants).

DISEASES	COEFFICIENTS	
	PARAUAPEBAS	STATE OF PARÁ
Infectious diarrhoea and parasitic diseases	1,142	723.1
Malaria	10,101	2,744.7
Tuberculosis	107	76.9
Leprosy	196	45.8
Measles	86	2.2
Hepatitis	67	27.2
Whooping Cough	25	7.2
Meningitis	20	1.3
Tetanus	7	0.6

Source: FSESP and Secretaria de Saúde Pública do Estado do Pará (IDESP, 1990).

Widespread urban poverty and malnutrition were reflected in high indices of mortality (see table 5.7), especially infant mortality (up to one year old), which averages 46 per 1,000 live births, and foetal mortality, which averages 82,8 per 1,000 live births (IDESP, 1990).All indices of mortality in Parauapebas showed in the table bellow exceeded the city of Belém averages.

Table 5.7 - Main Health Indicators

Indicators	Coefficient	
	Parauapebas (1)	Belém (2)
General Mortality/1,000 hab.	5.9	3.7
Infant Mortality/1,000 live births	46.0	26.3
Maternal Mortality/1,000 live births	2.2	0.7
Foetal Mortality/1,000 live births	82.8	26.0
Birth Rate/1,000 hab.	31.1	26.3

Source: (1) FSESP, 1988; and (2) Secretaria de Saúde Pública do Estado do Pará, 1988 (IDESP,1990).

Although the incidence of most of diseases had decreased, the nosological table (see table 5.8) elaborated by FNS (SMS, 1994) in 1994 shows clearly that the municipality of Parauapebas continued to present high indexes of malaria, infectious diarrhoea and parasitic diseases, tuberculosis, leprosy, leishmanioasis, whooping cough, measles, tetanus, sexually transmitted diseases, infectious hepatitis and respiratory diseases.

In 1991, the indicators of infant mortality, which averages 39.1 per 1,000 live births; of general mortality, which averages 3.73 per 1,000 inhabitants; of maternal mortality, which averages 1.31 per 1,00 live births and of foetal mortality, which averages 41.15 per 1,000 live births (SEPLAN/Pará, 1995) decreased in comparison with the same indicators from table 5.7, which had been registered in 1988. This decrease, although continued high, shows clearly that the municipality of Parauapebas was making some improvements.

Despite the improvements in the health sector, the situation was still worrying. The reasons for high incidences of most of diseases in the municipality of Parauapebas are intrinsically related to problems such as inadequate housing conditions, the "sanitary short-circuit", the consumption of non-treated water, the consumption of milk and food products with no sanitary inspection, lack of an adequate basic sanitation, lack of an effective combat (vaccination, etc.) against virus responsible for diseases and also against the factors which favoured the proliferation of these virus. In addition, the infrastructure of the health system is not sufficient for meeting the growing demands of local population, which is prevented by CVRD from using the modern hospital Yutaka Takeda in Carajás town. In a region which lacks everything, this prohibition is surreal and inconceivable and makes the life of poor population much more difficult.

With regard to the education sector, the situation in Parauapebas and Rio Verde was also dramatic. Problems had their origins in a great demand and scarce human and financial resources, which in turn were associated with the lack of urban services and facilities. A blatant contrast was provided by Carajás town, which has an excellent educational infrastructure with nursery, primary and secondary schools and well-qualified teachers. In March 1984, the school's staff (teachers, directors and people for administrative services)

Table 5.8 - Incidence of diseases in Parauapebas (population estimated at 94,000 hab.)

DISEASES	N° of Cases	Percentage
Aids	01	0.002
Soft chancre	03	0.006
Condyloma	51	0.002
Whooping cough	08	0.006
Infant diarrhoea	1267	0.104
Chagas disease	08	0.016
Schistosomiasis	05	0.010
Gonorrhoea	70	0.142
Leprosy	108	0.220
Hepatitis	12	0.024
Genital herpes	05	0.010
Respiratory infection	2409	4.916
leishmanioasis	210	428.5
Linfogranuloma_Venerum	05	0.010
Malaria	1752	3.575
Meningitis	07	0.014
Gonocoecal ophthalmia	02	0.004
Measles	10	0.02
Syphilis	30	0.061
Tetanus	05	0.010
Tuberculosis	22	0.044

Source: FNS (SMS, 1994)

numbered 49 for a total population of 691 students (CVRD,1984). At the beginning, the school system was run by the CETEP (Centre for Technical Teaching of the State of Pará), whose central office was in Belém (capital of the Pará State). However, educational services were supervised by the well-known *Pitágoras* (Pythagoras) school, which was a private educational institution from Belo Horizonte (capital of Minas Gerais State).

The Parauapebas and Rio Verde region comprised five schools: one private and four public schools. These five schools had a total of 4,652 places (Mayerhofer, 1986). However, the total demand, which consisted of 6,799 people of school age (up to eighteen years old) and of 6,362 adults, in the region was of 13,161. Thus, the gap between supply and demand was 8,509. This considerable gap means that the school system in the twin towns was totally insufficient to meet local demand.

In 1985, CVRD undertook a census (Mayerhofer, 1986) which showed that 21.64% of adults in Parauapebas, Rio Verde and adjacent invasions were illiterate. According to the World Bank (1997), adult illiteracy is defined as the proportion of the population aged fifteen years old and older, who can not, with understanding, read and write a short, simple statement on their every day life. From this total, Parauapebas had only 1.60%, while Rio Verde and surrounding invasions had 20.04% of illiterates (with no educational attainment). This significant difference between these urban nuclei also illustrates the existing inequalities of each kind of occupation.

It was predicted that the Euclydes Figueiredo school would be able to absorb a total of 1,480 students in four shifts of four-hours (Mayerhofer,1986). In 1985, 2,829 students were registered in the school, which was in fact functioning with 91% of students above the limit originally planned. Overcrowded schools, a common phenomenon in Parauapebas and Rio Verde, mean problems related to internal space, a large number of students per classroom, loss of teaching quality and, principally, the lack of educational infrastructure, which was completely unable to meet local demand. In addition to these problems, there was another: the low level of qualification of teachers, which contributed to making the situation even more difficult.

In 1989, the municipality of Parauapebas comprised 92 schools, 13 urban and 79 rural (IDESP, 1990). Despite the increase in the number of schools, the situation of the municipality was very problematic: its educational infrastructure continued to be insufficient for meeting the growing local demand; 90% of elementary teachers had not completed primary school (IDESP, 1990; Roberts, 1991a); 20% of adults in town were illiterate (Roberts, 1991a), which meant they did not any educational attainment; rural

schools were poorly built and worked precariously and there was neither teaching materials for students nor manuals for teachers (IDESP, 1990).

Although data have not been updated, there was a significant increase in the number of schools in the municipality of Parauapebas, by 1991 (SEPLAN/Pará, 1995); 252 schools: 20 in the urban area and 232 in the rural area. According to Decennial Plan for Education (SEMED, 1994), there were 36,800 people of school age (from 4 years old to 17 years old), but only 22,460 were registered and this fact means that approximately 40% of student population was not even able to attend school. The reasons for this problem lie principally in the insufficient number of places in schools for meeting the existing demand and high incidence of repeater students, which is estimated at 30% in 1994 (SEMED,1994), while the national average was 19% in 1993 (World Bank, 1993).

In relation to the lack of sufficient places in schools for attending the local demand, the Decennial Plan for Education predicted that would be necessary to construct 406 classrooms in ten years (1994-2004) in order to solve this problem. However, the construction of 40 classrooms per year, as suggested by the Decennial Plan itself, was beyond the capacity of municipal courses, principally because of other important problems, such as the lack of qualified teachers and the little participation of the state of Pará in the construction of new schools. All these problems associated with the low salaries paid to municipal teachers, low level of qualification of these teachers, a large number of students per classroom (the average is 50 students per classroom in both, primary and secondary, schools), etc. contribute to making the quality of teaching, principally in the public schools, very poor.

5.9 - Summing up

This chapter has focused on two distinct phases of Parauapebas: before and after its emancipation from the municipality of Marabá. Although different, these have some connections and similarities that will be essential for understanding the development of this town. In the first phase, neither Parauapebas nor Verde had any autonomy and, consequently, were directly subjected to the Marabá municipal administration and indirectly to CVRD. However, Parauapebas/Rio Verde was not a priority for the municipality of Marabá, which had countless other problems to tackle. In addition, CVRD itself maintained a difficult relationship with the local authorities and adopted hostile attitudes towards the population of Parauapebas and Rio Verde, such as the rigid control exercised by CVRD guards in its entrance gate and its decision to establish Carajás as a "company town", which meant social segregation and exclusion, contributed to making the local problems even more difficult.

These aspects allied to a large and intense flow of migrants, who arrived in the region in search of economic opportunities, contributed to producing a serious situation in which the Parauapebas/Rio Verde region presented inadequate urban infrastructure and services; a critical nosological table and worrying problems in the educational sector. This situation provoked the emancipation of the region, which would begin a new phase, as hoped, in its development. In fact, the emancipation has brought many improvements to the municipality of Parauapebas.

Paradoxically, the situation in Parauapebas, despite improvements, was still worrying. The municipality continued to present high indices of infant and foetal mortality and high incidences of many diseases. These impacts on public health are intrinsically related to the lack of basic urban services and facilities, widespread urban poverty and malnutrition. In addition, the situation of educational sector was also problematic. The reasons for this serious situation lie in the flow of migrants, who arrived continually in the region; in the Federal government, which reduced drastically its presence in the region; in the CVRD, which could do much more to improve local living conditions, but the company's

assistance only materialised in accordance with its own interests; and in the local governments; which has many limitations.

This chapter has provided a whole picture of Parauapebas, always focusing on the improvements made and on the problems generated. The next chapter will analyse the local impacts in the light of development pole theory.

Chapter 6

The Beneficial Spread Effects and the Case of Parauapebas

6.1 - Introduction

The last chapter provided a complete picture of Parauapebas in which its development was traced. It was verified that, despite improvements, the municipality of Parauapebas continues to present a problematic situation, which can be partly explained by a number of factors, varying from a difficult relationship between CVRD and local authorities to the limitations of local governments. However, these factors are unable to explain entirely the socio-economic transformations undergone by Parauapebas. These transformations are a direct product of development policies, principally development pole strategies, implemented in Amazonia. Owing to its privileged location in the Carajás immediate area of influence, Parauapebas offers a special opportunity to examine the beneficial spread effects generated by development poles. While the second chapter focused on the assumptions behind this theory in relation to the beneficial spread effects, the main purpose of this chapter is to analyse the local problems in the light of development pole theory itself.

6.2 - Development Pole Strategies

> "We have every possibility of making Brazil successful. The condition is to prevent past mistakes from repeating themselves in the future. It is to break the hegemony of, and perverse domination by, our selfish dominating class. This class and its technocrats only plan against the people and examples of their actions are countless. So there it is, this horrible Carajás Project".
> (Darcy Ribeiro in: O Brasil como Problema, 1995)

As seen in chapter four, Parauapebas, despite its political independence, continues to present a worrying picture, whose origins may be traced to development pole strategies adopted by the Brazilian government during the 1970s. From the government's point of view, the implementation of the regional infrastructure as well as the Carajás Project was to be the basis for the future development of the region. In fact, the Carajás Project has been a tremendous economic success, as will be shown in the next chapter, but on the other hand its social and environmental impacts have been considerable. The discrepancy between economic and social results is a distortion of the economy in which highly profitable projects generate enormous poverty in surrounding areas.

Parauapebas is a by-product of the Carajás Project and, consequently, the situation of this town and of the municipality itself is intrinsically related to spread effects generated by development poles. Owing to its location, Parauapebas is a privileged case. This town is in the immediate area of influence of the Carajás mine, which was the most important pole - the Carajás pole - designated by POLAMAZÔNIA, and at the same time was one of the PGC's development poles. Therefore, to understand the present situation of Parauapebas it is essential to analyse local problems in the light of development pole theory itself.

The idea advocated by development pole theory (see chapter two) that economic growth, interregional equilibrium and integration of backward regions could be achieved through a strategy of decentralised development harmonised with the geopolitical as well as with the economic objectives of the military regime. Development pole strategies were strongly implemented by POLAMAZÔNIA. This programme, launched by the Geisel administration in the PND II, lasted thirteen years, from 1974 to 1987, and its spatial

strategy contributed considerably to the opening up of the Amazon region for the exploitation of its vast resources and to tens of thousands of migrants.

Development pole policies in Brazil concentrated basically on infrastructure, of which POLAMAZÔNIA is a perfect example. Heavy infrastructural investments, associated with existing fiscal and credit incentives, were made by the Federal government in order to create, as pointed out by Mahar (1989, pp. 40), "a more favourable investment climate in Amazonia for private enterprise". In fact, the military government had opted for the market economy and, therefore, development planning and government actions were to be oriented towards the private sector in order to support and encourage investments while the government itself, as producer and investor, was to restrict its activities to those areas considered of national interest and security.

The implementation of POLAMAZÔNIA was part of government strategy for overcoming the serious problems caused by the sharp oil price increases of 1973-74. Restrictive policies were ignored by the Brazilian government, which opted for an ambitious programme of import-substitution investments in capital goods and basic raw materials. In this regard, the export potential of Amazonia, a region with vast mineral resources and which offered favourable conditions for agriculture and forestry, was viewed by the Geisel administration as an important contribution to boosting Brazil's foreign exchange earnings and improving its balance of payments.

POLAMAZÔNIA marked a significant change in government policy in favour of large-scale private enterprises to the detriment of small-scale colonisation schemes, but this change, notwithstanding intense entrepreneurial lobbying, was perfectly compatible with the government's economic objective, which was to attain high rates of economic and industrial growth. It is worth noting that this objective was totally compatible with development pole strategy. The Carajás Project, the Greater Carajás Programme (PGC) and other industrial undertakings were implemented within the logic of development pole theory.

Indeed, the Federal government implemented development pole strategies with the clear purpose of attaining its economic and geopolitical (national integration and occupation of Amazonia) objectives. Although these strategies have been abandoned since the abolishment of POLAMAZÔNIA in 1987, they marked the Amazon region indelibly. With respect to this point, two important questions remain: What did development pole policies accomplish? And what were the impacts caused by these policies? Owing to its favourable location, Parauapebas is an ideal place for answering these questions, which will be taken up in the next section.

The allocation of POLAMAZÔNIA funds to development poles and sectors (see table 6.1) shows the real priorities of the Federal government and at the same time provides some evidence which will be useful for understanding subsequent impacts on the region. For instance, the Carajás pole was by far the major beneficiary of resources allocated in 1975-79. This pole also received more resources than others for urban development as well as transport sectors. On the other hand, it obtained insufficient funding for other important sectors, such as agriculture, health and basic sanitation, education and culture, etc., especially for a pole which had the highest rate of population growth throughout the 1970s (Bunker, 1986; Vasconcelos dos Santos, 1986)

In relation to the 1980-85 period, the priorities for the Carajás pole, in financial terms, continued to be the urban development and the transport sectors, although the latter was the most favoured sector in comparison with the others. Despite this fact, it is important to observe the sharp contrast between 1975-79 and 1980-85, when the sum invested in the first period was practically three times the amount spent in the second. This decrease in investment was due to two factors: the establishment of the PGC, which overlapped with a considerable part of POLAMAZÔNIA`s area; and the economic crisis faced by the Federal government, which needed to cut public spending.

Table 6.1 - POLAMAZÔNIA - Investment in Sectors and Poles (1)

Cr$1 billion

Sectors \ Poles	Agricult.	Urban Develop.	Educ. and Culture	Health and Sanit.	Transp.	Others (2)	TOTAL	%
1975-79	588.064	808.411	55.866	90.602	573.285	246.803	2363.031	72.7
Acre	87.671	90.454	6.009	5.600	16.559	7.652	213.915	6.6
Carajás	67.349	151.590	7.728	14.065	296.117	18.330	555.179	17.1
Pré-Amaz. Mar.	77.392	72.651	19.876	23.464	65.323	37.664	296.370	9.1
Tapajós	115.954	117.543	3.815	7.971	12.255	125.265	382.265	11.8
Others (3)	239.698	376.173	18.438	39.502	183.031	57.892	914.734	28.1
1980-85	202.917	255.158	74.571	69.351	169.936	117.506	839.439	27.3
Acre	27.487	22.908	8.255	4.387	24.442	16.494	103.953	3.2
Carajás	9.606	30.398	8.147	8.273	45.267	11.081	112.772	3.5
Pré-Amaz. Mar	20.055	22.906	13.416	15.062	32.757	24.062	128.258	3.9
Tapajós	44.270	41.900	6.876	3.356	4.289	7.395	108.086	3.3
Others (3)	101.499	137.046	37.877	38.273	63.201	58.474	436.370	13.4
TOTAL	790.981	1063.569	130.437	159.953	743.221	364.309	3252.470	100.0
%	24.3	32.7	4.0	4.9	22.9	11.2	100.0	

Source: MINTER-SEPLAN-PR (Vasconcelos dos Santos, 1986).
(1) - Values adjusted to 1985 prices
(2) - assistance and welfare, science and technology, energy, industry and services, government planning, employment and mining and community development.
(3) - Amapá, Altamira, Juruá-Solimões, Marajó, Roraima and Trombetas.

Although POLAMAZÔNIA was a programme directed essentially at infrastructure development, it should have made clear its expectations of beneficial spread effects to be generated by industrial undertakings in the region. However, this did not happen. These expectations remained rather vague and the document POLAMAZÔNIA: Carajás is a good example. This document is eminently descriptive, providing a whole picture of the region, showing its main problems and suggesting guidelines in order to set in motion the development of the area. Nevertheless, spread effects were somewhat nebulous. They were expected, but they were neither clearly described nor quantified, just hoped for and suggested along with the text.

Two important facts must be taken into consideration. Firstly, the document POLAMAZÔNIA: Carajás is much more vague, even considering that the Carajás pole

embraced the Tucuruí Hydroelectric scheme in its area, in respect of forestry, agro-livestock, food supply and colonisation schemes than in relation to mineral undertakings, which were, of course, the top priority and the Carajás Project as well as the railway connecting the mine to the port were strongly emphasised. In fact, the document gives a clear impression that other activities were only loosely attached to the main priority. Secondly, the document POLAMAZÔNIA: Carajás presented a sharp contrast with the Master Plan for the Carajás Corridor, which, after its elaboration in 1989, was shelved by government.

Much has been written about development pole theory and some authors (see chapter 2) blamed Perroux`s disciples, especially Boudeville, for its failure, of theory, which had been completelly "distorted" by them. In this regard, Roberts (1995a) not only agreed with this interpretation but added that this "distorted" theory, broadly adopted in Latin American countries, when associated with plans for resource-led development led to the premise that "mining can be a motor for a diversified regional economy". Both interpretations were far from being true. As seen in the second chapter, Perroux was acutely aware of other contributions, principally those of Boudeville, to his theory, and moreover, Perroux himself recognised their importance and legitimacy.

In relation to the second interpretation, it is important to remember that Boudeville had published a significant study in 1957 of Brazilian growth poles, in which the metallurgical industry was regarded by him as a growth or propulsive industry, which, according to Perroux, tends to generate spread effects on its environment. Boudeville, in his study (1957), focused on the state of Minas Gerais, which was rich in iron-ore (CVRD exploited the iron-ore mine in the town of Itabira) and stressed that one of the characteristics of the emergence of this growth pole (development pole) was the presence of the mineral resource. However, the central point is that the exploitation of iron-ore led to the establishment of the metallurgical industry and steel production led automatically to the setting up of other branches of the metallurgical industries in the region. In other words, the iron-ore mine was the starting point for the economic growth of Minas Gerais state.

Boudeville made some comments on the agricultural sector of the state of Minas Gerais. This sector was responsible for 50% of Minas` income and this fact was considered a "fundamental symbol of poverty" (1957, pp. 10) because the agricultural income of developed countries was low, even when this sector was developed in these countries. According to the author, the reasons for the weakness of the agricultural sector of Minas relied upon "the primitive and sclerosed tradition" of this sector and the solution would be its mechanisation. It is interesting to observe that this solution was adopted by the Brazilian government in programmes such as POLAMAZÔNIA and PGC practically two decades later.

Although mineral resources were important, the key element was the propulsive (growth) industry, which was responsible for generating effects on the entire economy. In this regard, Perroux (1968; 1988a) pointed out that there were certain industrial combinations -principally exemplified by the following: power + iron and steel + metal goods + engineering - that have the virtue of generating new industries and providing the entire industrial sector with the capacity for renewal. Despite the importance of these combinations which can induce economic growth, the author himself stressed that not all the components are necessarily located in the same country and even when these components have to be created, they cannot all be created in the same country.

Owing to this problem, Perroux stressed that:

> "...multinational investments carried out under properly formulated programmes designed to foster simultaneously the industrialisation, the development, and the relative autonomy of the regions concerned, can led to the establishment of two types of combinations of industries: (a) industrial complexes, around common centres for the extraction of raw materials, power generation, and distribution and technological research; and (b) agro-industrial complexes, for on-the-spot processing of agricultural products, either for export or for domestic consumption" (1988a, pp.69).

Perroux`s idea mentioned above fitted in well with the programmes implemented by the Brazilian government in the 1970s and 1980s. The exploitation of mineral resources (raw material) was regarded by Perroux as a means of attracting catalyst industries, which

could induce the establishment of others and, consequently, economic growth in the region.

Many authors were unaware that development pole strategies were intrinsically related to a development paradigm termed "from above". According to Stöhr and Taylor (1981, pp.1), the development based on this paradigm

> "... is driven by external demand and innovation impulses, and that from a few dynamic sectoral or geographical clusters [development poles] development would, either in a spontaneous or induced way, "trickle-down" to the rest of the system. Such strategies, as well as being outward-looking or externally oriented, have tended to be urban and industrial in nature, capital-intensive, and dominated by high technology and the "large project" approach".

The discovery of renewable natural resources or non-renewable ones assumed a particular importance for the development of peripheral regions, because the availability of these resources was to stimulate the future formation of an export-base oriented to the internal or external market and, consequently, was to promote the economic growth of this area. The setting up of this export-base in backward regions aimed to exploit their comparative inter-regional advantages, but at the same time infrastructural investments and transfer of technology and capital were necessary to initiate the dynamic process of development.

With respect to Amazonia, the great variety of renewable and non-renewable natural resources was regarded by the Brazilian government as an extremely favourable factor because a diversified economy tends to be less vulnerable to external factors, such as market prices or a decrease in the consumption of certain types of goods produced locally, etc. It is worth noting that the Amazon region was considered by the PDA II a "tropical frontier" and terms in development theory such as "comparative advantages" and "multiplier effects", were mentioned not only in this plan but also in the PND II and in documents about POLAMAZÔNIA (Decrees, POLAMAZÔNIA: Carajás, etc.). These terms, used in planning documents, show that the Federal government had the clear intention in exploiting the vast natural resources of Amazonia, and the fifteen development poles were selected in order to develop their comparative advantages. (CDE, 1974).

These efforts based on large-scale investment resources aimed to generate structural changes by means of accelerated economic growth. However, planning documents neither provided negative scenarios nor commented on probable negative consequences of the development model adopted by the Brazilian government. The one exception was the PDA II (1975, pp. 35), which stressed superficially that this model, despite the high probability of its generating "multiplier effects" in the region, had a propensity to provoke "leakage" of profits and capital generated in the peripheral regions to other regions or abroad, which would be benefited, instead of Amazonia, by "multiplier effects".

By identifying the problem, considered a "spontaneous characteristic" of the development model, the PDA II stressed the importance of tackling it in order to achieve four targets. Two of them were important: to make the model generate "multiplier" and "germinative" effects within the region as much as possible; and to compensate the region, through financial transfers from the Federal government, for the risks of having a development biased outwards with no regional benefits. Although vague, these targets are extremely suggestive. The probability of having a regional development oriented exclusively to outside the region with a few beneficial spread effects generated on the peripheral region itself, is characteristic of an economic enclave. The export enclave is not explicitly mentioned by the PDA II, but the indirect references made in this document show clearly that the planners were aware of this problem.

However, the strategy suggested by the PDA II to avoid this problem was to complement the existing infrastructure in order to serve the non-dynamic sectors. Indeed, the strategy was also evasive and moreover, the plan, even the document POLAMAZÔNIA: Carajás, which was a detailed plan of POLAMAZÔNIA strategy, did not discuss important matters, such as the dynamism and competitiveness of productive sectors in the region, the possibility of "linkages" between these sectors, etc. By paying attention to both targets, principally the first one, mentioned above, it is quite clear that what really mattered to planners was to achieve high rates of economic growth. This urgency of achieving economic growth was due to the pervasive belief, generated to a large extent by

development pole theory, that once economic growth had taken place, the beneficial spread effects would automatically occur in all surrounding regions.

At the beginning of the 1980s, when the Carajás Project as well as the PGC were implemented, development pole policies continued to guide Amazonian development and Brazil faced a serious economic crisis. Brazil's trade deficit rose from US$ 1 billion in 1978 to US$ 2.8 billion in 1980; the deficit in the balance of payments increased from US$ 3.2 billion in 1979 to US$ 3.6 billion in 1980; imports rose from US$ 18 billion in 1979 to US$ 23 billion in 1980; the current account deficit rose from US$ 10.5 billion in 1979 to US$ 12.8 billion in 1980; and inflation rose from 77% in 1979 to 110% in 1980 (Malan & Bonelli, 1992, pp. 87-88). This difficult situation led Mr. Delfim Netto, then Minister of Planning in the Figueiredo administration (1979-85), to make some unequivocal declarations in relation to the Carajás Project and the PGC.

In 1982, he declared that:

> "when we have Carajás [the Carajás Project] working at full-scale, it will represent an export of the order of US$ 9 to 10 billion a year. It will be an increase over the normal exports. This means that the export curve will raise, will generate a gap between exports and imports, which will be the surplus of the trade balance...We shall decrease our current account deficit with this surplus; and it is in this way that we shall diminish the relative importance of the foreign debt" (quoted by Loureiro, 1992, pp. 316-317).

The Carajás Project had already been approved by the Geisel government and the construction of the railway was initiated in 1978, but this project and other undertakings such as Tucuruí hydroelectric scheme and the aluminium plants gained a definitive push under the succeeding Figueiredo administration, which was seduced by the idea of developing the region in an "integrated" way, i.e. through the PGC (see chapter 1; Hall, 1991a). This programme, in which the Carajás Project was the cornerstone, embraced mineral, infrastructural, agricultural, livestock and forestry undertakings in Eastern Amazonia. In social terms, the creation of a large number of jobs in the industrial and agricultural sectors, together with the possibility of absorbing a considerable contingent of workers from other regions of Brazil (Amazonia continued to exert its role of "safety-

valve"), were regarded by the Federal government as a great advantage of this "integrated" development programme.

However, the main focus of the PGC was economic. According to Mr. Delfim Netto, this programme would help "to eliminate the obstacles which hinder Brazil's growth, taking into consideration that, "we are prisoners of the balance of payments...There is no alternative model" (quoted by Hall, 1991a, pp.47). However, in 1981, the year before the above declaration, Mr. Delfim Netto affirmed that "it is the Carajás Project that will ensure the viability of the PGC" (quoted by Neto, 1990, pp. 140). The second declaration is suggestive because this programme, in spite of embracing a large number of heavy and non-heavy industrial activities , would depend on the Carajás Project to became viable. Thus the importance of this project was confirmed, but at the same time the significance of the PGC is questionable insofar as the work on the Carajás Project as well as on its other important components had been initiated before its implementation.

The main reason for the implementation of the PGC is the fact that the Brazilian government, because of its serious economic problems, needed to attract a large amount of loans and generate foreign exchange in order to service its huge external debt and decrease its worrying balance of payments deficit. Thus, the presentation of a ready-made and attractive regional development strategy was convenient and fundamental for the Federal government to realise its objectives. The PGC was implemented and this period can be considered the apex of development pole strategies. By encouraging a number of projects, it was hoped that further industrial and agribusiness ventures would be attracted to the PGC`s seven development poles, Parauapebas being one of them.

The setting up of pig-iron industries and iron-alloy plants was a decisive element in the PGC strategy to establish an "integrated" industrial development along the Carajás railway and two iron-alloy plants were to be located in Parauapebas. Owing to their potentially devastating environmental consequences only a few industries were implemented. In relation to Parauapebas, there was another specific problem, namely the stagnant atmosphere in the region, which could make the problems there worse than ever.

Although the PGC had highly privileged mineral extraction and processing activities, agriculture, lumbering and livestock were, although to a much lesser extent, important elements in this programme. The most comprehensive plan for agricultural development and related activities in Eastern Amazonia was the Programa Grande Carajás Agrícola (PGCA), which was elaborated in 1983 by the Brazilian Ministry of Agriculture. Its objectives were to increase and diversify production of food and industrial goods within seven development poles in the Carajás region by using capital-intensive modern technology (Fearnside, 1986; Hall, 1991a; World Bank, 1992). The PGCA remained a plan on paper and it is beyond the scope of this chapter to analyse the reasons for this. However, some points are sufficiently important to be considered.

Firstly, the plan was very technocratic, placing great emphasis on large-scale, commercial and export-biased production and advocated the intensive use of modern technologies. It is worthwhile noting that these characteristics are related to the logic of development poles, in which the foremost aim was to achieve high rates of economic growth. Secondly, the PGCA was never taken seriously by the Brazilian government, which elaborated this document with the clear purpose of presenting an unreal image of the PGC as a fully-integrated regional development plan for Eastern Amazonia and, consequently, of obtaining substantial foreign loans and investments (Hall, 1991a). What really mattered to the PGC was the industrial projects and it was no coincidence that the major beneficiaries of fiscal incentives were mineral extraction and processing activities.

In spite of the fact that the PGCA was not implemented, significant investments were made in other agricultural, lumbering and livestock projects, even though these projects absorbed only about 1% of total PGC funds (Hall, 1991a). However, the "philosophy", which had had been adopted since POLAMAZÔNIA and which was based on large-scale, commercial and export-oriented production was maintained throughout the PGC period, and thus the impacts caused by these projects exacerbated the already negative trends, contributing even more to producing a worrying social and environmental picture of the region.

The main point is that the socio-economic and environmental impacts on Eastern Amazonia were generated by development policies guided by modernisation principles and, principally, development pole strategies with their convenient beneficial spread effects. This theme will be discussed below and the focus will be centred on Parauapebas.

6.3 - Interindustry Linkages

Economic development occurs at variable intensities throughout the region. Thus development for Perroux is highly polarised because the catalytic effects, generally produced by a cluster of economic activities, tend to engender the growth of the economic whole. The main reason for the occurrence of economic development is technological progress or, according to Perroux`s preferential word, innovation, which is usually introduced by a particular type of industry, a propulsive industry (*industrie motrice*). This type of industry tend to be clustered in special places, which could be cities or areas of mining, agriculture, etc. The agglomeration of propulsive industries is a development pole.

Development pole theory suggests that development poles will generate spread effects, but these effects will not be felt without propulsive industries. These industries play a central role in Perroux`s theory insofar as they have a higher than average rate of growth of product as well as of productivity and a rapidly increasing share in industry as a whole (Perroux, 1968. pp. 244; 1988a, pp. 67-68). As a consequence, these industries would be able to produce effects on the entire economy. Despite these characteristics, the foremost point is that a propulsive industry exerts a propulsive effect on another industry. According to Perroux (1968. pp. 243; 1988a, pp. 67), this effect can be either accidental or typical in nature, is divided into two components which frequently combine with each other: a dimension effect - the increase of demand on B by A, or the possibility provided by A to B of increasing its supply; and an innovation effect (or productivity effect) - the capacity provided by A to B or induced by A to B to introduce an innovation which for a given quantity of factors of production yields the same quantity of product at a lower price and of better quality.

Thus, the interindustry linkages assume a great importance in Perroux`s theory and an essential point was to identify which type of industry was propulsive. In general, scholars who were involved with the development pole theory were, as pointed out by Polenske (1988, pp. 102), interested in looking at interindustry linkages and had the clear aim of determining multiplier effects of particular investment programmes. Perroux himself in his work (1973) *L`effet d`entraînement: de l`analyse au repérage quantitatif* provided quantitative measures of the propulsive effects as well as a table of intersectoral linkages embracing 78 branches of the French industry. Despite the significance of these works, the best contribution was given by Hirschman, who introduced the concepts of backward and forward linkages into the economic literature.

These concepts were an attemptive at describing the dynamic of industrialisation and, because of their clearness and usefulness in the analysis of the industrialisation process, they were broadly accepted and became part of the vocabulary of development economics. According to Hirschman (1981, pp. 63; 1992, pp. 58), his own concepts were "more operational" and "less fuzzy" than Perroux`s propulsive industry, Rostow`s leading sectors or Dahmén`s development block and the main reason for this advantage on other concepts relied upon the intrinsic connection between linkages and the input-output model. In his book The Strategy of Economic Development, Hirschman only created and defined the backward and forward linkage effects and years later he developed two more concepts, the consumption linkage and the fiscal linkage.

Although it is beyond the scope of this chapter to analyse concepts developed by Hirschman, it is important to understand and comment briefly on them because they are useful in interpreting development experiences, principally in those countries such as Brazil which adopted an export-led growth model. Consequently, these concepts will helpful in examining whether beneficial spread effects have been generated in Parauapebas.

Backward linkages are intrinsically related to the stimulus that lead one sector of an economy to exert pressure on a second in order to supply the inputs required by the former. Forward linkages are related to the pressure that one sector exerts on another,

which leads to the establishment of new activities that use the output of the first as an input. Hirschman considered backward linkage effects more important, principally for developing countries, than the forward linkages because the dynamic of the former allowed these countries to experience all stages of industrialisation - finished goods, semi processed goods and machinery - at once. This industrial path become known as import-substitution industrialisation (ISI). This industrialisation process was adopted by the Brazilian government for a very long time.

In fact, import-substitution had occurred in Brazil since the beginning of its industrialisation, and heavy protective tariffs, subsidies and incentives were important instruments of this process. Malan and Bonelli (1992) divided Brazilian development based on import-substitution industrialisation into two phases: the first up to the 1960s was defined as "inward-looking" development; and the second from the 1960s to the 1980s was considered an "outward-looking" growth. In both phases, as both authors also pointed out, the pattern of development was associated with reliance on a large domestic market; a leading role of the Federal government as investor and promoter of specific activities; and a policy for attracting foreign investments.

It is worth mentioning that the Geisel government (1974-79), despite the first oil shock in 1973, opted for the ultimate stage of import-substitution industrialisation which was the sector of intermediate goods, specifically chemical and metallurgical industries and capital goods. The PND II (see chapter 2) placed a great emphasis on metallurgical and chemical industries, principally basic petrochemical (see Evans, 1986), because of their ability to creating backward and forward linkages. By setting-up petrochemical poles, such as Camaçari in the state of Bahia and Polosul in the state of Rio Grande do Sul, and mineral and agro-industrial poles, selected by POLAMAZÔNIA in the North, the Federal government aimed to take advantage of scale and agglomeration economies, to maintain the high rates of economic growth achieved in the "miracle years", to make these poles function as a counter-magnet preventing immigration to the large and congested cities, to avoid industrial concentration on the Centre-South and, consequently, to reduce regional imbalances, etc.

After developing both concepts, backward and forward linkages, Hirschman identified other types of linkage effects which were useful for detecting not only "how one thing leads (or fails to lead) to another", but also for analysing "the causal links involved in the complex interactions among technology, ideology, institutions, and development" (Hirschman, 1992, pp.74). In this regard, Hirschman added the concept of consumption linkage, which was defined as the stimulus for domestic production of consumer goods by means of the new incomes earned from staple production and export. The industrial development generated by consumption linkages depends on the aggregate income stream to which primary exports give rise and also depends on its distribution.

Consumption linkage, as pointed out by Hirschman, is the beginning of the process of import-substitution industrialisation insofar as this type of linkage can explain the establishment of the first industries in developing countries. These new industries, which were set-up to satisfy rising consumer demand, owed their origin to the increase in domestic incomes caused by the export of primary products, principally mining and agricultural products. Another important way in which one activity can induce another is through the ability of the Federal government to tax the incomes accruing from mining and other types of enclave enterprises and at the same time to direct these fiscal receipts towards productive investments. This situation characterises a particular linkage, the fiscal linkage (Hirschman, 1981; 1992).

There are two categories of fiscal linkage: direct and indirect (Hirschman, 1981; 1984; 1992). Direct fiscal linkage is when a portion of the State's revenue accrues from export taxes or royalties. It should be mentioned here that export taxes have been predominant in relation to primary commodities produced in enclave conditions, and the mining sector is a very good example of this. Indirect fiscal linkage is the increase in fiscal revenues through the levying of taxes on imports. All these concepts developed by Hirschman are important for understanding to what extent the economic growth generated by staple products, based on renewable and non-renewable natural resources (mining and agriculture), starts and also stimulate the diversification of the whole economy.

6.4 - The Case of Parauapebas

Despite its enormous potential, the Carajás region presents weak interindustry linkages because the most important industrial sectors in the region are export-biased and principally because these sectors produce goods which require practically no processing. As a consequence,, their interactions with other sectors of the economy are very limited. Thus, large-scale export activities, such as iron-ore and aluminium, can be characterised as enclave economies with slight or even no multiplier effects in the region. The tenuous intersectoral linkages in the Carajás region are confirmed by its input-output matrix, which shows that while the national average of the sectoral multiplier is approximately 3,1, the multiplier for this region is about 1,2 (World Bank, 1994b).

The mining sector can however generate forward linkages. As mentioned before, the iron-ore mine in the state of Minas Gerais was essential for the development of the national steel industry. Good examples of forward linkages are pig-iron industries and ferrous-alloy plants which were established along the Carajás railway and which were key elements in the PGC`s industrial strategy. These industries may generate other linkage effects that would strengthen the interdependence between different sectors of the economy and, would thereby induce the increase in employment and income in the region. In fact, the input-output matrix for Carajás indicates that the sectoral multiplier for the region increased from 1,2 to 1,6 with the introduction of these new sectors (pig-iron production, charcoal, etc.) into the economy (World Bank, 1994b).

This increase, although small, is significant insofar as these sectors are partially or completely directed towards the domestic market. In other words, spread effects such as an increase in employment and income are most likely to occur in a region whose economy has a relatively high degree of intersectoral linkages, which can only be achieved through development oriented towards the internal market, or at least not totally biased towards the external market.

The PGC approved nineteen industrial projects, six ferrous-alloy plants and thirteen pig-iron smelters. Despite high expectations, only one ferrous-alloy plant, set-up by the

Camargo Correia company in *Tucuruí* and which produces metallic silicon is in operation and another, located in Marabá, is being constructed by the PROMETAL company to produce iron-manganese alloy. Of the thirteen pig-iron plants originally planned, only six plants are now in operation. They are located in three development poles along the Carajás railway: Marabá (COSIPAR company); Açailândia (Viena Siderúrgica, Vale do Pindaré, Gusa do Nordeste and SIMASA companies) and Rosário (MARGUSA company). It seems highly unlikely that other pig-iron plants will be built in the near future if opposition to these industries continues to be intense. The main objection to them is their adverse environmental impact on forests and air quality (Anderson, 1990), but this aspect will be taken up later.

There are several reasons for explaining such a discrepancy between the number of industrial projects approved by the PGC and the number of projects implemented in the Carajás region. Firstly, the withdrawal of the PGC`s fiscal incentives under Collor's government in response to "structural adjustment". Secondly, the environmental constraints , as mentioned above. In this regard, legislation, through Decree n° 140 of November 1990, was changed by the President's Regional Development Secretariat. This Decree established new criteria for the approval of metallurgical projects as well as for the concession of fiscal incentives in the PGC area. In relation to the metallurgical industries, this decree also established that they, in order to obtain fiscal incentives, should plan sustainable timber plantations in order to become self-sufficient in energy instead of producing charcoal from the native forest.

However, the central point is that these industries were regarded by planners as an essential element in the region's industrial strategy because the setting-up of metallurgical industries would create backward and forward linkages, strengthen the local economy and, consequently, many benefits would accrue to the region in the form of taxes (fiscal linkages), generation of employment, increase in revenue, etc. Initial optimism estimated that the thirteen industrial projects, the pig-iron and ferrous-alloy plants, would generate, if implemented as originally planned, 5,200 direct and 31,500 indirect job opportunities in the Carajás corridor. In addition, official projections for the total amount of employment to be created in several industrial branches (metallurgical, food processing, construction,

lumbering, charcoal, etc.), i.e. in an economy with a satisfactory degree of interindustry linkages, were that 85,000 jobs would to be generated directly and another 106,000 indirectly in the Carajás region by the year 2000 (World Bank, 1992).

The ferrous-alloy plants were not set-up in the Parauapebas region as originally envisaged by the PGC. The main reason for this is that Parauapebas is a critical area in terms of ventilation and thermal changes because it is located in a valley surrounded by the *Serra dos Carajás*. Moreover, the Master Plan for the Carajás railway (SEPLAN/PGC, 1989) stressed that serious impacts on the soil and rivers had already been caused by wild-cat gold mining in the region. As a consequence, Parauapebas would not experience the postulated spread effects generated by these industrial activities.

Without the implementation of these ferrous-alloy industries, the economic perspectives, in industrial terms, for Parauapebas were more limited and, consequently, its dependence on CVRD`s investments in industrial projects, such as the Salobo copper project, increased more than ever. The Salobo copper project illustrates this situation perfectly, a situation in which not only Parauapebas, but also other municipalities are greedy for industrial investments, and principally the revenues which accrue from them. This project is initially planned to last thirty years and the investment is estimated at US$ 1.5 billion during the first four years. Production is estimated at 200,000 tons of metallic copper, 200,000 tons of sulphuric acid, 8 tons of gold and 20 tons of silver (O Liberal, 1995).

With this significant investment in production, the municipalities of Parauapebas and Marabá are interested in the benefits to be generated by this project. For instance, the taxes to be levied by the municipality (one of them) in the first four years will raise an estimated US$ 540 million and create at least 1,740 direct and 5,260 indirect jobs, in addition to the multiplier effect itself of the Salobo copper project (O Liberal, 1995). In view of this prospect, both municipalities are competing for it. The mayor of Marabá alleges that his municipality has the necessary infrastructure, water, power, and telephones, is connected with the rest of the country by three highways and it is, moreover, crossed by the Carajás railway. Parauapebas, in his opinion, does not have the infrastructure to support an uncontrollable migration because it has already had problems

with the extremely rapid growth of its population. On the other hand, the mayor of Parauapebas states that the implementation of the project in his municipality would compensate for future social problems, because the access to the copper project, independently of its location, will be through Parauapebas (Interview, 1995).

Although a technical study has already been undertaken, the decision of where to locate the copper plant has been postponed by CVRD in order to reconcile different interests, such as those of the municipalities, the state of Pará and the shareholders of the company itself. It is likely that CVRD is also waiting for the results of its own privatisation in order to take a firm decision on this issue. Competition for this industrial project is the result both of the amount of money and the direct and indirect employment to be generated by it, as well as the possibility that it will revitalise the local economy. In spite of the fact that projections are generally optimistic and that industrial projects usually bring about more problems than benefits, a new project is regarded by local governments as a chance to diversify its economy and make it boom. The negative impacts are usually understood as the inevitable "price of progress" and, consequently, the best way to tackle them is to stimulate even more economic growth. The belief persists that social and environmental questions can be overcome by achieving high rates of economic growth.

With regard to Parauapebas, the main industrial activities are those of the CVRD, such as the Manganese project, the Igarapé Bahia gold project and the Carajás iron-ore project. The most important mining project is unquestionably the last, but all of them are interrelated insofar as they are located at the *Serra dos Carajás* and use the same industrial infrastructure, i.e. the railway and the deep-water port, which were components of the Carajás project. The fact that the industrialisation of Parauapebas is in the hands of CVRD has important implications for the development of the region.

Owing to the lack of forward linkages in Parauapebas (ferrous-alloy plants), other types of benefits and employment in the region are related mainly to the implementation and operation of the Carajás project. However, this project, as originally expected, was to be important for the local economy and principally for Brazil. At the national level, the CVRD has claimed that the project has benefited Brazilian industries, most of them

located in the Centre-South, insofar as the materials and equipment used at the Carajás mine are to a large extent provided by domestic industries. Although there are no data about the number of jobs created as a result of project demands for goods and services produced outside the region, CVRD (World Bank, 1992) pointed out that approximately US$ 980 million were spent in material and equipment demanded by the project, but of that amount only 9% (or US$ 90 million) was imported from abroad while 91% (or US$ 890 million) was produced in Brazil. Among the most important goods produced domestically and imported by the project was the rolling stock for the Carajás railway, which included roughly 2,900 ore wagons, some 570 other types of cargo wagons, and 74 locomotives. The CVRD also stressed that the Carajás project had positive impacts on the domestic shipbuilding industry, principally through the joint Norwegian-Brazilian construction of two large ore and petroleum carriers, in which the Brazilian share of the contract was US$ 143.5 million (World Bank, 1992).

These positive effects at the national level described above call into question Roberts' (1991a, pp. 272; 1995a, pp. 390) assertion that Carajás remained an enclave for the nation because "the expensive, high technology equipment is imported, while the low-value, high-volume items are produced in Brazil". Although technologically sophisticated equipment is very expensive, the sharp difference between the money spent on imports shows clearly that the Carajás project had major impacts on the domestic economy. However, the central point here is that goods and services must be imported from outside the region and this condition, as will be seen in this chapter, makes the Carajás pole an enclave with little beneficial spread effects for the surrounding region.

The number of jobs created directly and indirectly in Parauapebas is to a large extent related to CVRD's industrial projects, principally Carajás. As already mentioned in chapter 4, this project, at the peak of construction activities (1982), employed approximately 26,500 workers, of which 24,000 were hired by subcontracting firms and 2,500 were CVRD employees (World Bank, 1992). In 1990, the American sociologist Roberts (1995b) stressed that over 80 subcontracting firms supplied 70% of the Carajás labour force. Two years later, the German researcher Schonenberg pointed out that there were 4,928 workers employed by 138 subcontractor firms and roughly 1,600 CVRD

employees (Santos, 1994; Roberts, 1995b,). In the following year, these numbers were updated by Roberts (1995b), who found 1,573 CVRD employees and approximately 4,500 workers in subcontractor firms. In 1994, there were 1,599 CVRD employees at the Carajás mine and 80 subcontracting firms working for CVRD, although the average was 94 (CVRD, 1995).

According to the World Bank (1992), the Carajás project has generated at least two to three indirect permanent jobs for each direct employment and this average can be confirmed by the numbers mentioned above. In this regard, the number of subcontracted workers can be estimated at 4,800. All these numbers are very informative. During construction, the Carajás project attracted thousands of migrants in search of employment and 26,500 jobs reflects this phase. In subsequent years, there was a drastic decrease in employment, which coincided with the beginning of the operational phase of the project.

Despite the considerable level of unemployment, most construction workers decided to remain in the region and look for other economic opportunities in the rural area, in any type of urban employment and at surrounding wild-cat gold mining sites. This fact partly explains the rapid population growth of towns such as Parauapebas and Rio Verde. The Carajás project (see chapter 4) generated a tremendous impact on indirect employment, of which Rio Verde is an excellent example insofar as it emerged in order to serve the construction camps in the surrounding area through a wide variety of services, such as bars, restaurants, bordellos, etc. Rio Verde was not an unusual phenomenon in Eastern Amazonia, because Curionópolis and Eldorado emerged similarly, specifically as a result of wild-cat gold mining activities at nearby *Serra Pelada.*

In examining carefully the relation between the direct and indirect employment generated by the Carajás project, some important aspects have to be considered. From 1982, the peak of construction activities, to 1992, the number of CVRD employees was reduced and there was an increase in the number of subcontracted workers between 1990 and 1992. However, the numbers of CVRD employees as well as of subcontracted workers showed an insignificant variation in the 1992-94 period, whose importance lies in the fact that the number of subcontracting workers represented 75% of the total labour-force at Carajás.

Thus, there was a correlation between the increase in the number of subcontracted workers and the decrease in CVRD employees during the 1990-92 period, so the proportion of the Carajás labour-force, represented by 75% of subcontracted workers and 25% of CVRD employees, is maintained in the subsequent period.

The labour-force hired by subcontracted firms was barred by CVRD from living at Carajás town and, consequently, from having access to a better quality of life. As a result, these workers had to live in Parauapebas and this fact contributed either to stimulating the local economy insofar as they had to spend money in the town or to putting more pressure on the already inadequate urban infrastructure and facilities. The subcontracted labour-force performed tasks which had previously been undertaken by CVRD employees and CVRD, by using subcontractors (*terceirização*) as a management strategy, has had important impacts on Parauapebas. In this regard, Santos (1994) argues that the spread of poverty in Parauapebas is intrinsically related to the use of subcontractors by CVRD. Roberts (1995b, pp. 376) goes further and states that the Carajás project was planned on the basis of a segmented workforce: as much of the project as possible was farmed out to private national subcontractors". In addition, this author (1995, pp. 751) stresses that "by segmenting its labour-force and using cheap male labour in its subcontractors, the Brazilian state-run mining company CVRD is creating a peculiar society in Parauapebas. Brothels, favelas [shanty-towns], split families, informal vending, and land invasions are likely to continue as key features of Parauapebas as long as subcontracting does".

Despite the problems generated by this management strategy, the picture of Parauapebas is not as black as the above two authors have painted. Although it is beyond the scope of this chapter either to analyse the survival strategies of subcontracted workers or to discuss Santos` and Roberts` work, some points must be raised. First, the main reason CVRD uses subcontractors is essentially economic. Indeed, CVRD, by subcontracting most of its workers, aims to save a considerable amount of money insofar as it is freed from paying social security benefits for these workers as well as from the costs related to their maintenance, such as housing, security services, roads, etc., at the company town. Clearly, it is much cheaper to maintain a town for 25% of the total labour-force than for 100%.

Cost reduction also affects CVRD employees. CVRD has used several strategies, namely: construction of three housing nuclei (*Chácara do Sol, Chácara da Lua and Chácara das Estrelas*) in Parauapebas, which encourages its employees, through the Rio Doce Valley Foundation, to buy their own bungalows. CVRD estimated that, in July 1995, 178 employees would be living in these nuclei and, consequently, US$ 90,000 a month would be spent in the local market (CVRD, 1995; Carvalho, 1994); resignation encouraged by the company, which tries to convince its employees that they would benefit from voluntary redundancy (Machado, 1995); the implementation of a particular system of work to be adopted at the Carajás mine, which consisted of fifteen working days in twelve hour shifts and fifteen days on "holiday". In this system, which is very similar to those of marine oil-rigs, the families of CVRD employees would return to their home states and their houses in Carajás town would become vacant (METABASE, 1995; Interview, 1995).

Second, the use of subcontractors does not fully explain the worrying situation in Parauapebas. As seen in chapter four, CVRD did not allow subcontracted workers to stay in Carajás town, forcing them to live in Parauapebas at their own expense. As a result, they helped to exacerbate the already inadequate urban infrastructure in the town. Thus, problems already existed when these workers moved down to Parauapebas and, moreover, the situation would not be solved in this town even if CVRD allowed them to live in Carajás town. The use of subcontractors by CVRD poses an important question: should the company subcontract workers or not? Roberts and Santos blame CVRD for subcontracting workers and, consequently, for the problematic situation in Parauapebas.

CVRD is a powerful mining company, has several subsidiaries and is a minority shareholder in many other industries (CVRD, 1994). Thus, this highly competitive company acts within the capitalist logic, optimises its production and maximises its profits, and it would be naive to suppose that competitive companies would spend large sums when they could avoid such expenses. Unlike most Brazilian companies, the considerable autonomy of CVRD had enabled it to act independently of the Federal government. This autonomy, as suggested by Neto (1990), was intrinsically associated with its intense participation in the competitive world market and with its high

profitability, which allowed it to be free of State subsidies and to make decisions according to criteria established by its own company management. This does not mean that CVRD was a State company not committed to regional development, but simply that it is still a company committed to making profits. As already mentioned in chapter four, this dual status (state x private) has always been present in CVRD attitudes and has also been a source of problems between the company and local authorities.

The use of subcontractors (*terceirização*) has caused many problems. For instance, subcontracted workers` salaries are lower than those of CVRD employees, although the same tasks are performed, under the same conditions and leadership (Machado, 1995; Interview, 1995); these subcontracted workers, unlike CVRD employees, do not receive any type of social benefit and were forced by CVRD to live in Parauapebas. As a consequence, their living conditions are precarious (Roberts, 1991a; 1995b; Santos, 1994; Machado, 1995); they rotate amongst subcontracted firms. In order to generate competition between these firms for services to be undertaken at Carajás, CVRD may or may not renew their contracts. These contracts vary from twenty days to a maximum two years. According to Santos (1994), the replacement of subcontracted firms by others is usual during the period in which contracts are renewed. When this happens, a certain number of workers who worked for the replaced firm is absorbed by the new firm, and, although firms may be replaced, the activities undertaken by subcontracted workers continue the same as before. However, the status of these workers changes with this replacement. In this regard, subcontracted workers are subjected to the "contract for experience" (*contrato de experiência*), which is the usual practice adopted by all firms subcontracted by CVRD (Santos, 1994). This type of contract varies from thirty days to forty-five days, but may be renewed for up to ninety days. If a worker is dismissed during the period of "experience", the firm only pays the total sum specified in the contract, but does not pay for any rights and benefits stipulated in labour legislation.

All the problems described above are serious and affect a considerable number of people. However, these problems show clearly that there is a tremendous loophole in Brazilian labour legislation and also that different tiers of government have been unable to cope with the impacts generated by the employment of subcontractors. To blame CVRD for

employing subcontracted workers and, consequently, for creating, as suggested by Roberts (1991a, pp. 220), "an urban crisis in Parauapebas" is to put a great emphasis on a questionable aspect. Cost-cutting strategies, which include the use of subcontractors, temporary workers, etc., are company responses in a highly competitive market. By adopting these strategies, companies such as CVRD aim to increase their competitiveness and/or profitability. Thus, this is not a Machiavellian strategy elaborated intentionally to undermine the labour-force, but simply a strategy employed by companies which want to maintain their competitiveness, and this is the logic in which the market operates and companies act.

Therefore, criticisms of these strategies as well as of CVRD, which has employed them, are pointless insofar as they do not provide any solution. The understanding of this process of economic change and of the underlying forces which generate these changes is important for evaluating social policies and, consequently, for tackling local problems. CVRD did not adopt such strategies by itself. Many other companies around the world have adopted them in order to increase their competitiveness and lower their fixed costs. These strategies, as already mentioned, have had impacts on Parauapebas and, principally, on the subcontracted labour-force. In the Parauapebas region, these impacts, despite their importance, are much more a result of gaps in the labour legislation, whose protection of employees is considered by firms too costly, and of the lack of enforcement of the law than of the perversity of the strategy itself.

In relation to subcontracted workers, the document (Fórum Carajás, 1995) elaborated by the international round-table on Carajás neither blames CVRD for employing these workers, nor does it claim that the company should have incorporated them as its direct employees. This document stressed some important points, such as: parity between CVRD employees and subcontracted workers in relation to wages and social benefits; the contract between CVRD and subcontracted firms should last four years at least; and other items were specified in order to make this subcontracted labour-force less vulnerable and, consequently, to minimise the effects of "flexible accumulation", i.e. the use of subcontractors. The relevant point here is that there are ways to tackle the problems

generated by this strategy and it is useless to blame CVRD and subcontracted firms for adopting it.

The above thesis is corroborated by the IBAM report (1993a), which suggested that the municipality of Parauapebas should subcontract firms to perform some tasks related to basic sanitation. It was also added that the demand for subcontracting firms to undertake public services tend to increase because of several reasons, which vary from better community organisation to a wave of privatisation and the local government has to be prepared for this. According to this report (1993a, pp. 66), this strategy "may promote local development insofar as small firms and people are employed and the organisation of society is stimulated to render services to the government. In short, this strategy prepares, in accordance with the language of the Total Quality Management [it should be mentioned here that this management strategy is adopted by CVRD], subcontractors for a constructive partnership that tends to perfection".

Two points deserve attention: the employment of subcontracted firms, which, under certain conditions, can stimulate local economy and that small firms are an important part of this process. Although IBAM has been too optimistic in relation to perfect partnership, these points were supported by UNCTAD`s seminar participants, who also highlighted that small firms play a preponderant role in reducing poverty. All participants (UNCTAD, 1996, pp. 10) stressed that:

> "... through extended subcontracting chains, such enterprises [micro- and small-scale enterprises] can also function as a bridge to help integrate the informal sector with the formal sector - assuming official regulatory harassment of the informal sector is relaxed or eliminated - thereby enhancing the poverty-reducing role and economic potential of the informal sector in the economy".

All these examples suggest that the employment of subcontractor firms is not only an irreversible process, but also this strategy, if driven appropriately, can generate positive effects on the local economy insofar as more firms, principally those which are low-skill and labour-intensive, are subcontracted to undertaken different services. The increase in the number of firms implies that more jobs will be created and more taxes paid. With regard to Parauapebas, the process of contracting out services is virtually limited to

CVRD and, as already seen, has a number of problems. However, these firms subcontracted by CVRD have to pay taxes and the municipality of Parauapebas collected US$ 1,739 million in 1994 (Parauapebas em Revista, 1994) from the ISS tax paid by them. This sum is quite reasonable in the local economy. The investments in urban infrastructure, basic sanitation, education and other types of improvements made by the municipality of Parauapebas as a consequence of the increase in its revenue, which accrued principally from taxation, is characterised as an indirect fiscal linkage. It is important to stress here that the municipality of Parauapebas was privileged in terms of revenue (Parauapebas` income was the third largest in the state of Pará), but despite its significance, the municipal budget was not sufficient for tackling mounting problems, such as lack of hospitals and schools, inadequate urban infrastructure, etc., at the same time in the region.

In fact, subcontractor firms generate not only fiscal linkages, but also backward linkages insofar as these firms buy equipment and materials in Parauapebas. The increase in the number of commercial establishments related to metallurgical and civil construction activities illustrates this point. For example, the number of establishments which sold machines and equipment increased from 4 in 1989 to 7 in 1991, while those establishments which sold electrical material and iron fittings used for construction, artefacts, etc., increased from 3 in 1989 to 7 in 1991 (IDESP, 1990; Seplan/Pará, 1995). Although there is no recent data, it is likely that the number of these commercial establishments has increased because the growth of the commercial sector was significant between 1991-94, in which the number of establishments more than doubled (see chapter five). The examples are not restricted to these above, principally because CVRD contracts out many firms to undertake different services and, consequently, there is a strong probability that these firms purchase other types of products locally. Owing to the lack of data, it is almost impossible to specify those establishments which were induced by subcontractor firms, but these firms certainly contributed to increasing the number of commercial establishments in Parauapebas.

Commercial establishments, by obtaining a license fee to function freely, have to pay taxes, which increase the municipality's revenue and, consequently, its power to tackle a

number of problems in the region. These establishments also generate employment, although the number of jobs created is limited (Roberts, 1995a). However, the central point is that the use of subcontractor firms has also generated benefits and not only problems as suggested by Roberts. In addition, to fiscal and backward linkages, it is important to bear in mind that subcontracted workers, despite their low-salaries which varied from just over one minimum salary to a little bit more than four minimum salaries (Santos, 1994), play an important role in spending part of their salaries in Parauapebas. According to the 1990 Roberts` survey (1995b, pp. 749), 91% of households reported buying some of their food at the informal market, although 84% of these households also bought at supermarkets, i.e. at the formal sector.

Subcontracted firms as well as workers contributed to stimulating the local economy and this is to some extent reflected in the increase in the number of commercial establishments and of some industries during 1989-91. Nowadays, firms and workers hired by CVRD continue to play an important role in the Parauapebas economy, but the emphasis given by Roberts on the subcontracted labour-force is not so relevant as it was in 1990. In his random household survey, he found that forty percent of households had one or more adults working for a subcontracted firm (Roberts, 1991a, 1995b). Forty percent meant approximately 4,500 subcontracted workers living in Parauapebas, which had an urban population estimated at 25,014 in 1989 (SEPLAN/Pará, 1995) and consequently, this labour-force represented roughly 20% of the total urban population. Because these workers were concentrated in Parauapebas and, therefore, represented a significant portion of its urban population, this town was termed by Roberts as a "city of subcontractors".

This situation now in Parauapebas is rather different from when Roberts undertook his research at the beginning of 1990s. According to SEMPLA, the urban population of Parauapebas was estimated at 65,000 (FASE, 1995), which means that the local population more than doubled in five years. Despite this population growth, the number of the labour-force subcontracted by CVRD has not changed significantly since Roberts` fieldwork in 1990. The number of subcontracted labour-force increased from 4,500 to 4,800, so these workers, even taken into account both estimates, now represent less than

8% of the urban population of Parauapebas. Therefore, the subcontracted labour-force has become less important insofar as this town has grown rapidly and other commercial establishments have been created. The municipality of Parauapebas registered 1,500 commercial establishments (Parauapebas em Revista, 1994), while there were only 428 in 1991 (see chapter 5).

This fact contradicts Roberts` point of view that CVRD, by segmenting its labour-force and using cheap labourers in its subcontractor firms, was creating a particular type of society in Parauapebas (Roberts, 1995b). Indeed, the strategy of contracting out (*terceirização*) services has generated impacts on Parauapebas and on the labour-force, but these impacts are only part of many existing problems in this town and CVRD cannot be blamed for adopting such strategy. The sharp increase in the number of commercial establishments associated with the rapid population growth demonstrate clearly that Parauapebas is not dependent on subcontractor firms. Thus CVRD is far from creating any type of specific society and, moreover, this was neither its objective nor its function. Nevertheless, this does not mean that CVRD had no responsibilities to the region. On the contrary, as a government agency it had broader commitments to stimulate regional development. Although the criticism of CVRD in relation to the local authorities (lack of competence and dynamism) is partially true, the mining company acted according to its own interests and as a State company and the main development agency in the region, it could make efforts to promote regional development in another way: strengthening its relationship with municipal authorities, providing technical assistance, work together with governmental and non-governmental organisations, etc. (see chapter 7). This alternative course of action was available, but its main preoccupation was to earn profits. In this regard, the rest was relegated to the secondary position.

The increase in the number of commercial establishments is significant in many respects. Although there is no data about the number of jobs created by these establishments, it is very clear that the tertiary sector is growing in importance in Parauapebas. Its importance is not a particular phenomenon of this town. In this regard, Oliveira (1993) pointed out that this sector was responsible for absorbing 55,2% of Brazilian workers in 1990 and the reasons for this lies in the reorganisation of industrial production associated with an

expansion of the informal sector. According to a recent research (Visor IPEA, 1997), 68% of Brazilian workers are in the commercial sector, which, by including the activity of street vendors (comerciantes ambulantes), etc., embraces the informal sector.

In looking at the commercial sector, its association with the informal sector is inevitable, and even more so in Parauapebas. Although the lack of data is a real problem, it is possible, by a process of elimination, to have an idea of the dimension of the informal sector in this town. Formal employment in Parauapebas is concentrated in local government (teachers, administrative staff, etc.), industries (construction, metallurgy, lumbering, etc.) and some commercial establishments, principally the largest ones. Most of these establishments, as suggested by Roberts (1995a), are family-owned and, consequently, they do create a few jobs. According to CVRD (1995), 57 firms were established between 1992 and 1994 and 788 jobs were created, 197 directly and 591 indirectly. These firms were created through the PRODER programme, which was designed especially by CVRD, SEBRAE and the municipality of Parauapebas in order to stimulate the setting up of micro-, small and medium-firms in the municipality. Many firms, including those subcontracted by CVRD, avoid registering their employees, as already mentioned. The same applies to domestic servants, which are common in Parauapebas. The main reason for not signing work cards relies upon the protection offered by the labour legislation, which is considered too costly by employers.

The point is that Parauapebas has a small employment base and the continuous arrival of job-seeking migrants, who are generally semiskilled and unskilled workers, contributes to exacerbating this already difficult problem. The bulk of the labour-force in the informal sector tends to create its own employment or to work for small-scale, family-owned enterprises. The self-employed workers are involved in a number of activities, which vary from street vending, car washing, cleaning, seamstresses, baby-sitting, and prostitution to mechanics, carpenters, small artisans, etc. Others have became successful micro-entrepreneurs with some employees, most of them relatives. Brazil witnessed unprecedented urban population growth, principally after the 1970s. For instance, 55,9% of the Brazilian population lived in cities in 1970, increasing to 66% ten years later and to 77% in 1994 (Oliveira, 1993; World Bank, 1996a). The average annual growth rate

between the 1980-90 period was 3.3% and 2.7% between 1990-94, while in Parauapebas the average was 18.07% in 1991 (World Bank, 1996a, IBGE, 1991).

This large influx of population - and the Parauapebas average was significantly higher than the national average - has generated tremendous problems in urban centres because their formal sectors are not able to absorb this labour-force. Thus, these workers are forced to enter the informal sector, which is characterised by small-scale production; ease of entry; labour-intensive and simple technology; family owned enterprises; and unregulated and competitive markets (Peattie, 1987). Owing to lack access to financial capital as well as the low-skill of this labour-force, its productivity and income tend to be lower in the informal than the formal sector and moreover, these workers are not protected by labour legislation. Most of these workers are migrants from the poorest Brazilian rural areas who had not been incorporated into the formal sector. With respect to Parauapebas, most of its population - 68% - came from the Northeast (see chapter 5). At the household level, usually most of its members, including women and children, are involved in a number of activities as a means of increasing their incomes.

The housing pattern of these workers is intrinsically associated with their incomes, which are generally low. As a result, most of them live in shanty towns or in very poor districts, in which the urban infrastructure and facilities are precarious. These problems are faced by several cities, such as Rio de Janeiro, São Paulo and many others in developing countries and Parauapebas is no exception to the rule. According to IPEA (Visor IPEA, 1997), street vending (*comércio ambulante*) was the activity which achieved the highest growth rate in all Brazilian regions and principally in the North (172%), Centre-West (154%) and Northeast (130%). The profile of the Brazilian worker, as suggested by IPEA, is: no work card signed, no secondary school; if a man, he works in the commerce and earns from two to four minimum salaries; if a woman, she works in other services and earns from one to two minimum salaries. Although these data are not directly related to Parauapebas, they are important to show that the growth of the informal sector is not an isolated phenomenon. It is worth noting that these three regions which present the highest rates of street vending activity are the poorest ones. This fact is not a mere coincidence,

because these regions are less industrialised, have less diversified economies and also have a great land concentration.

Allied to industrial projects, the agriculture was an important element for the regional development. As seen in chapter one, CVRD stressed that the implementation of the Carajás project would be the beginning of a development corridor, based firstly on the export mineral and agricultural products, and progressively encompassing the establishment of development poles and agro-industries directed at the internal market. In this regard, the setting up of colonisation projects by GETAT - Carajás I and II - and by ITERPA - the agricultural colony Jáder Barbalho - had a number of purposes, such as to defuse social tension and land conflict in the "parrot's beak", to leave these lands for large landowners and large projects and to avoid possible invasions in CVRD`s territory, and one of them was to stimulate food production to meet the growing local demands (see chapters 4 and 5).

In looking at the local food supply, Roberts (1991a; 1995a) found illuminating data. For example, 90% of supermarket goods were imported from distant regions such as Rio de Janeiro, São Paulo, Goiás or Anápolis. Supermarkets alone are responsible for 85% of the retail food sales in Carajás town, while semiformal vendors controlled 14%. A large portion of products - fruits and vegetables - sold by these vendors in a once-a-week farmer's market at Carajás was imported from outside the region. It was estimated that only 22% of expenditure on food in Carajás was on Amazonian foods and a plausible explanation is that most of CVRD employees in the company town came from the Centre-South and, consequently, with imported tastes. However, the main reason lies in the fact that products from industrialised regions are supplied at large scale, regularly and have quality control.

With respect to meals supplied in Carajás to the labour-force, there are cafeterias (*refeitórios*) which provide three meals a day for most of unmarried workers who live in the company town and lunch and/or breakfast for subcontracted workers. Most of larger subcontractor firms have their own cantinas and together , these cantinas and larger cafeterias serve more than 4,500 meals a day. However, the foremost point is that the

largest of the cafeterias, which serves over 1,000 CVRD employees a day, purchases 99% of its food from Rio de Janeiro because of reliability and ease of purchasing, while the other cafeterias and carry-out (marmitex) providers, including large and small ones, buy between 50 and 85% of their food money on local products and more than 50% of their food budgets are spent on meats, bought from local ranchers or butchers (Roberts, 1995a). In general, the cantinas buy approximately 47% of their food locally, although only about 6% of the money drifts towards the small farmers set up in the surrounding colonisation projects.

The food supply in Parauapebas is completely different from Carajás, where all products are inspected by CVRD officials. Despite dissimilarities, the supermarkets, small food shops (*armazéns*) and even small front-room shops in Parauapebas also import between 70 and 90% of their foodstuffs. If the formal market in both towns have the same behaviour, the exception to the rule is the informal market. In this regard, 80% of food sold in this sector in Parauapebas are produced in the surrounding region (Roberts, 1991a; 1995a).

This situation has not changed significantly since then, albeit the local government has tried to tackle these problems. For instance, the SEMPRO, through its Action Plan (1993), placed a great emphasis on small farmers and identified some objectives, such as the construction and maintenance of secondary roads, the promotion of technical assistance, the construction of warehouses for crop storage, etc., in order to increase local production and also avoid rural exodus. However, the main initiative taken by SEMPRO is the open-air market (*feira do produtor*), which consists of 150 small farmers and collects US$ 15,000 a month on average (EEPP, 1994). This Municipal Secretary aims to improve the conditions in which the products are marketed, but until now the only effective help is the truck to transport the total production and even so, this help fails frequently.

These problems above show clearly that local government is still unable to support small farmers. Although important, the lack of local support does not explain the whole situation, simply because it is only part of the problem. However, the main question is: if the municipality of Parauapebas has potential to supply the internal and external market

with its food production, what are the reasons for its failure? The main reason lies in the pattern of rural land ownership. In this regard, IDESP (1990) pointed out that there was a strong trend towards the expansion of cattle ranching at the expense of subsistence and small-scale production of rice, bean, corn and manioc, which were the main agricultural products of the municipality of Parauapebas. This trend seems to be confirmed by the growing size of cattle herds, which increased from 81,000 head in 1991 (Seplan/Pará, 1995) to 300,000 in 1994 (Parauapebas em Revista, 1994). This expansion of cattle ranching is corroborated by land concentration verified within Carajás colonisation projects themselves. The concrete example occurred in the Carajás II project, in which only one farmer bought approximately 2,000 hectares - around forty plots - from colonists to expand his cattle herd from 10,000 to 50,000 head (Hall, 1991a; World Bank, 1992).

Land concentration is neither an isolated phenomenon, nor specific to Paraupebas. Amazonian development policies adopted a clear *latifúndio*-biased model and, consequently, were responsible for generating a number of impacts, such as land concentration, rural violence, land conflicts, on the rural area. These impacts were exacerbated by the Carajás project as well as the Greater Carajás Programme (PGC), which also contributed to the increase of land values. In this regard, the World Bank (1992) pointed out that following the creation the municipality of Parauapebas in late 1988, rural property values in some areas rose by nearly 3000%. The generous incentives given by the Federal government to large-scale industrial and agricultural enterprises and the acquisition of large land properties for speculative aims principally because of high rates of inflation were important factors to generate land concentration, but development poles, where the industrial investments would be allocated, also played a significant role in increasing in land values and land concentration (Hall, 1991a; World Bank, 1992).

Therefore, land concentration is related to a loss of food security, which is also a consequence of development policies which favoured livestock, lumbering and the production of cash crops for export to the detriment of food staples. Food deficits occurs in Parauapebas and in the Carajás region, where several towns along the railway corridor have to import their foods from the Centre-South (Hall, 1991a; World Bank, 1992). It is important to mention here that the increase in the size of cattle herds verified in the

municipality of Parauapebas means deforestation insofar as the native forest is converted into pasture. The environmental impact is considerable because the methods, such as defoliants, burning and *correntão*, used to clear the forest contributed to reducing drastically soil fertility (Hecht, 1985). The social and environmental impacts caused by the PGC as well as the Carajás project on rural and urban areas were discussed, in a broader perspective, in chapter three.

6.5 - Summing up

This chapter has analysed the local impacts of the Carajás project on Parauapebas in the light of development pole theory. This theory advocated that by investing heavily in selected development poles, economic growth would be generated, which would in turn "trickle down" to peripheral regions. Indeed, massive investments were made, through POLAMAZÔNIA, in infrastructure undertakings and the provision of incentives in order to achieve high rates of economic growth and, consequently, to produce spread effects to local populations. However, the beneficial spread effects in Parauapebas fell below expectations, but this phenomenon also occurs in the broader Carajás region, which has tenuous intersectoral linkages. This fact is corroborated by its input-output matrix, which shows that while the national average of the sectoral multiplier is roughly 3,1, the multiplier for this region is about 1,2 (World Bank, 1994b). This multiplier increased to 1,6 with the introduction of new sectors, such as pig-iron, charcoal, etc., into the economy, even though it continues rather below the national average.

In Parauapebas, the ferrous-alloy industries were not implemented as originally envisaged by the PGC. As a consequence, the economic perspectives, in industrial terms, for the region were more limited and its dependence on CVRD`s investments in industrial projects increased more than ever. Without these ferrous-alloy industries, other types of benefits and employment in the region are related mainly to the Carajás project. Indeed, this project has generated linkages by demanding goods and services inside and outside the region. However, this chapter has shown that external linkages are stronger than internal ones. For example, 91% (or US$ 890 million) of US$ 980 million was spent on material and equipment produced in Brazil, specifically in the Centre-South; the Carajás project had positive impacts on the domestic shipbuilding industry, principally through the joint Norwegian-Brazilian construction of two large ore and petroleum carriers, in which the Brazilian share of the contract was US$ 143.5 million; 78% of all money spent on retail food sales in Carajás town was spent on imported foods; the largest of the cafeterias in the company town, which serves over 1,000 CVRD employees a day, purchases 99% of its food from Rio de Janeiro; other cafeterias and carry-out providers buy between 15 and 50% of their food money on imported products; and the

supermarkets, small food shops (*armazéns*) and even small front-room shops in Parauapebas import between 70 and 90% of their foodstuffs.

The main linkages in Parauapebas are fiscal because a large portion of Parauapebas government revenue accrues from royalties and taxes on mining activities. In this regard subcontracted firms and, principally, CVRD represent the principal source of income of the municipal budget. However, there are other linkages in the region and the increase in the number of small-scale firms as well as commercial establishments is a good indicator because this is a clear sign that the local population is demanding services. In fact, the service sector is already assuming a tremendous importance and it is likely that this sector will be the future of this municipality, principally due to the lack of options for diversifying its economy. The belief that the municipality of Parauapebas would supply the internal and external market with its food production is far from being the case and only the informal sector absorbs a large part - 80% of which is sold locally.

The main reason for this lies in the expansion of cattle ranching to the detriment of the subsistence crops, such as rice, bean, corn and manioc, which were the main agriculture products of the municipality of Parauapebas. This trend is be confirmed by the growing number of cattle herd, which increased from 81,000 head in 1991 to 300,000 in 1994. This expansion is also corroborated by land concentration verified within Carajás colonisation schemes themselves and an excellent example occurred in the Carajás II project, in which only one farmer bought approximately forty plots from colonists to expand his cattle herd from 10,000 to 50,000 head.

Land concentration and related rural impacts, such as rural violence and land conflicts are a direct product of development policies, specially development pole strategies, implemented in Amazonia which adopted a clear *latifúndio*-biased model. All these impacts were exacerbated by the Carajás project as well as the Greater Carajás Programme (PGC), which also contributed to the increase of land values. In this particular, following the creation the municipality of Parauapebas in late 1988, rural property values in some areas rose by nearly 3000%. Many factors, such as the generous incentives given by the Federal government to large-scale industrial and agricultural

enterprises and the acquisition of large land properties for speculative aims principally because of high rates of inflation, were important to generate land concentration, but development poles, where the industrial investments would be allocated, also played a significant role in increasing in land values as well as land concentration.

Land concentration, rural violence, land conflicts, loss of food security, inadequate urban infrastructure, intense flow of migrants are problems related either to Parauapebas or other towns along the Carajás corridor. The next chapter will briefly summarise the main impacts generated by development pole strategies on Parauapebas, will discuss the role of the World Bank and CVRD and will conclude with the discussion of policy implications for more sustainable policy for Eastern Amazonia.

Chapter 7

Conclusion

7.1 - Brief Summary

The central objective of this dissertation is to analyse the adverse social impacts generated by regional development policies in Easter Amazonia and illustrated by the town of Parauapebas. According to this objective, the first chapter outlined development policies and frontier integration that have been implemented in Brazilian Amazonia.

Until the military coup of 1964, government action in Amazonia did not significantly affect the environment. After that year, however, this region became the focus of attention and its occupation was planned and implemented by the military regime, bringing about many negative impacts. In fact, military governments saw Amazonia, with its tremendous potential of natural resources as well as its vast "empty spaces", as a means of rapidly tackling a number of economic, social and geopolitical problems. The military regime had a modernisation project, in which the general objective was to make Brazil comparable with the developed countries. This project was permeated by the National Security Doctrine, a doctrine embedded in government geopolitics. Thus, in order to modernise the nation, the military regime realised several specific aims, which varied from institutional reforms, such as the creation of the Central Bank, to stimulating the Amazon economy and to populating this region and integrating the national territory.

The military government, considered it fundamental to have complete control over the State, which was the only body capable of accelerating the process of modernisation and, consequently, of achieving their objectives. Planning became the keystone of the authoritarian regime, principally because it was understood to be a rational and neutral technique which would increase the degree of efficacy of economic policy. The participation of the State in the economy became more intense through the formulation and implementation of several national plans and, as a consequence, the process of regional planning was centralised and was to be consolidated in the mid-1970s. The State

intensified its participation in the economy with the clear purpose of expanding private enterprise.

At the beginning of the 1970s, the Federal government's presence in Amazonia became strengthened principally because geopolitical objectives (occupation and national integration) assumed a particular importance in relation to all others. The document Target and Bases for Government Action, launched during "the Brazilian miracle" by the Médici government for the 1970-72 period, placed great emphasis on two depressed regions of the country, Amazonia and the Northeast. In this regard, the construction of highways (Transamazônica, the Cuiabá-Santarém highway and Northern Perimeter road), the implementation of colonisation projects and the redistribution of unutilised land and the promotion of agro-industries in both regions were encouraged by the Brazilian government in order to occupy Amazonia's vast empty spaces making it viable in agrarian terms; alleviate social tensions in the Northeast and at the same time to avoid agrarian reform by encouraging migration from those areas. In addition, the Federal government believed that small properties could produce a surplus of staple foods such as rice and beans to compensate for the loss of export production.

The First National Development Plan (PND I), formulated for the 1972-74 period, maintained the same objectives as those of the previous government plans such as national integration, occupation of Amazonia and the acceleration of economic growth. Although reserves of iron-ore, gold and copper had already been discovered, the Brazilian government planned to discover more minerals in Amazonia with the purpose of exploiting them. In this regard, an aerial survey was undertaken and made the future commercial expansion in the region possible by confirming the vast mineral wealth in the subsoil, the extent of timber reserves and land available for livestock production.

The Second National Development Plan (PND II), launched by President Geisel for the 1974-79 period, maintained the same priorities established in the PND I. The occurrence of the first oil crises in 1973 contributed to the Brazilian government's decision to exploit Amazonia's vast natural resources in order to generate foreign exchange through exports. In this regard, PND II stressed the importance of expanding infrastructure in particular

areas such as energy, transport and communications, as well as the export of specific products, and of investing in the expansion of basic industries located in selected areas of the region. Owing to its resources of comparative advantage (mineral sector, timber, beef, crops, etc.) Amazonia was understood by the PND II as a "tropical frontier" and this idea was reflected in the POLAMAZÔNIA programme. Indeed, this programme aimed to establish fifteen development poles in selected areas, in which investments were channelled into infrastructure and financial incentives were provided by the Federal government with the purpose of stimulating export-oriented activities in favour of private enterprises. In addition, POLAMAZÔNIA marked an important change in government policy in favour of large corporate agribusiness, livestock production and private colonisation schemes, associated with infrastructure investments, mining and processing activities.

PND III, drawn up for the 1979-85 period, maintained the same preoccupation of previous plans: integration and occupation, but focused on increasing exports in order to reduce the external debt crisis, which was aggravated by the severe oil stock of 1979. This plan stressed the importance of the POLAMAZÔNIA programme for the occupation of Amazonia and, therefore, development poles were regarded by the Federal government as a means of integrating Amazonian development and of occupying this region. In fact, the Brazilian government put its trust in the mining sector and the implementation of the Carajás project, although had officially started in 1978, was only intensified when President Figueiredo took power and decided to authorise CVRD to obtain necessary funds to carry it forward in October, 1980. One month later, the PGC was created and new fiscal incentives established.

CVRD and the World Bank have played a major role in the development of Eastern Amazonia. The CVRD was a State-owned mining company, the Bank's client, the Government agency responsible for the Carajás project, and took a lead role in formulating the PGC. On the other hand, the World Bank made the Carajás project viable by approving a major loan to CVRD as well as by encouraging other foreign financial institution to fund this industrial project.

The PGC was the largest and most ambitious "integrated" development plan ever devised and implemented for any area of tropical rainforest in the world. This programme comprised four major projects: the Carajás iron-ore project, which was the PGC's centrepiece; two aluminium plants: the ALBRÁS-ALUNORTE complex located at Barcarena, close to Belém and ALUMAR in Sao Luis; and the Tucuruí hydroelectric scheme on the River Tocantins. In addition, the PGC involved investments in infrastructure, agriculture, livestock and forestry. It was important and convenient for CVRD as well as for the Federal government that the PGC was presented as a ready-made and attractive "integrated" regional development strategy and the reasons lie in the fact that the State-owned enterprise faced serious problems in obtaining financing necessary to implement the interdependent mineral (the Carajás project, ALBRÁS, ALUMAR) and infrastructural (the Tucuruí hydroelectric, the Carajás railway, port and new town) projects in which it was involved and dependent upon to varying degrees. At the same time, the support given by the Federal government to the PGC was based on a considerable possibility of attracting overseas official and private capital and of generating foreign exchange to service Brazil's external debt.

The Brazilian government hoped that, once several investments were channelled into economic and social infrastructure associated with a wide range of fiscal incentives, further industrial and agribusiness ventures would be attracted to the PGC's development poles, particularly along the Carajás railway corridor at Parauapebas, Marabá, Açailândia, Buriticupu, Santa Inês, Rosário, and Sao Luis. It is important to stress here that the term "development pole" was coined by François Perroux and all the national development plans after the Decennial Plan (the only exception was the Target and Bases for Government Action, which was not properly a plan) adopted the terminologies of the French economist. However, Perroux's development pole theory is taken up in chapter two.

Chapter two focused on development pole theory, which is one of the central themes of this dissertation. The concept of the development pole, formulated in order to describe and explain the process of economic development, was based on the idea that the propulsive effects inherent in a development process tended to be generated by a cluster

of economic activities and also tend to engender broader economic growth. Because of its clear potential, several professionals involved with problems of regional development became very interested in this concept. Nevertheless, Perroux's concept was conceived in an economic context, which was too abstract and non-operational to be applied as a basis for planning. The principal factor responsible for transforming this concept into an operational tool for regional planning was Boudeville, who was Perroux`s disciple. As a result, this concept became very well-known and applied extensively on both sides of Atlantic.

Perroux`s development pole theory was widely accepted in Brazil, as its presence in most national development plans testifies. The main reason for its wide acceptance lies in the fact that the theory's underlying idea suggested that economic growth, interregional equilibrium and integration of backward regions could be achieved through a strategy of decentralised development. According to the theory, development poles could be induced by means of infrastructure investments as well as by several types of incentives (fiscal, subsidies, etc.) which would attract the propulsive industries into the induced pole and, consequently, would initiate the process of economic growth. In fact, the raison d'être of these induced poles was that they would perform as efficient counter-magnets to the densely populated cities; would produce scale and agglomeration economies; and would generate trickle-down effects to their peripheral areas, so that in the long-term an "balanced growth" throughout a country would be expected.

These ideas fitted in well with the geopolitical and economic objectives of the military regime, and development pole strategies were vigorously implemented by the Federal government through the Second National Development Plan - PND II (1975-79) - and these strategies continued with the advent of the Greater Carajás Programme - PGC - in the 1980s. The main objectives of the PND II were economic. Thus, in order to maintain the accelerated growth rates of the "miracle years" (1968-73), to contain inflation and to keep the balance of payments in relative equilibrium industrial, agricultural, urban and geopolitical strategies were designed. The industrial strategy was based on a "new phase" of import-substitution, whose emphasis was on basic sectors, especially in chemical and metallurgical industries. With respect to agricultural strategy, it was hoped that Brazil

would become a world supplier of food, agricultural raw materials and industrialised agricultural products principally because of the vast "empty spaces" at its disposal. The Federal government encouraged diversification and regional specialisation of agriculture with the purpose of taking advantage of the productive potential of each region.

The national integration strategy was fundamentally related to geopolitical and economic preoccupations. In fact, the occupation of "empty spaces", especially in Amazonia, assumed great importance for the military regime insofar as these vast spaces had connotations of security and sovereignty. At the same time, their incorporation into the market economy through a number of projects, which varied from mining to forestry, was essential for the government`s economic strategy, in which decentralisation of economic activities was a key factor. Thus, the best way of integrating and occupying these "virgin" areas was by means of the highway system, already constructed to a large extent, and principally by economic activities to be stimulated there. The POLAMAZÔNIA programme was established for this purpose and massive investments were channelled into fifteen previously selected development poles. All these strategies were intrinsically connected with urban development strategy based on Perroux`s theory and served as a basis for the national development and occupation strategy advocated in the PND II. Urban poles identified as centres of regional development would be strengthened by productive activities and investments in infrastructure and social apparatus. It was hoped that these poles would contain migration and support industrial activities.

The spatial development strategy of the PND II was formalised in the POLAMAZÔNIA. This programme comprised fifteen development poles selected according to their potentialities, which were: mineral, forestry, agro-livestock and agro-industrial. The most important pole was Carajás, because of its huge iron-ore deposits, which would be exploited through a 940 km railway linking the mine to the Itaqui port in São Luís. In addition, the pole also had reserves of manganese, cassiterite, diamond and tin, a great potential for agro-livestock to the west of the iron-ore deposits, and forestry resources. This spatial strategy continued under the PGC, which embraced mineral (the Carajás project was its centrepiece) and associated infrastructure, agricultural, and forestry projects to be set up at development poles along the Carajás railway. Through both

programmes, POLAMAZÔNIA and PGC, a number of incentives and infrastructural investments was provided by the Federal government in order to accelerate economic growth and, consequently, create favourable conditions for these poles to generate the hoped-for trickle-down effects to their peripheral areas.

In fact, professionals involved with regional policy believed that it was necessary to implement development pole strategies in order to overcome social and economic disparities between regions and also between larger urban centres and their peripheral areas. Owing to scarce resources in developing countries, development pole strategies focused on a few urban centres selected where investments would be allocated with the aim of obtaining scale and agglomeration economies. These strategies took a number of forms, particularly in developing countries such as Brazil. Some focused on infrastructure, aiming to supply a basic level of power, water, transport and other public facilities. Others were based on intermediate or heavy manufacturing industries (generally public enterprises), these projects being commonly associated with industrial complexes organised around such sectors as iron and steel, aluminium, petrochemicals and heavy engineering. The common factor in all these projects was the importance of the direct use of large-scale investment resources to produce structural changes through accelerated economic growth.

This basic idea of producing structural changes through accelerated economic growth permeated modernisation theories and development pole theory. These theories understood development as an economic problem, economic growth being practically synonymous with development. Accelerated economic growth would thus reduce regional inequalities, unemployment levels, and poverty. With respect to Perroux`s theory, these problems were regarded as temporary obstacles, which would be overcome through the trickle-down effects generated by development poles to their immediate periphery, generally backward regions, leading in the long-term to a more egalitarian and prosperous society.

Chapter three discussed the social and environmental impacts generated by development policies in the Carajás region. Usually, Brazilian public policies can be portrayed by

inefficiency in establishing a co-ordinated and efficient spatial occupation. Although massive investments in infrastructure have contributed to making the access to remote regions viable and have shown new opportunities for financial gain, they have also accelerated spatial occupation. As a consequence, the natural resources have been exploited in a predatory way and social disparities have worsened considerably.

Development policies have been responsible for generating negative social and environmental impacts in urban and rural areas. In relation to impacts on urban development, it is clear that towns and cities in Eastern Amazonia have benefited, to some extent, from industrial undertakings implemented in this region. For instance, the Carajás railway has transported a considerable number of passengers and has carried large quantities of products, varying from pig-iron to food. Moreover, the road and sanitation infrastructure was improved and schools and hospitals were constructed in several towns and cities, which previously lacked such facilities. The indirect employment and income effects produced by industrial activities have partly contributed to the development of local economies.

Industrial projects, such as the Carajás project, associated with other public interventions in Eastern Amazonia have attracted, directly or indirectly, a substantial flow of migrants, which has aggravated the already insufficient infrastructure and service-provision capabilities of local urban nuclei. Municipal governments have endeavoured to tackle a number of problems, with very limited assistance from the CVRD, of the towns and cities along the Carajás corridor, improving some facilities, but these attempts have been totally inadequate. In fact, the local authorities have been unable to meet the growing needs, and some political changes, such as dismemberment of districts, have exacerbated this situation.

All cities and towns along the Carajás corridor have problems of infrastructural deficiency. Water supplies are commonly untreated, sewage and trash collection and storm drainage systems are usually restricted to higher income neighbourhoods, while sewage treatment and adequate solid waste disposal are scarce. The inadequacy of urban services and facilities directly affects the health and education sectors. The impacts on the

health sector are aggravated by widespread urban poverty, which is caused by the intense flood of migrants attracted to the region in search of economic opportunities. In general, the towns and cities in the Carajás region present high incidences of a number of diseases, which vary from malaria to sexually transmitted diseases, and also high indices of infant and foetal mortality. With regard to the education sector, schools are frequently lacking or greatly overcrowded in most of the region and these problems connected with the need to supplement family incomes contribute to making the situation more problematic.

Industrial projects, such as the Carajás project, implemented in Eastern Amazonia have generated many impacts and one of them is related to urban displacement and involuntary resettlement. In fact, industrial activities have affected small communities by displacing their populations without any type of compensation. The villages were demolished and the only alternative for most of displaced people was to live in squatter settlements. There are several examples of displacement caused by these projects, such as the ALUMAR plant, which displaced 20,000 small farmers and fishermen; the Tucuruí dam and reservoir, which displaced approximately 35,000 people and demolished six small towns; and CVRD which expropriated families from small villages, such as Santo Antonio, Boqueirão, Itaqui, etc., to "Morro Pelado"("Naked Hill") in order to construct its rail and port facilities.

Brazilian development policies, principally for Eastern Amazonia, adopted a clear *latifúndio*-based model, which favoured large landowners with generous subsidies to the detriment of the vast majority of small farmers. In this regard, these policies have directly affected the rural sector, which have undergone many and interconnected impacts, namely land conflicts, land concentration, rural violence, and food insecurity. The implementation of both the PGC and the Carajás project, by increasing land values in Eastern Amazonia, exacerbated land concentration and rural violence, and moreover, stimulated a considerable flow of migrants into the region.

Amazonia development policies were responsible for excluding a large part of the peasant population from access to land. However, the persistence of rural violence in Brazil is intrinsically related to the police and the judiciary, whose local and state structures are

slow and corrupt. In addition, the Federal government, which is also responsible for formulating and implementing these policies, could use its powers to ensure that the law is better enforced instead of being negligent and even conniving with this situation. A recent confrontation between the police of the state of Pará and approximately 1500 landless workers at Eldorado do Carajás , close to Parauapebas, in April 1996, not only illustrates the whole problem, but also indicates that rural violence is far from coming to an end in Brazil. These landless occupied the highway PA-150 with the clear purpose of protesting against the Federal government, which had postponed the resettlement of their families, and the governor of the state of Pará's immediate reaction was to send in the military police to expel them rapidly. As a result, nineteen landless workers were killed while fifty-one were seriously wounded (Bergamo&Camarotti,1996).After more than one year nothing was done to punish the main culprits.

Rural violence also embraces the indigenous question insofar as Indian people have been directly affected by development policies implemented by the Federal government. In fact, Indian lands have been correct because of their valuable natural resources and the pressure from mining companies became more intense with Decree N° 88,895 of 1983 which legitimised mechanised mineral extraction on all Indian lands, CVRD being one of the companies that has made many applications to prospect in tribal territories. These policies associated with the authorities' slowness in assuring land demarcation and assistance to the indigenous population have been responsible for a number of violations, such as invasions by agricultural, mining and lumbering enterprises, assassinations, death threats and outbreaks of disease, in tribal territories under PGC's area of influence.

Intrinsically connected to rural violence is the problem of land concentration and speculation, problems which have been severely aggravated by development policies. Although polarisation of land ownership in the region had already reached an advanced stage before 1980, the implementation of the PGC including the Carajás project exacerbated this process through generous subsidies provided to large farmers and also through the indirect stimulus given by development poles and land values. These factors made Eastern Amazonia an area extremely attractive for purely speculative investment in land during a period of high inflation. Another important impact caused by development

policies is on food security, which directly affects the nutritional levels of the population in the region. The reasons for the impact on food security lie in a number of factors, such as: great stimulus given by the Federal government to livestock, lumbering and the production of cash crops for export instead of food staples; the total control over agricultural lands of largely unproductive properties; the increase in landless small farmers due to the process of expulsion from land allied to the impediment to access to new lands; and the rise in temporary wage labour on larger rural properties. Food insecurity is a common phenomenon in Eastern Amazonia, whose urban areas, from the state capitals to towns along the Carajás corridor, have problems in maintaining supplies of food stuffs, which have to be imported from the Centre-South.

With regard to environmental impacts, it is important to bear in mind the fact that the forest cover of Amazonia remained practically untouched until the military coup. Amazonian development policies stimulated a number of undertakings, such as the construction of highways and secondary roads; cattle-ranching; lumbering; official and "spontaneous" colonisation; mining together with associated infrastructural projects (rail and port facilities and hydroelectric power); and pig iron smelters. All these initiatives are interconnected and have contributed to worsening deforestation and environmental degradation in Eastern Amazonia. Alterations in soil and water quality are associated with rapid deforestation. In relation to soils, clearing the forest for pasture on crops results in erosion, leaching, loss of fertility, and an increase in soil densities by means of compaction, principally when land is used for grazing or heavy machinery is utilised in connection with agricultural activity. With respect to water quality, its contamination is the result of a number of factors, such as: soil erosion, the use of herbicides and fertilisers, increasing urbanisation, and mineral activities. Mercury pollution as a result of gold prospecting is a serious problem in the Carajás region.

Although the Carajás project is not directly responsible for most of environmental impacts that has occurred in the Carajás region, it has indirectly contributed to this process by attracting a substantial flow of labourers, many of whom decided to remain in the region after the construction works; by constructing and improving new roads, facilitating the access to remote areas of the region; by means of private land speculation along the

Carajás railway corridor; through lumber requirements for construction of the Carajás project facilities; and more directly through the consumption of charcoal from native forests promoted by the implementation of metallurgical industries, principally pig-iron smelters.

Chapter four analysed the planning and implementation process of public policies in Parauapebas. This town is intrinsically connected with the Carajás project insofar as it would not have come into existence without the iron-ore project. While this industrial project was being implemented, CVRD considered that the construction of a high standard urban nucleus on top of Carajás mountain was essential for attracting and convincing skilled labours from the Centre-South of Brazil to live in that town and, consequently, to operate the Carajás mine. CVRD was conscious that the Carajás project would attract a substantial flow of job-seekers to the region and decided to preserve its company town from the population and activities not directly related to mining.

Parauapebas was envisaged as an area of "planned invasion", in other words, an alternative to human settlements that were usually encountered in Brazil's peripheral regions. Indeed, this urban nucleus was built with the clear purpose of avoiding the formation of a huge shanty town at the CVRD's main entrance gate and also of minimising some past problems, such as reoccupation of hills and areas liable to flooding, generated by this type of human agglomeration. Thus, an area of approximately 170 hectares close to the CVRD's gate was poorly urbanised in order to accommodate a population of 5,000, most of them migrants not directly related to the company and attracted to the region because of economic opportunities produced by the Carajás project. However, this underestimated provision was totally inadequate in view of the rapid population growth of the area. Consequently, a peripheral peri-urban squatter settlement, known as Rio Verde, emerged contiguous to the planned town.

The reasons for the rapid population growth in the Parauapebas-Rio Verde region lie in a number of factors, such as GETAT's colonisation projects (Carajás I,II and III), the spontaneous establishment of small farmers and ranches of varying sizes, several wild-cat gold mining sites(especially Serra Pelada) in the surrounding area, and principally the

Carajás project. In fact, this project attracted a considerable number of migrants, who arrived in the region either as construction workers or to serve the construction camps close to Parauapebas and Carajás. Rio Verde had its roots as the "red light district" for construction workers in these urban nuclei. The permanence of many of these workers after the end of the construction phase played a major role in the rapid growth of the region. In addition to these factors, CVRD's decision to establish the Carajás town as a company town also contributed to affecting the already inadequate urban infrastructure and facilities in Parauapebas and Rio Verde. Despite increasing pressure on both nuclei, the central question is that there was availability of land in Carajás town and, moreover, CVRD was committed to housing contract-service workers there, as established in the Loan Agreement with the World Bank

Although population growth in the Parauapebas-Rio Verde region has been extremely rapid, the peripheral nucleus grew much faster than in the planned town and this is due to two main factors: the extension of the construction of the town of Parauapebas by one and a half years, during which plots of land were not made available for the settlement of migrants; and a certain elitism related to the quality of life, housing and work, which was imposed on those people who wanted plots of land in Parauapebas. These two factors made this urban nucleus inaccessible to most migrants, who were forced to live in the surrounding area of Rio Verde.

Indeed, all those factors mentioned above contributed to attracting an intense flow of migrants, which in turn led to a worsening of the already debilitated urban infrastructure and services in Parauapebas (including its peripheral settlement Rio Verde). It was, to a certain extent, beyond the control of planners to predict the real dimensions of the flow of migrants to be attracted to the region. Nevertheless, the substantial flow of migrants, which had already been predicted by government agencies, was largely stimulated by the Federal government, whose overriding development strategies in Eastern Amazonia were based on modernisation principles and development pole theory.

According to development pole theory, the population to be attracted to development poles in search of employment was essential for making them productive. The theory also

advocated that high rates of economic growth would generate a "trickle-down" effects to benefit peripheral areas and their populations. In this regard, the attraction of a substantial flow of migrants was an attempt to make the Carajás pole viable and planners disregarded the volume of migrants attracted to the region, certainly because of the economic objective, but also because of the crude and extremely convenient "trickle-down" assumptions. These factors partly explain CVRD's under-estimation of the pace of urbanisation in Parauapebas, its non-compliance with the Loan and Guarantee Agreement with the World Bank, its "unawareness" of previous predictions made by government agencies and the change in its plans for Parauapebas, which was redesigned to house a population of 10,000 residents instead of 5,000 originally planned, principally because of pressure from the World Bank.

At the same time, the above factors reveal not only negligence on the part of CVRD, but also its lack of interest in tackling the problems caused by the Carajás project. These particularities of the CVRD are corroborated by the problematic relationship between local authorities and the mining company. This problem is partly due to its omnipotence associated with its inherent lack of sensitivity to the nature of local problems which led CVRD to adopt hostile attitudes towards the local population. The other part is related to disagreement between both sides over their responsibilities. In this regard, the local authorities believed that CVRD was responsible for most of the problems in these municipalities, while the CVRD professed that these problems were beyond its competence. In fact, CVRD's faults, behaviour and attitudes indicate clearly that its foremost preoccupation was the Carajás project and those pre-requisites considered fundamental for making the project work properly. As a consequence, other aspects and problems were regarded by CVRD as secondary.

There were other significant factors, such as a lack of municipal resources, misuse of municipality funds and corruption, which contributed to making the situation in the Parauapebas-Rio Verde region worse. These factors were intrinsically connected with the lack of technical capacity, inability to forge external links and obtain access to funding, and incompetence to implement policies, which were problems faced by all municipalities, including the municipality of Marabá (Interview, 1995). This municipality,

which occupied a huge area, considered Parauapebas and Rio Verde areas of low priority not only because of the factors mentioned above, but also because of the growing demand for urban infrastructure and services throughout the entire municipality, especially the city of Marabá, which grew considerably because of the construction of the Carajás railway.

CVRD as well as local governments have intrinsically been involved with problems in the region. They have been important actors which have played a significant role in bringing about negative impacts and in coping with them. These adverse impacts have their roots in regional development planning, which was too technocratic, over-centralised and totally directed towards economic aspects. All these characteristics were visible in the Carajás region, where local governments did not participate in any phase of planning. This was typically a "top-down" process, in which decisions were taken from above. At the dame time, these development strategies, based on modernisation principles and the development pole theory, stimulated a large flow of migrants to the region.

Chapter five analysed the implications of planning for Parauapebas , focusing on its two distinct phases: before and after its emancipation from the municipality of Marabá. Although distinct, both phases are interrelated and have some similarities. Until its political independence, Parauapebas and its satellite Rio Verde came under the municipality of Marabá, which maintained a local sub-administration (*sub-prefeitura*) in Parauapebas, and indirectly under the CVRD. As seen in the previous chapter, the Parauapebas-Rio Verde region was not a priority for this municipality, which had a problematic relationship with the local authorities and this fact caused many problems for both urban nuclei.

CVRD considered Parauapebas of secondary importance and the main reason for this lies in the fact that this urban nucleus was planned in order to avoid the formation of an enormous shanty town, which represented , in the eyes of CVRD, a tremendous source of trouble for the Carajás project operation. In this regard, CVRD, by planning and implementing the town of Parauapebas, was not motivated by humanitarian aspirations. The Carajás project was CVRD's principal preoccupation and, consequently, the mining company took all the precautions against possible invasions on interference that could

affect its industrial project. In this regard, CVRD's "buffer zone", which was formed by the GETAT's colonisation projects, by the Indian reserve of Xicrin do Cateté, by the areas of Gleba Aquiri and Gleba Cinzento, and by Gleba Ampulheta, is a very good example.

In addition, CVRD's arrogance, lack of sensitivity to problems not directly related to the Carajás project and its hostile attitudes towards the population of Parauapebas and Rio Verde are well-illustrated by the company's decision to forbid small farmers form the agricultural colony Jáder Barbalho to transport their crops through the Raimundo Mascarenhas road, which was within CVRD's concession area, to Parauapebas; by the rigid control exercised by the company's guard in its entrance gate; and by its decision to establish Carajás as a "company town", which shows clearly the CVRD's objective of keeping peripheral population away from its territory, or in other words, a process of social segregation and exclusion. All these attitudes contributed to generating widespread resentment against CVRD and also to making local problems even more difficult.

The problematic relationship between CVRD and local authorities, the inability of the municipality of Marabá to tackle the problems in its own municipality, CVRD's attitudes and decisions associated with a considerable flow of migrants, who arrived in the region in search of jobs, were to a large extent responsible for producing a problematic situation in Parauapebas and Rio Verde. For instance, with respect to urban infrastructure, Rio Verde had unpaved streets and precarious electrical supplies, while other facilities such as a water-distribution network and street lighting were non-existent. In relation to public health, the nosological table of both nuclei was critical and there were high indices of some diseases such as malaria and leishmanioasis. The situation of the education sector in Parauapebas and Rio Verde was also dramatic, with overcrowded schools, the lack of educational infrastructure and low level of teacher qualification a common phenomenon in Parauapebas and Rio Verde. This difficult situation generated widespread dissatisfaction, which in turn provoked the emancipation of this region from the municipality of Marabá. It was hoped that the emancipation of Parauapebas would improve its situation, principally through direct investments of mining royalties, and would also mark the beginning of a new development phase in the region.

Although established on 10 May 1988, the new municipality of Parauapebas only initiated its activities on 1 January 1989, when the Mayor, Mr. Salmen, the vice - Mayor and nine town councillors *(vereadores)* were installed. Insofar as tax funds, including mining royalties, began to flow directly to municipality, several improvements could be made by the new municipal administration in the region. Despite their significance, these improvements fell far short of meeting growing local demands and the reasons for this lie in a number of factors. The municipal budget was not sufficient for tacking all problems, which were aggravated by the continuous and intense flow of migrants; the presence of the Federal government in Eastern Amazonia was strongly reduced because of Brazil`s economic crisis (high rates of inflation, etc.) and the 1988 Constitution, which encouraged decentralisation, redistribution of revenues, and an increase power of state and, principally, municipal governments; and corruption in the municipal administration.

In relation to the inadequacy of the municipal budget, the substantial flow of migrants plays a major role in bringing about many problems. In fact, Parauapebas grew from 1980 to 1991 at an impulsive annual rate of 18.07% and nowadays the population in the municipality is estimated at 101,440 inhabitants. However, local problems, such as a lack of tax collectors and law enforcement capacity, associated with the delay of the Brazilian census data contributed to making some taxes financially insignificant for Parauapebas. With respect to corruption, Mr. Salmen's as well as Mr. Souza's administration were accused of fiscal irregularities, although only the first has been temporally suspended from his administrative functions.

Both municipal administrations were marked by several irregularities. In relation to Mr. Salmen`s administration, the Municipal Council (*Câmara Municipal*) of Parauapebas raised a list of irregularities, such as false invoices, non-existing constructions, ghost employees, funds diverted, etc. and Mr. Salmen had his accounts rejected by the Municipal Council as well as the Tribune of Municipal Accounts (*Tribunal de Contas do Município*) (Parauapebas em Revista, 1994). Although Mr. Souza`s accounts has not been rejected, his administration was also marked by several irregularities, which varied from expropriation of an urban area without legislative authorisation; the duplication of salaries of some municipal secretaries; the purchase of curtains from the mayor's firm; irregular

contracts; the rent of a house for a town councillor (*vereador*); overpayment to firms by services (constructions) done in the municipality; to fraudulent competition between firms with the connivance of the local administration (EEPP, 1993).

In spite of the importance of these accusations, the existence of corruption in Mr. Souza's administration is evidenced by the basic sanitation project, which was the main achievement and pride of his administration. This project was a result of an agreement between the municipality and CVRD to provide the whole town of Parauapebas with water, sewage disposal and garbage collection facilities. Nevertheless, CVRD alleged that there was corruption in the municipal administration and became responsible for practically all phases of the project, while the municipality was in charge of supervising and paying the costs (CVRD deducts the necessary sum from mining royalties) of the project (FASE, 1995). In fact, this basic sanitation project is highly illustrative insofar as it shows that there were corruption problems in the municipality; it revealed the limitations of the municipal administration; and also that CVRD continues to have a strong presence in the region, although its assistance only materialised in accordance with its own interests and convenience.

The municipality of Parauapebas, despite improvements, continues to present a problematic situation. Due to the continuos arrival of migrants, new areas were reoccupied and, consequently, new districts were formed in Parauapebas town. Many improvements were made in the old districts such as Cidade Nova and Rio Verde, but the urban infrastructure and facilities of the new ones were practically non-existent. In relation to basic sanitation, the district Bairro da Paz will not be supplied by water, while the districts Maranhão, Riacho Doce, Karajás Sul and Cortinas will not have water supply and will not be served by the sewage disposal system (FASE, 1995), although the local authorities as well as CVRD said that the project of basic sanitation would provide the whole town with water and sewage disposal facilities.

The situation in the health and education sectors is also problematic. With respect to the first sector, the lack of basic urban services and facilities, widespread urban poverty allied to the infrastructure of the health system, which is unable to meet the growing local

demands, result in high incidences of most of diseases in the municipality. The education sector despite the increase in the number of schools faces serious problems, such as infrastructure is not sufficient for meeting local demand; low level of qualification of teachers, high incidence of repeater students, low salaries paid to municipal teachers, and overcrowded schools. All the problems contribute to making the quality of teaching very poor in the municipality of Parauapebas.

Chapter six analysed the impacts of the Carajás project on Parauapebas in the light of development pole theory. This theory predicts that economic growth would be generated through investments in selected development poles, which would trickle-down to peripheral regions. In fact, the POLAMAZÔNIA programme was created and massive investments in infrastructure associated with generous fiscal incentives were channelled principally into the Carajás pole with the clear purpose of achieving high rates of economic growth and, consequently, of generating spread effects to local populations.

The discovery of renewable natural resources or non-renewable ones took on particular importance for the development of peripheral regions, because the availability of these resources would stimulate the future formation of an export-base oriented to the internal or external market and, consequently, would promote the economic growth of this area. The setting up of this export-base in backward regions aimed to exploit their comparative inter-regional advantages, but at the same time infrastructural investments and transfer of technology and capital were necessary to initiate the dynamic process of development. With respect to Amazonia, the great variety of renewable natural resources and non-renewable ones was regarded by the Brazilian government as an extremely favourable factor because a diversified economy tends to be less vulnerable to external factors, such as market prices, a decrease in the consumption of certain types of goods produced locally, etc.

Development pole strategies adopted by the Brazilian government were externally oriented, based on capital-intensive industries, and dominated fundamentally by large projects, and put a great emphasis on high technology. These strategies were responsible directly and indirectly for important impacts, such as: 1) the considerable number of jobs

generated during the implementation of large industrial projects (principally the Carajás project) was drastically reduced during the operation phase, which principally required skilled workers. As a consequence, the vast majority of the labour-force, formed essentially by unskilled migrants, was condemned to unemployment or underemployment; 2) the peripheral regions became dependent on goods and services produced outside, which made the problems of underemployment and the "leakage" of profits and capital generated in the regions worse; 3) the problems above contributed to an increase in income inequalities between the local population and also affected the natural resources of the region in a predatory way; and 4) the increase in land values and land concentration, which resulted in rural violence and land conflicts.

In Brazil, it has been shown that the trickle-down effects of development pole policies have on the whole failed to materialise, as illustrated by the Carajás region and, specifically, Parauapebas, which assumes particular importance insofar as it was within the Carajás pole's area of influence and at the same time was one of the PGC's development poles. The central point is that the Brazilian development model was export-biased and could not ensure a sustainable regional development principally because the very limited, or the lack of, linkages between the export-sector and the rest of the local economy, thus hindering the propagation of spread effects generated by the increase in export-based activities to the other economic activities in the region. This point is corroborated by the Carajás project, which was designed to export iron-ore and generate foreign exchange. Although this industrial project has been an economic success, the Carajás region has presented tenuous intersectoral linkages because the exploitation of the vast iron-ore deposits and of other important activities based on natural resources of the region (other mineral and lumbering) have been oriented towards the external market. These weak interindustry linkages have resulted in a few beneficial effects being generated in the region and Parauapebas is no exception.

Parauapebas is a microcosm of the impacts generated by development pole policies. Firstly, industrial activities, especially the Carajás project, attracted a substantial flow of migrants, who arrived in the region either as construction workers or to service the construction camps close to Carajás and Parauapebas. The continued presence of these

workers after the construction phase contributed to a worsening of local problems, which varied from inadequate urban infrastructure to high levels of ill health and poor educational provision. In industrial terms, the ferrous-alloy plants, which were considered together with pig iron smelters a key element in the strategy to establish an integrated industrial development along the Carajás railway, were not implemented on the scale originally envisaged by the PGC. Without these industries, the economic perspectives of this municipality have been centralised principally on the Carajás project and on future industrial investments to be made by the CVRD in the region.

Indeed, the Carajás project has generated linkages by demanding goods and services inside and outside the region. However, the most important linkages have been external as confirmed by many examples, such as the purchase of material and equipment produced in the Centre-South, the construction of two large ships to carry ore and petroleum, and the large-scale import of food from other Brazilian states. These examples show clearly that the Carajás project is an enclave with few positive impacts in the region. In addition to the external linkages, there are internal linkages in the region, illustrated for example by the increase in the number of commercial establishments and small scale firms. Despite the importance of these linkages and the service sector being indeed the future of Parauapebas principally because of the lack of industrial alternatives for diversifying its economy, the main linkages in this municipality are fiscal because a large portion of its revenue accrues from royalties and taxes on mining activities. In this regard, CVRD and its subcontracted firms are the principal source of income for the municipal budget.

7.2 - Role of CVRD and the World Bank

After summarising the main social, economic and environmental impacts generated by the Carajás project on the region, and on Parauapebas in particular, and its underlying development pole assumptions, it is important to discuss the policy implications of these findings. In this regard, the role played by CVRD as well as the World Bank in Eastern Amazonia assumes a particular importance insofar as the mining company was the Bank's client, responsible for the Carajás project, and took a lead role in formulating the Greater

Carajás Programme (PGC), while the World Bank made the Carajás project viable by approving a major loan to CVRD as well as by encouraging other foreign financial institutions to fund this project.

CVRD played a major role in Amazonian regional development and its performance and attitudes have generated negative consequences along the Carajás corridor and, specifically, in Parauapebas. In fact, the company's brazen attitudes at Carajás, its disregard for the local municipality as well as for other important impacts generated in the region are illustrated by many examples, such as: the change in CVRD`s plan for Parauapebas, which was originally to accommodate 5,000 inhabitants, but which, owing to pressure from the World Bank, was doubled to 10,000; CVRD`s faulty prediction of the pace of urbanisation; the company's "unawareness" of previous predictions made by government agencies, such as SUDAM and GETAT; CVRD`s non-compliance with the Loan and Guarantee Agreement with the World Bank to settle service workers at Carajás town, which intentionally became a company enclave; the problematic relationship between local authorities and CVRD, which considered them a group that only knew how to complain about their circumstances and whose lack of competence and dynamism was an obstacle to the solution of local problems and also a continual annoyance to the company; and security measures taken in Carajás town.

In order to understand CVRD's behaviour and negligence, some points must be understood. First of all, it is important to place the company's attitudes within a historical context. CVRD was created and became the world largest mining company within a context dominated by a long tradition of centralised planning. If policy decisions were in the hands of the Federal government, which did not allow any participation in the planning process by different government tiers and if State enterprises were considered an extension of the State itself, the CVRD was neither an exception to the rule nor free from this type of influence. In this regard, top-down planning and its attributes were part of the CVRD`s organisational culture and this fact partially explains its negligence in relation to local municipality and other impacts generated in the Carajás region. Another factor is the type of relationship which existed between the Federal government and CVRD, which enjoyed relative autonomy in comparison with other Brazilian State enterprises.

State-owned enterprises, like private enterprises, tend to grow and diversify their investments and CVRD is no exception. This public enterprise became involved in many other industries, in a range of products which varied from ores and aluminium to woodpulp and timber (CVRD, 1996). Owing to the competitive world market, CVRD is always trying to reduce its costs and to achieve global standards of quality (termed ISO 9,000) and these preoccupation are reflected in its management strategy - Total Quality Management- which aims to optimise the whole enterprise. In fact, CVRD is a very powerful, competent and profitable enterprise and its high profitability was an essential factor in its obtaining considerable autonomy in relation to the Federal government.

The duality of the public and the private is very clear in CVRD. Its private side is manifested mainly in its successful performance in the market, where this enterprise shows some recognised attributes of private firms, such as competence, dynamism, efficiency and pragmatism. Despite these visible qualities, CVRD is a State-owned mining enterprise and owing to this condition it has some limitations and commitment from which private firms are free. These two contrasting sides of CVRD produce a type of "identity crisis", which is reflected in its attitudes. In fact, this duality is the result of the relationship between CVRD and the Federal government which involved coincident as well as divergent interests and the setting-up of the PGC and *Serra Pelada* illustrate perfectly this situation.

As already seen in chapter one, the PGC was the amalgamation of industrial projects implemented previously with new projects supported by a number of fiscal incentives. In relation to these projects already initiated, they had been encouraged by the Federal government through the PND II - POLAMAZÔNIA regional development strategy, which aimed to exploit Amazonian mineral wealthy rationally. The mineral-metallurgical activities were considered top priority by this national plan, which placed great emphasis on the role to be played by the State enterprises (principally CVRD) as well as by national and multinational enterprises. Thus, CVRD participated in several joint-ventures with multinational enterprises, such as MRN, ALBRÁS and ALUNORTE, to exploit aluminium and at the same time was involved in its own project to exploit Carajás iron-

ore reserves. The Iron-Ore project embraced the mine, the railway, a deep-water port and the company town.

CVRD`s self interest here is obvious in view of the fact that it was growing, diversifying its investments and aiming to grow much more, but for achieving this objective it was necessary to complete these interdependent mineral and infrastructural projects approved by the Geisel administration, which was sceptical in relation to the feasibility of the Carajás project, principally because of CVRD difficulties in obtaining all the foreign funding for it. Worried about the future of this project, CVRD played a fundamental role in formulating an "integrated" regional development strategy for Eastern Amazonia which was jubilantly adopted by the Figueiredo government. Both CVRD and the Federal government profited from this "integrated" regional plan. From the CVRD`s perspective, the government approval was essential for attracting overseas official and private capital, ensuring the continuation of the Carajás project, which was extremely important for its organisational strategy. On the other hand, the Federal government saw this ready-made regional package as a real and viable possibility for generating foreign exchange to service Brazil's huge external debt.

All industrial projects in Eastern Amazonia, especially Carajás, meant the future survival of CVRD, which pressurised the Federal government to switch its iron and steel production from the state of Minas Gerais, whose forest was seriously depleted, to Amazonia. This interest is confirmed by the fact that the "integrated" regional plan was elaborated by CVRD itself and not by the Federal government as it was supposed to have been. The logic was inverted and this aspect is significant insofar as CVRD was the main beneficiary of the federal government in the region. For instance, the Tucuruí dam, a key element in the PGC, provided cheap electricity to the Carajás iron-ore complex as well as to the aluminium plants of ALUMAR and ALBRÁS-ALUNORTE, of which CVRD was shareholder. However, the best example is the CVRD`s buffer zone. This enterprise wanted to avoid invasion or any interference that could affect the Carajás project and as a result of this desire, the Federal government , through GETAT, decided to locate its colonisation projects Carajás I, II and III around the CVRD`s iron-ore concession area in order to complete the protected zone .

CVRD`s difficulties in obtaining funds for its projects (mine, port, railway, town) came to an end when the PGC was approved in 1980. Despite its access to foreign funds, CVRD had to spend a considerable amount of its own financial resources on the Carajás iron-ore complex. As a consequence, this enterprise undertook a partial privatisation by selling debentures in the financial market which reduced the Brazilian government's ownership of the CVRD from 70% to 56% in 1985 (Neto, 1990; Hall, 1991a). With the necessary funds, CVRD was able to implement the Carajás project successfully and its organisational efficiency is well-illustrated by the fact that the railway was inaugurated in February 1985, ten months ahead of schedule, while the first shipment of iron-ore from Carajás mineral deposits was exported through Itaqui port in May 1985 (World Bank, 1992).

Owing to its efficiency, competence, and, principally, capacity for generating revenue, CVRD, unlike most of Brazilian State enterprises, enjoyed a considerable autonomy to act independently of the Federal government. Although relative, its autonomy was sufficient for constituting a type of a "State within a State" or, in Rueschemeyer and Evan`s (1985) words, a "semi-peripheral State" and the company town is a vivid example. Security measures are taken in Carajás town. For instance, all vehicles and sub-contracted workers are routinely searched at the CVRD`s main gate by security guards who work for a firm ironically called Sacrament. These measures contribute, in addition to the high level of the town's urban design, to increasing the tremendous gap which already exists between the towns of Carajás and Parauapebas.

Security measures put into effect to protect, in Becker's (1992) word, CVRD`s "stronghold" and the creation of its "buffer zone" illustrate not only the considerable autonomy of the State mining enterprise and, consequently, the reduced role played by the Federal government in the Carajás region, but also the CVRD`s strategy towards social exclusion. As seen in chapter four, the process of social exclusion has its roots in the planning of both Carajás and Parauapebas towns and this process has been maintained by means of elaborated security precautions in the company town. In fact, the top-down planning and its attributes (centralised decision-making, hierarchical structure,

authoritarian leadership, lack of internal democracy, etc.) were embedded in CVRD`s organisational culture and, consequently, in its own planning. This authoritarian character of the CVRD is reinforced by its omnipresence and omnipotence, which is a direct result of its significant autonomy in the region. CVRD is an enterprise committed principally to making profits, being regional development a secondary question. This priority is very clear and reflected on its attitudes.

Although the CVRD`s autonomy was considerable, it was a State enterprise and, therefore, its autonomy was limited. For instance, the World Bank approved a loan of US$ 304.5 million to CVRD, which was the borrower and responsible for the implementation of the Carajás project. However, a sine qua non condition for the Bank's approval was that the Brazilian government was Guarantor of the loan. Another example is the famous wild-cat gold mining *Serra Pelada*, which was controlled by DOCEGEO, a CVRD subsidiary. The rich deposits of *Serra Pelada*, discovered in the late 1970s, attracted thousands of gold prospectors from all over Brazil and by 1980 the Federal government decided to intervene with the aim of organising the gold mine. This intervention opposed to DOCEGEO interests which was in favour of mechanising production. In 1984 over 2,000 gold prospectors marched towards Parauapebas, which had some of its community facilities built by CVRD burned, in order to pressurise the Brazilian Congress into revoking its decision to close the mine (Hall, 1991a; Becker, 1992; World Bank, 1992).

It is important to stress here that the Federal government played an important role in development policy formulation and implementation in Easter Amazonia, through a variety of special programmes, fiscal incentives and centralised institutional control over regional activities. With respect to CVRD, the Federal government was aware of the autonomy of the Sate enterprise and supported its actions consciously. The main reasons for this lie in the fact that CVRD, due to its competence and efficiency, was essential for "solving" the main preoccupations, which were essentially macroeconomic, of the Brazilian government: balance of payments and external debt. Due to its considerable autonomy, CVRD was integrated with the Federal government only at very highest level of policy formulation.

In addition to CVRD, The World Bank was also an important actor in Eastern Amazonia. In fact, the Bank played a significant role in approving the Carajás project and encouraging other foreign institutions to help finance this project. The Bank undertook several missions, which varied from the preparation to post-appraisal missions, in order to give its approval. All these missions gave priority to financial and economic aspects, such as market constraint, financing plan completion, market risks, rates of return, etc., of the Carajás project, while Amerindian, environmental and urban development issues did not receive any attention. This fact is significant insofar as this project was appraised by the Bank essentially in economic terms.

This understanding and appraisal of the Carajás project was very limited, principally because the World Bank was aware of the Federal government's plan, the PGC, for Eastern Amazonia even before its establishment as well as of the fact that the Carajás project would be the cornerstone of this programme. This previous knowledge is confirmed by the Bank report (1992, pp. 57), which stressed that:

> "Using Carajás (i.e. the iron-ore project) as the base, a major development programme is being considered for the states of Pará and Maranhão. The basic concept is to develop an "export corridor" in the North of Brazil...An important side effect would be the strong impact it would have on industrial development of the Northeast (i.e. Maranhão). The future availability of energy at Tucuruí promises good prospects for exploitation of the vast mineral deposits in the area which, in addition to iron-ore, include: copper...bauxite...nickel...(and) manganese".

Two other points were the environmental protection measures and the Amerindian Special project, which were part of the Carajás project and approved by the Bank. Environmental measures consisted of air and water pollution monitoring and control at the mine and port areas, soil erosion control along the Carajás railway, environmental education and ecological research, the establishment of conservation tracts, greenbelts buffer zones, ecological stations and biotic inventories - for the most part inside or on the periphery of CVRD`s mining concession - and an "environmental zoning" exercise for the Carajás region. The CVRD was responsible for implementing these measures, while GEAMAM supervised them (World Bank, 1992; Redwood, 1993). With respect to the Amerindian

Special project, CVRD signed a contract with FUNAI in order to alleviate the expected negative impacts of the Carajás iron-ore operation on the indigenous population. Thus, land demarcation, long-term development, health and educational services were the main aims to be achieved by the Amerindian project, which was under CVRD`s and Bank's supervision.

This process involving evaluation, negotiation and approval phases showed clearly that the World Bank saw the Carajás project as a single sector (mining-cum-infrastructure) linked with sectors, such as indigenous tribes, environment and urban development, which were totally secondary. In fact, the Bank was unable to place the Carajás project in a broader regional policy context and, consequently, verify that the Brazilian government was using Carajás for many reasons, but principally for achieving high rates of economic growth, which meant that the region would be subjected to an accelerated economic development. Thus, the probable social and environmental impacts on rural and urban areas to be generated by this government strategy, together with a considerable number of migrants to be attracted to the Carajás region were ignored by the Bank. The central point is that economic potential of the Carajás project was carefully appraised by the Bank, while the potential social and environmental costs were not.

What makes this lack of attempt to appraise the probable negative impacts of the Carajás project worse is the fact that the World Bank was acutely aware of the Federal government regional development strategy for the Eastern Amazonia represented by the PGC. In this regard, agro-livestock, lumbering, infrastructure and mineral (consisting of pig iron smelters and industrial plants processing iron-ore and manganese) projects, which would be encouraged through a generous fiscal incentives system and set-up in development poles along the Carajás railway were not recognised before or during the Bank's approval, nor were the probable environmental impacts to be generated by theses industrial activities considered.

Indeed, the negligence of the World Bank as well as the CVRD in identifying and mitigating the probable negative impacts of the Carajás project was very limited and the consequences of such narrowness are felt up to the present day. Nevertheless, other

factors are also very important for explaining the whole socio-economic transformation undergone by the Carajás region and particularly by Parauapebas. In this regard, the role played by the Federal government in Eastern Amazonia was considerable. The regional development strategies were centred essentially on development poles. It was hoped that the implementation of the Carajás project, associated with the development of the regional infrastructure, would be the beginning of a development corridor, based on export mineral and agricultural products. Despite its economic success, the Carajás project failed as an instrument to induce the development of the region insofar as socially and environmentally sound regional development was not achieved. In fact, the adverse impacts have their roots in development planning, which was too-technocratic, over-centralised and fundamentally directed towards economic aspects. All these characteristics were visible in the Carajás region and, especially, in Parauapebas, where local governments did not take part in any phase of the planning process. This was typically a "top down" process, in which decisions were made entirely from above.

As seen in chapter six, the Carajás region, despite its tremendous potential, presents weak interindustry linkages and, consequently, low level of employment and income generation. The promotion of sustainable developmen[1]t in the Carajás region and, particularly, in Parauapebas relies upon maximisation of employment and income. Owing to the availability of mineral, transportation and energy sources, the metallurgical sector is very important for regional development and its verticalization associated with diversification of regional economy would benefit the local population. However, planning for this must take into account the demands of local civil society for access to means of production and subsistence as well as participation in the benefits of economic development. These demands can no longer be neglected.

The Federal government, through its planning Secretariat and with financial support from CVRD, had already planned the development for the Carajás region. In fact, the Master Plan for the Carajás Railway Corridor was designed to "promote self-sustaining growth, the improvement of income distribution and environmental preservation" (SEPLAN/PGC,

[1] sustainable development is understood here as the type of development which allows the rational exploitation of natural resources for economic growth and livelihood of a considerable number of people, while ensuring the protection of the environment.

1989, pp.5). In order to achieve this objective, the plan established resource needs for regional development as well as a set of guidelines for the public and private sectors. The Master Plan recognised past mistakes of development strategies based on cattle ranching and at the same time stressed that the industrialisation of mineral production was important for regional development insofar as these industrial activities could generate significant linkage effects and, consequently, an increase in employment and income.

However, the central point is that the Master Plan suggested the adoption of a bottom-up development approach (see Sthör, 1981) precisely in order to avoid the problems discussed so far. By advocating such a development strategy, the plan emphasised participation local population in the decision-making process as a means of meeting the basic needs of the local population with respect to land access, to employment generation and its self-determination. Although decentralisation was implicit in these objectives, the plan also stressed the importance of the role to be played by the Federal government in planning social development. However, the Master Plan was never put into effect and this fact reveals the low priority given by the Federal government to socially more responsible development.

The case of Parauapebas shows clearly that the State is still important for promoting social development. But, the Sisyphean task of installing the infrastructure, maintaining services, planning national development strategies, co-ordinating its actions, and controlling its agencies, Superintendencies and enterprises proved to be too much for the State, which was unable to simultaneously deal with these tasks. Since the return to civilian rule in 1985 and, particularly, after the 1988 Constitution, which approved and stimulated a substantial decentralisation, a considerable redistribution of revenues and an increase in the power of state and municipal governments, the State apparatus began to be shrink and its presence in Eastern Amazonia was significantly reduced.

The reduction in the size of the State is associated with the Brazilian economic crisis and, fundamentally, with structural adjustments advocated by the World Bank and IMF. These structural adjustments aimed to make the allocation of resources more efficient and also to strength the export sector. In this regard, loans were given by multilateral agencies on the

condition that clients liberalise, decentralise, and deregulate their economies and privatise their State-owned enterprises. These market-oriented reforms were intrinsically related to a minimal State (Streeten, 1993; 1995), in which the market was considered capable of designating the best way of attaining economic growth and also of solving its social consequences. Although the limitations of a centralised State are visible, a strong State is vital. However, this strong State is necessarily different from that usually adopted in Brazil (Hall, 1995; Streeten, 1995) and essential for promoting sustainable development.

Midgley (1995) stresses that the concept of sustainable development is still poorly defined and requires more theoretical refinement to be accepted as a unifying development concept. Although vague, this concept is fundamental insofar as environmental issues became an essential part of social development. In fact, integration of development and environmental concerns are key elements in meeting basic needs, to improve living standards of populations, to protect and manage ecosystems. Sustainable development presupposes attitudes of solidarity between different government tiers as well as different countries in the quest for a better distribution of welfare. In order to promote sustainable development, the State must be democratised and the main reason lies in the fact that only a democratic State will be able to stimulate and enable civil society (there is a need for the empowerment of weak and neglected groups within civil society, such as ethnic minorities, the unemployed, etc.) to represent its own interests and participate actively in the design and implementation of public policy.

7.3 - Policy Implications

One of the fundamental elements for the promotion of sustainable development is the Federal government, which, in order to achieve this objective, should involve a broad participation in the decision-making process. This includes the co-operation of different government tiers (state and municipal governments), organisations and all social groups in relation to public policies and probable interventions which potentially affect the local communities in which they are involved with. The Federal government, by involving all sectors of society and acting together with them, should delegate decision-making and financing powers to those authorities, who have local knowledge and, consequently, who

are able to implement appropriate policies (Hall,1995). In addition, the Federal government should intervene in the process of price formation, production and finance in order to reduce the effects generated by market failures and benefit a considerable number of people.

Although general, these actions mentioned above are also valid for Parauapebas. With regard to this municipality, the Federal government, in order to avoid past mistakes, should:

- support the investments made by the municipality of Parauapebas (as well as the state of Pará) in social and economic infrastructure;

- implement policies to influence land tenure and property rights, ensuring the access of rural people, especially landless and small farmers, to land and natural resources;

- finance, through its credit institutions, agricultural and rural development projects with the purpose of assisting small farmers;

- develop and implement, agricultural programmes together with the municipal government, for reducing land degradation;

- protect Indian lands. Despite being demarcated, the Xicrin do Cateté reserve (west of CVRD's area and within the municipalities of Parauapebas and Água Azul) has been invaded by timber extractors (Berno de Almeida, 1994). The protection allied to a more complete assistance (demarcation, regularisation, registration and provision of health care) must be extended to all tribal lands principally because of increasing pressure on their lands; and

- establish environmental protection, management and research for the Carajás region. This includes protection of national and state' parks (and indigenous reserves as well), ecological reserves and natural resources (land, water, air, farm and vegetation

cover). In this regard, the Federal government should strengthen the IBAMA in order to make the Brazilian environmental agency able to manage the whole region. Therefore, IBAMA should work together with state and municipal governments. These measures should be accompanied by ecological research and the aim is to increase knowledge about the region's potential natural resources as well as to create database and information system to facilitate the monitoring of the region. This monitoring system would be important for accompanying productive activities and urban expansion.

Companies play an important role in the social and economic development of a country by paying taxes, by providing trading, employment and livelihood opportunities . They can play a major role in reducing the impacts on human health and the environment by implementing technologies, good engineering and management practices towards sustainable development. In relation to all these aspects, the CVRD is a model company, which is the world largest mining company, employs a large number of people, pay taxes and implemented environmental measures in its concession area successfully. However, problems arose when CVRD had to deal with the adverse regional impacts generated directly or indirectly, by the Carajás project which means by the company itself.

Indeed, CVRD was a State company committed to regional development, but it was still a company committed to earning profits. In addition, its assistance only materialised according to its own interests. This fact is corroborated by the vice-Mayor of Marabá, who said that "the attempts [to discuss the impacts to be generated by the Carajás project on the municipality of Marabá] are always looked in CVRD's proper perspective, according to its objectives mine, railway and port. We are considered an accident in the railway project" (Braglia, 1986/87, pp.53). Another example is the technical assistance given by CVRD to small farmers in the municipality of Parauapebas. This assistance was strongly criticised (Dana, et al., 1993) because CVRD aimed exclusively to make these small farmers able to produce at large scale and, consequently, to increase their incomes , while the planning and organisation of their production and the strengthening their roles as a category were completely ignored by the mining company. In order to help stimulating the development of the municipality of Parauapebas, CVRD should:

- provide technical assistance to small farmers as well as to municipal administration staff. This assistance must be directed towards local interests and not according to the company's interests;

- provide financial support to local projects;

- support the initiatives and the role of small farmers` organisations; and

- stimulate local economy. In this regard, CVRD could invert the logic of food supply in Carajás town. Instead of importing approximately 80% of its food from outside the region, the company town could be supplied by local production. The company itself can help overcoming the problems faced by small producers and the municipality.

Although CVRD have made many mistakes, it is possible to learn from past errors and be more accountable in relation to social and environmental aspects, as the case of ELETROBRÁS (the national power authority). Due to tremendous social and environmental impacts caused by its hydroelectric projects (Sobradinho, Itaparica and Itá are good examples) as well as the wave of criticisms generated by these impacts, ELETROBRÁS has adopted, in its latest Master Plan, social and environmental impact assessment procedures (Serra, 1993; Hall, 1994). In addition, the company has made efforts to work together with other organisations and non-governmental organisations have been consulted more frequently. With respect to CVRD, the mining company could do much more than it did and its privatisation may be a sign of change in its blatant attitudes at Carajás, traditional arrogance and negligence in relation to the negative impacts generated by the Carajás project. As a private company, CVRD is free of its permanent "identity crisis" and this fact may signify a better relationship with municipal authorities and a more awareness of its responsibilities in the region.

The World Bank played a major role in approving the Carajás project and attracting additional resources from foreign lenders. However, its appraisal of the project was very limited and the main reason lies in the fact that the Bank, despite its previous knowledge, did not take into account the Federal government's plans for Eastern Amazonia. As a

result, the Carajás project presented a few measures to deal with its probable social and environmental impacts outside the CVRD's mining concession area. The negligence of the World Bank in identifying and mitigating these adverse impacts shows clearly that its own environmental polices were almost non-existing by the time the Bank loan was approved. Despite the narrowness of its evaluation, the Bank was responsible for some positive results. For instance, the Amerindian project was incorporated into the Carajás project due to Bank's insistence and it is unlikely that CVRD and the Federal government had included tribal protection measures in the Iron Ore project without the Bank's pressure.

In order to avoid or at least alleviate such negative consequences generated by the Carajás project, the World Bank should have:

- identified and evaluated previously the social and environmental impacts (*ex ante* social and environmental impact assessment) of project implementation and correlated investments (for instance, pig-iron industries);

- taken into account the broader regional development policies context; and

- intensified its supervision, clearly insufficient, of the project's environmental protection and urban development components.

These measures show clearly that the Bank should change its very limited approach and incorporate social and environmental dimensions into project design and appraisal procedures. Due to widespread criticisms of the negative impacts caused by Bank-financed projects, such as the POLONOROESTE programme and the Carajás project itself in Brazil, the World Bank began to pay more attention to environmental questions. In fact, during the 1990s the Bank has employed many environmentalists as permanent staff and, consequently, is better able to deal with environmental issues (Hall, 1995). Although changes have taken place, social and environmental problems continued to occur, as in the case of the Sardar Sarovar dam project in India's Narmada Valley, which affected approximately 250,000 people (Cernea, 1993). According to Kolk (1996), the environmental destruction caused by these projects and the insufficiency of environmental

impact assessment are a direct result of environmental departments` lack of power within the Bank. Weakness or not, the point is that multilateral agencies have much to do in order to make their financial assistance more effective. Social variables are still relegated to secondary importance in development planning (Hall, 1988; Cernea, 1991) and the achievement of sustainable development implies that social planning and impact assessment must be broadened.

The local government plays an important part in the development process. As the tier of government closest to the people, municipal governments can develop a strong relationship with civil society, NGOs and the private sector. This relationship can encourage municipal governments to enhance their responsiveness, mobilise resources, improve local services and stimulate the development of the private sector. The accountability of local governments associated with the participation of civil society and NGOs can lead to a promotion of sustainable development. In this regard, the municipality of Parauapebas should:

- invest in economic and social infrastructure. As seen along this dissertation, Parauapebas experienced, as a direct result of the Carajás project, rapid population growth, which was mainly responsible for aggravating the already insufficient urban infrastructure and services. Thus, specific interventions in basic sanitation, housing, health, education, transportation and energy sectors need to be designed and implemented in the region. Indeed, in 1994 the municipal administration signed an agreement with CVRD and the World Bank to implement an urban project which would provide the town of Parauapebas with water, sewage disposal and garbage collection facilities. However, this project does not cover all districts (FASE, 1995) and much has to be done not only in the urban nucleus, but also in the whole municipality;

- forge links with the Federal and state governments, CVRD and foreign agencies in order to obtain funds for its projects;

- formulate and implement agricultural policies in association with farmers and their rural organisations. These policies, with their appropriate instruments, should place a

great emphasis on food security in the region, on increase in small farmers income and on generation of employment. In this regard, the *Frutos do Cerrado* (Fruits from Savannah) project, elaborated by the municipality of Santa Maria do Tocantins (in the state of Tocantins) together with small farmers` organisations of Soninho and São José, is a very good example (MMA/SCA, 1997a). This project is funded by the Pilot Programme for the Conservation of the Brazilian Amazon Forest, which aims to help tackling the needs of Amazonian population, supporting the productive use of the forest and at the same time encouraging the conservation of its natural resources. Although the *Frutos do Cerrado* project has been implemented last year and, consequently, it is too early evaluate its results, it is a promising initiative.

- provide technical assistance to small farmers, encouraging them to adopt sustainable and efficient farming practices;

- support the formation of farmers` organisations;

- strengthen its relationship with the civil society. There are many ways of stimulating the participation of civil society and Porto Alegre is a very good example. Its municipal administration encouraged people to take part in "participatory budgeting" through local associations and popular organisations. In relation to health sector in Porto Alegre, the active participation of social sectors traditionally without voice in Hirschman`s (1970) words, principally shanty town populations, was fundamental for increasing the responsiveness of publicly financed health services to the needs of local population (Cortes, 1995).

- stimulate local development. The generation of employment is fundamental and the municipal government should support the creation of small firms in order to tackle unemployment (Tendler, 1997; Tendler & Amorim, 1996). In this regard, some initiatives have been undertaken in the region and the PRODER programme, which was designed by CVRD, SEBRAE and the municipality of Parauapebas, is a concrete example.

Non-governmental organisations play a vital role in the shaping and implementation of participatory development. Their credibility lie in the responsible and constructive role they play in society. In fact, NGOs have developed a closer relationship with grassroots organisations and have become important channels for the expression and defence of people's interests. In Brazil, NGOs have evolved from a welfare role in the 1960s and 1970s towards a more advocacy and lobbying role in the 1980s and 1990s (Hall, 1993). Significant examples are: the opposition organised by the Kayapó and other indigenous tribes against the construction of a series of dams along the Xingu river valley in Amazonia. There was a strong pressure from local groups and NGOs on the Brazilian government and the World Bank, which suspended the proposed US$ 500 million Second Power Sector Loan for Brazil (Goodman and Hall, 1990); the campaign promoted by NGO (formed by 13 rural trade unions, known as the POLOSINDICAL) in favour of approximately 40,000 people, who would be displaced by the Itaparica hydropower scheme in the São Francisco Valley of Brazil's north-east region (Hall, 1992). The pressure from the POLOSINDICAL resulted in a comprehensive resettlement of this considerable population.

In relation to the municipality of Parauapebas, there are many active non-governmental and grassroots organisations acting in the region and EEPP is very illustrative in this respect. In fact, this NGO has worked together with small farmers and their organisations with the clear purpose of strengthening their roles as category (EEPP, 1993; Dana et al., 1993). The municipal administration should pay greater attention to the role played by such organisations and should also endeavour to develop closer working contact with them in order to stimulate the local development.

As seen along this dissertation, Amazonian regional development was heavily influenced by Perroux`s theory, which advocated that the concentration of investments into selected development poles, as in the case of POLAMAZÔNIA programme, would generate beneficial spread effects on income and employment in the region. However, the positive effects were limited and the social and environmental impacts of such strategies were considerable. Under the Cardoso administration, the conception of development has shifted from the notion of development poles to that of development axes (*eixos de*

desenvolvimento). According to the document *Brasil em Ação*[2] (Brasil, 1996), these development axes, unlike their predecessors development poles, tend to spread positive effects to a wider area.

These development axes are also known as integration corridors (*corredores de integração*) and the main objective is to integrate the Brazilian Amazonia with the Continent and, consequently, provide its access to the world market (MMA/SCA, 1995). In this regard, these axes are: 1) the paving of the BR-174 highway, which links Brazil with Venezuela providing Amazonia with access to the Caribbean; 2) the extension of the BR-364 highway, which connects the state of Acre with Peru, opening for Amazonia access to the Pacific; 3) the paving of the Santarém-Cuiabá highway; 4) the Araguaia-Tocantins riverway, which will be connected with the Carajás and North-South railways; and 5) the completion and paving of the Macapá-Cayenne road, extending the Belém-Brasília highway (Brasil, 1996, Hall, 1997).

The Federal government, in its document Política Nacional Integrada para a Amazônia Legal (MMA/SCA, 1995), recognises that past development strategies in Amazonia had reduced positive effects and that the exploitation of the natural resources of the region occurred in a predatory way. The government also recognises the importance of the metallurgical sector (and support its verticalisation) for Amazonia, but at the same time it stresses that old projects and future undertakings in the region must be compatible with the environment. In fact, there are several projects, supported by the Brazilian government, undertaken in Amazonia with the clear purpose of conciliating productive use and conservation of the forest and a good example is the Pilot Programme for the Conservation of the Brazilian Amazon Forest (PPG-7), which is funded by the World Bank. However, this new development strategy designed by the government may be incompatible with the efforts in protecting the environment.

This dissertation analysed the assumptions behind the Perroux`s development pole theory about the trickle-down effects of such strategies in Amazonia, as illustrated by Parauapebas. At the same time, the case-study provided a better understanding of the link

[2] Officially translated as "Brazil on the Move".

between development projects and the negative consequences in the Amazon region. The Cardoso administration designed a new development strategy, based on the notion of development axes or integration corridors, which aims to stimulate Amazonian economic development and integrate this region with the Continent. In this regard, these development axes need to be carefully studied in order to avoid limited positive effects and serious negative social and environmental impacts occurred in the recent past. However, this is a task for future researches.

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Appendix I

The List of Interviewees

Rio de Janeiro:
Gemal, José A., director of NATRON firm.
Toledo, Luiz C., director of Mayerhofer & Toledo firm.
Cordeiro, Berenice de S., Sanitarian Engineer of IBAM.
Piquet, Rosélia, Senior Lecturer of IPUR-UFRJ.
Medeiros, Luciano P., Superintendency of Development of Infrastructure Projects of CVRD.
Pereira Neto, Vânia V., Environmental Adviser of CVRD.
Pacheco, Maria E., the national director of FASE.

Belém:
Hoyos, Juan B., Co-ordinator of NUMA-UFPa.
Andrade, Frederico de, Superintendent of SUDAM.
Cesar, Evaldo G. M., Director of the Division of Basic Studies and Researches of SUDAM.
Benatti, José H., Director of SDDH.

Marabá:
Pies, Luiz C., Technician of FASE.
Corrêa, João, Technician of FASE.
Hébette, Jean, Director of CAT and Researcher of NAEA-UFPa.
Costa, Roberto L. da, Director of FUNAI.
Karangré and Katendjo, both tribal leaders of the Indian reserve Xicrin do Cateté.

Carajás town:
Teixeira, Hernani G., Superintendent's adviser of CVRD.
Machado, José R. S., director of METABASE.
Ribeiro, José S., director of METABASE.

Paraupebas:
Romão, Fernando J. G., Planning secretary
Chain Filho, José J., Mayor's Special Adviser.
Borges, Rinaldo Q., Agriculture Secretary.
Rezende, Osmar, Secretary of Education.
Anjos, Vilma dos, Health Secretary.
Paula, Euclides F. de, Director of STR.
Souza, José M. O., Director of SIMETAL.
Luiz, Director of SINTEPE.
Neri, J., Director of MST.
Lermen, Darci; Schneider, Milton Z.; Bezerra, Antônio C., members of EEPP.
Soares, Geraldo M., President of CONDEPE.

Brasília:
Cagnin, João U., ex-PGC co-ordinator of urban and regional development. Nowadays, he works at the Secretary of Regional Development in the Ministry of Regional Integration.
Sawyer, Donald, President of ISPN.

Appendix II

Sample of Interviews

The interviews undertaken in this dissertation, as seen in the first chapter, were unstructured, which means that they were conducted informally, without close-ended questions or a formal method. The aim here is to provide an idea of information, evidence, etc. obtained from the interviews.

Interviewee: Fernando Romão - Planning secretary of Parauapebas (May, 1995).

> A adutora antiga é completamente insuficiente para resolver os problemas de contaminação do rio Parauapebas.
>
> A firma EPC Engenharia não participou da licitação da obra para a futura rede de abastecimento de água do município de Parauapebas e surpreendentemente ganhou a "concorrência" e sendo convidada para o empreendimento. Importante ressaltar que o dono desta firma é da família do superintendente da própria Companhia Vale do Rio Doce (CVRD).
>
> Em relação a obra a ser realizada em Parauapebas, a CVRD tomou a decisão no tocante a todos os aspectos (técnicos e financeiros) ignorando os técnicos da própria prefeitura municipal, que arcará com os custos deste empreendimento.
>
> A prefeitura não está acompanhando a obra e tudo é deixado nas mãos da CVRD, que tem total controle das operações e exerce esse domínio de forma incontestável. A CVRD não esteve e não está interessada na melhoria da qualidade de vida de Parauapebas.

O Prefeito "Chico das Cortinas" é muito limitado. É uma pessoa de origem humilde, cujo ofício era confeccionar cortinas e sua principal clientela era formada pelos empregados da CVRD. A maioria dos secretários municipais também são extremamente limitados e poucos são os que demonstram alguma capacidade para o cargo que ocupam.

O projeto Salobo triplicará o ônus social do município de Parauapebas, uma vez que este é passagem obrigatória para se atingir a localidade onde o projeto está inserido.

A secretaria de planejamento estava uma verdadeira bagunça antes da minha posse. Era uma secretaria de planejamento só no nome, porque de planejamento não tinha nada. Agora eu comecei a botar "a casa em ordem". Comecei a organizar a secretaria de forma a catalogar as informações disponíveis. Por exemplo, neste momento nós dispomos dos mapas da cidade e do próprio município, algo que não era sequer sonhado nesta secretaria. Entretanto, ainda falta muita coisa. Não temos informações precisas acerca da nossa região e precisamos urgentemente fazer um mapeamento do município para podermos ter a noção exata dos problemas a serem atacados e saber quais são os mais urgentes. Sem isto, não podemos fazer muita coisa. Eu propus ao prefeito contratar uma firma para fazer um levantamento da região com o propósito de sabermos qual é a nossa exata situação, sabermos o que se passa em cada esquina, mas o prefeito alegou que a prefeitura não tem dinheiro para contratar uma firma para fazer este tipo de trabalho. Este é um claro exemplo da limitação do nosso prefeito. Quer dizer, sem informações precisas nós não temos condições para atacar os verdadeiros problemas e todas as ações do governo local são empreendidas de forma desorganizada e por isso mesmo se mostram ineficientes como um todo.